

VOLUME 29 SUPPLEMENT 1 APRIL 2018

OSTEOPOROSIS INTERNATIONAL

with other metabolic bone diseases

EDITORS-IN-CHIEF JOHN A. KANIS AND FELICIA COSMAN

WCO-IOF-ESCEO

**World Congress on Osteoporosis, Osteoarthritis
and Musculoskeletal Diseases**

19–22 April, 2018

Krakow, Poland





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WORLD'S LEADING
CLINICAL CONFERENCE
ON BONE, JOINT AND
MUSCLE HEALTH

WORLD CONGRESS ON OSTEOPOROSIS,
OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES



2018 KRAKÓW



April 19-22

ICE KRAKÓW CONGRESS CENTRE

2018 | POLAND



www.wco-iof-esceo.org | #OsteoCongress

Congress Organizer: Sinklar Congress Management B.V. | Congress Secretariat: www.humacom.com

BECAUSE WE ALL WORK WITH AND FOR PATIENTS



Global Patient Charter

BE PART OF THE MOVEMENT

SIGN UP



www.iofglobalpatientcharter.org

Patients & families have the right to:



DIAGNOSIS



PATIENT CARE



PATIENT VOICE



SUPPORT

www.iofbonehealth.org

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straight to your desktop



DOWNLOAD SLIDE SETS



Get exclusive access to hot new research findings from the World Congress on Osteoporosis, Osteoarthritis & Musculoskeletal Diseases (WCO-IOF-ESCEO), April 2018:

- Original scientific abstracts selected by leading international opinion leaders summarized in easy-to-read slides.
- Covering two key symposia: ASBMR-IOF-ESCEO Symposium - Closing the treatment gap and Clinical application of bone markers.
- Watch video commentaries from selected expert reviewers.
- Key themes include: treatment of osteoporosis, screening, fracture risk and prevention, diet, among others.

FREE DOWNLOAD ON THE IOF WEBSITE

www.iofbonehealth.org/congress-highlights

Slides available end of May 2018

ABOUT ESCEO

The European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) is a not-for-profit organization, dedicated to a close interaction between clinical scientists dealing with bone, joint and muscle disorder, pharmaceutical industry developing new compounds in this field, regulators responsible for the registration of such drugs and health policy makers, to integrate the management of Osteoporosis and Osteoarthritis within the comprehensive perspective of health resources utilization.

The objective of ESCEO is to provide practitioners with the latest clinical and economic information, allowing them to organize their daily practice, in an evidence-based medicine perspective, with a cost-conscious perception. – www.esceo.org



ABOUT IOF

The International Osteoporosis Foundation (IOF) is a non-profit, non-governmental organization dedicated to the worldwide fight against osteoporosis, the disease known as “the silent epidemic”. IOF’s members – committees of scientific researchers, patient, medical and research societies and industry representatives from around the world – share a common vision of a world without osteoporotic fractures. IOF now represents 240 societies in 99 locations around the world. – www.iofbonehealth.org

Mission

- | Increase awareness and understanding of osteoporosis.
- | Motivate people to take action to prevent, diagnose and treat osteoporosis.
- | Support national osteoporosis societies in order to maximize their effectiveness





NOVEMBER 30 - DECEMBER 1, 2018

IOF REGIONAL SYDNEY'18

7TH ASIA-PACIFIC OSTEOPOROSIS CONFERENCE

www.iof-regional.org

Organizer
International Osteoporosis Foundation

Secretariat
www.humacom.com

KEY DATE
Abstract submission opens
on April 27, 2018

PRE-CONFERENCE COURSES

Nov 28 – 29, 2018

- \\ Young Investigators Course
- \\ Osteoporosis: Essentials of Densitometry, Diagnosis and Management Course



 www.iofbonehealth.org

KEY TOPICS

- \\ Improving the identification of high risk patients
- \\ Similarities and differences in fracture risk and treatment response: Asia vs West
- \\ Quality of life in musculoskeletal diseases
- \\ Mapping calcium intake
- \\ Assessment and management of bone fragility beyond idiopathic osteoporosis
- \\ New insights in the management of knee osteoarthritis
- \\ Update on osteoporosis treatment

DEAR COLLEAGUES,

It is with great pleasure that we welcome you to Krakow and the 2018 IOF-ESCEO World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases.

The Congress' scientific programme has been developed by a team comprising members of the Committee of Scientific Advisors of the International Osteoporosis Foundation (IOF) and the Scientific Advisory Board of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO). We would like to thank the Scientific Chairs, Professors Cyrus Cooper and René Rizzoli, for taking the lead in setting up an exciting and comprehensive programme that brings together the world's best in the field of musculoskeletal health and disease, and takes advantage of the synergies and combined expertise of our two organisations.

We are all meeting in Krakow with a common aim - to gather new knowledge, skills and tools in the prevention and treatment of osteoporosis and osteoarthritis, the two most disabling conditions in elderly people. An important addition is a focus on sarcopenia because of its intimate relation to bone and joint disease. It is our hope that this Congress will move the field one step forward on all fronts; from new understanding of bone metabolism and pathology, to new strategies and options in prevention, diagnosis and treatment.

The core scientific programme consists of **10** plenary lectures by renowned speakers and **39** oral communications selected from the very best of hundreds of submitted abstracts, and **21** oral presentations of selected posters. In addition, participants can choose among **13** different Meet-The-Expert sessions and **8** special sessions and symposia on issues of clinical importance.

We also encourage you to attend many of the scheduled poster sessions. **7** industry sponsored satellite symposia and to visit the large commercial exhibition presented by the leading companies in the bone field.

The city of Krakow offers a modern and most convenient and pleasant setting for international congresses. We hope that you will also take the opportunity to explore its many attractions, or simply savour 'dobre życie' in this truly wonderful city!

Thank you for your participation. We will do our best to ensure that this meeting is a memorable, enriching experience for all.



Jean-Yves Reginster

John A. Kanis

EVENT**WCO-IOF-ESCEO****April 19-22, 2018**

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

CONGRESS CHAIRMEN**Jean-Yves REGINSTER**

ESCEO President

John A. KANIS

IOF Honorary President

PROGRAMME COMMITTEE**Cyrus COOPER**

IOF President

René RIZZOLIChair, ESCEO Scientific Advisory Board
(SAB)**John A. KANIS**

IOF Honorary President

Jean-Yves REGINSTER

ESCEO President

HONORARY LOCAL**ORGANIZING COMMITTEE**

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B. VELLAS

CONGRESS ORGANIZER**Sinklar Conference Management B.V.**

Hogehilweg, 7K
1101CA Amsterdam Zuidoost, Netherlands
secretariat@sinklarcn.org

CONGRESS SECRETARIAT**Humacom**

Rue Renier, 9
4800 Verviers, Belgium
Tel: +32 87 852 652
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info@humacom.com
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REGISTRATION**Pacific World**

World Trade Center, North Building, 8th Floor
Moll de Barcelona s/n
08039 Barcelona, Spain
Tel: +34 96 352 81 61
registration-wco-iof-esceo@pacificworld.com

HOTEL BOOKING**JORDAN Congress Bureau**

Sobieskiego 22/2
31-136 Krakow, Poland
Tel: +48 12 341 46 40
+48 12 341 61 62
Fax: +48 12 341 61 63
hotel-wco-iof-esceo@jordan.pl

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A special thanks goes to the Mayor of Krakow, Professor Jacek Majchrowski, and the city of Krakow for their active collaboration in the preparation of the WCO Congress.

OPENING CEREMONY VENUE (APRIL 19)

Slowacki Theatre
plac Świętego Ducha, 1
Kraków 31-023

CONGRESS VENUE (APRIL 20-22)

ICE Kraków Congress Centre
Marii Konopnickiej 17,
Kraków 30-302
Tel: +48 12 354 23 00
www.icekrakow.com

OPERATING DATES AND HOURS**Congress Opening Hours**

Thursday April 19, 2018	17.30-20.25
Friday April 20, 2018	07.30-18.30
Saturday April 21, 2018	07.30-19.30
Sunday April 22, 2018	07.30-12.30

Registration Desks Opening Hours

ICE Kraków Congress Centre	
Friday April 20, 2018	07.30-19.00
Saturday April 21, 2018	07.30-19.00
Sunday April 22, 2018	07.30-12.30

Congress Exhibition Hours

ICE Kraków Congress Centre	
Friday April 20, 2018	07.30-18.30
Saturday April 21, 2018	07.30-19.30
Sunday April 22, 2018	07.30-13.00

POSTER VIEWING**Poster Viewing Session I (P101-P500)**

Friday April 20, 2018	14.00-15.00
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Poster Viewing Session II (P501-P900)

Saturday April 21, 2018	14.00-15.00
-------------------------	-------------

Poster Viewing Session III (P901 and above)

Sunday April 22, 2018	09.00-10.00
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Oral Presentation of Selected Posters

Friday April 20, 2018	14.00-15.17
Saturday April 21, 2018	14.00-15.10

ACCREDITATIONS**European**

The WCO-IOF-ESCEO 2018 Krakow Congress has been granted 16 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME).

American

EACCME credits can be converted to AMA credits for American delegates.

Belgian

The WCO-IOF-ESCEO Krakow 2018 Congress was granted:

2 Belgian CME credits (INAMI/RIZIV) under the numbers 17025723 (CP 1), 17025726 (CP 1), in category 6 "Ethics & Economy" and 12 Belgian CME credits under the number 18001161 in category 4 "International meeting".

BADGES

For registered participants, personalized badges will be requested for entry to all scientific programmes and to access the exhibition and posters areas. Blank badges are prohibited.

Lost badges: 65 euros fee/badge

CERTIFICATE OF ATTENDANCE

A certificate of attendance may be printed at the self-printing stations available in the Registration Area on Saturday April 21, 2018 (afternoon). This system will issue your certificate with date from the barcode printed on your badge.

Please ensure that you have your badge with you.

CLOAKROOM

A cloakroom service for clothing and reasonably sized items is available during the opening hours of the Congress. It is located next to the registration desk. Items of value should not be left in the cloakroom. Please make sure to collect all belongings at the end of each day.

HOTEL INFORMATION DESK

The Hotel Desk is located in the Registration Area during Registration opening hours.

INTERNET ACCESS**Courtesy of ESCEO**

A free Wireless internet connexion is available in the Congress Center. A Multimedia Center with computers will be also available to all delegates in the exhibition area during the Congress Exhibition Hours.

LUNCHES, COFFEE AND REFRESHMENTS

In order to comply with international compliance rules, no official lunches or coffee breaks will be provided. Coffee, beverages and snacks can be purchased from the cafeteria located in the exhibition area and opened during Congress hours.

MEDIA

The WCO-IOF-ESCEO 2018 Congress will not provide any Media Center, however Media representatives are free to use the Multimedia Center available during Congress hours.

CITY MAPS

Courtesy of the City of Krakow

NOTE PADS AND PENS

Courtesy of Medimaps

TOURIST INFORMATION

www.krakow.pl

GENERAL EMERGENCY NUMBER

European Telephone Number: 112

WELCOME COCKTAIL**Courtesy the City of Krakow and Mylan**

All WCO-IOF-ESCEO 2018 participants are invited to the Welcome Cocktail on Thursday April 19, 2018

Venue

Slowacki Theatre
plac Świętego Ducha 1
31-023 Kraków

FUTURE MEETINGS

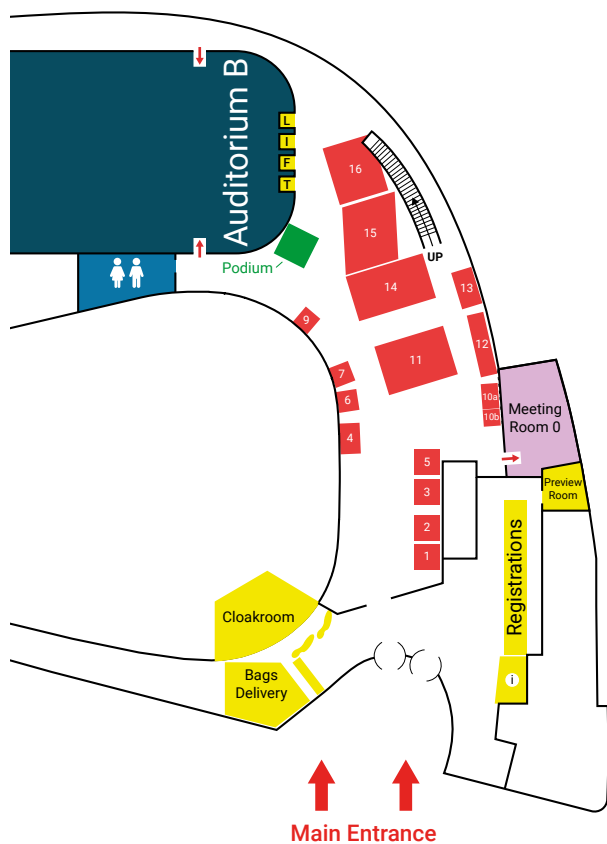
2019 – WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

WCO-IOF-ESCEO 2019

Paris – France
April 4 - 7, 2019

LANGUAGE

English will be the official language of the Congress. No translation is provided.



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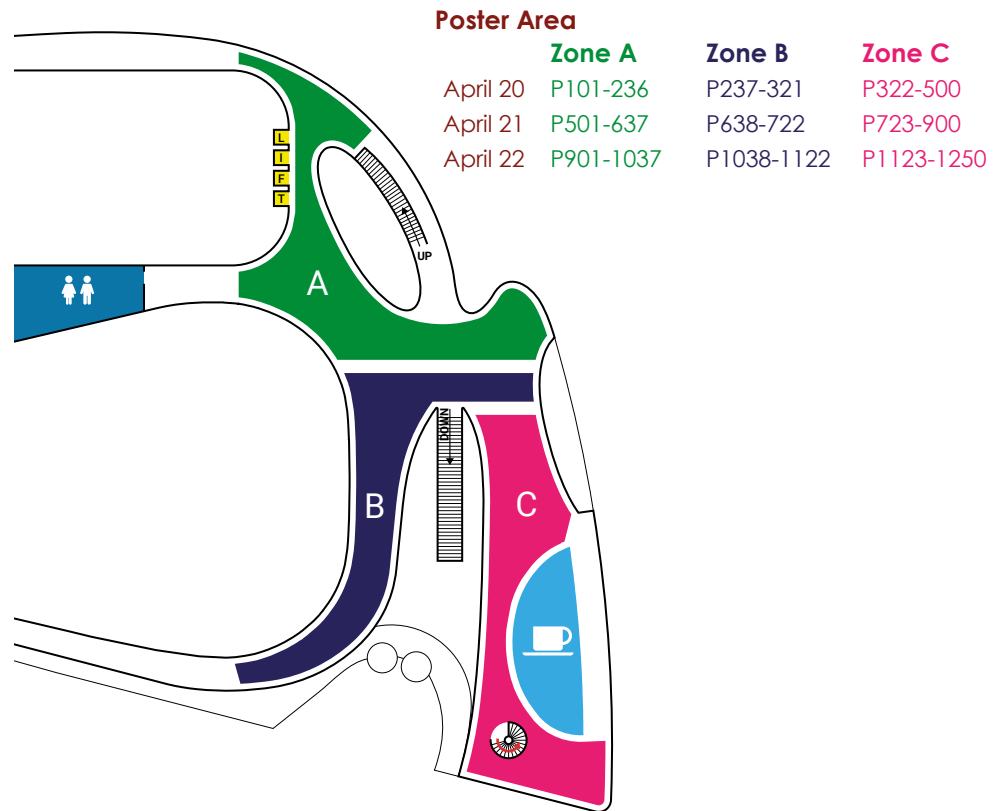
1. ESCEO
2. WCO
3. SARQOL
4. EUGMS
5. BIOMEDICA
6. ICFSR
7. ACTIVE LIFE SCIENTIFIC
9. ICCBH
- 10a. BINDEX
- 10b. SEQUOIA
11. ELI LILLY
12. HOLOGIC
13. THERAMEX
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15. AMGEN
16. AGNOVOS

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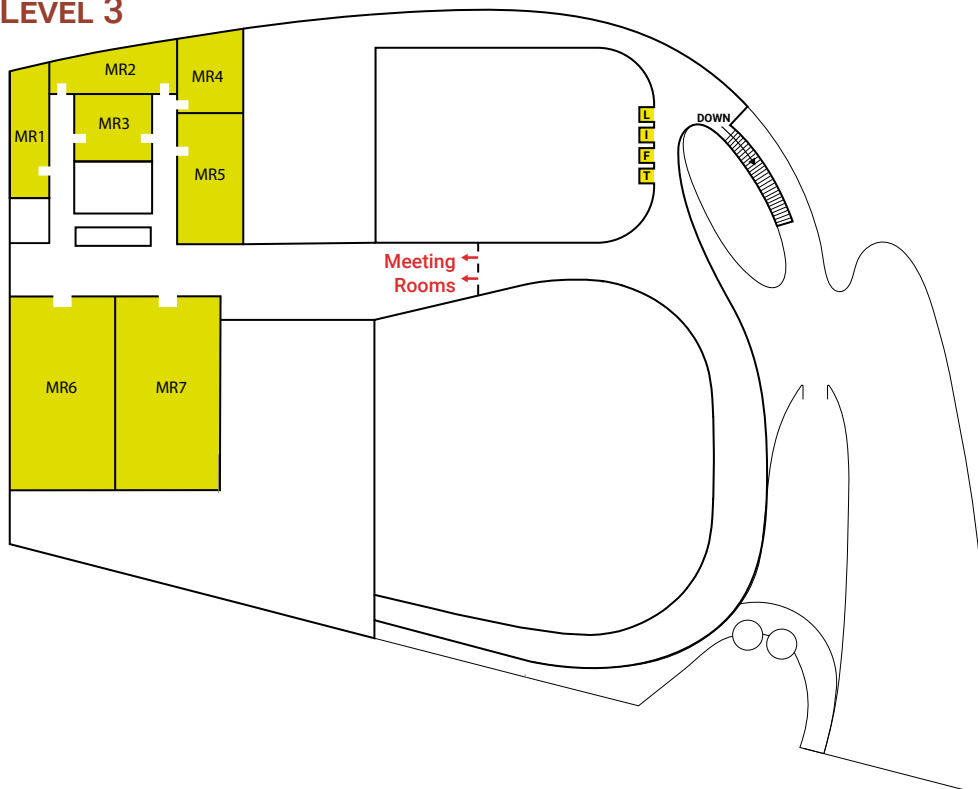
17. KYOWA KIRIN
18. KYOWA KIRIN
19. WISEPRESS
20. GE HEALTHCARE
21. ABIOTEN - EFFRX
22. OSTEOSYS
23. MEDIMAPS
24. PIERRE FABRE
25. MEDI
26. MYLAN
27. IOF
29. ROCHE
30. BIOVENTUS
31. GALGO MEDICAL
32. FIDIA
33. ALEXION
34. ECHOLIGHT



LEVEL 2



LEVEL 3



WORLD CONGRESS ON OSTEOPOROSIS,
OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

WCO
IOF-ESCEO

2019 PARIS

April 4-7, 2019
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WORLD'S LEADING CLINICAL CONFERENCE ON BONE, JOINT AND MUSCLE HEALTH

17.30 - 19.25

WCO-IOF-ESCEO - OPENING CEREMONY

Chairpersons: Jean-Yves Reginster, John A. Kanis

17.30

Best clinical papers published in 2017

René Rizzoli

18.30

Opening of the meeting

- *Welcome* Cyrus Cooper (IOF President, ESCEO Vice-President)
 - *Invitation to the stage of Professor Edward Czerwinski, Professor Jacek Majchrowski (Mayor of the City of Krakow) and Professor Tomasz Grodzicki (Rector of the Jagiellonian University Medical College)*
- Cyrus Cooper (IOF President, ESCEO Vice-President)

18.45

WHO Clinical Consortium on Healthy Aging : Objectives and achievements

Islene Araujo de Carvalho (World Health Organization – Geneva)

18.55

Regional discrepancies in calcium intake: the IOF global calcium map

Bess Dawson-Hughes

19.05

Presentation of the 2018 ESCEO Medal of Excellence

John A. Kanis

19.10

Presentation of the ESCEO-IOF Herbert Fleisch Medal

John A. Kanis

19.15

Presentation of the IOF Medal of Achievement

Cyrus Cooper

19.20

Presentation of the IOF Olof Johnell Science Award

Serge Ferrari

19.25 - 20.25

INDUSTRY-SPONSORED WELCOME COCKTAIL

See detailed programme on [page 34](#)

08.00

Opening of the commercial exhibition

08.00 - 09.00

NON-SPONSORED SYMPOSIA

Meeting Room 1

Breast Cancer and Bone Health– Joint session of the Cancer And Bone Society (CABS) and the IOF

Chairpersons: Jean-Jacques Body, Peyman Hadji

- *Adjuvant antiresorptive treatment in women with breast cancer - Cancer Treatment Induced Bone Loss (CTIBL) and much more* Peyman Hadji
- *Treatment of metastatic bone disease in women with breast cancer - New insights of an old story* Jean-Jacques Body

Meeting Room 2

Sarcopenia: Problem-solving a new lifestyle disease

Chairperson: Kerrie Sanders

- *Reducing the burden of sarcopenia: A healthy lifestyle throughout the lifetime* David Scott
- *Is the risk of sarcopenia socially patterned?* Sharon Brennan-Olsen
- *Sarcopenia: is the right food the key to prevention?* Sandra Iuliano-Burns
- *International dialogue and problem-solving*

Meeting Room 3

Bone fragility in diabetes

Chairperson: Serge Ferrari

- *Pathophysiology of bone fragility in diabetes* Serge Ferrari
- *Fracture risk assessment in diabetes* Emmanuel Biver
- *Osteoporosis drug effects in diabetics* Nicola Napoli

Meeting Room 4

Treating Osteosarcopenia by Targeting Muscle and Bone: Actuality and Perspectives

Chairperson: Gustavo Duque

- *Combined effects of vitamin D on muscle and bone: a review of evidence among senior adults age 65+* Heike A. Bischoff-Ferrari
- *Novel Exercise and Nutritional Approaches to Optimize Bone, Muscle and Mobility into Old Age* Robin Daly
- *Pharmacological Treatment of Osteosarcopenia: How to target bone and muscle at the same time?* Gustavo Duque

Meeting Room 5

Global Map of Dietary Calcium Intake reveals large geographic regions of low intake – a call to action

Chairperson: Bess Dawson-Hughes

- *Introduction* Bess Dawson-Hughes
- *Calcium intake and its implications in India* Ambrish Mithal
- *Calcium intake and its implications in China and the Pacific Rim* Wei-bo Xia
- *Discussion*

08.00 - 09.00

ESCEO-WHO SYMPOSIA

Meeting Room 6

Principles for the engagement of patients in the preparation of clinical and regulatory guidelines : outcomes of an experts consensus meeting organized by the World Health Organization and the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases.

Chairpersons: Famida Jiwa, Peter Tugwell

- 08.00 ► *Welcome and scope of the problem* Peter Tugwell
 - 08.05 ► *A journey in patient partnership* John Kirwan
 - 08.15 ► *Principles for patients engagement in the preparation of clinical guidelines* Maarten de Wit
 - 08.30 ► *Principles for patients engagement in the preparation of regulatory guideline* Nathalie Bere
 - 08.45 ► *Discussion - Leaders* Philip Conaghan, Daniel Pinto
 - 09.00 ► *Conclusion* Famida Jiwa
- Panel: Isabelle Aujoulat, Nathalie Bere, Maria Luisa Brandi, Olivier Bruyère, Philip Conaghan, Cyrus Cooper, Maarten de Wit, Philippe Halbout, Mickaël Hilgsmann, Famida Jiwa, John A. Kanis, John Kirwan, Andrea Laslop, Daniel Pinto, Jean-Yves Reginster, René Rizzoli, Marieke Scholte, Peter Tugwell, Lia Van der Ham, Mila Vlaskovska

08.00 - 09.00

Meeting Room 7

Assessment of Physical Performance in daily clinical practice: Outcomes of an Experts' consensus meeting organized by the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) under the auspices of the World Health Organization

Chairpersons: Islene Araujo de Carvalho, Roger Fielding

- 08.00 ► *Welcome* Cyrus Cooper
- 08.05 ► *Scope of the problem* René Rizzoli
- 08.10 ► *Principles for the standardization of the assessment of physical performance*
Alfonso Cruz Jentoft
- 08.25 ► *Principles for the standardization of the assessment of muscle strength and power*
Laura Schaap
- 08.40 ► *Discussion - Leader:* Ivan Bautmans
- 08.55 ► *Conclusion* Stefania Maggi
Panel: Islene Araujo de Carvalho, Jurgen Bauer, Ivan Bautmans, Roberto Bernabei, Olivier Bruyère, Cyrus Cooper, Alfonso Cruz Jentoft, Bess Dawson-Hughes, Roger Fielding, Jean-Marc Kaufman, Stefania Maggi, Jean Petermans, Jean-Yves Reginster, René Rizzoli, Yves Rolland, Laura Schaap, Daniel Uebelhart

09.00 - 12.10

Auditorium A

SCIENTIFIC SESSION I

Chairpersons: John A. Kanis, Jean-Yves Reginster

09.00

Auditorium A

Plenary Lecture 1

- *Frax : 10 years later* Cyrus Cooper

09.30

Auditorium A

Oral communications selected from abstracts

09.30

Auditorium A

OC1

ABALOPARATIDE FOR RISK REDUCTION OF NONVERTEBRAL AND VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: AN UPDATED NETWORK META-ANALYSIS

Presenting author: J.-Y. Reginster

Authors: F. Bianic, R. Campbell, M. Martin, S. A. Williams, L. A. Fitzpatrick

09.40

Auditorium A

OC2

PERSISTENT FRACTURE RISK REDUCTION WITH ABALOPARATIDE-SC FOLLOWED BY 24 MONTHS OF ALENDRONATE

Presenting author: S. Papapoulos

Authors: H. G. Bone, L. A. Fitzpatrick, B. Mitlak, M.-Y. Hu, G. Hattersley, K. G. Saag, R. Rizzoli

09.50

Auditorium A

OC3

COST-EFFECTIVENESS OF ABALOPARATIDE FOR THE TREATMENT OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

Presenting author: M. Hilgsmann

Authors: S. A. Williams, L. A. Fitzpatrick, J.-Y. Reginster

10.00

Auditorium A

OC4

RESULTS FROM A 52-WEEK, PHASE 2A STUDY OF AN INTRA-ARTICULAR, WNT PATHWAY INHIBITOR, SM04690, FOR KNEE OSTEOARTHRITIS

Presenting author: J. Tambiah

Authors: N. Lane, Y. Yazici, T. McAlindon, A. Gibofsky, D. Clauw, C. Swearingen, A. DiFrancesco, M. Hochberg

10.10

Auditorium A

OC5

JOINT SPACE WIDTH CRITERIA CAN REDUCE KNEE OA TRIAL HETEROGENEITY: PHASE 2 POST-HOC DATA FROM WNT PATHWAY INHIBITOR, SM04690

Presenting author: P. Conaghan

Authors: J. Tambiah, C. Swearingen, S. Kennedy, M. Bowes, A. Brett, C. Litterman

10.20

Auditorium A

Presentation of the ESCEO-AgNovos Healthcare Young Investigator Awards

Jean-Yves Reginster

10.30

Auditorium A

Plenary Lecture 2

- *Bone microstructure and fracture risk: implications for the clinician?* Serge Ferrari

11.00

Auditorium A

Oral Communications selected from abstracts

11.00

Auditorium A

OC6

SYSTEMATIC SCREENING USING FRAX LEADS TO INCREASED USE OF, AND ADHERENCE TO, ANTI-OSTEOPOROSIS MEDICATIONS: THE UK SCOOP TRIAL

Presenting author: C. Parsons

Authors: N. C. Harvey, L. Shepstone, J. A. Kanis, E. Lenaghan, S. Clarke, R. Fordham, N. Gittoes, I. Harvey, R. Holland, A. Heawood, N. Redmond, A. Howe, T. Marshall, T. J. Peters, D. Torgerson, T. W. O'Neill, E. V. McCloskey, C. Cooper

11.10

Auditorium A

OC7

LOCAL OSTEO-ENHANCEMENT PROCEDURE UTILIZING A NOVEL TRIPHASIC CALCIUM BASED IMPLANT INCREASES LONG TERM FEA-ESTIMATED PROXIMAL FEMUR STRENGTH IN OSTEOPOROTIC WOMEN

Presenting author: M. Bouxsein

Authors: T. Keaveny, D. Lee, J. Stronck, R. Hill, J. Howe, B. Huber

11.20

Auditorium A

OC8

A META-ANALYSIS OF 4 CLINICAL TRIALS OF DENOSUMAB (DMAB) COMPARED WITH BISPHOSPHONATES (BPS) IN POSTMENOPAUSAL WOMEN PREVIOUSLY TREATED WITH ORAL BISPHOSPHONATES (OBPS)

Presenting author: J. Malouf

Authors: P. D. Miller, N. Pannaciuoli, A. Singer, E. Czerwinski, H. G. Bone, C. Wang, R. B. Wagman, J. P. Brown

11.30

Auditorium A

OC9

TEN-YEAR CONTINUED NONVERTEBRAL FRACTURE (NVFX) REDUCTION IN POSTMENOPAUSAL OSTEOPOROSIS WITH DENOSUMAB (DMAB) TREATMENT

Presenting author: S. Ferrari

Authors: P. W. Butler, D. L. Kendler, P. D. Miller, C. Roux, A. T. Wang, R. B. Wagman, E. M. Lewiecki

11.40

Auditorium A

OC10

DENOSUMAB IMPROVES GLYCEMIC CONTROL OF TYPE 2 DIABETIC PATIENTS WITH OSTEOPOROSIS

Presenting author: C.K. Chew

Authors: S. Khosla, R. Rizza, J. Geske, B. Clarke

11.50

Auditorium A

OC11

EVALUATION OF INVASIVE ORAL PROCEDURES AND EVENTS (OPES) IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS (PMO) TREATED FOR UP TO 10 YEARS WITH DENOSUMAB (DMAB): RESULTS FROM THE PHASE 3 FREEDOM OPEN-LABEL EXTENSION (EXT)

Presenting author: P.W. Butler

Authors: N. B. Watts, J.T. Grbic, N. Binkley, X. Yin, A. Tierney, R. B. Wagman, M. R. McClung

12.00

Auditorium A

OC12

EFFECTS OF ROMOSUZUMAB IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AFTER 2 AND 12 MONTHS ASSESSED BY MICRO COMPUTED TOMOGRAPHY AND HISTOMORPHOMETRY ON ILIAC CREST BONE BIOPSIES

Presenting author: P. Chavassieux

Authors: R. D. Chapurlat, J.-P. Roux, N. Portero-Muzy, P. Garcia, J. P. Brown, S. Horlait, C. Libanati, R. Boyce, A. Wang, A. Grauer

12.15 - 13.45

Auditorium A

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 34](#)

12.15 - 13.45

Auditorium B

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 34](#)

14.00 - 15.00

MEET-THE-EXPERT SESSIONS

Meeting Room 1

► *Bone fragility in young people: when and how to investigate ?*

Serge Ferrari

Meeting Room 2

► *Hypophosphatasia, diagnosis and management*

Maria Luisa Brandi

Meeting Room 4

► *Local bone treatment in osteoporosis*

Andreas Kurth

Meeting Room 3

► *Muscle function assessment in daily practice*

Olivier Bruyère, Charlotte Beaudart

14.00 - 15.00

Poster Area

Poster Viewing Session I

14.00 - 15.17

Podium

Oral presentation of selected posters

Chairperson: Fanny Buckinx

14.00

Podium

P656

SERUM CTX PREDICTS HIP FRACTURE RISK INDEPENDENTLY OF FRAX (WITHOUT BMD) BUT NOT OF BMD – A POST HOC ANALYSIS FROM THE SHEFFIELD HIP FRACTURE STUDY

Presenting author: E. V. McCloskey

Authors: H. Johansson, A. Oden, N. C. Harvey, R. Eastell, F. Gossiel, J. A. Kanis

14.07

Podium

P153

DIETARY PROTEIN INTAKE ABOVE THE CURRENT RDA AND BONE HEALTH: A SYSTEMATIC REVIEW AND META-ANALYSIS

Presenting author: T. C. Wallace

Author: C. L. Frankenfeld

14.14

Podium

P188

INCREASED MORTALITY RISK IN MEN WITH HIGH DIETARY CALCIUM INTAKE BUT NOT IN WOMEN

Presenting author: A. J. Rodriguez

Authors: D. Scott, B. Khan, A. Hodge, D. R. English, G. G. Giles, B. Abrahamsen, P. R. Ebeling

14.21

Podium

P701

ASSOCIATIONS BETWEEN RADIUS LOW-FREQUENCY AXIAL ULTRASOUND VELOCITY AND BONE FRAGILITY IN ELDERLY MEN AND WOMEN

Presenting author: E. Biver

Authors: J. Pepe, A. De Sire, T. Chevalley, S. Ferrari

14.28

Podium

P510

VITAMIN D STATUS IN ADOLESCENCE IS AN INDEPENDENT PREDICTOR OF BONE MINERAL DENSITY AND MICROARCHITECTURE IN EARLY ADULTHOOD: A 17-YR PROSPECTIVE COHORT STUDY

Presenting author: Y. Yang

Authors: F. T. Wu, T. Winzenberg, G. Jones

14.35

Podium

P308

BUROSUMAB, AN ANTI-FGF23 MONOCLONAL ANTIBODY, FOR X-LINKED HYPOPHOSPHATEMIA (XLH): ANALYSIS BY AGE FROM TWO PHASE 2 PEDIATRIC TRIALS

Presenting author: R. Padidela

Authors: T. O. Carpenter, E. Imel, A. A. Portale, A. Linglart, W. Högl, A. Boot, W. van't Hoff, G. S. Gottesman, M. Mao, A. Skrinar, J. San Martin, M. P. Whyte

14.42

Podium

P1065

INTERVENTION THRESHOLD BASED ON FRAX AND BMD

Presenting author: H. Johansson

Authors: F. Azizieh, N. Al Ali, A. Thamer, N. C. Harvey, E. V. McCloskey, J. Kanis

14.49

Podium

P195

IMPACT OF BISPHOSPHONATES IN AGE-RELATED MACULAR DEGENERATION: RETROSPECTIVE COHORT AND NESTED CASE-CONTROL STUDY

Presenting author: C. Garriga

Authors: M. Pazianas, S. Hawley, A. Delmestri, D. Prieto-Alhambra, C. Cooper, A. Judge

15.10

Podium

P443

FRAME STUDY: THE FOUNDATION EFFECT OF REBUILDING BONE WITH ONE YEAR OF ROMOSUZUMAB LEADS TO CONTINUED LOWER FRACTURE RISK AFTER TRANSITION TO DENOSUMAB

Presenting author: S. Ferrari

Authors: F. Cosman, D. B. Crittenden, A. Khan, N. E. Lane, K. Lippuner, T. Matsumoto, C. E. Milmont, C. Libanati, A. Grauer

15.03

Podium

P524

ANTI-OSTEOPOROSIS MEDICATION PRESCRIPTIONS AND INCIDENCE OF SECONDARY FRACTURE AMONGST HIP FRACTURE PATIENTS IN ENGLAND AND WALES: AN AGE STRATIFIED INTERRUPTED TIME SERIES ANALYSIS

Presenting author: S. Hawley

Authors: D. Prieto-Alhambra, A. Delmestri, N. K. Arden, C. Cooper, A. Judge, M. K. Javaid

14.56

Podium

P473

POCOSTEO: POC IN-OFFICE DEVICE FOR IDENTIFYING INDIVIDUALS AT HIGH RISK OF OSTEOPOROSIS AND OSTEOPOROTIC FRACTURE

Presenting author: P. Khashayar

Authors: F. Leys, P. Lopes, A. Ostovar, G. Schols, R. Gransee, D. Latta, P. Biggs, I. J. Riley, C. K. O'Sullivan, I. Katakis, M. Ortiz, J. L. L. Acero, R. Hoogenboom, F. Devlieghere, P. Ragaert, B. Barredo, M. Adriaens, B. Obermayer-Pietsch, H. P. Dimai, B. Larijani, J. Vanfleteren

14.00 - 15.00

Meeting Room 6

IOF-ESCEO SYMPOSIUM

Meeting Room 6

Nutrition and physical activity in the prevention and treatment of sarcopenia: Outcomes of the IOF-ESCEO sarcopenia Working Groups

Chairpersons: Charlotte Beaudart, Elaine M. Dennison

► 14.00 ► *Welcome and scope of the problem*

Nicholas Harvey

► 14.05 ► *Methodology of the systematic review*

Elaine M. Dennison

► 14.15 ► *Outcomes of the systematic review*

Charlotte Beaudart

► 14.25 ► *Dairy products in the prevention and treatment of sarcopenia: Outcomes of the ESCEO Working Groups* Jean-Yves Reginster

► 14.40 ► *Discussion - Leader: Roland D. Chapurlat*

► 14.55 ► *Conclusion* Charlotte Beaudart

This Symposium was made possible through an Unrestricted Educational Grant from the "European Milk Forum" (EMF) and the "Centre de recherche et d'information nutritionnelles" (CERIN)

15.00 - 16.45

Meeting Room 6

COMMITTEE OF NATIONAL SOCIETIES SPECIAL PLENARY SESSION

Clinical, social, ethical and economic burden of osteoporosis and fragility fractures

Chairperson: Jean-Yves Reginster

15.03

Meeting Room 6

OCs1

ONE YEAR OUTCOMES OF FRACTURE LIAISON SERVICE AT THE NATIONAL TAIWAN UNIVERSITY HEALTHCARE SYSTEM

Presenting author: D.-C. Chan

Authors: R.-S. Yang, C.-H. Hong, K.-S. Tsai

15.11

Meeting Room 6

OCs2

RELATIONSHIPS OF PLASMA TOTAL HOMOCYSTEINE, FOLATE AND VITAMIN B12 LEVELS TO VERTEBRAL FRACTURE AND BONE MINERAL DENSITY IN MOROCCAN HEALTHY POSTMENOPAUSAL WOMEN

Presenting author: A. El Maataoui

Authors: S. Nadifi, A. El Maghraoui, Z. Ouzzif

15.19

Meeting Room 6

OCs3

SARCOPENIA AND QUALITY OF LIFE QUESTIONNAIRE (SARQOL®): GREEK CROSS CULTURAL ADAPTATION

Presenting author: C. Matzaroglou

Authors: M. Tsekoura, E. Billis, J. Giliatis, E. Tsepis, G.K. Sakkas, C. Beaudart, O. Bruyère, E. Panagiotopoulos

15.27

Meeting Room 6

OCs4

FRAILTY AND RISK OF FRAGILITY FRACTURES IN PARTICIPANTS WITH TYPE 2 DIABETES MELLITUS

Presenting author: G. Li

Authors: J. Prior, A. Papaioannou, L. Thabane, M. Levine, J. Adachi

15.35

Meeting Room 6

OCs5

DIETARY CALCIUM INTAKE IN CAUCASIAN AND EAST ASIAN ADOLESCENTS: A STUDY OF EXPATRIATE MALE HIGH SCHOOLERS AGED 16-18 YEARS RESIDING IN SINGAPORE

Presenting author: M. Chandran

Author: A.D. Chandran

15.43

Meeting Room 6

OCs6

THE ORGANIZATION OF SECONDARY FRACTURE PREVENTION SERVICES IN RUSSIAN FEDERATION

Presenting author: O. Lesnyak

Authors: K. Belova, O. Ershova

15.51

Meeting Room 6

OCs7

ASSOCIATION BETWEEN OSTEOPOROSIS AND COGNITIVE IMPAIRMENT IN A COMMUNITY DWELLING OLDER POPULATION

Presenting author: F. Sharifi

Authors: G. Shafiee, R. Heshmat, I. Nabipour, B. Larijani, A. Ostovar

15.59

Meeting Room 6

OCs8

VERTEBRAL FRACTURES CASCADE: POTENTIAL ETIOLOGIES AND RISK

Presenting author: H. Che

Authors: V. Breuil, B. Cortet, J. Paccou, L. Chapuis, F. Debais, R.M. Javier, N. Mehse, T. Thomas, C. Roux, K. Briot, S. Loiseau Peres

16.07

Meeting Room 6

OCs9

PREVALENCE OF OSTEOPOROSIS IN THE TURKISH WOMEN, RISK FACTORS AND THEIR AWARENESS ABOUT OSTEOPOROSIS ACCORDING TO THE CAMPAIGN OF "HEALTHY BONES & STRONG WOMEN"

Presenting author: Y. Kirazli

Authors: F.C. Atamaz Calis, S. Tuzun, O. El, O. Peker, B. Durmaz, S. Oncel

16.15

Meeting Room 6

OCs10

OSTEOPROTECTIVE BEHAVIOR AMONG IRAQI GENERAL POPULATION: AN URGENT NEED FOR BONE HEALTH RESCUE CAMPAIGN

Presenting author: M.N. Sahib

Author: S.A. Abdulameer

16.23

Meeting Room 6

OCs11

CROSS CULTURAL ADAPTATION OF THE SARQOL QUESTIONNAIRE INTO HUNGARIAN LANGUAGE

Presenting author: A. I. Gasparik

Author: L. Hodinka

16.35

Meeting Room 6

Presentation of the IOF Committee of National Societies Medal

Jean-Yves Reginster

15.00 - 17.00

Auditorium A

SCIENTIFIC SESSION II

Chairpersons: Cyrus Cooper, Olivier Bruyère

15.00

Auditorium A

Plenary Lecture 3

► *New perspectives in osteoarthritis management*

Philip Conaghan

15.30

Auditorium A

Presentation of the IOF President's Award

Cyrus Cooper

15.35

Auditorium A

Presentation of the ESCEO-IBSA Young Investigator Award

Cyrus Cooper

15.35

Auditorium A

Presentation of the ESCEO-IBSA Best Oral Presentation Award

Olivier Bruyère

15.40

Auditorium A

Oral communications selected from abstracts

15.40

Auditorium A

OC13

A PHASE 3 RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY INVESTIGATING THE EFFICACY AND SAFETY OF BUROSUMAB, AN ANTI-FGF23 ANTIBODY, IN ADULT X-LINKED HYPOPHOSPHATEMIA (XLH)

Presenting author: P. Kamenicky

Authors: R. Lachmann, T. O. Carpenter, M. Cohen-Solal, R. Eastell, M. L. Brandi, R.K. Crowley, S.H. Ralston, K. Javard, R. Keen, K. Briot, H.I. Cheong, Y. Imanishi, N. Ito, H. Tanaka, L. Zhang, C. Theodore-Oklot, M. Mealiffe, J. San Martin, K.L. Insogna

15.50

Auditorium A

OC14

EFFECTS OF RESISTANCE AND IMPACT EXERCISE TRAINING ON TRABECULAR BONE MICROARCHITECTURE AND KNEE CARTILAGE HEALTH IN OLDER ADULTS: AN 18-MONTH RANDOMIZED CONTROLLED TRIAL

Presenting author: R.M. Daly

Authors: J. Gianoudis, M.E. Kersh, Y. Wang, C.A. Bailey, P. R. Ebeling, C.A. Nowson, K. Sanders, F. Cicuttini, K.D. Hill

16.00

Auditorium A

OC15

EFFECT OF TNF INHIBITORS ON BONE MICROARCHITECTURE IN PATIENTS WITH ANKYLOSING SPONDYLITIS: A LONGITUDINAL STUDY BASED ON HIGH-RESOLUTION PERIPHERAL QUANTITATIVE BASED (HRPQCT)

Presenting author: N. Nigil Harron

Authors: R. Inman, E. Szabo, A. M. Cheung

16.10

Auditorium A

OC16

EFFECT OF LACTOBACILLUS REUTERI ON BONE LOSS IN OLDER WOMEN WITH LOW BONE MINERAL DENSITY – A RANDOMIZED CLINICAL TRIAL

Presenting author: M. Lorentzon

Authors: G. Nilsson, D. Sundh, F. Bäckhed

16.20

Auditorium A

OC17

*MORE FREQUENT AND MORE SUSTAIN
OSTEOPOROSIS TREATMENT AFTER FRAGILITY
VERTEBRAL FRACTURES WHEN INTRODUCED
EARLY IN INPATIENTS THAN DELAYED IN
OUTPATIENTS*

Presenting author: T. Chevalley

Authors: H. Spechbach, I. Fabreguet, E. Saule, M. Hars, J. Stirnemann,
S. Ferrari, R. Rizzoli

16.30

Auditorium A

Plenary Lecture 4► *Management of iatrogenic osteoporosis*

Peyman Hadji

17.00 - 18.30

Auditorium B

INDUSTRY-SPONSORED SYMPOSIUMSee detailed programme on [page 34](#)

17.00 - 18.30

Auditorium A

INDUSTRY-SPONSORED SYMPOSIUMSee detailed programme on [page 34](#)

18.40 - 19.40

Cocktail offered by ESCEO and IOF to all
recipients of prizes, awards, fellowships and
scholarships - by invitation only

08.00 - 09.00

NON-SPONSORED SYMPOSIA

Meeting Room 1

Complex Regional Pain Syndrome: Facts on Causes, Diagnosis and Therapy

Chairperson: Maria Luisa Brandi

- *Introduction* Maria Luisa Brandi
- *Definition of the Complex Regional Pain Syndrome* Giovanni Iolascon
- *Therapies for the Complex Regional Pain Syndrome* Giovanni Orsolini
- *Conclusion*

Meeting Room 2

Achieving gender equity in musculoskeletal science - why it matters and how can we do it ?

Chairperson: Christel Lamberg-Allardt

- *The effects of equity and diversity on research impact: narrative review of the literature* Christel Lamberg-Allardt
- *Advance Australia Fair: progress in gender equity in science in Australia* Tania Winzenberg
- *Practical initiatives to support gender equity in science* Sharon Brennan-Olsen

Meeting Room 3

Demonstrating fracture liaison service effectiveness - Use of fracture incidence and prescribing data to demonstrate clinical and cost effectiveness in a small population

Chairperson: Kassim Javaid

- *Preventing disability and ageing well: an innovative service support model for fracture prevention in the UK* Debbie Stone
- *Making the case for fracture liaison services in prevention of disability – analysis of national prescribing data in England* Tim Jones

Meeting Room 4

Mediterranean diet and musculoskeletal diseases

Chairpersons: Gaetano Crepaldi, René Rizzoli

- *Introduction*
- *Mediterranean diet and bone health* Stefania Maggi
- *Mediterranean diet and muscular function* Francesco Landi
- *Mediterranean diet and osteoarthritis* Nicola Veronese
- *Discussion*

Meeting Room 5

DO-HEALTH: First results of a large European Trial

Chairperson: John A. Kanis

- *Introduction* John A. Kanis
- *Review results of recent trials involving supplemental vitamin D and musculoskeletal outcomes* Bess Dawson-Hughes
- *First presentation of trial findings of DO-HEALTH regarding musculoskeletal outcomes.* Heike A. Bischoff-Ferrari

Meeting Room 7

ASBMR-IOF-ESCEO Symposium: Closing the Treatment Gap

Chairperson: Cyrus Cooper

- *An update on fracture liaison implementation and quality measures in the US* Robert Adler
- *A strategic roadmap and action plan to prevent secondary fractures* Douglas Kiel
- *A global overview of secondary fracture prevention strategies and service initiatives worldwide* Nicholas Harvey
- *An update on risk assessment and fracture prevention in European nations* Eugene McCloskey

08.00 - 09.00

Meeting Room 6

Joint ESPRM – ESCEO – IOF Symposium

Meeting Room 6

Role of Physical Medicine and Rehabilitation in the Management of Osteoporosis and Musculoskeletal Disorders

Chairpersons: Fitnat Dincer, Jolanta Kujawa

- *The role of rehabilitation in prevention and treatment of osteoporotic fractures* Jolanta Kujawa
- *The effect of exercise on pain and functional activity in knee osteoarthritis* Fitnat Dincer
- *The role of rehabilitation in prevention and treatment of Spinal Disorders* Piotr Tederko

09.00 - 12.10

Auditorium A

SCIENTIFIC SESSION III

Chairpersons: René Rizzoli, Alfonso Cruz Jentoft

09.00

Auditorium A

Plenary Lecture 5

► *Inflammation and musculoskeletal aging*

Eugene McCloskey

09.30

Auditorium A

Oral communications selected from abstracts

09.30

Auditorium A

OC18

PHYSICAL ACTIVITY PHENOTYPES ARE ASSOCIATED WITH CARTILAGE VOLUME LOSS AND KNEE REPLACEMENT, BUT NOT WITH INCIDENT BONE-MARROW LESIONS OVER 10.7 YEARS

Presenting author: I. P. Munugoda

Authors: F. Pan, K. Wills, F. Cicuttini, S.E. Graves, M. Lorimer, G. Jones, M.L. Callisaya, D. Aitken

09.40

Auditorium A

OC19

ASSOCIATION BETWEEN DIETARY NUTRIENT INTAKE AND SARCOPENIA: THE SARCOPHAGE COHORT STUDY

Presenting author: C. Beaudart

Authors: M. Locquet, M. Touvier, J.-Y. Reginster, O. Bruyère

09.50

Auditorium A

OC20

THE FRAIL TOOLS STUDY - A COMPREHENSIVE VALIDATION OF TOOLS TO SCREEN AND DIAGNOSE FRAILTY IN DIFFERENT CLINICAL AND SOCIAL SETTINGS

Presenting author: T. Grodzicki

Authors: A. Parnicka, A. Kańtoch, B. Wizner, B. Gryglewska, M. Checa, J. Carnicero, S. Bellary, B. Vellas, M. Cesari, R. Bernabei, F. Landi, L.R. Mañas

10.00

Auditorium A

OC21

TRANSLATING THE LIFESTYLE INTERVENTIONS AND INDEPENDENCE FOR ELDERLY CLINICAL TRIAL TO MOBILITY-LIMITED OLDER ADULTS IN THE COMMUNITY: THE ENGAGE PILOT STUDY

Presenting author: K. Reid

Authors: J. Laussen, K. Bhatia, D. Englund, D. Kirn, L.L. Price, T. Manini, C. Liu, C. Kowaleski, R. Fielding

10.10

Auditorium A

OC22

DYNAMIC APPROACH OF THE FRAILTY STATUS IN NURSING HOMES: 2-YEAR PROSPECTIVE FOLLOW-UP OF THE SENIOR COHORT

Presenting author: F. Buckinx

Authors: A. Charles, X. Rygaert, J.-Y. Reginster, J. Petermans, O. Bruyère

10.20

Auditorium A

Presentation of the ESCEO-IOF-ERAB Scholarship

René Rizzoli

10.30

Auditorium A

Plenary Lecture 6

► *New perspectives in frailty and sarcopenia management* Francesco Landi

11.00

Auditorium A

Oral communications selected from abstracts

11.00

Auditorium A

OC23

RELATIONSHIPS BETWEEN MUSCLE SIZE, STRENGTH AND FUNCTION AND THE RISK OF FALLS AND FRACTURES: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

Presenting author: N. R. Fuggle

Authors: K. A. Jameson, M. H. Edwards, E. M. Dennison, C. Cooper

11.10

Auditorium A

OC24

THREE-YEAR ADVERSE HEALTH CONSEQUENCES OF SARCOPENIA IN COMMUNITY-DWELLING OLDER ADULTS: RESULTS FROM THE SARCOPHAGE COHORT STUDY

Presenting author: M. Locquet

Authors: C. Beaudart, J.-Y. Reginster, J. Petermans, O. Bruyère

11.20

Auditorium A

OC25

THE DISCRIMINATIVE ABILITY OF SARQOL® ACCORDING TO THE DEFINITION OF SARCOPENIA: THE OFELY STUDY

Presenting author: E. Sornay-Rendu

Authors: C. Beaudart, O. Bruyère, R. D. Chapurlat

11.30

Auditorium A

OC26

LONG-TERM COST-EFFECTIVENESS OF SCREENING FOR FRACTURE RISK IN A UK PRIMARY CARE SETTING

Presenting author: F. Borgström

Authors: E. Jonsson, N. C. Harvey, L. Shepstone, E. Lenaghan, S. Clarke, N. Gittos, I. Harvey, R. Holland, A. Heawood, N. Redmond, A. Howe, T. Marshall, T. J. Peters, D. Torgerson, T. W. O'Neill, E. V. McCloskey, C. Cooper, J. A. Kanis

11.40

Auditorium A

OC27

COST-BENEFIT ANALYSIS OF CALCIUM AND VITAMIN D SUPPLEMENTS

Presenting author: H. A. Bischoff-Ferrari

Authors: C. Weaver, C. Shanahan

11.50

Auditorium A

OC28

PHYSICAL PERFORMANCE OR FUNCTION, BUT NOT APPENDICULAR LEAN MASS, PREDICT INCIDENT FRACTURES INDEPENDENTLY OF FRAX PROBABILITY AND BMD: RESULTS FROM THE OSTEOPOROTIC FRACTURES IN MEN (MROS) COHORT

Presenting author: N. C. Harvey

Authors: A. Odén, E. Orwoll, J. Lapidus, T. Kwok, M. Karlsson, B. Rosengren, O. Ljunggren, C. Cooper, P. M. Cawthon, J. A. Kanis, C. Ohlsson, D. Mellström, H. Johansson, E. V. McCloskey

12.00

Auditorium A

OC29

PLASMA CTX IN PREGNANCY IS ALTERED BY CHOLECALCIFEROL SUPPLEMENTATION AND IS ASSOCIATED WITH MATERNAL BONE INDICES: THE MAVIDOS TRIAL

Presenting author: E. M. Curtis

Authors: K. Maslin, S. D'angelo, R. J. Moon, S. R. Crozier, F. Gossiel, N. J. Bishop, S. Kennedy, A. T. Papageorgiou, R. Fraser, S. V. Gandhi, A. Prentice, H. M. Inskip, K. M. Godfrey, I. Schoenmakers, M. K. Javadi, R. Eastell, C. Cooper, N. C. Harvey

12.15 - 13.45

Auditorium A

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 34](#)

12.15 - 13.45

Auditorium B

INDUSTRY-SPONSORED LUNCH SYMPOSIUM

See detailed programme on [page 34](#)

14.00 - 15.00

MEET-THE-EXPERT SESSIONS

Meeting Room 4

► *Sound use of bone turnover markers*

Etienne Cavalier

Meeting Room 1

► *Interaction of nutrition and exercise on bone and muscle*

Elaine M. Dennison

Meeting Room 2

► *Calcium : what is good and what is bad*

Nicholas Harvey

Meeting Room 3

► *HIV and bone*

Emmanuel Biver

Meeting Room 5

► *Bone microstructure and fracture prediction*

Roland D. Chapurlat

14.00 - 15.00

Meeting Room 6

Educational Session jointly organized by EUGMS-ESCEO and IOF

Meeting Room 6

Managing complex older patients: beyond the bone and muscle

Chairpersons: Alfonso Cruz Jentoft, Stefania Maggi

► 14.00 ► *Welcome* Stefania Maggi

► 14.05 ► *Assessing older complex patients (Core Geriatric Assessment for non-geriatricians)*

Alfonso Cruz Jentoft

► 14.20 ► *Understanding and measuring co-morbidity in older people* Finbarr Martin

► 14.35 ► *Decision-making in complex older patients* Stefania Maggi

► 14.50 ► *Discussion - Leader* Alfonso Cruz Jentoft

14.00 - 15.00

Poster Area

Poster Viewing Session II

14.00 - 15.10

Podium

Oral presentation of selected posters

Chairperson: Fanny Buckinx

14.00

Podium

P616

STATINS AND INCIDENT KNEE OSTEOARTHRITIS: RESULTS FROM THE OSTEOARTHRITIS INITIATIVE

Presenting author: N. Veronese

Authors: S. Maggi, C. Cooper, J.-Y. Reginster

14.07

Podium

P378

COMBINED FRACTAL- AND ENTROPY-BASED ANALYSIS OF BONE TEXTURE PREDICTS INCIDENT OSTEOARTHRITIS OF THE KNEE: DATA FROM THE MULTICENTER OSTEOARTHRITIS STUDY (MOST).

Presenting author: R. Ljuhar

Authors: Z. Bertalan, S. Nehrer, D. Ljuhar, A. Fahrleitner-Pammer, H. P. Dimai

14.14

Podium

P379

RISK OF SEVERE LUMBAR SPINAL STENOSIS ON MRI SCANS IS INCREASED BY HEAVY MANUAL WORK: THE WAKAYAMA SPINE STUDY

Presenting author: Y. Ishimoto

Authors: C. Cooper, K. Walker-Bone, G. Ntani, H. Yamada, H. Hashizume, K. Nagata, S. Muraki, S. Tanaka, N. Yoshimura, M. Yoshida

14.21

Podium

P1112

A NEW DECISION TREE FOR DIAGNOSIS AND MANAGEMENT OF OSTEOARTHRITIS IN PRIMARY CARE: INTERNATIONAL CONSENSUS OF EXPERTS

Presenting author: J. Martel-Pelletier

Authors: F. Rannou, J.-P. Pelletier, O. Mkinsi, J. Branco, L. Alekseeva, P. Monod, F. Planta, E. Maheu, J.-Y. Reginster

14.28

Podium

P103

EFFECT OF HIGH-INTENSITY INTERVAL OR MODERATE-INTENSITY CONTINUOUS TRAINING ON BODY COMPOSITION AND PHYSICAL PERFORMANCE IN OBESE-OSTEOPENIC ELDERLY WOMEN

Presenting author: P. Noirez

Authors: M. Dulac, L.P. Carvalho, G. El Haj Boutros, V. Marcangeli, P. Gaudreau, J. A. Morais, G. Gouspillou, M. Aubertin-Leheudre

14.35

Podium

P543

PATIENT'S ENGAGEMENT IN THE IDENTIFICATION OF CRITICAL OUTCOMES IN SARCOPENIA

Presenting author: C. Beaudart

Authors: O. Bruyère, J.-Y. Reginster, J. Bauer, C. Cooper, A. J. Cruz Jentoft, F. Landi, M. Locquet, S. Maggi, R. Rizzoli, Y. Rolland, N. Vaquero, M. Hilgsmann

14.42

Podium

P640

HIGH POSTURAL SWAY PREDICTS FRACTURES IN ELDERLY WOMEN

Presenting author: S. L. Qazi

Authors: J. Sirota, H. Kröger, R. Honkanen, M. Isanejad, O. Airaksinen, T. Rikonen

14.49

Podium

P876

EFFICACY OF DIFFERENT MODES OF VITAMIN D SUPPLEMENTATION STRATEGIES IN SAUDI ADOLESCENTS

Presenting author: N. Al-Daghri

Authors: M. Ansari, S. Sabico, Y. Al-Saleh, N. Aljohani, H. Alfawaz, M. Alharbi, A. Al-Othman, M. Alokail, S. Wimalawansa

14.56

Podium

P646

LOW BONE MINERAL DENSITY AND RISK OF FALLS ARE INCREASED AMONG INDIVIDUALS WITH RHEUMATOID ARTHRITIS: FINDINGS FROM UK BIOBANK

Presenting author: M. A. Clynes

Authors: K. A. Jameson, D. Prieto-Alhambra, N. C. Harvey, C. Cooper, E. M. Dennison

15.03

Podium

P637

THIRTY-ONE MEN AND WOMEN WITH 145 SPONTANEOUS VERTEBRAL FRACTURES AFTER DENOSUMAB DISCONTINUATION: A SINGLE CENTER OBSERVATIONAL STUDY

Presenting author: E. Gonzalez Rodriguez

Authors: D. Stoll, B. Aubry-Rozier, O. Lamy

14.00 - 15.00

Meeting Room 7

ESCEO SYMPOSIUM

Meeting Room 7

Guidelines for the conduct of clinical trials in hand osteoarthritis

Chairpersons: Cyrus Cooper, Andrea Laslop

- 14.00 ► *Introduction and scope of the problem*
Nigel K. Arden
 - 14.10 ► *Guidelines for the conduct of pharmacological trials in hand OA : Consensus of a working group of the ESCEO* Ida Haugen
 - 14.30 ► *Discussion* All
 - 14.55 ► *Conclusion* Andrea Laslop
- Panel: Nigel K. Arden, Jaime Branco, Olivier Bruyère, Etienne Cavalier, Roland D. Chapurlat, Cyrus Cooper, Elaine M. Dennison, Ida Haugen, Gabriel Herrero-Beaumont, Andrea Laslop, Stefania Maggi, Ouafa Mkinsi, Daniel Prieto-Alhambra, Jean-Yves Reginster, François Rannou, Thierry Thomas, Daniel Uebelhart, Nicola Veronese

15.00 - 17.00

Auditorium A

SCIENTIFIC SESSION IV

Chairpersons: Serge Ferrari, Nicholas Harvey

15.00

Auditorium A

Plenary Lecture 7

- *Microbiota and bone disease* René Rizzoli

15.35

Auditorium A

Presentation of the IOF Best Committee of National Societies Booth

Jean-Yves Reginster, Philippe Halbout

15.40

Auditorium A

Oral communications selected from abstracts

15.40

Auditorium A

OC30

RISK OF INCIDENT FRACTURE IS ASSOCIATED WITH DOSE, DURATION AND RECENCY OF ORAL GLUCOCORTICOID EXPOSURE

Presenting author: D. E. Robinson

Authors: T. P. Van Staa, M. Lunt, E. M. Dennison, C. Cooper, W.G. Dixon

15.50

Auditorium A

OC31

PRO-INFLAMMATORY DIETARY PATTERN IS ASSOCIATED WITH FRACTURES IN WOMEN: AN EIGHT YEAR LONGITUDINAL COHORT STUDY

Presenting author: N. Veronese

Authors: N. Shivappa, J. Hebert, C. Cooper, G. Guglielmi, J.-Y. Reginster, R. Rizzoli, S. Maggi

16.00

Auditorium A

OC32

LONG-TERM EFFECTS ON BONE MINERAL DENSITY AFTER FOUR YEARS OF TREATMENT WITH TWO INTENSIVE COMBINATION STRATEGIES, INCLUDING INITIALLY HIGH DOSE PREDNISOLONE, IN EARLY RHEUMATOID ARTHRITIS PATIENTS: THE COBRA-LIGHT TRIAL.

Presenting author: M. J. J. Lucassen

Authors: M.M. Ter Wee, D. Den Uyl, N.P.C. Konijn, M.T. Nurmohamed, D. van Schaardenburg, P.J.S. Kerstens, I.E.M. Bultink, L.H.D. van Tuyl, M. Boers, W.F. Lems

16.10

Auditorium A

OC33

UTILITY LOSS AFTER A SENTINEL FRACTURE

Presenting author: H. Johansson

Authors: J. Kanis, A. Odén, N. C. Harvey, V. Gudnason, K. Sanders, G. Sigurdsson, K. Siggeirsdottir, L. A. Fitzpatrick, M. Lorentzon, F. Borgström, E. V. McCloskey

16.20

Auditorium A

OC34

DANGER OF OVERTREATMENT OF OSTEOPOROSIS WITH INAPPROPRIATE USE OF INTERVENTION THRESHOLDS DERIVED BY COST-EFFECTIVENESS ANALYSIS

Presenting author: E. V. McCloskey

Authors: H. Johansson, A. Oden, N. C. Harvey, J. Compston, C. Cooper, J. A. Kanis

16.30

Auditorium A

Plenary Lecture 8

- *Obesity, osteoporosis diagnosis and fracture risk*
Peter R. Ebeling

17.00 - 18.30

Auditorium B

INDUSTRY-SPONSORED SYMPOSIUM

See detailed programme on [page 34](#)

18.30 - 19.30

NON-SPONSORED SYMPOSIA

Meeting Room 0

Joint IOF ESCEO FFN Secondary Fracture Prevention / FLS

Chairperson: Kristina Åkesson

- *Challenges of FLS - Global perspective & Results of Survey* Kassim Javaid
- *Integration with Trauma* Frede Frihagen
- *Tools from the CtF programme* Thierry Thomas
- *Discussion*

Meeting Room 1

Clinical Application of Bone Markers

Chairpersons: Richard Eastell, Adolfo Diez-Perez

- *Methodological conditions for testing PINP and CTX. NBHA recommendations.* Pawel Szulc
- *Assay Standardisation. Report of the IOF/IFCC Bone Turnover Marker Working Group.* Etienne Cavalier
- *Recommendations for the practice. IOF/ECTS Adherence Working Group recommendations* Adolfo Diez-Perez
- *Recommendations for the practice. IOF/ECTS Adherence Working Group recommendations* Richard Eastell

Meeting Room 3

Management of Bone Health Throughout Women's Life Span. Gynecological Perspective on Effective Prevention of Osteoporosis Fragility Fracture

Chairperson: Adriana Orcesi Pedro

- *Opening* Adriana Orcesi Pedro
- *Epidemiology and risk factors for osteoporosis in women.* Bruno Muzzi Camargos
- *Update on hormone therapy and osteoporosis prevention* Adriana Orcesi Pedro
- *Osteoporosis prevention and treatment on special situations during women's life span* Ben-Hur Albergaria
- *Question & Answers with audience*

Meeting Room 5

Musculo-skeletal Imaging by clinical microCT

Chairpersons: Roland D. Chapurlat, Eric Lespessailles

- *Introduction "Contribution of HRpQCT to the management of bone and joint diseases"* Roland D. Chapurlat, Eric Lespessailles
- *What does HRpQCT investigation have added to the field of osteoporosis ?* Serge Ferrari
- *What does HRpQCT investigation have added to the field of chronic inflammatory rheumatism ?* Stephanie Finzel
- *Questions & Answers* All

Meeting Room 6

A contemporary approach in education: Developing the role of nurses working in secondary fracture prevention

Chairperson: Kassim Javaid

- *The role of the fracture liaison nurse* Sonya Stephenson
- *Competency framework for health professionals working in fracture prevention* Debbie Stone

Meeting Room 7

Optimising bone health, muscle strength and balance in middle-aged women: new opportunities for long-term fracture prevention

Chairpersons: Tania Winzenberg, Christel Lamberg-Allardt

- *Targets for optimising bone, muscle strength and balance in middle-aged women* Feitong Wu
- *The role of dietary phosphorus in bone health in middle-aged adults* Christel Lamberg-Allardt
- *Is bone density testing an under-utilised educational tool in younger women?* Tania Winzenberg

08.00 - 09.00

NON-SPONSORED SYMPOSIA

Meeting Room 1

Taking care of the osteoporotic spine

Chairpersons: Sansin Tüzün, Radmila Matijevic

- *The Impact of spinal alignment on falls and fractures* Ülkü Akarımak
- *How to create a stable spine via exercise in osteoporosis?* Sansin Tüzün
- *To brace or not to brace in the osteoporotic spine?* Füsun Güler Uysal
- *Spinal Augmentation: How to choose the best candidate?* Çağatay Öztürk

Meeting Room 2

Optimalisation of Fracture Liaison Services

Chairpersons: Willem Lems, Kassim Javaid

- *The Capture the Fracture Project, a flagship of IOF* Kristina Åkesson
- *A database of > 200 FLS services, what can we learn from that?* Kassim Javaid
- *In patients in which a DXA is indicated, a VFA (vertebral fracture assessment) is also indicated!* Willem Lems
- *Discussion*

Meeting Room 3

Diabetes and Osteoporosis: A sweet relationship

Chairperson: Bruno Muzzi Camargos

- *Underlying mechanisms between diabetes mellitus and osteoporosis* Oscar Rosero Olarte
- *Bone microarchitecture in diabetes* Maria Belen Zanchetta
- *Fracture risk assessment on diabetic patients: FRAX, DXA, TBS* Bruno Muzzi Camargos
- *Osteoporosis treatment on diabetic patients: Efficacy and drug interactions* Adriana Medina Orjuela
- *Clinical guidance: Diabetic patients at risk of fractures* Luis Fernando Vidal Neira
- *Questions and answers* All

Meeting Room 4

Impact of osteoporosis/osteopenia in management of osteoarthritis

Chairperson: Hannu T. Aro

- *The prevalence of osteoporosis and vitamin-D deficiency in patients with hip osteoarthritis* Julie Glowacki
- *Selection of uncemented or cemented hip prosthesis in fracture patients and osteoarthritic patients: implant stability, periprosthetic bone loss and periprosthetic fractures* Olof Sköldenberg
- *Zoledronic acid and denosumab in prevention of periprosthetic bone loss in cementless hip replacement of postmenopausal women* Hannu T. Aro

Meeting Room 5

Novelty regarding the potential of nutritional interventional studies with or without exercise training to prevent muscle function in older adults

Chairpersons: Mylène Aubertin-Leheudre, Olivier Bruyère

- *Vitamin D and muscle function* Olivier Bruyère
- *Omega-3 and muscle function* Yves Rolland
- *Citruline and muscle function* Mylène Aubertin-Leheudre

Meeting Room 7

Management of Osteoporosis - Closing the gap in the CEE countries

Chairperson: Heinrich Resch

- *Fracture epidemiology in the CEE countries* Peter Lakatos
- *Closing the treatment gap in Poland - our experiences* Edward Czerwinski
- *The add value of Biomarkers* Vladimir Palicka
- *Simple but accurate tools in the fracture risk assessment* Catalina Poiana
- *Treatment failures and side effects* Juray Payer

08.00 - 09.00

Meeting Room 6

ESCEO SYMPOSIUM

Meeting Room 6

Phosphate wasting disorders: What the bone doctor should know. A report of an ESCEO Working Group.

Chairpersons: Maria Luisa Brandi, René Rizzoli

- 08.00 ► *The FGF23/Phosphate/Klotho/FGF-Rs machinery* Dieter Haffner
- 08.15 ► *Expression of Phosphate Wasting Disorders in the Adults* Kassim Javaid
- 08.30 ► *Management of Phosphate Wasting Disorders* Laura Masi
- 08.45 ► *Discussion*
- 08.55 ► *Conclusions* Serge Ferrari

Panel: Maria Luisa Brandi, René Rizzoli, Dieter Haffner, Kassim Javaid, Laura Masi, Serge Ferrari, Peter Kamenicky

09.00 - 10.00

MEET-THE-EXPERT SESSIONS

Meeting Room 2

- *Intra-articular therapy in knee osteoarthritis* François Rannou

Meeting Room 1

- *Vitamin D : What is good and what is bad* Bess Dawson-Hughes

Meeting Room 3

- *Fall risk assessment and prevention* Stefania Maggi

Meeting Room 4

- *Pharmacological management of osteoporosis in Poland* Edward Czerwinski

09.00 - 10.00

Poster Area

Poster Viewing Session III

09.00 - 10.00

Meeting Room 5

EDUCATIONAL LECTURE

- *How can behavioural sciences improve the outcome of daily practice?* Daniel Pinto, Zachary Zenko

10.00 - 12.00

Auditorium B

SCIENTIFIC SESSION V

Chairpersons: Bess Dawson-Hughes, Stefania Maggi

10.00

Auditorium B

Plenary Lecture 9

- *How to manage imminent fracture risk* Thierry Thomas

10.30

Auditorium B

Presentation of the ESCEO-IOF Pierre Meunier Young Scientist Award

Bess Dawson-Hughes

10.40

Auditorium B

Oral communications selected from abstracts

10.40

Auditorium B

OC35

ASSESSING THE RISK OF OSTEOPOROSIS THROUGH RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS): RESULTS OF THE SCREENING CAMPAIGN IN THE ITALIAN POPULATION

Presenting author: L. Cianferotti

Authors: L. Cavalli, F. Giusti, G. Gronchi, C. Signorini, P. Pisani, M. L. Brandi

10.50

Auditorium B

OC36

ADVANCED 3D REGISTRATION FOR MONITORING PERIPHERAL BMD AND BMC CHANGES IN GROWING BONES IN CHILDREN

Presenting author: K. Engelke

Authors: A. Friedberger, O. Museyko, H. Genant

11.00

Auditorium B

OC37

CLUSTER ANALYSIS OF HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY PARAMETERS IDENTIFIES BONE PHENOTYPES ASSOCIATED WITH HIGH RATES OF PREVALENT FRACTURE

Presenting author: M. H. Edwards

Authors: L. D. Westbury, C. Cooper, E. M. Dennison, K. A. Ward

11.10

Auditorium B

OC38

ASSESSING THE IMPACT OF PRESCRIBING ANTI-OSTEOPOROSIS MEDICATION AFTER AN INDEX FRACTURE AS PART OF A NATIONAL CLINICAL AUDIT

Presenting author: M. K. Javaid

Authors: C. Gallagher, A. Judge, N.J. Vasilakis

11.20

Auditorium B

OC39

ARTHRITIS ACROSS EDUCATION, INCOME AND RACE/ETHNICITY, AND THE MODERATING ROLE OF CHILDHOOD MAL TREATMENT: DATA FROM THE NATIONAL EPIDEMIOLOGICAL SURVEY ON ALCOHOL AND RELATED CONDITIONS (NESARC)

Presenting author: S. L. Brennan-Olsen

Authors: T.L. Taillieu, S. Turner, J. Bolton, S.E. Quirk, F. Gomez, R.L. Duckham, S.M. Hosking, G. Duque, D. Green, T.O. Afifi

11.30

Auditorium B

Plenary Lecture 10

- *Combined and sequential therapies in osteoporosis*
Michael R. McClung

12.00 - 13.00

NON-SPONSORED SYMPOSIA

Meeting Room 1

Management of Osteoporosis in Poland

Chairperson: Edward Czerwinski

- *The review of the 2017 updated polish guidelines for the diagnosis and management of osteoporosis*
Piotr Gluszko
- *Management of osteoporosis in poland: calcium and vitamin D* Ewa Marcinowska-Suchowierska
- *Rac-ost-pol – population based polish epidemiologic study on postmenopausal osteoporosis* Wojciech Pluskiewicz
- *Value of T- and Z-scores in fracture prediction*
Przemyslaw Borowy
- *Correlation between tbs, age and fracture in postmenopausal women* Edward Czerwinski

Meeting Room 2

Physical activity and rehabilitation in osteoporosis and sarcopenia

Chairperson: Mark Lissens

- *Adapted physical activity using gerontechnology as the solution to counteract muscle function in frail population.* Mylène Aubertin-Leheudre
- *Rehabilitation of sarcopenic elderly*
Yannis Dionyssiotis
- *Correlation between sarcopenia and osteoporosis in patients with post poliomyelitis syndrome*
Mark Lissens

Meeting Room 3

Identification of vertebral fractures in Fracture Liaison Services in the UK

Chairperson: Kassim Javaid

- *The financial burden of vertebral fracture* Tim Jones
- *Understanding the clinical guidance for the identification of vertebral fractures in the UK*
Sonya Stephenson

Meeting Room 5

Non-irradiating evaluation of bone mineral mass at peripheral and axial sites

Chairpersons: Maria Luisa Brandi, René Rizzoli

- *Non-irradiating osteoporosis diagnosis: Technologies description* Francesco Conversano
- *An international clinical experience* Adolfo Diez-Perez
- *Symposium take home message* Piotr Leszczynski

Meeting Room 6

Rational approach to osteoporosis in Turkey

Chairpersons: Berrin Durmaz, Sema Oncel

- *Approach of Turkish Physicians to Osteoporotic Vertebral Fractures* Ozlen Peker
- *Hidden Problem: Osteoporotic Vertebral Fractures*
Yesim Gokce Kutsal
- *Medical Treatment of Osteoporosis* Ozlem El
- *Orthoses and Exercises for Osteoporotic Vertebral Fractures* Funda Calis
- *FRAX Study with Calcaneal Ultrasound in Turkish Postmenopausal Women* Yesim Kirazli

Meeting Room 7

Autoimmune Sarcopenia

Chairperson: Mislav Radić

- *Autoimmune sarcopenia – current knowledge and perspective* Mislav Radić
- *Risk of sarcopenia in rheumatoid arthritis patients*
Tonko Vlak
- *Risk of sarcopenia in systemic lupus erythematosus patients* Miroslav Mayer

13.00

End of the Congress

THURSDAY, APRIL 19

19.25 - 20.25

WELCOME COCKTAIL

Courtesy of:

*the City of Krakow
and Mylan*

FRIDAY, APRIL 20

12.15 - 13.45

Auditorium A

MYLAN SATELLITE LUNCH SYMPOSIUM

Chairpersons: Eugeniusz J. Kucharz, Jean-Yves Reginster

- ▶ *Inappropriate claims from non-equivalent medications in osteoarthritis* Luca Gallelli
- ▶ *Cost-effectiveness evaluation of glucosamine in osteoarthritis based on simulation of data coming from published studies.* Olivier Bruyère
- ▶ *Safety of anti-osteoarthritis medications: results of ESCEO Working Groups 2017* Jean-Yves Reginster
- ▶ *Discussion*

12.15 - 13.45

Auditorium B

AMGEN SATELLITE LUNCH SYMPOSIUM - OSTEOPOROSIS TREATMENT: DIVING INTO REALITIES

Chairperson: Serge Ferrari

- ▶ *Delving into real world data* Cyrus Cooper
- ▶ *What should I treat with and how?* Eugene McCloskey
- ▶ *What do my patients need to know to understand benefits and risks of osteoporosis treatments?* Thierry Thomas

17.00 - 18.30

Auditorium A

AGNOVOS HEALTHCARE SATELLITE SYMPOSIUM

Chairpersons: Jean-Yves Reginster, Serge Ferrari

- ▶ *Introduction and Agenda* Jean-Yves Reginster
- ▶ *The Burden of Osteoporosis and Hip Fracture* Eugene McCloskey
- ▶ *Current Gaps in Care for Osteoporosis at the Hip* Serge Ferrari
- ▶ *Novel Treatment to Address Pathology of OP at Hip* Mary Bouxsein
- ▶ *Expert Panel Discussion* All
- ▶ *Audience Q&A* All

17.00 - 18.30

Auditorium B

ELI LILLY SATELLITE SYMPOSIUM - CLINICAL EFFICACY AND EFFECTIVENESS OF TERIPARATIDE: NEW RESULTS 2018

Chairperson: Cyrus Cooper

- ▶ *Welcome and Introduction* Cyrus Cooper
- ▶ *Real World Experience Results of Teriparatide Use: Pooled Analyses of Four Observational Studies* Stuart Silverman
- ▶ *New Results of the Active Comparator VERO Clinical Trial* Salvatore Minisola
- ▶ *Panel Discussion* All
- ▶ *Summary and Symposium Close* Cyrus Cooper

SATURDAY, APRIL 21

12.15 - 13.45

Auditorium A

**RADIUS HEALTH LUNCH SYMPOSIUM -
OSTEOPOROSIS: THE HOW AND WHY OF
DIAGNOSIS AND TREATMENT**

Chairpersons: Jean-Yves Reginster, Cyrus Cooper

- *Diagnostic and treatment modalities to enhance the identification of patients at high risk for fracture*

René Rizzoli

- *Treating to Goal: Does the Sequence of Therapy Matter in Helping to Reduce Fracture Risk?*

Jean-Yves Reginster

- *Economic Aspects of OP Treatment*

Mickaël Hilgsmann

12.15 - 13.45

Auditorium B

**UCB SATELLITE LUNCH SYMPOSIUM - HOW
DO WE STRENGTHEN OUR APPROACH TO
FRAGILITY FRACTURES?**

Chairperson: Kassim Javaid

- *Strengthening our approach: where do we start?*

Kassim Javaid

- *Managing our fragility fracture patients: the urgency for action*

Serge Ferrari

- *Patient perceptions: are we talking the same language?*

Vivian Auyeung

- *A common language to strengthen our approach to fragility fractures*

Audience collaboration

- *Closing remarks: from talk to action*

Kassim Javaid

17.00 - 18.30

Auditorium B

**KYOWA KIRIN SATELLITE SYMPOSIUM -
REALIGNING OUR THINKING: XLH, A
LIFELONG DISEASE**

Chairperson: Maria Luisa Brandi

- *Introduction*

Maria Luisa Brandi

- *XLH: A progressive disease*

Ralf Oheim

- *Quality of life matters*

Kassim Javaid

- *Challenges of managing a chronic condition*

Dieter Haffner

- *Beyond conventional therapy: addressing the unmet medical need in XLH*

Agnès Linglart

- *Questions and Answers*

All

- *Summary and Close*

Maria Luisa Brandi

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2018): Educational Lecture Abstract

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EL1

HOW CAN BEHAVIOURAL SCIENCES IMPROVE THE OUTCOME OF DAILY PRACTICE?

D. Pinto¹

¹Marquette University, Department of Physical Therapy, Milwaukee, United States

We face decisions all day, every day. We often expect patients to make choices to improve their health, students to improve understanding, colleagues to improve the profession, and representatives to improve society. Most theories of behavior suggest a cognitive approach to behavior change, e.g. if we better understand consequences, our decisions and behavior will adjust accordingly. However, many decisions bypass cognition, they reflect individual preferences and are grounded in habit. Research in behavioral sciences has shown that our

actions are not always reflective of the preferences we express, but often change based on the context surrounding a situation. How should this information affect how we practice? Knowing that we can influence preferences by changing context can be a powerful tool for medical practitioners as we seek to facilitate improvements in the health of patients and society. The science of human judgment and decision-making (JDM) recognizes three important domains that affect individual-level decisions: decision features, situational factors, and individual differences. We can use our understanding of these domains to design choices/circumstances to improve health. This educational session will provide a brief review of the origins of behavioral economics, highlight key principles relevant to medical practice, and allow attendees to explore the use of behavioral insights to address problems in adherence to medical therapies.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2018): Plenary Lectures Abstracts

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PL1

FRAX – TEN YEARS ON

C. Cooper FMedSci^{1,2}

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ²Institute of Musculoskeletal Science, University of Oxford, Southampton, United Kingdom

Osteoporosis constitutes a major public health problem through its association with age related fractures. A number of pharmacological interventions have been developed which retard bone loss and reduce the risk of fracture; the FRAX risk assessment tool was developed to characterise the 10 year absolute risk of hip or major osteoporotic fracture in an individual, and thereby assist in the most effective targeting of such treatments. The FRAX tool uses readily assessable clinical risk factors and bone mineral density. The calibration and discrimination characteristics of the FRAX algorithm have been well established, but there is less consistency in the use of FRAX to set intervention thresholds for treatment in different healthcare settings. A systematic review of available probability-based thresholds in the published literature revealed widespread utilisation of fixed and age-dependent FRAX thresholds. The age-dependent approach has been recently evaluated in a large pragmatic randomised controlled trial of a screening programme for osteoporosis, utilising thresholds based on 10 year probability of fracture (MRC SCOOP Trial). It included 12,483 women from the general population aged 70–85 years. A screening programme based upon the FRAX risk assessment tool (using 10-year probability of hip fracture) with usual management in primary care. In the screening arm, treatment was recommended in women identified at high risk of hip fracture. Osteoporosis medication use was higher by the end of the first year in the screening group compared to controls (15.3% vs 4.5%, respectively). Treatment uptake was higher (78.3% at 6 months) in the screening high risk subgroup and led to a significant reduction in hip fractures (HR: 0.72, $p=0.0032$; 95%CI: 0.59, 0.89). A systematic, community-based screening programme of fracture risk in older women in the UK is therefore feasible, and reduces the risk of hip fractures cost effectively.

PL2

BONE MICROSTRUCTURE AND FRACTURE RISK: IMPLICATIONS FOR THE CLINICIAN

S. Ferrari¹

¹Service of Bone Diseases, Geneva University Hospital, Geneva, Switzerland

More than half of all fragility fractures occur in subjects with aBMD better than -2.5 T-scores, i.e. with osteopenia and sometimes even normal BMD. Notwithstanding the importance of falls and the highly variable energy that these falls may impact on the skeleton, this observation has pointed to the importance of alterations in bone quality, primarily bone microstructure, as a determinant of bone fragility above and beyond bone mineral mass. Of the few techniques allowing to evaluate bone microstructure non-invasively, peripheral high-resolution pQCT (HR-pQCT) has been the most commonly used. Many studies comparing women or men with / without prevalent fractures have shown that alterations in both the trabecular and cortical compartment at the distal radius and/or tibia are associated with fragility fractures. Ultimately, estimates of bone strength derived by FEA from the HR-pQCT parameters have proven to be better predictors of fracture risk than central aBMD. Very recently, some investigators have demonstrated that baseline assessment of radius vBMD and microstructure improves the prediction of incident fragility fractures beyond FN aBMD and FRAX. However, a study has also shown that aBMD measured at the distal radius captures most of the components of bone fragility measured by HR-pQCT at the same site.

Hence these studies have allowed the clinician to realize the importance of trabecular and cortical bone, particularly cortical porosity, as a main constituent of bone fragility and raised interest into understanding the differential effects of osteoporosis drugs on these parameters. Although the potential value of evaluating bone microstructure to predict fragility fractures has been demonstrated, the improvement over aBMD at the same site and/or FRAX is limited. Therefore, it remains

unlikely that the evaluation of bone microstructure and/or strength by currently available tools will find a place in clinical practice.

PL3

NEW PERSPECTIVES IN OSTEOARTHRITIS MANAGEMENT

P. Conaghan¹

¹Professor of Musculoskeletal Medicine, University of Leeds, Leeds, United Kingdom

In terms of recent developments in therapies for osteoarthritis (OA), we have seen a number of meta-analyses suggesting that paracetamol has very little benefit for OA pain; NSAIDs demonstrate reasonable benefits in such analyses, with significant side effects; and American data has highlighted many more problems with opioids than previously thought. However a number of new pharmacological therapies are on the way; most have been trialled in knee OA.

In terms of analgesics, a novel microsphere-based delivery system has enabled the development of a triamcinolone acetate-extended release formulation for intra-articular (IA) delivery, providing sustained IA presence. Phase II and III trials of this agent have demonstrated benefits over placebo through 12 weeks post injection, with studies in diabetic OA patients demonstrating no glucose flares. Results from an anti-interleukin1alpha/beta dual variable domain immunoglobulin (ABT-981) were however disappointing, with limited effects on pain and no benefits on MRI-assessed synovitis.

The efficacy of anti-nerve growth factor (NGF) therapies has long been established, though side effects such as rapidly progressive OA have delayed development. However a number of these anti-NGFs are now back in large phase III trials. These therapies have happily created more interest in the NGF nociceptive pathway, and recently a phase II study demonstrated analgesic benefits above placebo through 12 weeks following IA injection of synthetic trans-capsaicin which targets the transient receptor potential vanilloid 1 (capsaicin receptor) resulting in desensitisation of nociceptive neurones.

Structure modification of OA remains a difficult challenge, but putative pharmacological DMOADs are also showing promise, though perhaps not surprisingly on structural endpoints more than symptoms. There has been a trend for some of these therapies to be delivered IA for maximal local effect. Sprifermin is a recombinant human fibroblast growth factor 18 given IA that promotes chondrocyte growth, and recent 2yr results from a phase II RCT suggest reduction in cartilage loss with the active therapy, though no benefits above placebo for pain. Phase II data from an RCT of a small molecule Wnt signalling pathway inhibitor (SM04690) given IA has also

been reported, with sub-analyses reporting benefits on symptoms and Xray joint space width.

There has recently been increased understanding of the performance metrics of Xray and MRI, with modern supervised machine learning techniques enabling sensitive assessment of OA progression with reduced patient numbers. In a 6month phase II dose-ranging study of a novel oral cathepsin-K inhibitor (MIV-711), although the primary pain outcome was not achieved, significant reduction in MRI bone shape change (the most sensitive measure of OA progression and a predictor of joint replacement) was demonstrated with both doses of active agent.

PL4

MANAGEMENT OF IATROGENIC OSTEOPOROSIS

P. Hadji¹

¹Head of the Department of Bone Oncology, Endocrinology and Reproductive Medicine, Frankfurt, Germany

Osteoporosis is one of the most frequent diseases in postmenopausal women leading to an increased fracture risk due to the physiologic loss of the bone protective effects of estrogen. Hereby, several risk factors for fracture such as prevalent fracture, low BMD, age, low BMI, family history, tendency to falls, smoking, use of SSRIs, glucocorticoid use etc. have been identified. Additionally, the further reduction of endogenous estrogens with chemotherapy (CHT), GnRH-analogs or aromatase inhibitors (AI) continuously increases fracture risk. Breast cancer (BC) on the other hand is the most frequent cancer type in women. Recent reports indicated a continuous increased incidence while mortality, due to early diagnosis and treatment improvements is decreasing. Dependent on specific tumor characteristics, radiation, chemotherapy (CHT), antibody treatment as well as endocrine treatment has been introduced into the adjuvant clinical treatment setting.

Some but not all of this cancer specific treatments interfere with bone turnover leading to an accelerated bone loss referred to as cancer treatment induced bone loss (CTIBL). Whereas CHT leads to an unspecific increased bone resorption, Aromatase inhibitor (AI) reduces residual serum endogenous estrogen level and is associated with a decrease of bone mineral density (BMD) and increased fracture risk. Independent of the type of AI administered, bone loss is 2-3 fold increased compared to healthy, age matched postmenopausal controls. Therefore several guidelines have emerged to help managing CTIBL in women with BC including strategies to identify and treat those at highest risk for fractures. The talk will summarize the current knowledge on CTIBL and fracture risk and indicates current treatment guidelines and intervention options.

PL5**INFLAMMATION AND MUSCULOSKELETAL AGING**E. McCloskey¹¹University of Sheffield, Sheffield, United Kingdom

Chronic conditions associated with musculoskeletal aging contribute to a heavy functional and economic burden for our rapidly ageing population. The two most common chronic musculoskeletal disorders, osteoarthritis and osteoporosis, contribute to a high prevalence of disability among older adults and together with age-related loss of skeletal muscle mass and function (commonly described as sarcopenia), affect 30–60% of people over 65 years of age. These have major adverse effects on independence and quality of life of older individuals and, by limiting physical activity, amplify age-related risks or effects of multiple cardio-metabolic diseases, major cancers and neurodegenerative diseases.

Age is the greatest risk factor for these musculoskeletal disorders, and there have been dramatic advances in understanding the fundamental mechanisms underlying the ageing process itself. This information is informing investigations of the mechanisms underlying age-related degeneration of single tissues, including skeletal muscle, bone and cartilage and of interventions to ameliorating such degeneration.

Biological aging, as expected, has multiple mechanisms including redox stress, telomere attrition, mitochondrial dysfunction, glycation, dysregulation of the immune system, and hormonal changes. It is now widely recognised that chronic inflammation contributes to accelerate biological aging. Such chronic inflammation, arising within or external to the musculoskeletal system, is characterized by elevated levels of pro-inflammatory cytokines and has been termed “inflammaging”. Indeed, the vast majority of age-related diseases, including musculoskeletal diseases, share an inflammatory pathogenesis. Although definitive mechanisms remain unidentified, the proinflammatory phenotype of cells that have become senescent, under the impact of some of the mechanisms mentioned previously, is thought to play a key role in the initiation and progression of age-related diseases. Such observations raise many questions; can anti-inflammatory approaches reduce the burden of musculoskeletal age-related diseases?; can specific inhibition of musculoskeletal inflammation decrease age-related diseases in other tissues?; what is the impact of removal of senescent cells (via senolytics)? There remains a clear need to identify and test new strategies to reduce the incidence, and consequences, of common age-related chronic musculoskeletal disease.

PL6**NEW PERSPECTIVES IN FRAILTY AND SARCOPENIA MANAGEMENT**F. Landi¹, R. Calvani¹, M. Tosato¹, E. Marzetti¹¹Catholic University, School of Medicine, Rome, Italy

The bi-dimensional nature of sarcopenia implies that the operative definition should simultaneously capture both quantitative and qualitative declines occurring in skeletal muscle with aging. However, muscle mass is different from muscle strength and/or physical performance. Sarcopenia is a phenomenon that systematically occurs in all-skeletal muscles of an organism (potentially with different extents and velocities).

The methods designed to measure sarcopenia should be validated, standardized, repeatable, reliable, and accurate. All the available techniques are affected by different weaknesses partly related to the instrument (e.g., accuracy, costs, availability) and partly to the examined population (e.g., clinical conditions limiting the assessment and/or biasing the results). Consequently, all efforts should be made to identify a unique “golden standard” to be systematically adopted.

Identifying older adults with sarcopenia in clinical practice is an important task because it may allow for the implementation of therapeutic strategies that can impede the progression towards disability and other adverse outcomes. Regardless of the operational definition, the diagnosis of sarcopenia requires documentation of low muscle mass and low muscle function (strength or performance). The EWGSOP has proposed a population screening of all people 65 years and older. Accordingly, the evaluation should start with the measurement of 4-meter gait speed using a cut-off value of <0.8 m/s to identify those at risk of sarcopenia. Those who test positive should undergo subsequent quantification of muscle mass and muscle strength.

Popular assessment tools include body imaging techniques (e.g., magnetic resonance imaging, computed tomography, dual X-ray absorptiometry, ultrasonography), bioelectric impedance analysis, anthropometric parameters (e.g., calf circumference, mid-arm muscle circumference), and biochemical markers (total or partial body potassium, serum and urinary creatinine, deuterated creatine dilution method).

Over the last years, sarcopenia has gained its spotlight in biogerontology and clinical research. The recent assignment of a specific code for sarcopenia in the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10), valid as of October 1st 2016, will likely provide further impetus to the development of standards for the screening, diagnosis and monitoring of the condition. In such a context, the establishment of an international consensus on an accurate, reliable, and cost-effective method to assess muscle mass across research and clinical settings is of utmost importance.

Biomedical research is now progressing towards portability and miniaturization of imaging equipment and the identification of surrogate biomarkers for muscle mass. These advancements, together with a clear operationalization of sarcopenia, will allow clinicians, regulators, and policy-makers to overcome existing obstacles to the development of new treatments for sarcopenia and its negative outcomes.

PL7

MICROBIOTA AND BONE DISEASE

R. Rizzoli¹

¹Division of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland

The largest number of cells in the body are commensal microorganisms, such as bacteriae, virus and fungi, living in the intestine. They are referred to as the gut microbiota. Its composition varies with age and is influenced by genetic background, sex, living conditions, diet and drugs. The microbiome refers to the aggregate collection of genomes and genes present in gut microbiota. Products of gut microbiota metabolism influence gut endocrine function, intestine permeability, and the immune system, potentially contributing to the pathogenesis of various diseases. Imbalance in gut microbiota has been linked to inflammatory bowel disorders, colon cancer, obesity, diabetes mellitus, autoimmune diseases, neurological and psychiatric disorders. Concerning bone homeostasis, germ free mice, thus without microbiota, have higher bone mass, in both trabecular and cortical envelopes, but this seems to depend on the genetic background of the animals. Gut microbiota modulates and stimulate IGF-I synthesis by the host in a dynamic interaction, contributing thereby to influence bone growth. Prebiotics or oral antibiotics at subtherapeutic doses can modify gut microbiota, decrease large intestine pH, increase calcium absorption and enhance bone growth, in both animals and humans. Probiotics can reduce ovariectomy-induced increased bone resorption and bone loss. Calcium or vitamin D supplementation may modulate gut microbiota composition. Conversely, some probiotics may increase 25-hydroxyvitamin D levels. In addition to providing calcium and protein, fermented dairy products are a source of probiotics. Radius cortical bone loss is attenuated in yogurt consumers independently of total calcium and protein, total dairy products intakes, or physical activity. Whether yogurts-mediated changes in gut microbiota may contribute to this specific protective effect of fermented dairy product is not known yet. By modulating host metabolism and immune function, gut microbiota is becoming a new player in the controllers of bone turnover and bone health. Whether dietary or drug interventions capable of influencing microbiota composition, gene expression or production, can modify age-related bone fragility, hence fracture risk, remains to be investigated.

PL8

OBESITY, OSTEOPOROSIS DIAGNOSIS AND FRACTURE RISK

P. Ebeling¹

¹Department of Medicine/ School of Clinical Sciences at Monash Health, Monash University, Monash Medical Centre, Clayton, Australia

Bone and Muscle Health Research Group, Department of Medicine, School of Clinical Sciences at Monash Health, Faculty of Medicine, Nursing and Health Sciences, Monash University, Clayton, Australia

Previously, one of the proposed benefits of obesity was a reduced risk for osteoporotic fractures, accompanied by a higher bone mineral density, compared with non-obese age-matched peers. However, this hypothesis is not supported by the literature which has instead identified a more complex relationship. While obesity defined by body mass index (BMI) is generally associated with a lower fracture incidence, fracture risk at specific sites may be increased. In the Global Longitudinal Osteoporosis in Women (GLOW) study, fracture prevalence and incidence were similar for obese and non-obese women, however, the risk of incident ankle and upper leg fractures were significantly higher in obese. BMI is a better indicator of lean than fat mass and in over 43,000 Canadian older adults, higher lean mass was positively associated with femoral neck bone mineral density (BMD), whereas fat mass had no effect on BMD and adversely affected femoral strength index. Thus, higher lean mass, not fat mass, likely explains positive associations between higher BMI with BMD in older adults.

Body fat distribution may be more predictive of osteoporotic fractures than BMI. Men with higher levels of visceral adipose tissue have poorer bone mechanical properties, despite having similar BMD compared with those with low visceral adipose tissue. A recent meta-analysis also demonstrated that high waist circumference, a measure of abdominal adiposity, was associated with an almost 60% increased relative risk of hip fracture. While men in the underweight category have the highest incidence of hip fracture, most hip fractures occur in overweight or obese men. Metabolic and endocrine factors associated with an increased fracture risk in obesity include a higher risk of type 2 diabetes mellitus, lower vitamin D levels, lower testosterone levels in men, and a higher falls risk. Obesity can also be related to abnormalities in muscle mass and function, including intra- and inter-muscular adipose tissue infiltration, resulting in sarcopenic obesity or dynapenic obesity, when strength alone is considered. Sarcopenic and dynapenic obese older adults may have an increased risk of osteoporosis and non-vertebral fracture relative to obese alone counterparts. Sarcopenic and dynapenic obese individuals therefore potentially represent a subset of the obese older adult population who require closer monitoring of bone health during ageing. Finally, weight loss in obesity results in further

declines in muscle and bone mass that may increase falls and fracture risk. Incorporating exercise, particularly resistance training, into weight loss programmes can significantly reduce the loss of muscle and bone mass, and is therefore strongly recommended for obese older adults.

PL9

HOW TO MANAGE IMMINENT FRACTURE RISK

T. Thomas¹

¹INSERM U1059, Lab Biologie Intégrée du Tissu Osseux, Université de Lyon, Rheumatology Department, CHU Saint-Etienne, Saint-Etienne, France

A previous fracture at different sites is a well-documented risk factor for future fracture. This risk is highest immediately after the initial event and most studies showed that it subsequently declines with time, while it remains an important predictor of fracture risk for up to 10 years. A recent fall in the past year is another clinical risk of fracture that may occur in the short term, the so-called imminent fracture risk. The management of this clinical situation should rely on the rapid correction of these major risk factors even though their responsiveness to medical intervention still need further investigations.

Assessment and prevention of the circumstances leading to falls are certainly critical in this management including deficiencies in calcium, vitamin D and proteins, especially in very elderly and frail patients. Pharmacological treatment of bone fragility is the other corner stone of reduction in fracture risk eventually with the aim of restoring both trabecular and cortical bone strength. Few studies to date have evaluated the effect of treatment immediately following a first event of fracture or else in patients with an increased risk of fracture related to a high risk of falls. A research phase 3 clinical trial demonstrated the significant reductions in subsequent vertebral and non-vertebral fracture risk under zoledronic acid as well as reduced mortality in a specific population included within 3 months following a first hip fracture. More recent clinical trials adopted a time frame parameter in their inclusion criteria, especially those evaluating new bone forming agents such as abaloparatide and more recently romosozumab. Their properties could provide more effective fracture prevention in a short period of time particularly in those patients who had a recent prior fracture or else in those with profound bone deterioration. The arrival of these new bone forming agents should improve the armamentarium in that respect.

Early adoption of effective fracture-prevention strategies targeted to patients at increased risk of fracture is another critical aspect to reducing the healthcare burden of osteoporosis. Ongoing global initiatives, such as the International Osteoporosis Foundation's 'Capture the Fracture®' campaign, aim to develop a best practice framework that should improve such strategies.

PL10

COMBINED AND SEQUENTIAL THERAPY FOR OSTEOPOROSIS

M. McClung¹

¹Oregon Osteoporosis Center, Portland, OR, United States

Osteoporosis is the result of an imbalance in bone remodeling in which bone resorption is greater than formation. This process occurs over years or decades in postmenopausal women, older adults, and with various diseases, resulting in low bone mass, disruption of skeletal architecture, impaired bone strength and an increase risk of fragility fracture. Several classes of pharmacological agents that modulate bone remodeling have been demonstrated to significantly strengthen the skeleton and reduce the likelihood of fracture. Until recently, pivotal clinical trials leading to registration of these drugs have involved monotherapy. The possibilities now exist of using these various classes of drugs in combination or in sequence to optimize clinical outcomes.

Combining therapies: There is little or no advantage to combining anti-remodeling agents. The appeal of combining an anti-remodeling agent with a stimulator of bone formation has not been realized. The anabolic effect of PTH agonists persists but may not be improved when used with an estrogen agonist and is inhibited by bisphosphonates. The greater increase in BMD during the first year of combination therapy with denosumab and teriparatide occurs despite a significant decrease in indices of bone formation, raising concern that the improvements in trabecular architecture associated with teriparatide monotherapy may not occur this agent is combined with denosumab. Since anti-sclerostin therapy transiently increases bone formation and decreases resorption, it is unlikely that combining such agents with other remodeling modulators would be advantageous.

Sequential therapy: With the exception of bisphosphonates, the effect of osteoporosis treatments on bone remodeling and fracture protection abate quickly when treatment has stopped, necessitating a change to an anti-remodeling agent to maintain the treatment benefit when estrogen, SERMs, denosumab or anabolic therapies are discontinued. Recent evidence documents that the sequence of beginning an anabolic agent followed by a potent anti-remodeling drug results in faster and greater reduction in fracture risk than occurs when treatment is begun with an anti-remodeling drug, strongly indicating that this sequence should be considered in patients at imminent risk of fracture.

Since we do not as yet have a cure for osteoporosis, it is important to have a long-term management plan in mind when beginning osteoporosis treatment. The initial choice of a drug should be individualized, guided by the patient's risk of fracture and other clinical considerations. The strategy for long-term treatment will depend upon the patient's initial response to treatment, risk of possible side effects of therapies and other clinical considerations.

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OC1

ABALOPARATIDE FOR RISK REDUCTION OF NONVERTEBRAL AND VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: AN UPDATED NETWORK META-ANALYSIS

J.-Y. Reginster¹, F. Bianic², R. Campbell², M. Martin², S. A. Williams³, L. A. Fitzpatrick³

¹Université de Liège, Liege, Belgium, ²in Ventiv Health, London, United Kingdom, ³Radius Health, Inc., Waltham, United States

Objective: To assess the relative efficacy of abaloparatide compared with other osteoporosis treatment options (alendronate, denosumab, ibandronate, raloxifene, risedronate, romosozumab, strontium ranelate, teriparatide, zoledronic acid).

Methods: PubMed®, Embase® and Cochrane Central Register of Controlled Trials were searched for all randomized controlled trials published prior to December 20, 2017 including postmenopausal osteoporotic women (PMO) with and without prior fractures. Selection of trials for inclusion in the network meta-analysis (NMA) was based on populations (inclusion/exclusion criteria), interventions (dose/frequency), and outcomes (fracture assessment). NMA was conducted by fracture sites with relative risk (RR) of fractures as the main clinical endpoint.

Results: For vertebral fractures (VF) and nonvertebral fractures (NVF), 18 studies informed a network of 11 treatments and 21 studies informed a network of 11 treatments, respectively. For VF, abaloparatide had the greatest effect relative to placebo (RR 0.13; 95% CrI: 0.04–0.34) with estimates ranging from 0.27 for teriparatide to 0.71 for strontium ranelate. For NVF, abaloparatide had a greater risk reduction versus placebo

(RR 0.50; 95% CrI: 0.28–0.85) and most effective (with a probability of 0.70) versus teriparatide (RR 0.62; 95% CrI: 0.47–0.82) and romosozumab (RR 0.64; 95% CrI: 0.49–0.81). In a further evaluation of specific fracture sites, 10 studies reporting wrist fractures informed a network of 8 treatments. Abaloparatide was associated with the greatest effect versus placebo (RR 0.36; CrI: 0.14–0.80) and reduced the risk of fractures versus teriparatide (RR 0.44; CrI: 0.17–1) and denosumab (RR 0.43; CrI: 0.16–1.01). The NMA illustrated a good level of agreement with the direct trial evidence and direct pairwise comparisons.

Conclusions: Based on the current NMA, abaloparatide treatment resulted in a greater reduction in RR of both vertebral and nonvertebral fractures in PMO versus placebo in comparison with other treatment options. Generalizability is limited to the trials' population included in the NMA.

OC2

PERSISTENT FRACTURE RISK REDUCTION WITH ABALOPARATIDE-SC FOLLOWED BY 24 MONTHS OF ALENDRONATE

S. Papapoulos¹, H. G. Bone², L. A. Fitzpatrick³, B. Mitlak³, M.-Y. Hu³, G. Hattersley³, K. G. Saag⁴, R. Rizzoli⁵

¹Center for Bone Quality, Leiden University Medical Center, Leiden, The Netherlands, ²Michigan Bone & Mineral Clinic, P.C., Division of Metabolism, Endocrinology, and Diabetes, University of Michigan, Ann Arbor, United States, ³Radius Health, Inc., Waltham, United States, ⁴Department of Medicine, University of Alabama, Birmingham, United States, ⁵University Hospitals and Faculty of Medicine of Geneva, Geneva, Switzerland

Introduction: In the ACTIVE phase III trial, 2463 postmenopausal women with osteoporosis were randomized 1:1:1 to abaloparatide (ABL; $n = 824$), blinded placebo (PBO; $n = 821$), or open-label teriparatide ($n = 818$). During ACTIVE, ABL increased BMD and reduced vertebral, nonvertebral, clinical, and major osteoporotic fractures compared to PBO. Women who completed ABL or PBO treatment in ACTIVE were eligible to enroll in an extension study (ACTIVEExtend) to receive up to 24 months of open-label alendronate (ALN).

Objectives: To provide additional safety information and to evaluate vertebral and nonvertebral fracture endpoints.

Methods: The ACTIVEExtend study enrolled 558 women from the original ABL group and 581 from the PBO group of the ACTIVE study (92% of women who completed ABL or PBO treatment in ACTIVE). Pre-specified endpoints, including vertebral, nonvertebral, clinical, and major osteoporotic fractures, were assessed over the 43-month period from ACTIVE baseline to the end of ACTIVEExtend (18 months of ABL or PBO treatment, 1 month for re-consent, and 24 months of ALN treatment). Nonvertebral fracture endpoints were assessed using the Kaplan-Meier (KM) method, proportional hazard model, and log-rank test for patients enrolled in ACTIVEExtend and for the full ITT population randomized to ABL or PBO treatment in ACTIVE.

Results: During the 43-month period, 5.6% ($n = 32$) of evaluable women sustained a new morphometric vertebral fracture in the PBO followed by ALN (PBO/ALN) group compared to 0.9% ($n = 5$) in the ABL/ALN group, an 84% relative risk reduction ($p < 0.0001$).

The **Table** shows the KM rates of nonvertebral fracture endpoints over 43 months from ACTIVE baseline through the end of ACTIVEExtend for both the ACTIVEExtend cohorts as well as the full ACTIVE ITT population.

The incidence of adverse events (AEs) including severe and serious AEs during ALN treatment period was similar for both study groups. The most common AEs were arthralgia, URI, and back pain. No cases of atypical femoral fracture or osteonecrosis of the jaw were reported.

Conclusions: In the ACTIVEExtend study, administration of ABL for 18 months followed by ALN for 24 months resulted in sustained vertebral and nonvertebral fracture reduction compared to PBO followed by ALN. In the full randomized ACTIVE ITT population, over 43 months, in the ABL + ABL/ALN groups, there was a significant reduction in the incidence of vertebral and nonvertebral fractures as well as hip fractures compared to the PBO + PBO/ALN groups.

Table Kaplan-Meier Rates of Nonvertebral Fracture Endpoints 124 During the 43 Month Analysis Period (from ACTIVE Baseline 125 Through the end of ACTIVEExtend).

Fracture Type	ACTIVEExtend		Full ACTIVE + ACTIVEExtend	
	PBO/ALN $N = 581$	ABL/ALN $N = 558$	PBO + PBO/ALN $N = 821$	ABL + ABL/ALN $N = 824$
Nonvertebral				
KM rate, %	8.0	5.0	8.4	5.5
Log-rank P-value		0.0376		0.0378
Clinical				
KM rate, %	10.4	7.0	11.3	8.1
Log-rank P-value		0.0447		0.0451
Major Osteoporotic				
KM rate, %	7.2	3.7	8.2	3.5
Log-rank P-value		0.0109		0.0005
Hip				
No. of patients	3	0	5	0
KM rate, %	0.6	0.0	0.8	0.0
Log-rank P-value		0.0853		0.0274

OC3

COST-EFFECTIVENESS OF ABALOPARATIDE FOR THE TREATMENT OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

M. Hiligsmann¹, S. A. Williams², L. A. Fitzpatrick², J.-Y. Reginster³

¹Maastricht University, Maastricht, The Netherlands, ²Radius Health, Inc., Waltham, United States, ³University of Liege, Liege, Belgium

Objective: To estimate the cost-effectiveness of abaloparatide compared to alternative treatments for postmenopausal osteoporotic women.

Material and methods: A previously validated Markov microsimulation model was developed to estimate the cost-effectiveness of abaloparatide with a lifetime horizon. In the primary analysis, abaloparatide was compared to teriparatide and to no treatment. Patients were assumed to receive abaloparatide and teriparatide for 18 months, similar to the treatment period in the ACTIVE trial. In the secondary analysis, comparison was made to antiresorptive drugs denosumab (DMAB) and generic alendronate (ALN). The effect of DMAB on fracture risk was derived from the FREEDOM trial and the effect of generic ALN was derived from the NICE appraisal. Evaluation was done for high-risk patients defined as having 10-year risk of a major osteoporotic fracture $\geq 20\%$ based on IOF FRAX

tool or defined as those with prevalent vertebral fractures and BMD T-score ≤ -2.5 . Given that abaloparatide price is not yet available in EU, several scenarios including parity to teriparatide and 10–30% discount/premium were considered. Costs and utility values were derived from the literature.

Results: Over the lifetime horizon and 1,000,000 simulations for each treatment strategy, abaloparatide was cost-saving (lower costs for more QALYs) compared with teriparatide. The cost per QALY of abaloparatide compared with no treatment fell under a threshold recommended by WHO. In women with prevalent vertebral fracture and BMD T-score ≤ -2.5 , abaloparatide was cost-effective at a threshold of €50,000 per QALY gained compared to DMAB and generic ALN and across all age groups.

Conclusion: In patients at high risk of fragility fractures, abaloparatide is a cost-effective (dominant) alternative to teriparatide as well as antiresorptive agents DMAB and generic ALN.

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OC4

RESULTS FROM A 52-WEEK, PHASE 2A STUDY OF AN INTRA-ARTICULAR, WNT PATHWAY INHIBITOR, SM04690, FOR KNEE OSTEOARTHRITIS Y. Yazici¹, T. Mcalindon², A. Gibofsky³, N. Lane⁴, D. Clauw⁵, C. Swearingen¹, A. DiFrancesco¹, J. Tambiah¹, M. Hochberg⁶

¹Samumed, LLC, San Diego, United States, ²Tufts Medical Center, Boston, United States, ³Hospital for Special Surgery, New York, United States, ⁴UC Davis Medical Center, Davis, United States, ⁵University of Michigan, Ann Arbor, United States, ⁶University of Maryland School of Medicine, Baltimore, United States

Objective: Wnt signaling is upregulated in osteoarthritis (OA) and involved in cartilage degradation. SM04690 is a small molecule Wnt pathway inhibitor in development as a potential disease modifying osteoarthritis drug for knee OA. A phase 2a study was conducted to identify a target population and optimize dose. The primary endpoint was change from baseline in WOMAC Pain at Week 13. Secondary endpoints included change from baseline in WOMAC Pain, Function and change in

radiographic medial compartment joint space width (mJSW) at Week 52.

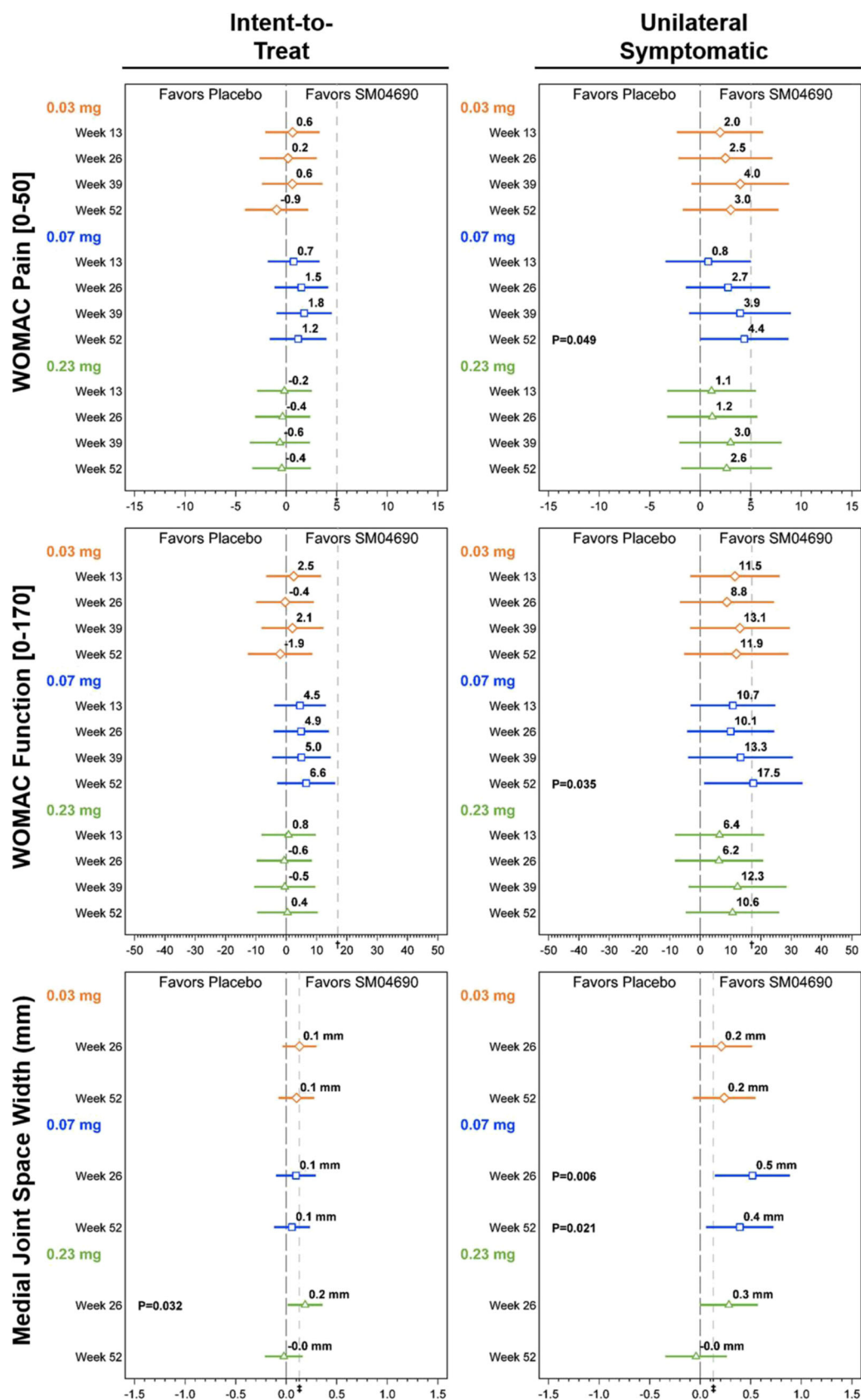
Material and Methods: Kellgren-Lawrence (KL) grades 2–3 knee OA subjects received a single 2 mL injection of SM04690 0.03 mg, 0.07 mg, 0.23 mg or saline (PBO) in their target (most painful) knee. WOMAC Pain and Function subscores were measured at Weeks 0, 4, 13, 26, 39 and 52. Knee radiographs (PA, weight-bearing, positioned) were taken at Weeks 0, 126, 52. Analysis of covariance adjusted for baseline with multiple imputation in the intent-to-treat (ITT) population and a pre-specified subgroup analysis of subjects with unilateral symptoms (US subgroup) were performed.

Results: 455 subjects (mean age 60.3 [± 8.7], BMI 29.9 [± 4.6] kg/m², female 58.9%, KL 3 [64.4%], US [36.0%]) were enrolled. SM04690 appeared well tolerated and incidence of adverse events was similar in active and PBO groups. In ITT, minimum clinically important differences ($>10\%$ range) from baseline were seen in all WOMAC subscores at all timepoints, but these changes in active treatment arms were not significant compared to PBO. In the US subgroup ($n = 164$), 0.07 mg SM04690 showed statistically significant improvements in WOMAC Pain (-4.4 , $P = 0.049$), WOMAC Function (-17.5 , $P = 0.035$) and mJSW (0.39 mm, $P = 0.021$) at Week 52 compared to PBO (Figure).

Conclusion: While the primary endpoint was not met, in a target population of subjects with unilateral symptoms treated with SM04690, WOMAC Pain, WOMAC Function, and mJSW were significantly improved over PBO. Further investigation of the 0.07 mg SM04690 Unilateral Symptomatic population is warranted.

Disclosures: Y. Yazici, C. Swearingen, A. DiFrancesco, and J. Tambiah are all employees and shareholders of Samumed, LLC. T. McAlindon: Consulting for and grant research support from Samumed, LLC and consulting for Astellas, Flexion, Pfizer, Regeneron, and Seikugaku. A. Gibofsky: Shareholder of Abbvie, Amgen, Johnson & Johnson, GSK, and Regeneron; consulting for Abbvie, Pfizer, Horizon Iroko, Celgene, Novartis/Sandoz, and Samumed, LLC; and speaker for Abbvie, Celgene, and Pfizer. N. Lane: Consulting for Samumed, LLC. D. Clauw: Consulting for AbbVie, Astellas, Cerephex, Eli Lilly, Forest Laboratories, Johnson and Johnson, Merck, Pfizer, Purdue, Samumed, LLC, Theravance, Tonix, UCB, Willams and Connolly LLP, and Zynherba. M. Hochberg: Consulting for Bioberica, EMD Serono, Novartis Pharma AG, Plexxikon, Pfizer, Proximagen, Regeneron, Samumud, LLC, and Theralogix LLC.

Improvement of SM04690 over Placebo



*Minimal clinically important difference (MCID) defined as 10% of WOMAC Pain scale, or 5 points.

†MCID defined as 10% of WOMAC Function scale, or 17 points.

‡Minimum detectable difference (MDD) defined as 0.13 mm of medial joint space width.

OC5

JOINT SPACE WIDTH CRITERIA CAN REDUCE KNEE OA TRIAL HETEROGENEITY: PHASE 2 POST-HOC DATA FROM WNT PATHWAY INHIBITOR, SM04690

P. Conaghan¹, J. Tambiah², C. Swearingen², S. Kennedy², M. Bowes³, A. Brett³, C. Latterman⁴

¹University of Leeds, Leeds, United Kingdom, ²Samumed, LLC, San Diego, United States, ³Imorphics, Manchester, United Kingdom, ⁴University of Kentucky, Lexington, United States

Objective: Limitations of Kellgren-Lawrence (KL) grading in osteoarthritis (OA) trials include inconsistent interpretation leading to study population heterogeneity. Knees with radiographic 2–4 mm medial joint space width (mJSW) showed improved responsiveness for OA biomarkers over 12 months¹. This criterion was applied post-hoc to data from a phase 2 trial of SM04690, a small molecule Wnt pathway inhibitor in development as a potential disease modifying knee OA drug (DMOAD). **Material and Methods:** Knee OA subjects, KL grades 2–3, were randomized to receive a single 2 mL intra-articular injection of 0.03 mg, 0.07 mg, or 0.23 mg SM04690 or placebo (PBO) into the target (most painful) knee at Day 0. Radiographs (PA, weight-bearing, QuAP positioned), were taken at Weeks 0 and 52. Two blinded, centralized readers measured mJSWs that were subsequently compared in a post-hoc manner between

specified groups (ITT, KL 2, KL 3, mJSW 2–4 mm). Heterogeneity was assessed with mJSW ‘box’ and ‘whisker’ plots. Finally, to assess effects of baseline heterogeneity, Week 52 in-group changes in mJSW were compared.

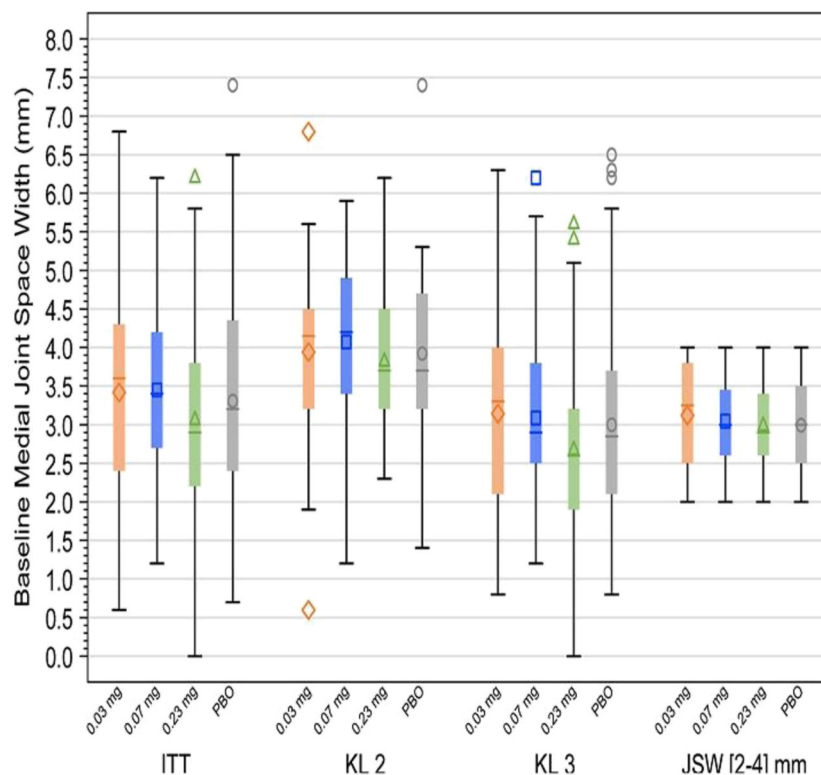
Results: Of 453 subjects, 161 were graded as KL 2, 290 as KL 3, and 258 had baseline 2–4 mm mJSWs. Baseline heterogeneity was reduced in the 2–4 mm group compared to ITT, KL2, and KL3 groups (Figure). Observed mJSW changes at Week 52 compared to PBO were beyond measurement error (>0.13 mm)² for 0.03 mg and 0.07 mg SM04690 doses in the 2–4 mm group, and 0.03 mg dose in the KL 2 group (Table).

Conclusion: A less heterogeneous baseline reduces measurement variability, which may therefore reduce the required population size in a clinical trial, whilst maintaining statistical power to detect change beyond radiographic measurement error. Specific mJSW inclusion criteria should be considered in knee DMOAD trials.

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References:

¹Bowes et al. EULAR 2017, ²Dupuis et al. OAC 2003.



Box and Whisker plot of Baseline JSW in the ITT, in Kellgren-Lawrence Grade 2, Kellgren-Lawrence Grade 3, and restricted within 2-4 mm.

Interior Bar: Median; Box: Interquartile [25th-75th] range; Whisker: 1.5x Interquartile Range; Interior Symbol: Mean; Exterior Symbol: Outlier

Table. mJSW measurements by group

ITT				
	0.03 mg	0.07 mg	0.23 mg	PBO
N	112	117	110	116
Baseline (mm) [Mean (SE)]	3.42 (0.12)	3.45 (0.10)	3.06 (0.12)	3.31 (0.13)
Week 52 Change from Baseline	-0.04 (0.06)	-0.09 (0.06)	-0.16 (0.07)	-0.14 (0.06)
Week 52 Compared to PBO	0.10 (0.09)	0.06 (0.09)	-0.02 (0.09)	—
P-value	0.259	0.529	0.807	—
Baseline Kellgren-Lawrence Grade 2				
	0.03 mg	0.07 mg	0.23 mg	Placebo
N	38	43	39	41
Baseline (mm) [Mean (SE)]	3.94 (0.20)	4.07 (0.16)	3.82 (0.14)	3.92 (0.17)
Week 52 Change from Baseline	0.10 (0.10)	-0.13 (0.09)	-0.08 (0.07)	-0.13 (0.11)
Week 52 Compared to PBO	0.23 (0.15)	0.02 (0.14)	0.06 (0.14)	—
P-value	0.129	0.891	0.681	—
Baseline Kellgren-Lawrence Grade 3				
	0.03 mg	0.07 mg	0.23 mg	Placebo
N	73	74	69	74
Baseline (mm) [Mean (SE)]	3.14 (0.14)	3.09 (0.12)	2.67 (0.15)	3.00 (0.16)
Week 52 Change from Baseline	-0.12 (0.07)	-0.07 (0.09)	-0.24 (0.09)	-0.16 (0.09)
Week 52 Compared to PBO	0.03 (0.11)	0.09 (0.12)	-0.09 (0.13)	—
P-value	0.774	0.473	0.502	—
Baseline JSW between 2 to 4 mm				
	0.03 mg	0.07 mg	0.23 mg	PBO
N	56	72	65	65
Baseline (mm) [Mean (SE)]	3.12 (0.09)	3.05 (0.06)	2.98 (0.07)	2.99 (0.07)
Week 52 Change from Baseline	-0.03 (0.08)	-0.03 (0.08)	-0.16 (0.09)	-0.22 (0.09)
Week 52 Compared to PBO	0.19 (0.13)	0.19 (0.12)	0.06 (0.13)	—
P-value	0.144	0.121	0.624	—

OC6

SYSTEMATIC SCREENING USING FRAX LEADS TO INCREASED USE OF, AND ADHERENCE TO, ANTI-OSTEOPOROSIS MEDICATIONS: THE UK SCOOP TRIAL

C. Parsons¹, N. Harvey¹, L. Shepstone², J. A. Kanis³, E. Lenaghan⁴, S. Clarke⁵, R. Fordham², N. Gittoes⁶, I. Harvey⁴, R. Holland², A. Heawood⁵, N. Redmond⁵, A. Howe⁴, T. Marshall⁴, T. J. Peters⁵, D. Torgerson⁷, T. W. O'Neill⁸, E. McCloskey⁹, C. Cooper¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ²University of East Anglia, Norwich, United Kingdom, ³Centre for Metabolic Bone Disease, University of Sheffield, Sheffield, United Kingdom, ⁴University of East Anglia, Norwich,

United Kingdom, ⁵University of Bristol, Bristol, United Kingdom, ⁶Queen Elizabeth Hospital, Birmingham, United Kingdom, ⁷University of York, York, United Kingdom, ⁸University of Manchester, Manchester, United Kingdom, ⁹Centre for Metabolic Bone Diseases, University of Sheffield, Sheffield, United Kingdom

Objectives: We aimed to investigate the effect of a population based, primary care-led fracture risk screening intervention, on initiation of anti-osteoporosis medication (AOM), and subsequent adherence.

Methods: The 'Screening for prevention of fracture in older women' (SCOOP) study was a UK multi-centre RCT of screening for osteoporotic fracture risk. 12,483 women (70–85 years) were randomised to either assessment using the

FRAX tool $\pm$ DXA BMD, with medication recommended for those found to be at high fracture risk, or to usual NHS care. Self-reported AOM use was obtained by postal questionnaire at 6, 12, 24, 36, 48 and 60 months. Ordered logistic regression was used to explore baseline determinants of adherence (defined as % study visits at which participants reported taking AOM, following a positive report at the index visit).

Results: The mean (SD) age of participants was 75.6 (4.2) years, with 6233 randomised to screening and 6250 to the control group. At 6 months, 73.8% of participants classified at high fracture risk reported taking AOM (and 12.3% of all screening participants), compared with 2% of all participants in the control group. 37.1% in the screening group on treatment at 6 months were still treated at 60 months; the respective figure for the control group was 21.6%. For those participants commenced on treatment later during follow-up, rates of adherence at 60 months became increasingly similar between intervention and control participants (e.g. 70.3% vs 68.1% respectively at 60 months for treatment initiated at 48 months). Older age was associated with lower adherence [OR 0.96 (95%CI: 0.93, 0.98), $p = 0.001$] and history of parental hip fracture with greater adherence [OR 1.68 (95%CI: 1.28, 2.20), $p < 0.001$].

Conclusion: Systematic fracture risk screening using FRAX leads to markedly greater use of AOM and greater adherence, in women at high fracture risk, compared with usual care. These findings inform public health strategies aimed at reduction of fragility fractures.

OC7

LOCAL OSTEO-ENHANCEMENT PROCEDURE UTILIZING A NOVEL TRIPHASIC CALCIUM BASED IMPLANT INCREASES LONG TERM FEESTIMATED PROXIMAL FEMUR STRENGTH IN OSTEOPOROTIC WOMEN

T. Keaveny¹, M. Bouxsein², D. Lee¹, J. Stronck³, R. Hill³, J. Howe³, B. Huber⁴

¹O.N. Diagnostics, Berkeley, United States, ²Harvard University, Cambridge, United States, ³AgNovos Healthcare, Rockville, United States, ⁴Copley Hospital, Morrisville, United States

Objective: To assess femoral strength using CT-based finite element analysis (FEA) in postmenopausal osteoporotic women treated with a local osteo-enhancement procedure (LOEP) to deliver a novel triphasic calcium based implant (AGN1) to the proximal femur.

Material and Methods: One proximal femur in each of 12 post-menopausal osteoporotic women was treated with AGN1 LOEP, the contralateral serving as an untreated control. CT scans were taken pre-operatively and at 12, 24 weeks ($N = 12$), and 315 weeks ($N = 10$). We used patient-specific, non-linear FEA of the CT scans to non-invasively estimate hip strength in

simulated sideways fall and stance loading conditions (VirtuOst, O.N. Diagnostics, Berkeley, CA). A scale factor was applied assuming that either 100% ($\alpha = 1.0$) or, conservatively, 30% ($\alpha = 0.30$) of any tissue within the injected bolus volume was normal load-bearing bone.

Results: Mean patient age was 72 years. T-scores of the treated and control hips were similar at baseline (mean $\pm$ SD; -3.1 ± 0.5 and -3.0 ± 0.7). For a sideways fall, strength increased significantly in treated versus control femurs with $\alpha = 1.00$ and 0.30, respectively, at 12 weeks ($63 \pm 32\%$ and $45 \pm 30\%$), 24 weeks ($58 \pm 27\%$ and $40 \pm 25\%$) and 315 weeks ($37 \pm 15\%$ and $23 \pm 15\%$); for stance loading, strength increased only with $\alpha = 1.00$ (data not shown). Mechanistically, at early time points newly formed bone adjacent to the implant area provided additional pathways for load transfer. The analysis suggests there is new integrated load-bearing bone within the implant area through 315 weeks.

Conclusions: These results suggest that AGN1 LOEP of the proximal femur in osteoporotic women can substantially increase proximal femoral strength for a sideways fall, the effect starting soon after treatment and persisting for at least 5–7 years.

Disclosures: M.B. consults with AgNovos Healthcare; D.F., R.H., J.H. employees of AgNovos Healthcare; T.K. consults with AgNovos Healthcare and O.N. Diagnostics, stock in O.N. Diagnostics.

OC8

A META-ANALYSIS OF 4 CLINICAL TRIALS OF DENOSUMAB (DMAB) COMPARED WITH BISPHOSPHONATES (BPS) IN POSTMENOPAUSAL WOMEN PREVIOUSLY TREATED WITH ORAL BISPHOSPHONATES (OBPS)

P. D. Miller¹, N. Pannacciulli², J. Malouf³, A. Singer⁴, E. Czerwinski⁵, H. G. Bone⁶, C. Wang², R. B. Wagman², J. P. Brown⁷

¹Colorado Center for Bone Research, Lakewood, United States, ²Amgen Inc., Thousand Oaks, United States, ³Hospital de la Santa Creu i Sant Pau, Barcelona, Spain, ⁴Georgetown University Medical Center, Washington, United States, ⁵Krakow Medical Center, Krakow, Poland, ⁶Michigan Bone and Mineral Clinic, Detroit, United States, ⁷CHU de Quebec Research Centre and Laval University, Quebec City, Canada

Objective: Meta-analysis of randomized studies comparing the safety and efficacy of transitioning to DMAB versus continuing on oBPs.

Materials and Methods: Data were pooled from 4 randomized studies in postmenopausal women with low bone mass or osteoporosis, aged ≥ 55 years, pretreated with oBPs, and randomized 1:1 to DMAB (60 mg every

6 months) or an oral (alendronate 70 mg weekly, ibandronate or risedronate 150 mg monthly) or intravenous (zoledronic acid 5 mg yearly) BP for 12 months. Percentage (%) change from baseline (BL) BMD at the lumbar spine, total hip, femoral neck and 1/3 radius (assessed in 2 studies) at month 12; % change from BL in serum C-terminal telopeptide of type I collagen (sCTX; subset of 1058 subjects) at 1, 6 and 12 months (in 2 studies); and safety were assessed. Fractures were collected as adverse events (AEs) and not adjudicated.

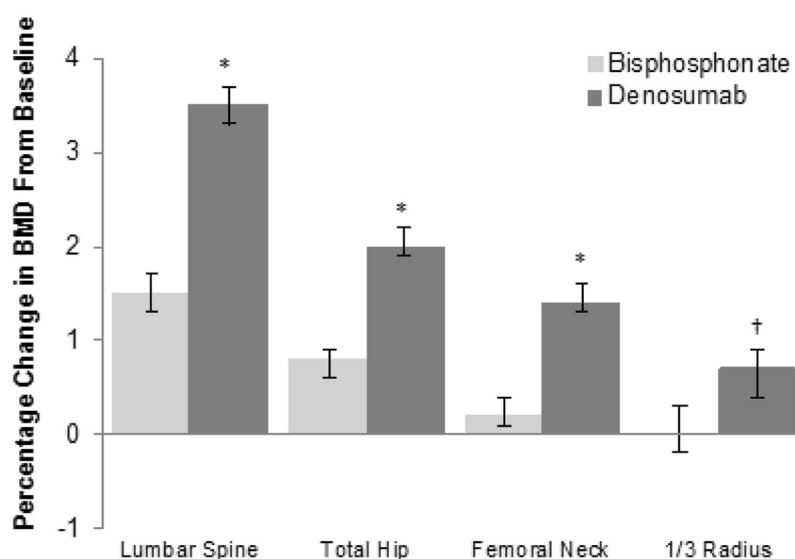
Results: 2850 subjects were included (1426 DMAB; 1424 BP): mean (SD) age, 68 (8) years; mean (SD) lumbar spine BMD T-score, -2.5 (1.0); mean (SD) duration of prior oBP use, 3.8 (3.6) years. BMD % change from BL at month 12 was significantly greater with DMAB vs BPs at all measured sites (Figure) and independent of length of

prior BP use (<2 or ≥ 2 years) at all sites measured (except for 1/3 radius for those with <2 years of prior BP use). Median sCTX % decrease from BL was greater with DMAB than BPs at months 1 (-58% vs -12%), 6 (-36% vs -14%), and 12 (-26% vs 8%; all $p < 0.0001$). Overall AEs/serious AEs were similar between groups. There were no cases of osteonecrosis of the jaw. Three events consistent with the definition of atypical femoral fracture were observed (2 DMAB; 1 BP). Osteoporosis-related fractures were reported in 47 (3.3%) DMAB and 43 (3.1%) BP subjects.

Conclusion: These data show greater clinical benefit with increases in BMD, reductions in bone turnover, and similar safety profile in transitioning from oBPs to DMAB, compared with continuing on or cycling through BPs.

Acknowledgement: Funded by Amgen Inc.

Figure. Percentage Change in BMD From Baseline at Month 12



* $p < 0.0001$ and † $p = 0.001$ denosumab vs bisphosphonate.

Data are least-squares means and 95% confidence intervals based on an ANCOVA model adjusting for treatment, duration of prior bisphosphonate use, baseline BMD, study, DXA machine type, and baseline-BMD-value-by-machine-type interaction. 1/3 radius was assessed in 2 of the 4 studies.

OC9

TEN-YEAR CONTINUED NONVERTEBRAL FRACTURE (NVFX) REDUCTION IN POSTMENOPAUSAL OSTEOPOROSIS WITH DENOSUMAB (DMAB) TREATMENT

S. Ferrari¹, P. W. Butler², D. L. Kendler³, P. D. Miller⁴, C. Roux⁵, A. T. Wang², R. B. Wagman², E. M. Lewiecki⁶

¹Geneva University Hospital, Geneva, Switzerland,

²Amgen Inc., Thousand Oaks, United States,

³University of British Columbia, Vancouver, Canada,

⁴Colorado Center for Bone Research, Lakewood, United States,

⁵Paris Descartes University, Paris, France,

⁶New Mexico Clinical Research & Osteoporosis Center, Albuquerque, United States

Objective: Assess long-term fracture rates with up to 10 years of DmAb treatment in the FREEDOM EXT.

Methods: In FREEDOM, subjects were randomized to placebo or DmAb 60 mg every 6 months (Q6M) for 3 years. Those who missed ≤ 1 dose could enroll in the 7-year EXT, in which all subjects received open-label DmAb; long-term (LT) subjects could receive up to 10 years of DmAb and XO subjects up to 7 years of DmAb. NVFX rate in the first 3 years of DmAb was compared with 1) years 4–7 in LT and XO groups separately and combined, and 2) years 4–10 in the LT group. Adjusted rate ratios (RR, 95% confidence intervals [CIs]) between time periods were computed by generalized estimating equation Poisson regression.

Results: Of 5928 subjects eligible for the EXT, 4550 (77%) enrolled ($N = 2343$ LT; $N = 2207$ XO). Baseline characteristics at FREEDOM and EXT and percent of subjects completing the EXT were balanced across groups. In the LT group, NVFX rate (95% CI) was

1.98 (1.67–2.34) per 100 subject-years over the first 3 years of DmAb treatment, 1.54 (1.29–1.83) over years 4–7 (RR 0.79, $p = 0.046$; Table), and 1.44 (1.24–1.66) over years 4–10 (RR 0.74, $p = 0.008$). In the XO group, NVFX rate was 2.37 (1.97–2.84) during the first 3 years and 1.52 (1.24–1.87) during years 4–7 (RR 0.65, $p = 0.002$). In the combined LT + XO group, NVFX rate was 2.15 (1.90–2.43) during the first 3 years and 1.53 (1.34–1.75) during years 4–7 (RR 0.72, $p < 0.001$). For 6089 subjects exposed to DmAb in FREEDOM or the EXT, the rate of bone safety events (ONJ or AFF) was 4.2 per 10,000 subject-years.

Conclusion: Compared with the first 3 years of DmAb treatment, a longer duration of DmAb therapy was associated with a further decrease in NVFX rate through 10 years. Long-term reduction in bone remodeling is not only associated with continued increases in BMD (Bone ASBMR 2016), but also with a favorable benefit/risk profile for bone.

Funding: Amgen Inc.

Table. Comparison of Nonvertebral Fracture Rates up to 10 Years of Denosumab Treatment

	First 3 Years of DmAb Treatment	Years 4–7 of DmAb Treatment	Years 4–10 of DmAb Treatment
Long-term Subjects ($N = 2343$)	140 Fractures	126 Fractures	184 Fractures
Fracture Rate (95% CI)	1.98 (1.67–2.34)	1.54 (1.29–1.83)	1.44 (1.24–1.66)
Rate Ratio (95% CI)	[Referent]	0.79 (0.62–1.00)	0.74 (0.60–0.93)
<i>p</i> -value		$p = 0.046$	$p = 0.008$
Cross-over Subjects ($N = 1731$)	123 Fractures	91 Fractures	
Fracture Rate (95% CI)	2.37 (1.97–2.84)	1.52 (1.24–1.87)	
Rate Ratio (95% CI)	[Referent]	0.65 (0.50–0.86)	
<i>p</i> -value		$p = 0.002$	
Long-term and Cross-over Subjects Combined ($N = 4074$)	263 Fractures	217 Fractures	
Fracture Rate (95% CI)	2.15 (1.90–2.43)	1.53 (1.34–1.75)	
Rate Ratio (95% CI)	[Referent]	0.72 (0.61–0.86)	
<i>p</i> -value		$p < 0.001$	

N = number of subjects who completed FREEDOM (ie, completed their 3-year visit and did not discontinue IP), did not miss >1 dose of IP in FREEDOM, and who enrolled in the Extension. In addition, cross-over subjects completed 3 years of the extension and did not miss >1 dose of DmAb during the first 3 years of the Extension. Fracture rates and rate ratios were obtained using generalized estimating equation Poisson models; fracture rates are per 100 subject-years. Rate ratios relative to the first 3 years of DmAb treatment were adjusted for age, total hip BMD T-score, weight, and history of nonvertebral fracture. In addition, the treatment group variable was included in the model for the combined analysis only.

OC10

DENOSUMAB IMPROVES GLYCEMIC CONTROL OF TYPE 2 DIABETIC PATIENTS WITH OSTEOPOROSIS

C. K. Chew¹, S. Khosla², R. Rizza², J. Geske³, B. Clarke²

¹Department of Endocrinology, Tan Tock Seng Hospital, Singapore, Singapore, ²Division of Endocrinology, Diabetes, Metabolism, and Nutrition, Mayo Clinic, Rochester, United States, ³Division of Biomedical Statistics and Informatics, Mayo Clinic, Rochester, United States

Objective: Denosumab (DMab) has been shown to stimulate human beta cell proliferation through inhibition of RANKL pathway in mice.¹ The primary aim of this study was to determine if DMab could improve glyce-mic control in T2DM or preDM patients with osteoporosis.

Methods: This was a retrospective case control study of subjects aged 45 to 100 years with T2DM or preDM and osteoporosis treated at Mayo Clinic between 01/01/2009 and 07/13/2016. Subjects were divided into 3 groups based on osteoporosis treatment with DMab, oral or IV bisphosphonate (BP), or calcium and/or vitamin D (Ca/vitD) supplementation. They were matched for age, sex, BMI and duration of T2DM or preDM in each group. Fasting plasma glucose (FPG), hemoglobin A1c (HbA1c) and weight were assessed at 0, 6 and 12 months after subjects started osteoporosis treatment.

Results: There were 115 eligible subjects in each group. Subjects in the DMab group were older. There were no significant differences in sex, BMI, duration of T2DM or preDM, baseline HbA1c and baseline FPG between the groups. From 0 to 12 months, there was significant difference in HbA1c change amongst the groups (Ca/vitD: +0.14%, BP: +0.30%, DMab: -0.29%; p -value = 0.01). There was also significant difference in weight change amongst the groups from 0 to 6 months (Ca/vitD: -0.17 kg, BP: +0.95 kg, DMab: -0.99 kg; p -value = 0.01) and from 0 to 12 months (Ca/vitD: -0.25 kg, BP: +0.81 kg, DMab: -2.47 kg; p -value = 0.0003). There was no significant difference in FPG change at any time point across the groups. When the groups were divided into subgroups of subjects with T2DM or preDM, the difference in HbA1c change from 0 to 12 months and difference in weight change from 0 to 6 months and from 0 to 12 months amongst the groups remained statistically significant in subjects with T2DM. However, in subjects with preDM, only the difference in weight change from 0 to 6 months and from 0 to 12 months amongst the groups remained statistically significant.

Conclusion: DMab is useful for treatment of osteoporosis. Our study demonstrates that it may also be useful for glucose lowering, especially in osteoporotic patients with T2DM.

Reference:

1. Kondegowda NG, et al. Osteoprotegerin and denosumab stimulate human beta cell proliferation through inhibition of the Receptor Activator of NF- κ B Ligand pathway. *Cell Metabolism*. 2015;22:77–85.

OC11

EVALUATION OF INVASIVE ORAL PROCEDURES AND EVENTS (OPES) IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS (PMO) TREATED FOR UP TO 10 YEARS WITH DENOSUMAB (DMAB): RESULTS FROM THE PHASE 3 FREEDOM OPEN-LABEL EXTENSION (EXT)

N. B. Watts¹, J. T. Grbic², N. Binkley³, P. W. Butler⁴, X. Yin⁴, A. Tierney⁴, R. B. Wagman⁴, M. McClung⁵

¹Mercy Health, Cincinnati, United States, ²Columbia University, New York, United States, ³University of Wisconsin School of Medicine and Public Health, Madison, United States, ⁴Amgen Inc., Thousand Oaks, United States, ⁵Oregon Osteoporosis Center, Portland, United States

Objective: Evaluate OPEs (specifically, scaling/root planing, tooth extraction, dental implant, natural tooth loss, jaw surgery) in women with PMO treated with DMab for up to 10 years (yrs) in FREEDOM Ext.

Materials and Methods: In FREEDOM, women with PMO were randomized to DMab 60 mg or placebo (PBO) SC every 6 months for 3 yrs. Those who missed ≤ 1 dose of DMab or PBO and completed the Yr 3 visit were eligible for the 7 yr. open-label Ext and received DMab regardless of original treatment assignment. Women who reached the Ext Yr 3 visit were asked to record their history of invasive OPEs since the start of the Ext to Yr 2.5 and oral events (including jaw surgery) in the prior 6 months. The questionnaire was then administered every 6 months until the end of the Ext.

Results: During the Ext, the rate of osteonecrosis of the jaw (ONJ) was 5.2 per 10,000 patient-yrs. The majority of women (79%; 3591/4550) completed at least one OPE questionnaire. Of these, 1621 (45.1%) reported at least one invasive OPE (Table; incidence of individual OPEs similar across groups). There were 12 confirmed ONJ cases among women who completed the questionnaire (11 had OPE) and one case in a woman who did not. ONJ incidence was 0.7% (11/1621) in women reporting invasive OPEs and 0.05% (1/1970) in women reporting no invasive OPEs. Of the 12 ONJ cases with questionnaire results, 10 resolved with treatment, one outcome was unknown, one was ongoing at the end of study.

Conclusion(s): Nearly all ONJ cases observed in FREEDOM Ext occurred after a reported invasive OPE. While invasive OPEs were common in this group of DMab-treated women with PMO, ONJ incidence was low. The actual number of invasive OPEs may be underestimated due to limited data capture in medical charts and recall bias in subjects with events occurring

in the first 2.5 yrs. of the Ext. ONJ is an adverse event of interest that continues to be monitored in DMAB pharmacovigilance activities.

Acknowledgements: Funded by Amgen Inc.

Table: Invasive OPEs during the EXT for patients who completed at least one oral event questionnaire

	7-yr FREEDOM Extension		
	Cross-over (N = 1731)	Long-term (N = 1860)	All (N = 3591)
Age at EXT baseline in yrs., mean (SD)	74.3 (4.9)	74.4 (4.8)	74.3 (4.8)
Any invasive oral procedure or event, n (%)	795 (45.9)	826 (44.4)	1621 (45.1)
Scaling root <u>planing</u>	503 (29.1)	531 (28.5)	1034 (28.8)
Tooth extraction	434 (25.1)	458 (24.6)	892 (24.8)
Dental implant	100 (5.8)	112 (6.0)	212 (5.9)
Natural tooth loss	72 (4.2)	75 (4.0)	147 (4.1)
Jaw surgery*	16 (0.9)	17 (0.9)	33 (0.9)

N = Number of patients who received ≥ 1 dose of investigational product in the EXT and responded to ≥ 1 oral event questionnaire related to the EXT

n = Number of patients with an OPE

*Collected in the oral event survey every 6 months; therefore, jaw surgery in the first 2.5 years of the EXT was not captured

OC12

EFFECTS OF ROMOSUZUMAB IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AFTER 2 AND 12 MONTHS ASSESSED BY MICRO COMPUTED TOMOGRAPHY AND HISTOMORPHOMETRY ON ILIAC CREST BONE BIOPSIES

P. Chavassieux¹, R. Chapurlat¹, J.-P. Roux¹, N. Portero-Muzy¹, P. Garcia², J. P. Brown³, S. Horlait⁴, C. Libanati⁵, R. Boyce⁶, A. Wang⁶, A. Grauer⁶

¹INSERM UMR 1033, Université de Lyon, Lyon, France, ²Hospital Universitario de Monterrey, Monterrey, Mexico, ³CHU de Quebec Research Centre and Laval University, Quebec, Canada, ⁴Amgen Inc., Boulogne-Billancourt, France, ⁵UCB Pharma, Brussels, Belgium, ⁶Amgen Inc., Thousand Oaks, CA, United States

Objective: Romosozumab, a sclerostin antibody, increases bone formation and BMD, and reduces bone resorption and fracture risk. We evaluated the effects of romosozumab on iliac crest bone biopsies by histomorphometry (HM) and microCT in postmenopausal women with osteoporosis participating in the FRAME trial (NCT01575834).¹

Methods: Women received romosozumab (ROMO) 210 mg or placebo (PBO) monthly for 12 months (m) and underwent transiliac biopsies at 2 m or 12 m. For microCT assessment, 28 women (14 PBO, 14 ROMO) were evaluable at 2 m, and 71 (32 PBO, 39 ROMO) at 12 m. For the HM assessment, 29 women (14 PBO, 15 ROMO) underwent quadruple fluorochrome labelling at 2 m, and 70 (31 PBO, 39 ROMO) double labelling at 12 m.

Results: At 2 m vs 0 m, BFR/BS significantly increased in cancellous and endocortical bone with ROMO ($p < 0.001$) with no significant change with PBO. From 0 m to 2 m, BFR/BS increased in cancellous bone by +328% (ROMO) vs +79% (PBO; $p = 0.007$) and in endocortical bone by +233% (ROMO) vs -34% (PBO; $p < 0.001$). At 2 m and 12 m, resorption indices (ES/BS) significantly decreased in cancellous and endocortical bone with ROMO vs PBO. Over 12 m there were significant increases in W.Th, bone mass Tb.Th and Ct.Th with ROMO vs PBO (all $p \leq 0.03$), with normal bone texture and quality. At 2 m, microCT showed a significant decrease in Tb.Sp with ROMO vs PBO ($p = 0.046$); at 12 m, Tb.BMD, Tb.TMD and Tb.BV/TV (Figure) significantly increased with ROMO vs PBO (all $p < 0.05$). The significant increase in Tb.Th ($p = 0.001$) and decrease in TBPf ($p = 0.03$) suggested an improvement of the microarchitecture with ROMO vs PBO.

Conclusion: Romosozumab treatment for 12 m led to an early, significant bone-forming effect associated with a sustained decrease in bone resorption. These effects were associated with increased bone mass and improved microarchitecture.

Reference:

1. Cosman F et al. N Engl J Med 2016;375:1532–43.

Funding: Amgen Inc., Astellas Pharma, UCB Pharma.



Figure: Bone samples representative of the median observed results at Month 12

OC13

A PHASE 3 RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY INVESTIGATING THE EFFICACY AND SAFETY OF BUROSUMAB, AN ANTI-FGF23 ANTIBODY, IN ADULT X-LINKED HYPOPHOSPHATEMIA (XLH)

P. Kamenický¹, R. Lachmann², T. O. Carpenter³, M. Cohen-Solal⁴, R. Eastell⁵, M. L. Brandi⁶, R. K. Crowley⁷, S. H. Ralston⁸, M. K. Javaid⁹, R. Keen¹⁰, K. Briot¹¹, H. I. Cheong¹², Y. Imanishi¹³, N. Ito¹⁴, H. Tanaka¹⁵, L. Zhang¹⁶, C. Theodore-Oklota¹⁶, M. Mealiffe¹⁶, J. San Martín¹⁶, K. L. Insogna³

¹Université Paris-Sud, Le Kremlin Bicêtre, France,

²University College London Hospitals, London, United Kingdom,

³Yale School of Medicine, New Haven, United States,

⁴Hôpital Lariboisière, 2 rue Ambroise Paré, Paris, France,

⁵University of Sheffield, Sheffield, United Kingdom,

⁶Azienda Ospedaliero Universitaria Careggi, Firenze, Italy,

⁷St Vincent's University Hospital and University College, Dublin, Ireland,

⁸University of Edinburgh, Western General Hospital, Edinburgh, United Kingdom,

⁹NDORMS, University of Oxford, Oxford, United Kingdom,

¹⁰Royal National Orthopaedic Hospital, Stanmore, United Kingdom,

¹¹Centre d'Evaluation des Maladies Osseuses, Hôpital Cochin, Paris, France,

¹²Seoul National University Children's Hospital, Seoul, South Korea,

¹³Osaka City University Graduate School of Medicine, Osaka, Japan,

¹⁴University of Tokyo, Tokyo, Japan,

¹⁵Okayama Saiseikai General Hospital, Okayama, Japan,

¹⁶Ultragenyx Pharmaceutical Inc., Novato, United States

Objective: We evaluated the efficacy and safety of burosumab, a fully human monoclonal antibody against FGF23, in adults with XLH.

Methods: CL303 is an ongoing, Phase 3, double-blind, multicenter study examining the efficacy and safety of burosumab in adults with XLH. Subjects were randomized 1:1 to receive burosumab 1 mg/kg or placebo subcutaneously every 4 weeks. After 24 weeks, subjects in the placebo group crossed-over to receive burosumab, and all subjects continued treatment for an additional 24 weeks.

Results: A significantly greater percentage of subjects in the burosumab group attained the primary endpoint of mean serum phosphorus above the lower limit of normal (LLN) at the midpoint of the dosing intervals through week 24 compared with the placebo group (94% vs 8%; $p < 0.0001$); increases were maintained between weeks 24–48, (crossover 89.4%, burosumab-only 83.8%). At baseline, 91 and 65 active fractures/pseudofractures (Fx/PFx) were present in 58% and 47% of subjects in the crossover and burosumab-only group, respectively. At Week 24, burosumab-treated subjects were more likely to show Fx/PFx healing (odds ratio 16.8, $p < 0.0001$). At Week 48, the burosumab-only group showed additional

Fx/PFx healing; the crossover group showed healing similar to that of the burosumab-only group at Week 24. For key secondary endpoints, burosumab showed greater reductions than placebo at Week 24 in stiffness scores ($p = 0.012$), and non-significant reductions in pain ($p = 0.092$) and physical functioning ($p = 0.048$) scores. At Week 48, both groups showed significant decreases from baseline (or week 24 for crossover) in stiffness (both $p < 0.0001$), physical functioning (both $p < 0.001$), and pain (both $p < 0.0001$) scores; and fewer subjects reported analgesic use. Fifteen subjects had serious AEs, none were drug-related. There were no meaningful changes in calcium, iPTH, or nephrocalcinosis scores.

Conclusions: In adults with XLH, burosumab was well tolerated and associated with improvements in serum phosphorus levels, pain, stiffness, physical functioning, and fracture/pseudofracture healing.

Disclosures: PK, RL, TOC, MM, RE, MLB, RC, SR, KMJ, RK, KB, HC, YI, NI, HT, and KI have received research support from Ultragenyx or Kyowa Kirin. LZ, CT-O, MM, and JSM are employees and shareholders of Ultragenyx.

Summary of Burosumab Efficacy in CL303 at Week 48

Assessment	Placebo > Burosumab Crossover (n = 66)	Burosumab Only (n = 68)
Serum Phosphorus, mmol/L		
Baseline	0.62 ± 0.01	0.65 ± 0.01
Week 22 ^a	0.65 ± 0.01	0.94 ± 0.02
Week 24 (Trough)	0.67 ± 0.01	0.82 ± 0.02
Week 46 ^a	0.98 ± 0.02	0.96 ± 0.02
Week 48 (Trough)	0.80 ± 0.02	0.79 ± 0.02
Percentage of Healed Fx/PFx, %		
Week 24 (Placebo-Controlled)	8	43
Week 48 (All on Burosumab)	35	63
Percentage of Subjects Using Pain Medication, % Opioid / % NSAID		
Baseline	20 / 65	25 / 69
Week 24 (Placebo-Controlled)	21 / 58	24 / 63
Week 48 (All on Burosumab)	6 / 17	6 / 19
BPI Worst Pain		
Baseline	6.5 ± 0.2	6.8 ± 0.2
Week 24 (Placebo-Controlled)	6.1 ± 0.3	5.8 ± 0.2
Week 48 (All on Burosumab)	4.9 ± 0.3	5.6 ± 0.2
Change at Week 48	−1.5 ± 0.2	−1.1 ± 0.2
WOMAC Physical Functioning		
Baseline	43.9 ± 2.5	50.8 ± 2.4
Week 24 (Placebo-Controlled)	42.7 ± 2.8	43.4 ± 2.4
Week 48 (All on Burosumab)	34.7 ± 2.8	38.4 ± 2.3
Change at Week 48	−6.4 ± 2.9	−7.8 ± 2.1
WOMAC Stiffness		

(continued)

Baseline	61.4 ± 2.6	64.7 ± 2.5
Week 24 (Placebo-Controlled)	60.4 ± 2.7	53.7 ± 2.5
Week 48 (All on Burosumab)	44.7 ± 2.8	45.3 ± 2.7
Change at Week 48	-15.3 ± 3.5	-16.0 ± 3.3

Baseline, Week 22, Week 24, Week 46, and Week 48 data are presented as mean ± SE. Change refers to least squares mean ± SE change from baseline.

^aMid-point of the dose interval

BPI, Brief Pain Inventory; Fx/PFx, Fractures/Pseudofractures; NSAID, Nonsteroidal anti-inflammatory drugs; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

OC14

EFFECTS OF RESISTANCE AND IMPACT EXERCISE TRAINING ON TRABECULAR BONE MICROARCHITECTURE AND KNEE CARTILAGE HEALTH IN OLDER ADULTS: AN 18-MONTH RANDOMIZED CONTROLLED TRIAL

R. M. Daly¹, J. Gianoudis¹, M. E. Kersh², Y. Wang³, C. A. Bailey⁴, P. R. Ebeling³, C. A. Nowson¹, K. M. Sanders⁵, F. M. Cicuttini³, K. D. Hill⁶

¹Deakin University, Melbourne, Australia, ²University of Illinois at Urbana-Champaign, Illinois, United States, ³Monash University, Melbourne, Australia, ⁴The University of Melbourne, Melbourne, Australia, ⁵Australian Catholic University, Melbourne, Australia, ⁶Curtin University, Perth, Australia

Objective: We previously demonstrated that high-velocity resistance training (HV-RT) combined with weight-bearing exercise (Ex) improved hip and spine BMD (net gain 1.1–1.2%), muscle strength, power and function in older adults at increased risk for falls and fracture. This study aimed to examine the effects of this intervention on trabecular microarchitecture and knee cartilage health.

Methods: In this 18-month RCT 162 adults aged 60+ years were randomised to Ex ($n = 81$) or usual-care (Con, $n = 81$). Ex consisted of HV-RT, weight-bearing impact (60–180 impacts/session) and challenging balance training 3 d/week. Outcomes included: proximal tibia bone-volume/total-volume fraction (BV/TV), trabecular number (TbN), thickness (TbTh) and separation (TbSp), cartilage volume (CV), tibiofemoral (TF) cartilage defects (CD) and bone marrow lesions (BMLs) assessed by MRI. CD and BMLs were assessed as changes can increase cartilage loss and may be indicative of incipient OA.

Results: 150 adults (93%) completed the study; 97/120 had repeat MRI scans. Ex attendance averaged 55% (range 0–98%). After 18-months there was a 1.8% ($P = 0.07$) net benefit to BVTV in Ex (+0.5%, $P = 0.56$) relative to Con (−1.3%, $P < 0.05$), which was driven largely by a reduction in Con for

TbTh (Ex −0.1 vs Con −0.2%) and TbN (Ex +0.6 vs −1.1%) and increased TbSp (Ex +0.6 vs Con +2.2%). An equal proportion of participants in both groups displayed progression of CD (Ex vs Con; TF medial, 14 vs 15%; lateral 26 vs 28%) and BMLs (Ex vs Con, TF medial 14 vs 17%; lateral 7 vs 5%). Tibial CV losses were similar in Ex and Con (medial, −2.5 vs −1.5%, $P = 0.27$; lateral, −3.2 vs −2.5%, $P = 0.33$), even when stratified by the presence of CD or BMLs at baseline.

Conclusion: A multi-modal targeted bone loading program that improved hip and spine aBMD in high risk older adults led to similar magnitude (but non-significant) net improvements in trabecular bone microarchitecture and had no adverse effects on knee cartilage structure.

OC15

EFFECT OF TNF INHIBITORS ON BONE MICROARCHITECTURE IN PATIENTS WITH ANKYLOSING SPONDYLITIS: A LONGITUDINAL STUDY BASED ON HIGH-RESOLUTION PERIPHERAL QUANTITATIVE BASED (HRPQCT)

N. Nigil Haroon¹, R. Inman², E. Szabo³, A. M. Cheung²
¹NOSN, SUDBURY, Canada, ²UNIVERSITY OF TORONTO, TORONTO, Canada, ³UHN, TORONTO, Canada

Background: Ankylosing spondylitis (AS) is associated with high risk of fractures. BMD, bone microarchitecture and strength are negatively affected in AS. TNF inhibitors such as etanercept, adalimumab, golimumab and infliximab are the mainstay of treatment in AS. However no data is available on the effect of TNF inhibitors on bone microarchitecture and strength. This study aimed to assess the effect of TNF inhibitors on bone microarchitecture in patients with AS.

Methods: AS was defined by Modified New York criteria. Areal BMD was measured by DXA. Volumetric BMD (vBMD) and bone microarchitecture were measured using highresolution peripheral quantitative CT (HRpQCT) at the radius and tibia at baseline and after one year of treatment with TNF inhibitors. Intake of calcium and vitamin D were optimized.

Results: There were 31 subjects (58% men). Mean (+SD) age and BASDAI were 40 + 14 years and 4.1 + 2.1 respectively. Median duration of disease was 14 (IQ: 6.5–25.5) years. Mean duration of follow-up was 15 months. Areal BMD ($n = 22$) at lumbar spine (1.053 + 0.235 vs. 1.049 + 0.202, $p = 0.89$), total hip (0.944 + 0.152 vs. 0.912 + 0.164, $p = 0.5$), and femoral neck (0.955 + 0.151 vs. 0.954 + 0.191, $p = 0.2$) did not change significantly. HRpQCT ($n = 31$) on follow-up demonstrated that total, trabecular and cortical volumetric BMD were unchanged at both radius and tibia. Also, HRpQCT based trabecular parameters such as trabecular number, thickness and separation, BV/TV and cortical parameters such as cortical

porosity and thickness remained stable. FEA estimates of bone stiffness and stress tended to be lower at the radius on follow-up however these parameters were not significantly different at the tibia.

Conclusions: This is the first study to document the changes in bone strength in AS patients with the use of TNF inhibitors. Treatment with TNF inhibitors might maintain bone microarchitecture at cortical and trabecular sites in patients with AS.

OC16

EFFECT OF LACTOBACILLUS REUTERI ON BONE LOSS IN OLDER WOMEN WITH LOW BONE MINERAL DENSITY – A RANDOMIZED CLINICAL TRIAL

G. Nilsson¹, D. Sundh¹, F. Bäckhed¹, M. Lorentzon¹

¹University of Gothenburg, Mölndal, Sweden

Objective: The importance of the gut microbiome for bone metabolism in mice has recently been demonstrated, but no studies are available in humans. *Lactobacillus reuteri* ATCC PTA 6475 (*L. reuteri* 6475) has been reported to increase bone mineral density (BMD) in mice but its effect on the human skeleton is unknown. The aim of the present study was to investigate if dietary supplementation with *L. reuteri* 6475 could affect bone loss in older women with low BMD. **Material and methods:** In this double-blind, placebo-controlled single-center study, women between 75 and 80 years of age with low BMD, were randomized to receive 10^{10} colony-forming units of *L. reuteri* 6475 daily ($n = 45$) or placebo ($n = 45$). Areal and volumetric BMD and bone microarchitecture were measured by dual-energy x-ray absorptiometry and high-resolution peripheral quantitative computed tomography, at baseline and after 12 months. The primary and prespecified (Clinicaltrials.gov number, NCT02422082) endpoint was relative change in tibia total volumetric BMD (vBMD) and secondary outcomes included relative changes in trabecular bone volume fraction, cortical vBMD, cortical thickness, and areal BMD.

Results: Supplementation with *L. reuteri* 6475 significantly reduced the loss of tibia total vBMD compared to placebo (-0.83% [95% confidence interval (CI), -1.47 to -0.19%] and -1.85% [95% CI, -2.64 to -1.07%]; mean difference 1.02% [95% CI, 0.02 to 2.03]). For secondary outcomes, none changed significantly in the intention-to-treat analysis whereas the loss in trabecular bone volume fraction was lower in women treated with *L. reuteri* 6475 ($n = 32$) compared to placebo ($n = 36$) in the per protocol analysis (mean difference 0.80% [95% CI, 0.13 to 1.46]). Adverse events did not differ between the groups.

Conclusion: Supplementation with *L. reuteri* 6475 for 12 months significantly reduced the loss of tibia total vBMD in older women with low bone density, and should be further explored as a novel approach to prevent age-associated bone loss and osteoporosis.

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OC17

MORE FREQUENT AND MORE SUSTAIN OSTEOPOROSIS TREATMENT AFTER FRAGILITY VERTEBRAL FRACTURES WHEN INTRODUCED EARLY IN INPATIENTS THAN DELAYED IN OUTPATIENTS

T. Chevalley¹, H. Spechbach², I. Fabreguet¹, E. Saule¹, M. Hars¹, J. Stirnemann², S. Ferrari¹, R. Rizzoli¹

¹Division of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland, ²Division of General Internal Medicine, Geneva University Hospitals and faculty of Medicine, Geneva, Switzerland

Objective: Patients identification and osteoporotic fracture secondary prevention through fracture liaison service (FLS) are presently osteoporosis standard care. More frequent and adequate treatment is ensured when introduced in FLS than upon recommendation to primary care physician (PCP). Whether higher prevalence of treatment is observed when initiated in inpatients than by recommendations to PCP for patients systematically searched for vertebral fracture in a service of general internal medicine is not known. We tested whether early management of inpatients with newly identified vertebral fractures leads to a higher percentage of patients with osteoporosis medication than delayed management in outpatients.

Methods: Patients over 60 years systematically searched for vertebral fractures by semi-quantitative visual grading on lateral chest and/or spinal radiographs at admission or during hospital stay in a general internal medicine ward were included either in phase 1 (outpatients care - recommendations to PCP on assessments and osteoporosis medications to be prescribed) or phase 2 (inpatient care - assessments and osteoporosis medication initiated in hospital). The percentage of patients under specific osteoporosis treatment was evaluated by telephone-interview at 3 and 6 months.

Results: Patients included in phases 1 (84 with fracture out of 407 assessed, 21%; 75.7 ± 7.7 years) and 2 (100/524, 19%; 77.8 ± 9.4 years) were similar for gender, age, Charlson comorbidity index, prior fractures, FRAX score and grade 1 or

≥ 2 vertebral fractures prevalence. A specific osteoporosis medication was more often prescribed in phase 2 than in phase 1 at 3 (67 vs 19%, $p < 0.001$) and 6 months (69 vs 27%, $p < 0.001$). Percentage of patients still under treatment was higher in phase 2 than in phase 1 at 3 (52 vs 19%, $p < 0.001$) and 6 months (54 vs 29%, $p < 0.001$). Similar results were observed in patients with grade ≥ 2 vertebral fracture only. Length of stay and destination after discharge were not different between both phases.

Conclusion: This controlled study highlights that early patient assessment and osteoporosis treatment initiation during hospital stay rather than delayed management in outpatients, is a more efficacious strategy of secondary fracture prevention for oldest olds with newly detected vertebral fragility fractures, and that without difference in length of stay.

OC18

PHYSICAL ACTIVITY PHENOTYPES ARE ASSOCIATED WITH CARTILAGE VOLUME LOSS AND KNEE REPLACEMENT, BUT NOT WITH INCIDENT BONE-MARROW LESIONS OVER 10.7 YEARS

I. P. Munugoda¹, F. Pan¹, K. Wills¹, F. Cicuttini², S. E. Graves³, M. Lorimer⁴, G. Jones¹, M. L. Callisaya¹, D. Aitken¹
¹Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia, ²Department of Epidemiology and Preventive Medicine, Monash University Medical School, Melbourne, Australia, ³Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Adelaide, Australia, ⁴South Australian Health and Medical Research Institute (SAHMRI), Adelaide, Australia

Objective: This study aims to identify physical activity (PA) phenotypes which helps in reducing heterogeneity of characteristics and to investigate the association of these phenotypes with tibial cartilage volume, bone

marrow lesions (BMLs) and knee replacements (KR) over 10.7 years.

Methods: 1046 community-dwelling older adults aged 50–80 years were studied. At baseline, PA was measured using pedometers (steps/day) and knee pain was assessed using Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). MRI scans were conducted at baseline and 10.7 years to assess tibial cartilage volume and BMLs. The incidence of KR was determined by data linkage to the Australian Orthopaedic Association National Joint Replacement Registry. Latent class analysis was used to determine ‘PA phenotypes’ based on baseline PA, BMI and WOMAC pain. Linear mixed-effects and log-binomial models were used to estimate the associations between PA phenotypes and change in cartilage volume, incident BMLs, and KR over 10.7 years. All models were adjusted for age, sex, and history of knee injury or surgery, while the KR model was additionally adjusted for prevalence of knee radiographic osteoarthritis. To account for missing data, weighted estimating equation methods were used.

Results: Three PA phenotypes were identified: Class 1: Normal/overweight participants with low PA and pain (42%); Class 2: Obese participants with low PA and high pain (26%); Class 3: Normal/overweight participants with high PA and low pain (32%). Class 2 had greater cartilage volume loss over 10.7 years ($b = -78.0$, 95% CI $-133.9, -22.1$) and, had a higher risk of KR (RR 2.36, 95% CI 1.20, 4.67) compared to Class 1. Class 3 was not associated with cartilage volume loss ($b = -28.1$, 95% CI $-75.9, 19.8$) or risk of KR (RR 0.86, 95% CI 0.40, 1.84) compared to Class 1. Similarly, PA phenotypes were not associated with incident BMLs (Class 2: RR 1.15, 95% CI 0.88, 1.50; Class 3: RR 1.19, 95% CI 0.93, 1.54; compared to Class 1).

Conclusions: Our findings support the existence of homogeneous PA profiles, and suggest that PA interacts with body weight and knee pain and has long-term impacts on osteoarthritis outcomes.

Table 1 Baseline characteristics of the 3 classes

	Class 1 (<i>n</i> = 436; 42%)	Class 2 (<i>n</i> = 275; 26%)	Class 3 (<i>n</i> = 335; 32%)			
Mean	(SD)	Mean	(SD)	Mean	(SD)	
Age (years)	65.0	(8.0)	62.5	(7.0)	60.7	(6.2)
Sex (Female: %)	50		56		49	
Physical activity (steps/day)	6863	(1990)	7373	(2983)	11,944	(2519)
BMI (kg/m ²)	26.0	(2.5)	34.0	(3.6)	25.2	(2.8)
WOMAC pain	3.6	(5.5)	5.5	(7.9)	2.0	(4.5)
Radiographic osteoarthritis (%)	61		65		55	

BMI – body mass index, WOMAC - Western Ontario McMaster Osteoarthritis Index

OC19

ASSOCIATION BETWEEN DIETARY NUTRIENT INTAKE AND SARCOPENIA: THE SARCOPHAGE COHORT STUDY

C. Beaudart¹, M. Locquet¹, M. Touvier², J.-Y. Reginster¹, O. Bruyère¹

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium, ²Equipe de Recherche en Epidémiologie Nutritionnelle (EREN, UMR U1153 Inserm / U1125 Inra / Cnam / Universités Paris 5, 7 et 13, Centre de Recherche en Epidémiologie et Statistiques Sorbonne Paris Cité (CRESS), Paris, France

Objectives: Aging could be associated with physiological anorexia, decreased caloric intake, malnutrition, and weight loss, which can lead to a decline in muscle mass and muscle function, characterised under the term sarcopenia. It has been suggested that a balanced nutrition intake may be useful in preventing or even reversing sarcopenia. To describe associations between dietary nutrient intake and sarcopenia.

Materials and Methods: Subjects were recruited from the *SarcoPhAge* study population, a Belgian cohort of community-dwelling subjects aged 65 years or older. Sarcopenia was diagnosed according to the criteria of the European Working Group on Sarcopenia in Older People. A Food Frequency Questionnaire (FFQ), developed in our Research Unit, using a 1-month recall period, was administered to the participants that were seen for a second-year follow-up. Two sets of meal pictures were displayed to estimate the portion of food daily consumed per participants. The Nutritional Belgian Recommendations of 2016 were used: i.e. adequate intake (AI) and estimated average requirement (EAR). For micronutrients, the prevalence of insufficient intake was estimated as the proportion of subjects whose intake was below the EAR. When possible, recommendations adapted to populations older than 60 years were used; otherwise, recommendations for adults (+18 years) were used.

Results: 331 subjects (mean age of 74.8 ± 5.9 years, 58.9% of women) had complete data and were included in this study. Among them, 51 were diagnosed sarcopenic (prevalence of 15.4%). FFQ analyses revealed that sarcopenic subjects had a lower total energy intake compared to non sarcopenic (1596.1 kcal/d versus 1820 kcal/d, $p = 0.008$, adjusted on age and sex). Sarcopenic subjects consumed significantly lower amount of macro-nutriments (proteins, lipids and saturated fatty acids, adjusted p -values < 0.05) and micro-nutriments (sodium, potassium, magnesium, phosphorus, iron, calcium and vitamins (D-A-E-C-K), all adjusted p -values < 0.05) compared

to non-sarcopenic. For the whole population, whatever the sarcopenic status, the prevalence of insufficient intake was 55.3% for vitamin C, 40.5% for vitamin E, 30.2% for calcium, 16.6% for proteins and 16.3% for vitamin A and potassium. Prevalence of insufficiency was lower than 10% for vitamin K, iron, sodium, magnesium and phosphorus. For macronutrients, 93.7% of the population was below the Nutritional Belgian Recommendations for carbohydrates and 74% for saturated fatty acids. Significantly higher prevalence of insufficiency (consumption below EAR) was found for sarcopenic subjects compared to non-sarcopenic for vitamin E and C, iron, calcium, potassium and magnesium. The prevalence of sarcopenic subjects who were also below the Nutritional Belgian Recommendations for one macronutrient, proteins, was significantly higher compared to non-sarcopenic subjects.

Conclusions: Sarcopenic subjects seem to consume significantly lower amount of many micro- and macro-nutriments compared to non-sarcopenic subjects. A poorly balanced diet is therefore suggested to be associated with sarcopenia and poor musculoskeletal health.

OC20

THE FRAILTOOLS STUDY - A COMPREHENSIVE VALIDATION OF TOOLS TO SCREEN AND DIAGNOSE FRAILTY IN DIFFERENT CLINICAL AND SOCIAL SETTINGS

A. Parnicka¹, A. Kańtoch¹, B. Wizner¹, B. Gryglewska¹, T. Grodzicki¹, M. Checa², J. Carnicero², S. Bellary³, B. Vellas⁴, M. Cesari⁴, R. Bernabei⁵, F. Landi⁵, L. R. Mañas²

¹Department of Internal Medicine and Gerontology, Jagiellonian University Medical College, Kraków, Poland, ²Servicio Madrilerio de Salud, Hospital Universitario de Gatafe, Madrid, Spain, ³Aston Research Centre for Healthy Ageing, Aston University, Birmingham, United Kingdom, ⁴Gérontopôle, Centre Hospitalier Universitaire de Toulouse, Toulouse, France, ⁵Department of Geriatrics, Neurosciences, and Orthopedics, Università Cattolica del Sacro Cuore of Rome, Rome, Italy

Background: Many studies have demonstrated the utility of certain assessment tools to evaluate frailty syndrome in populations, however the individual risk for disability has not been properly evaluated.

Objective: To assess the usefulness as screening and diagnosis tools of selected instruments to detect frailty for older adults in a clinical (hospital, outpatient clinics, primary care) and social (nursing homes) settings.

Material and methods: People 75 years or older were selected consecutively until reaching the sample size pre-determined by country and setting of care. The cognitive (MMSE - Mini Mental State Examination) and functional status (Lawton IADL- Instrumental Activities of Daily Living, Barthel's index, SPPB and

muscle strength) were assessed. Exclusions criteria were: a) MMSE score lower than 20 points and/or those who have a terminal illness (life expectancy <6 months); b) for subjects included from the clinical settings scoring less than 90 points in the Barthel index and for subjects enrolled in a nursing home score less than 40 points in the Barthel index. To detect frailty the following instruments were used: CHS-Frailty Phenotype, Shorten version of the Frailty Trait Scale-FTS, SHARE-FI, CSHA-Clinical Frailty Scale, Rockwood 35 items, FRAIL scale, The G rontop le Frailty Screening Tool-GFST.

The study endpoints were: death, falls, functional and/or cognitive decline during the 18-month follow-up.

Results: The study began in 2016 and the recruitment of the subjects was finished in September 2017. The Table summarize the results of recruitment in Poland in relation to total sample size.

	Overall	Poland
Acute care	364	109
Outpatient clinic	351	52
Primary care	394	25
Long-term care	374	84
Totally, n (%)	1483	270 (18.2)

Conclusions: The study will allow the evaluation: performance of the tools in the settings, it's feasibility and sensitivity to change in functional status, and qualification as screening and/or diagnosis tool.

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OC21

TRANSLATING THE LIFESTYLE INTERVENTIONS AND INDEPENDENCE FOR ELDERS CLINICAL TRIAL TO MOBILITY-LIMITED OLDER ADULTS IN THE COMMUNITY: THE ENGAGE PILOT STUDY

K. Reid¹, J. Laussen¹, K. Bhatia¹, D. Englund¹, D. Kirm¹, L. L. Price², T. Manini³, C. Liu¹, C. Kowaleski⁴, R. Fielding¹

¹Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University / Nutrition, Exercise Physiology and Sarcopenia Laboratory, Boston, United States, ²Tufts Medical Center /The Institute for Clinical Research and Health Policy Studies and Tufts University / Tufts Clinical and Translational Science Institute, Tufts University, Boston, United States, ³University of Florida / Department of Aging and Geriatric Research, Gainesville, United States, ⁴City of Somerville Council on Aging / Health and Human Services Department, Somerville, United States

Objective: The Lifestyle Interventions and Independence for Elders (LIFE) clinical trial demonstrated that a structured program of physical activity (PA) reduced mobility-disability in older adults by up to 28% (1). It remains unknown whether the benefits of LIFE PA can be translated to mobility-limited older adults in real world community-based settings. To address this knowledge gap, we conducted the ENGAGE pilot study and examined the safety, feasibility and preliminary effectiveness of translating LIFE PA to an urban community-based senior center.

Material and Methods: Forty older adults with severe mobility limitations (age: 76.9 ± 7.3 yrs.; BMI: 32.7 ± 8 kg/m²; 85% female; short physical performance battery (SPPB) score: 6.3 ± 2.2) were randomized to 24 weeks of PA or a health education (HE) control intervention.

Results: Community-based PA was safe (serious adverse events: PA: 0 vs. HE: 2; non-serious adverse events: PA: 3 vs. HE: 1) and participants successfully adhered to the PA intervention (65.2%). Compared to HE, PA participants who attended $\geq 25\%$ of scheduled visits had meaningful and sustained mobility improvements at follow-up (between group SPPB score differences: ~ 0.7 units). PA also elicited significant increases in executive cognitive function ($P = 0.03$), clinically meaningful improvements in quality of life, a trend for a lower occurrence of falls (Odds Ratio: 0.41 ($P = 0.29$)) and notable increases in accelerometry-derived light intensity activity levels (14.5 min/day).

Conclusions: ENGAGE has demonstrated the initial safety, feasibility and effectiveness of LIFE PA in a real-world community-based setting. Larger scale translational studies are needed to further disseminate the benefits of LIFE PA to vulnerable older adults in a variety of community-based settings.

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OC22

DYNAMIC APPROACH OF THE FRAILTY STATUS IN NURSING HOMES: 2-YEAR PROSPECTIVE FOLLOW-UP OF THE SENIOR COHORT

F. Buckinx¹, A. Charles¹, X. Rygaert¹, J.-Y. Reginster¹, J. Petermans², O. Bruyère¹

¹University of Liège, Department of Public Health, Epidemiology and Health Economics, Liège, Belgium,

²CHU of Liège, Geriatrics department, Liège, Belgium

Objective: To assess frailty transitions over 2-year of follow-up among nursing home residents.

Material and Methods: This is an analysis of the 2-year follow-up of the SENIOR (Sample of Elderly Nursing home Individuals: an Observational Research) cohort. All participants included in this cohort were classified into frail, pre-frail or robust according to the Fried's criteria at baseline (T0) and after a 24-month follow-up period (T24). Frailty transitions from T0 to T12 and from T12 and T24 were assessed.

Results: Among the 662 residents included in the SENIOR cohort (83.2 ± 8.99 years, 73.1% of women), 359 were included in the analysis between T0 and T12 (i.e. 90 residents died, 2 nursing homes refused to

continue the study (58 residents), 91 residents refused to be assessed at T12, 20 moved away from the nursing home, 41 were physically or cognitively unable to perform the various assessments at T12 and 3 have incomplete data for frailty diagnosis). 178 residents were included in the analysis between T12 and T24 (i.e. 35 residents died, 65 residents refused to be assessed at T24, 15 moved away from the nursing home, 11 were physically or cognitively unable to perform the various assessments at T24, 1 was hospitalized and 52 have incomplete data). Among people with complete evaluations at baseline and T12, respectively 75 (20.9%), 225 (62.6%) and 59 (16.4%) residents were classified frail, pre-frail and robust at baseline. At T12, these categories counted respectively 121 (33.7%; +12.8% from T0), 184 (51.2%; -11.4%) and 54 (15.1%; -1.3%) residents. At T24, respectively 62 subjects were frail (34.8%, +1.1% from T12), 109 were pre-frail (61.2%, +10%) and 7 (3.39%, -11.7%) were robust. Transition between the states of frailty, between T0 and T12 and between T12 and T24 are shown in Figure 1.

Conclusions: Frailty is a dynamic process with transitions in both directions, worsening and improvement, even among nursing home residents.

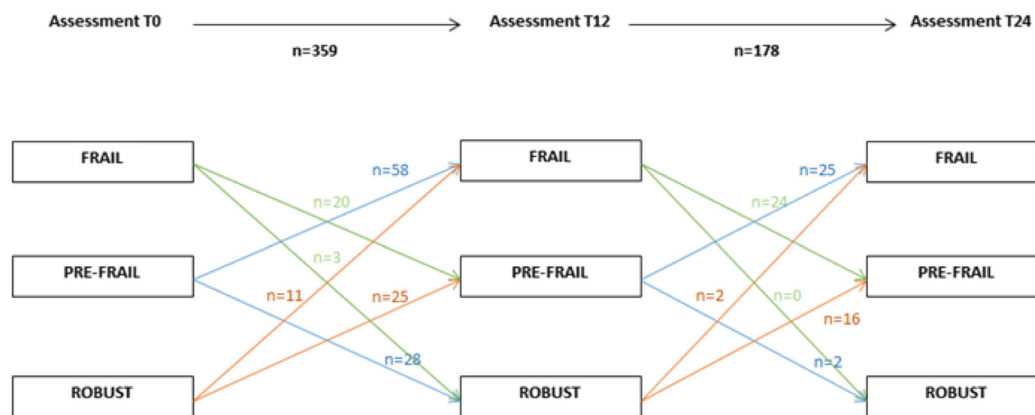


Figure 1: Transitions between the states of frailty, between T0 and T12 and between T12 and T24

OC23

RELATIONSHIPS BETWEEN MUSCLE SIZE, STRENGTH AND FUNCTION AND THE RISK OF FALLS AND FRACTURES: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

N. R. Fuggle¹, K. A. Jameson², M. H. Edwards², E. M. Dennison², C. Cooper²

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ²MRC

Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom

Objectives: Sarcopenia is thought to be an important contributor to falls risk, and hence fractures. The aim of this study was to examine the gender-related associations between falls and fractures and muscle measures of mass, strength and function in a population-based cohort of older adults in the United Kingdom.

Materials and Methods: A sample of 642 participants of the Hertfordshire Cohort Study (free-living, older adults) were recruited. Muscle mass was assessed as muscle cross-sectional area by peripheral quantitative computed tomography of the calf; muscle strength was assessed by JAMAR dynamometry and muscle function was measured using gait speed. Data on falls and fractures were collected via questionnaire which was repeated after 5–7 years including incident falls. Logistic regression was used to examine the associations between muscle measures and outcomes with and without adjustment for age, body mass index, social class, smoker status, alcohol consumption, activity level, calcium intake, hormone replacement therapy use and years since the menopause in women.

Results: The mean (SD) ages at baseline were 69.2 (2.5) and 69.5 (2.6) years for men and women respectively. Falls since the age of 45 and in the last year at baseline, and incident fractures and falls at follow-up were significantly more common in women ($p < 0.05$). Greater calf muscle area (z-score) was associated with fewer falls in women in the last year at baseline (OR 0.64, 95% CI 0.43, 0.95, $p = 0.03$ after adjustment) but no statistically significant relationships were seen in men, or with longitudinal analyses. Higher grip strength (z-score) at baseline was negatively associated with having a fracture since the age of 45 (OR = 0.74, 95% CI 0.56, 0.99, $p < 0.05$) but not lower risk of falls since baseline (OR = 1.50, 95% CI 1.07, 2.10, $p < 0.02$) in women in adjusted models. Higher baseline gait speed (z-score) was associated with fewer falls in the last year at follow-up in men (OR = 0.65, 95% CI 0.43, 0.99, $p < 0.05$) but not women.

Conclusions: We saw different relationships between muscle mass, strength and function with falls and fractures in men and women; function was more important in men, and size in women. Further studies are now required to reproduce these results.

OC24

THREE-YEAR ADVERSE HEALTH CONSEQUENCES OF SARCOPENIA IN COMMUNITY-DWELLING OLDER ADULTS: RESULTS FROM THE SARCOPHAGE COHORT STUDY

M. Locquet¹, C. Beaudart¹, J.-Y. Reginster¹, J. Petermans², O. Bruyère¹

¹Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium, ²Geriatrics Department, CHU of Liège, Liège, Belgium

Objectives: Sarcopenia is now considered as a real public health burden, mainly because of its association with falls, fractures, physical disabilities, hospitalizations, loss of independence, and ultimately death. Previous prospective studies

assessed the consequences of sarcopenia, but a limited number only extensively focused on fractures, falls, hospitalizations and institutionalizations. Our objective is then to better characterize adverse outcomes of sarcopenia (i.e., falls, fractures, physical disabilities, hospitalizations, institutionalizations and death) observed, over a 3-year follow up, in a cohort of community-dwelling older adults.

Methods: The ongoing SarcoPhAge (for *Sarcopenia and Physical Impairment with advancing Age*) project, initiated in 2013, includes 534 community-dwelling adults aged 65 and aims at identifying health consequences of sarcopenia. Sarcopenia is defined according to the European Working Group on Sarcopenia in Older People algorithm. To collect information, a health professional collects at each yearly visit, data on falls, fractures and hospitalizations. Moreover, for participants who are not able to attend the annual follow-up, these data are recorded by a phone call given to either participants themselves, or to their relatives. Information about physical disabilities (e.g. capacity to walk..), institutionalization (including the date of onset) or death (including the date of the event) are collected. When survival data are available (i.e., falls, hospitalizations, institutionalizations and death), we applied the Cox proportional hazards model to determine if sarcopenia is associated with these adverse outcome. If survival data are not available, (i.e., fracture and physical disabilities), we used the multivariable linear regression model. Both models were adjusted for covariates known to significantly impact muscle health, including age, sex, BMI, number of co-morbidities, number of co-prescriptions, nutritional status, and cognitive status.

Results: 534 subjects were recruited in this prospective cohort (73.5 ± 6.2 years, 60.5% of women), with 73 subjects (13.7%) diagnosed as sarcopenic. After 3 years of follow-up, 33 participants were lost to follow-up. Data on physical disability, institutionalization and death are therefore available for 501 subjects. Sarcopenic individuals are significantly older, have lower BMI and more comorbidities, take more medications and have a reduced nutritional and cognitive status compared to non-sarcopenic individuals (all $p < 0.01$). A higher number of death occurred, during the 3 years of follow-up in individuals diagnosed with baseline sarcopenia compared to those who were not (16.2% vs 4.6%, $p < 0.001$). The probability of death within 3 years when presenting a sarcopenia shows a 3-fold increase compared to non-sarcopenic subjects (adjusted HR = 2.93, 95% CI: 1.17–7.35, $p = 0.03$). 112 participants reported physical disabilities over the 3 years (22.4%). However, sarcopenia is not significantly associated with the occurrence of disabilities (29.4% vs 21.9%, $p = 0.13$). 10 institutionalizations were reported (2.0%) with no significant increase in sarcopenic subjects (2.9% vs 1.9%, $p = 0.55$). Data on falls, fractures and hospitalizations, information, collected at yearly visits, are available in a sample of 260 subjects. 101

individuals experienced at least one fall during the 3 years of follow-up (38.8%). Sarcopenic subjects were not significantly more affected (37.5% vs 39.0%, $p = 0.89$). Similar findings are reported for incident fractures (8.3 vs 11.4%, $p = 0.64$) and for incident hospitalizations (62.5% vs 44.9%, $p = 0.10$). However, we observe a longer duration of hospital stay in sarcopenic subjects (10.4 ± 3.5 days vs mean 5.5 ± 0.6 days, $p = 0.01$). When adjusted for covariates, the results remain similar ($\beta = 0.21$, p -value = 0.03).

Conclusion: After 3 years, sarcopenia at baseline is associated with an increased risk of mortality and with longer hospitalizations. However, no differences were observed for falls, fractures, physical disabilities and institutionalizations in our community-dwelling population. Our cohort will be followed-up for another two-year time to provide further information on the long-term consequences of sarcopenia.

OC25

THE DISCRIMINATIVE ABILITY OF SARQOL® ACCORDING TO THE DEFINITION OF SARCOPENIA: THE OFELY STUDY

E. Sornay-Rendu¹, C. Beaudart², O. Bruyère², R. Chapurlat¹

¹INSERM UMR1033 and Université de Lyon, Lyon, France,

²Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objective: A health-related quality of life questionnaire specific to sarcopenia has been developed and validated in Belgium (SarQoL®). The aim was to evaluate the discriminative ability of SarQoL® in French women aged 65 years or more from the Os des Femmes de Lyon (OFELY) cohort.

Material and Methods: The self-administered questionnaire was completed in 307 women, mean age 77 ± 5 yrs. at the 25th annual follow-up of the ongoing prospective study, one year after the measurement of appendicular lean mass (ALM) using DXA (Hologic®, QDR4500), grip strength (GS), height and weight. The SMI (ALM/height²) and the ALM_{BMI} (ALM/BMI) were calculated.

Results: Using the definition of the European Working Group on Sarcopenia in Older People (EWGSOP: SMI < 5.5 Kg/m² and GS < 20 Kg), or of the Foundation for the National Institute of Health sarcopenia project (FNIH: ALM_{BMI} < 0.512 and GS < 16 Kg), few women (4 and 1 respectively) had sarcopenia. Thus, we identified women in the lowest quartile of both SMI and GS (Q1SMIGS, $n = 23$), and of both ALM_{BMI} and GS (Q1ALM_{BMI}GS, $n = 29$). No significant difference in the total score of the SarQoL® was observed between Q1SMIGS and other women. In contrast, Q1ALM_{BMI}GS had a significantly reduced total score (medi-

an [IQR] of 60.4 [22.4]) compared with other women (71.7 [21.6], $p = 0.0001$). Six of the seven domains of the SarQoL® were altered in Q1ALM_{BMI}GS ($p = 0.02$ to $p < 0.0001$). Only eight women (28%) were belonging to both Q1SMIGS and Q1ALM_{BMI}GS. In all women, the total score was positively correlated with GS (Spearman $r = +0.23$) and ALM_{BMI} ($r = +0.29$), and inversely with age ($r = -0.33$), BMI ($r = -0.31$, $p < 0.0001$ for all), and SMI ($r = -0.13$, $p = 0.02$).

Conclusion: Only few women had sarcopenia defined by EWGSOP and FNIH. A significantly reduced quality of life assessed by the SarQoL® was shown in French women with both low grip strength and muscle mass defined according to ALM_{BMI} but not to SMI, may be explained by the negative effect of high BMI on quality of life.

Disclosure of interest: O. Bruyère and C. Beaudart are the shareholders of SarQoL sprl

OC26

LONG-TERM COST-EFFECTIVENESS OF SCREENING FOR FRACTURE RISK IN A UK PRIMARY CARE SETTING

F. Borgström¹, E. Jonsson¹, N. Harvey², L. Shepstone³, E. Lenaghan³, S. Clarke⁴, N. Gittos⁵, I. Harvey⁶, R. Holland³, A. Heawood⁷, N. Redmond⁴, A. Howe³, T. Marshall⁸, T. Peters⁷, D. Torgerson⁹, T. O'Neill¹⁰, E. McCloskey¹¹, C. Cooper¹², J. A. Kanis¹¹

¹Quantify Research, Stockholm, Sweden, ²University of Southampton, MRC Lifecourse Epidemiology, Southampton, United Kingdom, ³University of East Anglia, School of Medicine, Norwich, United Kingdom, ⁴University of Bristol, Bristol, United Kingdom, ⁵University Hospital Birmingham, Endocrinology, Birmingham, United Kingdom, ⁶University of East Anglia, School of Medicine, Health Policy and Practice., Norwich, United Kingdom, ⁷University of Bristol Faculty of Medicine and Dentistry, Bristol, United Kingdom, ⁸Norfolk and Norwich University Hospital, Department of Rheumatology, Norwich, United Kingdom, ⁹York University, York Trials Unit, York, United Kingdom, ¹⁰University of Manchester, Manchester, United Kingdom, ¹¹University of Sheffield, Sheffield, United Kingdom, ¹²MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom

Objective: To estimate the cost-effectiveness of screening for fracture risk in a UK primary care setting, based on a randomised controlled trial in women aged 70–85 comparing a screening programme using the FRAX risk assessment tool versus usual management of osteoporosis (the SCOOP study).

Material and Methods: The design of the SCOOP study is described elsewhere¹. A health economic Markov model was used to predict the life-time consequences in terms of costs and quality of life of the screening programme. The model was populated with drug, administration and screening intervention costs derived from SCOOP. Fracture costs, quality of life-weights and general population fracture risks and mortality were derived from the literature. Fracture risk reduction in the screening arm compared with the usual management arm were derived from SCOOP. Modelled fracture risk corresponded to the observed risk in SCOOP. The main outcome measures were quality-adjusted life years (QALY), costs and incremental cost/QALY.

Results: Fracture-related costs were £551 lower/patient in the screening arm compared with the usual management arm (Table 1). Drug and intervention costs were £265 higher in the screening arm. In total, the screening arm saved costs (£286) and gained 0.015 QALYs/patient in comparison with usual management arm. Screening saved 0.01 hip fractures and 0.02 non-hip fractures over the life-time of patients, compared with usual management.

Conclusion: This analysis suggests that a screening programme of fracture risk in older women in the UK could gain quality of life and life years, and additionally, reduce fracture costs offsetting the cost of running the programme.

References:

1. Shepstone L, et al. A Randomised Controlled Trial of Screening in the Community to Reduce Fractures in Older Women: the SCOOP Study. *Lancet*. 2017 Dec 15.

Table 1. Cost-effectiveness results

	Usual management	Screening	Screening vs. usual management
Costs			
Hospitalisations	3,059	2,934	-125
Nursing home	6,056	5,645	-410
Outpatient	378	363	-15
Total morbidity cost	9,493	8,942	-551
Drugs	12	43	31
Treatment management	92	326	234
Total intervention cost	104	369	265
Total cost	9,596	9,310	-286
Effects			
Life years	10.485	10.487	0.002
QALYs	7.359	7.374	0.015
Cost-effectiveness ratios			
Cost/Life year		Cost-saving	
Cost/QALY		Cost-saving	

OC27

COST-BENEFIT ANALYSIS OF CALCIUM AND VITAMIN D SUPPLEMENTS

C. Weaver¹, H. Bischoff-Ferrari², C. Shanahan³

¹Purdue University, Department of Nutrition Science, West Lafayette, United States, ²University of Zurich, Department of Geriatrics and Aging Research, Zurich, Switzerland, ³Frost & Sullivan, San Antonio, United States

Objectives: Determine cost-effectiveness of preventing osteoporotic fracture with calcium/vitamin D supplementation in older adults with osteoporosis.

Material and methods: The potential cost savings from reduced hospital expenses for fracture if all adults aged ≥ 50 years with osteoporosis in the EU and US used calcium/vitamin D supplements was estimated using a cost-benefit analysis tool. The benefit estimate used for the analysis was a 14% relative risk reduction of fracture with calcium/vitamin D supplementation, which was based on a recent meta-analysis [1]. Epidemiologic, clinical, and 2016–2017 cost data from the medical literature and public databases informed other model inputs compiled to estimate the number of avoided fractures and calculate the associated cost savings. Subtraction of market cost of supplements from cost savings yielded the net cost benefit.

Results: An estimated 30.5 million Europeans and 10.9 million Americans aged ≥ 50 years have osteoporosis, resulting in 3.9 million and 2.3 million fractures and hospital costs exceeding €50 billion and \$28 billion, respectively, annually. Use of calcium/vitamin D supplements in all adults ≥ 50 would result in 544,687 fewer fractures in Europe and 323,566 fewer fractures in the US per year, with a corresponding cost-savings of €7.0 billion and \$3.9 billion, respectively. The net cost benefit to society is estimated at €5,710,277,330 in Europe and \$3,312,236,252 in the US. For each €1 spent on calcium and vitamin D supplements in Europe, hospital costs would be reduced by €5.58, and the US would save \$6.22 per \$1 spent.

Conclusion: Supplementation with calcium and vitamin D in older adults with osteoporosis was found to be highly cost-effective. Expanded use in this population has the potential to substantially reduce fractures and related costs.

OC28

PHYSICAL PERFORMANCE OR FUNCTION, BUT NOT APPENDICULAR LEAN MASS, PREDICT INCIDENT FRACTURES INDEPENDENTLY OF FRAX PROBABILITY AND BMD: RESULTS FROM THE OSTEOPOROTIC FRACTURES IN MEN (MROS) COHORT

N. C. Harvey¹, A. Oden², E. Orwoll³, J. Lapidus⁴, T. Kwok⁵, M. Karlsson⁶, B. Rosengren⁶, O. Ljunggren⁷, C. Cooper¹, P. M. Cawthon⁸, J. A. Kanis⁹, C. Ohlsson², D. Mellstrom², H. Johansson¹⁰, E. V. McCloskey⁹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ²Centre for Bone and Arthritis Research (CBAR), Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, ³Oregon Health & Science University, Portland, United States, ⁴Department of Public Health and Preventive Medicine, Division of Biostatistics, Oregon Health and Science University, Portland, United States, ⁵Department of Medicine & Therapeutics and School of Public Health, The Chinese University of Hong Kong, Hong Kong, China, ⁶Department of Clinical Sciences Malmö, Lund University, Lund, Sweden, ⁷Department of Medical Sciences, University of Uppsala, Uppsala, Sweden, ⁸Department of Epidemiology and Biostatistics, University of California, San Francisco, United States, ⁹Centre for Metabolic Bone Diseases, University of Sheffield, Sheffield, United Kingdom, ¹⁰Institute for Health and Aging, Catholic University of Australia, Melbourne, Australia

Background/aim: In a combined analysis of the 3 Osteoporotic Fractures in Men (MrOS) Study cohorts, we investigated whether measures of physical performance/function and appendicular lean mass by DXA predicted incident fractures independently of FRAX probability and femoral neck BMD.

Methods: We used an extension of Poisson regression to investigate the relationship between time for 5 chair stands, walking speed over 6 m, grip strength, appendicular lean mass divided by height squared (ALM/ht^2), FRAX probability [major osteoporotic fracture (MOF) with or without femoral neck BMD, available in a subset of $n = 7531$], and incident MOF (hip, clinical vertebral, wrist or proximal humerus). All associations were adjusted for age, time since baseline, and are reported as hazard ratio (HR) for first incident fracture per SD increment in predictor, from meta-analysis of the three cohorts.

Results: Complete data were available for: 5660 men in USA (mean age 73.5 years); 2764 men in Sweden (mean age 75.4 years); and 1987 men in Hong Kong (mean age 72.4 years). Mean follow-up time: 8.7 to 10.9 years. Greater time for 5 chair stands was associated with a higher risk of incident MOF [HR:1.26(95%CI:1.19,1.34)], whereas higher walking speed [HR:0.85(95%CI:0.79,0.90)], grip strength [HR:0.77(95%CI:0.72,0.82)] and ALM/ht^2 [HR:0.85(95%CI:0.80,0.910)] were associated individually with lower risk. Associations remained largely similar after adjustment for FRAX (MOF with BMD), but that between ALM/ht^2 and MOF was weakened [HR:0.92(95%CI:0.85,0.99)]. Inclusion of femoral neck BMD markedly attenuated the association between ALM/ht^2 and incident MOF [HR:1.02(95%CI:0.96,1.10)], but had little effect on other relationships.

Conclusion: Measures of physical performance or function predict incident fractures independently of FRAX probability. The predictive value of ALM/ht^2 was substantially attenuated by inclusion of femoral neck BMD, an observation which requires further investigation.

OC29

PLASMA CTX IN PREGNANCY IS ALTERED BY CHOLECALCIFEROL SUPPLEMENTATION AND IS ASSOCIATED WITH MATERNAL BONE INDICES: THE MAVIDOS TRIAL

E. M. Curtis¹, K. Maslin¹, S. D'Angelo¹, R. J. Moon¹, S. R. Crozier¹, F. Gossiel², N. J. Bishop³, S. Kennedy⁴, A. T. Papageorgiou⁴, R. Fraser⁵, S. V. Gandhi⁵, A. Prentice⁶, H. M. Inskip¹, K. M. Godfrey¹, I. Schoenmakers⁶, M. K. Javaid⁷, R. Eastell², C. Cooper¹, N. C. Harvey¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ²Academic Unit of Bone Metabolism, University of Sheffield, Sheffield, United Kingdom, ³Academic Unit of Child Health, Sheffield Children's Hospital, University of Sheffield, Sheffield, United Kingdom, ⁴Nuffield Department of Women's & Reproductive Health, John Radcliffe Hospital, University of Oxford, Oxford, United Kingdom, ⁵Department of Obstetrics and Gynaecology, Sheffield Hospitals NHS Trust, University of Sheffield, Sheffield, United Kingdom, ⁶MRC Human Nutrition Research, Elsie Widdowson Laboratory, Cambridge, United Kingdom, ⁷National Institute for Health Research (NIHR) Musculoskeletal Biomedical Research Unit, University of Oxford, Oxford, United Kingdom

Objectives: In a randomised trial we investigated associations between i) maternal/umbilical cord β -C-terminal telopeptide of type I collagen (CTX) concentrations and gestational vitamin D supplementation, and ii) CTX and maternal postnatal bone indices. Our aim was to explore relationships between pregnancy vitamin D status, CTX (a marker of bone resorption) and maternal bone health.

Material and Methods: MAVIDOS is a randomised, double-blind, placebo-controlled trial of 1000 IU/day cholecalciferol from 14 weeks gestation to birth. Maternal plasma CTX (Roche ECLIA), plasma 25(OH)D (Diasorin Liaison), health and anthropometry were assessed at 14 and 34 weeks gestation, and newborn CTX in umbilical cord plasma. Maternal bone indices were assessed by DXA within 2 postnatal weeks.

Results: 636 women (314 placebo, 322 cholecalciferol) were included, with a measure of CTX in early pregnancy (14 weeks, EP), late pregnancy (34 weeks, LP) or in umbilical cord blood at birth (cCTX). CTX increased overall from EP to LP (median 219.4 to 437.4 pg/ml; p -diff <0.0001); EP and LP

values were correlated in both the placebo ($r = 0.31$) and treatment ($r = 0.45$) groups (both $p < 0.0001$). LPCTX was higher in the placebo than treatment group (median 445.3 vs 420.0 pg/ml; $p = 0.06$). In the treatment group only, cCTX was negatively associated with change in [25(OH)D] from EP to LP ($\beta = -0.002$ (95%CI -0.004, -0.001) pg/ml /nmol/l, $p = 0.008$). Associations persisted after adjustment for birth season. Overall LPCTX, but not EPCTX was negatively associated with maternal whole body bone mineral content [β /10% CTX increase -1.70 g (-2.80, -0.60), $p < 0.01$], bone area [-1.05cm² (-1.67, -0.43), $p < 0.001$] and bone mineral density [-0.0003 g/cm² (-0.0006, -0.0001), $p = 0.04$].

Conclusion: In this randomised trial, gestational vitamin D supplementation was associated with lower maternal late pregnancy CTX. The associations between CTX and maternal and cord 25(OH)D, and maternal bone indices, inform mechanisms linking pregnancy vitamin D status to maternal and offspring bone health.

OC30

RISK OF INCIDENT FRACTURE IS ASSOCIATED WITH DOSE, DURATION AND RECENCY OF ORAL GLUCOCORTICOID EXPOSURE

D. E. Robinson¹, T. P. van Staa², M. Lunt³, E. M. Dennison⁴, C. Cooper⁴, W. G. Dixon⁵

¹Arthritis Research UK Centre for Epidemiology, School of Biological Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, 2nd floor, Stopford Building, Oxford Road, Manchester M13 9PT, UK, Manchester, United Kingdom, ²Health eResearch Centre, Farr Institute for Health Informatics Research, University of Manchester, Manchester, United Kingdom, ³Arthritis Research UK Centre for Epidemiology, School of Biological Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, 2nd floor, Stopford Building, Oxford Road, Manchester, M13 9PT, UK, Manchester, United Kingdom, ⁴MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ⁵Arthritis Research UK Centre for Epidemiology, School of Biological Sciences, Faculty of Biology, Medicine and Health, The University of Manchester 2nd floor, Stopford Building, Oxford Road, Manchester, M13 9PT, UK, Manchester, United Kingdom

Objective: To evaluate how oral glucocorticoids (GCs) affect the risk of fracture in patients with rheumatoid arthritis (RA) using a statistical method incorporating dose, duration and recency of exposure in one model.

Material and methods: Patients with RA were identified from the Clinical Practice Research Datalink, a primary care, electronic medical record database in the United

Kingdom. Patients exposed to GCs were matched to up to two unexposed patients by age, gender and geographic location. First osteoporotic fracture was identified for each patient. A novel method, the weighted cumulative exposure (WCE) was used to assess the effect of oral GCs on fracture risk. A data defined weight function (WF) was produced using flexible spline curves. This WF was applied to theoretical patterns of GC use to estimate the risk of fracture compared to non-use with hazard ratios (HR) and 95% confidence intervals (CI) produced using bootstrapping.

Results: 16,507 patients were included of which 8357 were exposed to oral GCs. Average follow up was 4 years with 70% of patients female. The exposed patients were older, had higher BMI and more comorbidities. The most appropriate WF was 3 years in duration. The WF showed an increased risk for the first year after GC use; risk decreased with time. Comparing different patterns of GC exposure there were 3 key results: 1. Risk of fracture increased with duration of use: HR (95%CI) 1.09 (1.13, 1.05) to 1.25 (1.16, 1.35) to 1.42 (1.30, 1.55) for 5 mg/day for 1, 3 and 6 months respectively. 2. A low dose, long term treatment (5 mg/day for 6 months) has a lower cumulative risk than a high dose, short term treatment (30 mg/day for 1 month) HR (95% CI) 1.42 (1.30, 1.55) v 1.70 (1.37, 2.09). 3. Discontinuation of oral GCs decreased the risk of fracture; risk returned to baseline between 6 months and 1 year. HR (95% CI) 1.06 (0.97, 1.15) (5 mg for 6 months stopped 6 months ago) v 0.99 (0.92, 1.06) (30 mg for 1 months stopped 1 year ago).

Conclusion: A novel method was used to assess the association between oral GCs use and fracture risk. Doses of oral GCs taken in the past year increase the risk of fracture. Risk increased with duration of use. Long term low dose treatments have a lower cumulative risk than high dose, short term treatments with equal total dose. Risk of fracture returns to baseline 6 months to 1 year after discontinuation.

OC31

PRO-INFLAMMATORY DIETARY PATTERN IS ASSOCIATED WITH FRACTURES IN WOMEN: AN EIGHT YEAR LONGITUDINAL COHORT STUDY

N. Veronese¹, N. Shivappa², J. Hebert³, C. Cooper⁴, G. Guglielmi⁵, J.-Y. Reginster⁶, R. Rizzoli⁷, S. Maggi¹

¹National Council Research, Padova, Italy, ²The Cancer Prevention and Control Program., Columbia, United States, ³University of South Carolina, Columbia, United States, ⁴University of Southampton, Southampton, United Kingdom, ⁵University of Foggia, Foggia, Italy, ⁶University of Liège, Liege, Belgium, ⁷University of Geneve, Geneve, Switzerland

Objective: Inflammation is key risk factor for many adverse outcomes in older people. Whilst diet is a potential source of inflammation, little is known about the impact of inflammatory diet on fractures. Thus, we investigated whether higher Dietary Inflammatory Index (DII)TM scores are associated with fractures in a cohort of North American people.

Materials and methods: This longitudinal with a follow-up of 8 years included 3648 participants (1577 Males and 2071 Females; mean age: 60.6 years) with/at risk of knee osteoarthritis participating to the Osteoarthritis Initiative. DII scores were calculated using the validated Block Brief 2000 Food-Frequency Questionnaire, categorized into sex-specific quintiles. Information on fractures was obtained through self-reported history of fractures at hip, spine and forearm. The relationship between baseline DII score and incident fracture was assessed through a Cox's regression analysis, adjusted for potential baseline confounders, and reported as hazard ratios (HRs).

Results: During 8 years of follow-up, 560 individuals developed fractures (=15.4%). Adjusting for 10 potential confounders, women in the highest DII score quintile (i.e. most proinflammatory diet) had a significantly higher risk for fractures (HR: 1.46; 95% CI: 1.02–2.11) compared to women in the lowest quintile. An increase in one standard deviation of DII scores significantly predicted fracture onset in women (adjusted HR = 1.14; 95%CI: 1.02–1.27). The association between DII score and fractures was not significant among men or in the sample as whole.

Conclusion: Pro-inflammatory diet is associated with a higher incidence of fractures in women but not men.

OC32

LONG-TERM EFFECTS ON BONE MINERAL DENSITY AFTER FOUR YEARS OF TREATMENT WITH TWO INTENSIVE COMBINATION STRATEGIES, INCLUDING INITIALLY HIGH DOSE PREDNISOLONE, IN EARLY RHEUMATOID ARTHRITIS PATIENTS: THE COBRA-LIGHT TRIAL

M. J. J. Lucassen¹, M. M. Ter Wee¹, D. Den Uyl¹, N. P. C. Konijn¹, M. T. Nurmohamed¹, D. van Schaardenburg¹, P. J. S. Kerstens¹, I. E. M. Bultink¹, L. H. D. van Tuyl¹, M. Boers¹, W. F. Lems¹

¹Amsterdam Rheumatology and immunology Center, Amsterdam, The Netherlands

Objective: COmbinatietherapieBijReumatoideArtritis (COBRA)-light therapy (methotrexate and initially 30 mg/day prednisolone) has proven to be non-inferior to COBRA therapy (methotrexate, sulfasalazine and initially 60 mg/day prednisolone) in the first year of treatment of early rheumatoid arthritis (RA) patients. This study assessed changes in bone mineral density (BMD) after four years in early RA patients

initially randomized to one year of COBRA or COBRA-light therapy.

Material and Methods: In the open-label, randomized, non-inferiority trial patients were assigned to COBRA or COBRA-light therapy. After one year, treatment was at the discretion of the treating rheumatologists. BMD in g/cm² was measured at baseline, after one, two and four years at total hip, femoral neck, and lumbar spine with dual-energy X-ray absorptiometry (DXA).

Results: Of the 164 original patients, 154 could be assessed after a follow-up of four years (range 34 to 74 months); 68% were female; mean (SD) age at follow up 52 (13) years. In the COBRA-light group, 11% of the patients used bisphosphonates after four years; the mean cumulative prednisolone dosage was 2.6 g (inner quartiles:1.9; 5.9) and 49% of the patients had minimal disease activity (DAS44 < 1.6). In the COBRA group, these numbers were 10%, 3.2 g (2.5; 6.2) and 49%, respectively. At the lumbar spine, both groups showed no significant decline in BMD over four years and no difference between treatment groups in BMD change. At the hips, 1.7 to 3.7% BMD loss over four years was found with slightly but significantly more loss in the COBRA-light group.

Conclusion: In modern treat-to-target management of RA, including bone surveillance, a high starting dose of prednisolone, either 30 or 60 mg/day, was not associated with a dramatically increased bone loss at the lumbar spine, and minor losses at the hip over four years.

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OC33

UTILITY LOSS AFTER A SENTINEL FRACTURE

H. Johansson¹, J. Kanis¹, A. Odén², N. Harvey³, V. Gudnason⁴, K. Sanders¹, G. Sigurdsson⁴, K. Siggeirsdottir⁴, L. Fitzpatrick⁵, M. Lorentzon⁶, F. Borgström⁷, E. McCloskey²

¹Institute for Health and Aging, Catholic University of Australia, Melbourne, Australia, Melbourne, Australia,

²Centre for Metabolic Bone Diseases, University of Sheffield, Sheffield, UK, Sheffield, United Kingdom,

³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, Southampton, United Kingdom, ⁴Icelandic Heart Association Research Institute, Kopavogur, Iceland, Kopavogur, Iceland,

⁵Radius Health, Waltham, MA, USA, Waltham, United

States, ⁶Centre for Bone and Arthritis Research, Geriatric Medicine, Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden., Gothenburg, Sweden, ⁷LIME/MMC, Karolinska Institutet, Stockholm, Sweden, Stockholm, Sweden

Objectives: Osteoporotic fractures impact on the quality of life. The aim of the present study was to determine the utility loss for the cohort with a sentinel major osteoporotic fracture and compare that with utility loss from osteoporotic fracture for the whole population.

Material and Methods: The study was based on a population-based cohort of 18,872 persons born between 1907 and 1935. Cumulative loss of utilities was calculated using utility multipliers derived from the EQ-5D 3 Levels descriptive system for osteoporotic fracture sites. Multipliers were applied for each subsequent osteoporotic fracture that occurred for 10 year duration of follow up. The multipliers were applied to health state values published for the UK general population. The cumulative loss of utility was calculated for the whole cohort and for the sub-population having a sentinel fracture.

Results: The whole cohort included 18,872 individuals aged on average 52.8 years (range 33–81) and 52% were women. Sentinel hip fractures were sustained in 2074 men and women; for clinical spine, forearm and humerus fractures, the respective numbers were 1365, 2364 and 1092, respectively. Utility loss over 10 years was much greater in fracture cases than in the whole cohort. Loss was greatest following a vertebral fracture (0.92; 95% CI: 0.89–0.95), followed by hip (0.63; 95% CI: 0.61–0.65), humeral (0.51 (95% CI: 0.49–0.53) and forearm fracture (0.32; 95% CI: 0.31–0.33). The utility loss during the first 10 years after a sentinel fracture varied by age (less with age) and sex (greater in women). In women at the age of 70 years, the mean utility loss due to fractures in the whole cohort was 0.081 whereas this was 12-fold greater in women with a sentinel hip fracture, and was increased 15-fold for spine fracture, 4-fold for forearm fracture and 8-fold for humeral fracture.

Conclusions: The utility loss was higher in the population with a sentinel fracture than in the whole cohort adjusted for age and sex.

OC34

DANGER OF OVERTREATMENT OF OSTEOPOROSIS WITH INAPPROPRIATE USE OF INTERVENTION THRESHOLDS DERIVED BY COST-EFFECTIVENESS ANALYSIS

E. McCloskey¹, H. Johansson², A. Oden¹, N. Harvey³, J. Compston⁴, C. Cooper³, J. A. Kanis²

¹University of Sheffield, Sheffield, United Kingdom,

²Australian Catholic University, Melbourne, Australia,

³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ⁴Cambridge Biomedical Campus, Cambridge, United Kingdom

Objectives: NICE recently found oral bisphosphonates to be cost-effective when prescribed for UK patients fulfilling screening criteria laid out in NICE CG146 with a 10 year risk of major osteoporotic fracture (MOF) of 1% or more. This 1% threshold has mistakenly been interpreted as an intervention threshold, though NICE alluded to the use of the National Osteoporosis Guideline Group (NOGG) FRAX-based intervention thresholds; we have compared the impact of these different thresholds.

Material and Methods: In a simulated age-matched population of 50,633 UK women aged 50–90 years, with risk factor distribution similar to European FRAX derivation cohorts, the NICE and NOGG thresholds were compared including impacts on treatment recommendation and numbers needed to treat (NNT) to prevent a hip fracture.

Results: All women in the population had a 10-year FRAX MOF probability of $\geq 1\%$. As 40,537 fulfilled the NICE CG146 screening criteria, treatment would be recommended in 80.1% of women under the NICE threshold. In contrast, NOGG guidance recommended treatment in 20,465 women (40.8%). At ages 50–54 years, NOGG recommended treatment in 30.8% of women, rising to 63.7% in those aged 85–90 years. In contrast, the NICE threshold treated 61% of 50–54 year olds and 100% of those aged 65 years or older. The median 10-year FRAX hip fracture probability in those identified by NICE for treatment at ages 50–54 years was significantly lower (0.42%) than that in those identified by NOGG (1.07%), suggesting that the NNT would be 2.55 times higher under NICE, assuming the same treatment efficacy in both groups. At 80–85 years, the ratio was 1.32.

Conclusion: Misinterpretation of recent NICE thresholds markedly increases the proportion of postmenopausal women eligible for osteoporosis treatment, an effect that is more marked at younger ages. The higher number needed to treat to prevent a hip fracture, especially at younger ages, is likely to adversely alter the benefit-risk ratio.

OC35

ASSESSING THE RISK OF OSTEOPOROSIS THROUGH RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS): RESULTS OF THE SCREENING CAMPAIGN IN THE ITALIAN POPULATION

L. Cianferotti¹, L. Cavalli², F. Giusti², G. Gronchi¹, C. Signorini¹, P. Pisani³, M. L. Brandi¹

¹Department of Surgery and Translational Medicine, University of Florence, Florence, Italy, ²Department of Surgery and Translational Medicine, University of Florence; Fondazione Italiana Ricerca sulle Malattie dell'Osso (F.I.R.M.O.); National Research Council, Institute of Clinical Physiology, Lecce, Italy, Florence, Italy, ³National Research Council, Institute of Clinical Physiology, Lecce, Italy

Objective: A population-based screening campaign titled “Il piatto forte” (“the strong dish”) was promoted by F.I.R.M.O. Foundation (Fondazione Italiana per la Ricerca sulle Malattie dell'Osso) in order to increase the awareness of osteoporosis in the Italian population and assess bone status by offering a densitometric exam.

Materials and methods: Aboard a mobile unit, 397 subjects of both sexes, aged 61 ± 10 years, were recruited on a voluntary basis in 4 Italian cities by medical personnel. They were administered the “One Minute Risk Test” questionnaire on clinical risk factors for osteoporosis and underwent a densitometric exam. Differently from the previous BoneTour campaigns promoted by F.I.R.M.O. [1], where calcaneus Quantitative ultrasonometry (QUS) was performed, “Il piatto forte” campaign employed an innovative non-ionizing approach, Radiofrequency Echographic Multi Spectrometry (REMS), providing standard densitometric parameters at lumbar spine and femoral neck which has been shown to strongly correlate with those obtained by DXA [2].

Results: According to REMS examinations at femoral neck, osteoporotic subjects reached 25% (corresponding to 30.1% of the women and none of the men) and osteopenic ones 54% of the sample (58.6% and 34.4% of women and men, respectively). At lumbar spine, as much as 11% of the screened people resulted osteoporotic, while 76% had a T-score compatible with osteopenia. Together with the REMS densitometry, the surveyed people received a nutritional consultancy and the medical recommendations for a correct life style. These results will be updated across the future F.I.R.M.O. campaigns. Moreover, the obtained results were compared with those obtained by calcaneus QUS in the previous BoneTour, where the prevalence of osteoporosis reached 18.1% (20.2% of women and 7.4% of men), while 42.1% of the subjects (44.1% of women and 32.4% of men) were osteopenic.

Conclusions: Osteoporosis is known as a silent epidemic still often not recognized or untreated. The F.I.R.M.O. Foundation aim is the improvement of the awareness of people about risk factors prevention as well as about their own bone status. Nowadays, a new densitometric device is available at this

purpose, which uses REMS technology, a portable, easy-to-use, radiation-free and operator-independent approach. It allows investigating the most fragile bone sites (column and femur), showing a high accuracy and strong correlation with DXA.

Acknowledgements: The authors are grateful to F.I.R.M.O. Foundation for supporting this campaign.

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OC36

ADVANCED 3D REGISTRATION FOR MONITORING PERIPHERAL BMD AND BMC CHANGES IN GROWING BONES IN CHILDREN

A. Friedberger¹, O. Museyko¹, H. H. Genant², K. Engelke¹

¹Institute of Medical Physics, University Erlangen, Erlangen, Germany, ²Department of Radiology, University of California, San Francisco, San Francisco, United States

Objective: Peripheral QCT of distal arms and legs is a standard method to assess bone mineral density (BMD) and content (BMC) in children. However, monitoring is difficult because repositioning of analysis volume of interests (VOIs) in growing bone is complicated by length and shape changes. Therefore we developed a new QCT based 3D method for registration of radius and tibia considering bone growth in children.

Methods: The new method is based on affine registration of bone segmentation masks using the length change (LC) of tibia or radius over time as external input parameter. Bone masks of baseline (BL) and follow-up (FU) CT datasets are created using a full 3D segmentation (MIAF-Forearm). Volumes of interests (VOIs) for BMD/BMC analysis are automatically determined at BL using anatomic coordinate systems. At FU they are derived from the transformation matrix of the 3D registration between BL and FU datasets. For registration only the distal part of the bone is used. The length used is

adjusted with LC for each visit. The registration quality is given as Dice ratio (DR). A DR of 1 means perfect matching between images, at a DR of 0.9 10% of the voxels do not overlap.

Results: BL, 12 M and 24 M FU data from 22 children (10.8 ± 2.1 years) were used. Mean DRs of the new affine method

compared to a standard rigid registration (RR) were 0.91 vs 0.87 (M12) and 0.87 vs 0.77 (M24).

Conclusions: A new affine registration has been developed that, with progressive growth, increasingly improves registration quality compared to RR and ensures a more consistent anatomical location of analyses VOIs in longitudinal investigations of peripheral BMD in children.

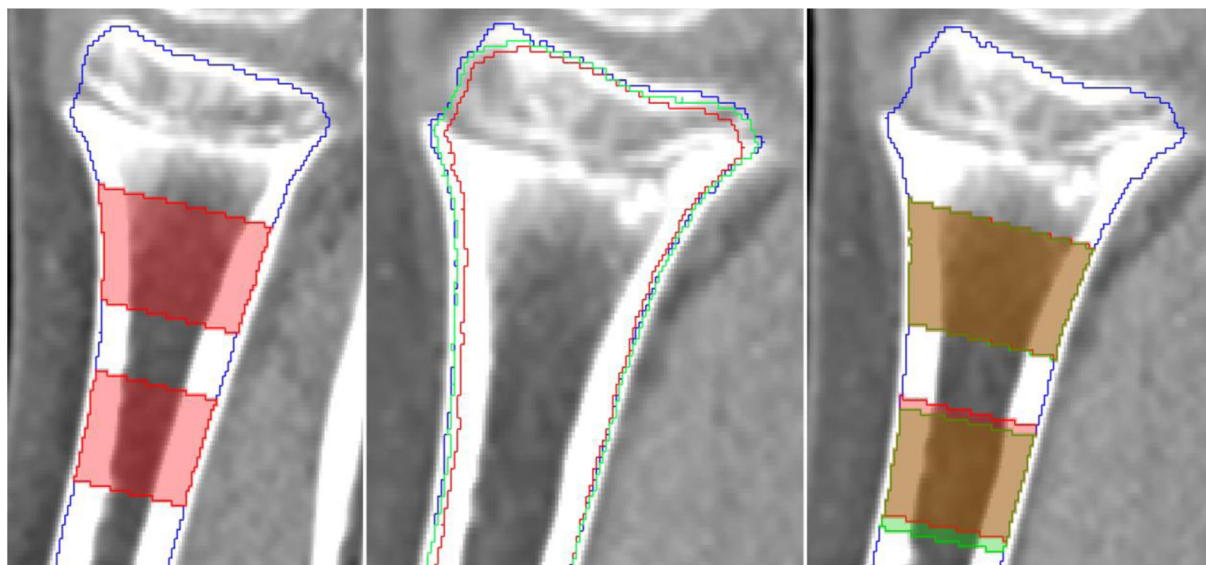


Figure 1: Left: BL segmentation and two analysis VOIs (red). Center: FU segmentation (blue), imported BL segmentation based on rigid (red) and new affine registration (green). Right: FU scan with VOIs calculated using rigid (red) and affine registration (green).

OC37

CLUSTER ANALYSIS OF HIGH RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY PARAMETERS IDENTIFIES BONE PHENOTYPES ASSOCIATED WITH HIGH RATES OF PREVALENT FRACTURE

M. H. Edwards¹, L. Westbury¹, C. Cooper¹, E. M. Dennison¹, K. A. Ward¹

¹MRC Lifecourse Epidemiology Unit, Southampton, United Kingdom

Objectives: To identify clusters of bone microarchitecture and strength in older men and women and relate them to fracture prevalence and aBMD.

Material and Methods: We studied 171 women and 188 men, aged 72.1–81.4 years, with HRpQCT (XtremeCT I) images of the distal radius. Standard image analyses were performed for assessment of macrostructure, regional densitometry, cortical porosity, trabecular

microarchitecture, and finite element analysis. K-means partitioning cluster analysis was used to identify 5 clusters in women and 5 in men. Prevalent fracture rates and femoral neck aBMD were determined for each cluster.

Results: Fifty (29.2%) women and 45 (23.9%) men had fractures. Using microarchitecture and FEA parameters together, in women, there were two phenotypes with fracture risk greater than the reference (lowest fracture prevalence) cluster. Cluster A contained 25 women (50% fractured) with Ct.Ar, Ct.Th, Ct.BMD, stiffness, and Young's modulus (YM) more than 1SD below the sex-specific cohort mean, and % Tb load (distal and proximal) more than 1SD above. Cluster B (41 women, 38.5% fractured) had a % Tb load proximal more than 1SD below the sex-specific cohort mean. Using FEA parameters alone, 3 clusters had significantly greater fracture risk. Two were similar to clusters A and B above. The third had stiffness, YM, cort stress, and cort

strain more than 1SD below the sex-specific cohort mean. In women, the reference cluster had higher aBMD compared to all other clusters ($p < 0.05$). Fracture rates did not differ significantly by cluster in men. However, similar phenotypes to clusters A and B were identified in the analyses.

Conclusions: We have demonstrated clusters with cortical and trabecular phenotypes associated with a higher proportion of fractures in women. In men, who had fewer fractures, significant differences in fracture rates were not identified despite similar phenotypes being identified.

OC38

ASSESSING THE IMPACT OF PRESCRIBING ANTI-OSTEOPOROSIS MEDICATION AFTER AN INDEX FRACTURE AS PART OF A NATIONAL CLINICAL AUDIT

M. K. Javaid¹, C. Gallagher¹, A. Judge², N. J. Vasilakis¹

¹The Royal College of Physicians, London, London, United Kingdom, ²NDORMS, University of Oxford, Oxford, United Kingdom

Objective: To identify what proportion of patients over 50 years are initiated on bone protection therapy following a fragility fracture.

Material and Methods: Each FLS in the audit was asked to submit data on all patients they saw who were aged 50 or over and who had sustained a fragility fracture that was diagnosed in the NHS between 1 January and 30 December 2016. As part of the audit we asked whether the patient was recommended bone therapy by the FLS.

Anti-osteoporosis medication included were: alendronate, risedronate, ibandronate, raloxifene, teriparatide, strontium, denosumab, zoledronate, systemic oestrogens, systemic oestrogen and progesterone, calcitriol and alfacalcidol.

There were a few cases where more than one drug was submitted. To identify the recommended drug, a hierarchy was used to select the one drug: oral bisphosphonate > denosumab > zoledronate, then teriparatide or raloxifene or strontium or activated vitamin D or oestrogen therapy.

Results: 50 FLS submitted data on 42,000 patients. Of the patients who have a recorded treatment outcome, 23% were recommended for bone therapy and 11% required further clinical input (either by a GP or another clinician).

However, there was considerable variation at FLS level, firstly the decision to treat and then the specific type of bone therapy recommended by FLSs.

Drug	Mean (%)	IQR (%)	Min- Max (%)
Clinical decision not to treat or inappropriate	30	22–42	0–70
Oral Bisphosphonate (alendronate, risedronate, ibandronate)	18	5–27	0–51
Zoledronate	2	0–2	0–32
Denosumab	3	0–2	0–15
Raloxifene	0	0	0–0.4
Teriparatide	0	0–0.1	0–0.4

Conclusions: NICE technology assessments (TAs) 161/204 have provided recommendations for first and second-line bone therapies after a fragility fracture for FLSs to follow. This audit has demonstrated marked variation between FLSs in the decision to treat and the type of bone therapy. Bone therapies vary in cost but also adherence and potentially effectiveness. These data suggest that local interpretation of national recommendations is significantly impacting therapeutic options offered to patients in the NHS. Better understanding of the contributory factors for this variation will inform future FLS delivery and more effective and efficient medicines management.

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OC39

ARTHRITIS ACROSS EDUCATION, INCOME AND RACE/ETHNICITY, AND THE MODERATING ROLE OF CHILDHOOD MALTREATMENT: DATA FROM THE NATIONAL EPIDEMIOLOGICAL SURVEY ON ALCOHOL AND RELATED CONDITIONS (NESARC)

S. L. Brennan-Olsen¹, T. L. Taillieu², S. Turner², J. Bolton², S. E. Quirk³, F. Gomez⁴, R. L. Duckham⁵, S. M. Hosking⁶, G. Duque¹, D. Green¹, T. O. Afifi²

¹University of Melbourne; Australian Institute for Musculoskeletal Science, St Albans (Melbourne), Australia,

²University of Manitoba, Department of Community Health Services, Winnipeg, Canada, ³Monash University; Monash Institute of Cognitive and Clinical Neurosciences, Clayton (Melbourne), Australia, ⁴Universidad de Caldas, Faculty of Health Sciences, Manizales, Colombia, ⁵Deakin University, Institute for Physical Activity and Nutrition, Geelong,

Australia, ⁶Monash University; Australian Institute for Musculoskeletal Science, Melbourne, Australia

Objective: Childhood maltreatment (CM) has been associated with increased risk of adult-onset arthritis; however, data are predominantly from women, and young adults, providing an abridged expression of arthritis risk in those with CM history. Furthermore, associations between arthritis and socioeconomic status (SES) are poorly understood, especially in large cohorts. We investigated arthritis across education, income and race/ethnicity, and whether CM moderated associations between SES and arthritis.

Materials and methods: Data were drawn from Wave 2 (2004–2005) of the nationally-representative National Epidemiological Survey on Alcohol and Related Conditions (NESARC, $n = 34,563$ United States adults aged ≥ 20 years). CM history was self-reported and included physical abuse, sexual abuse, exposure to intimate partner violence (IPV), emotional abuse, emotional neglect, and physical neglect.

We used descriptive statistics and logistic regression to determine the relationship between SES, CM and arthritis. Interaction terms were used to test if CM moderated the relationship between SES and arthritis.

Results: Arthritis prevalence was 26.8% (66.6% among women). In unadjusted analyses, women (Odds Ratios 1.6, 95%CI 1.5–1.7), and older age (both sexes, $p \leq 0.01$) was associated with increased odds of arthritis. All CM types were associated with increased odds of arthritis, except exposure to IPV among women. In sex-stratified, age-adjusted analyses, lower education and income, family dysfunction, being Hispanic or an Asian/Native Hawaiian/Pacific Islander and ≥ 1 physical comorbidity was associated with increased odds of arthritis among those with and without CM. Overall, associations between race/ethnicity and arthritis were similar in those with and without CM. In age-adjusted two-way interaction terms, CM did not moderate associations between SES and arthritis.

Conclusion: CM did not amplify associations between SES and arthritis: higher SES may plausibly increase resilience.

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ESCEO1

HAND OSTEOARTHRITIS – SCOPE OF THE PROBLEM

N. Arden^{1,2,3}

¹Nuffield Department of Orthopedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, United Kingdom, ²Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis University of Oxford, Oxford, United Kingdom, ³MRC Lifecourse Epidemiological Unit University of Southampton, Southampton, United Kingdom

Although there is a large body of research on the topic of knee and hip osteoarthritis, there is a relatively dearth of research on the topic of hand osteoarthritis. Hand osteoarthritis is very common with radiographic hand osteoarthritis being present in up to 60% of the elderly population. Only a subset of these patients are symptomatic with prevalence's ranging from 6 to 15% depending on age and gender of the population. Osteoarthritis is a heterogeneous disease with three major subsets:

1. Thumb based (first) carpometacarpal osteoarthritis (CMC OA) and Scaphotrapeziotrapezoidal (STT) joint,
2. Interphalangeal joint - proximal and distal
3. Erosive osteoarthritis (EOA)

These subsets have different risk factors, rates of progression and effects on quality of life. It is therefore very likely that they will have different responses to treatment modalities. Erosive osteoarthritis is the least common of these phenotypes, but is associated with greater pain, lower grip strength and more rapid structural progression. All phenotypes increase with age and are more common in women than men, especially after the menopause. There are also association with reduced quality of self-reported health.

Despite an increasing number of treatments for osteoarthritis under research and an increasing number of trials in the field of hand osteoarthritis, none have yet produced strong evidence of efficacy. As such there is no current license pharmacological therapy for hand osteoarthritis in the European Union.

More standardized definitions of disease and design of clinical studies will help the pipeline of drugs from discovery through to the market.

ESCEO2

GUIDELINES FOR THE CONDUCT OF PHARMACOLOGICAL CLINICAL TRIALS IN HAND OSTEOARTHRITIS: CONSENSUS OF A WORKING GROUP OF THE ESCEO

J.-Y. Reginster¹, N. K. Arden², I. K. Haugen³, F. Rannou⁴, E. Cavalier⁵, O. Bruyère¹, J. Branco⁶, R. Chapurlat⁷, S. C. Basset⁸, N. M. Al-Daghri⁹, E. M. Dennison¹⁰, G. Herrero-Beaumont¹¹, A. Laslop¹², B. F. Leeb¹³, S. Maggi¹⁴, O. Mkinsi¹⁵, A. S. Povzun¹⁶, D. Prieto-Alhambra¹⁷, T. Thomas¹⁸, D. Uebelhart¹⁹, N. Veronese¹⁴, C. Cooper¹⁰

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium, ²Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis, University of Oxford, Oxford, United Kingdom, ³Department of Rheumatology, Diakonhjemmet Hospital, Oslo, Norway, ⁴Division of Physical Medicine and Rehabilitation, Department of Rheumatology, AP-HP Cochin Hospital, Université Paris Descartes Sorbonne Paris Cité, Paris, France, ⁵Department of Clinical Chemistry, University of Liège, Liège, Belgium, ⁶CEDOC, NOVA Medical School, Universidade Nova de Lisboa, Department of Rheumatology, CHLO, Hospital Egas Moniz, Lisbon, Portugal, ⁷INSERM UMR 1033, Université de Lyon, Hôpital E Herriot, Lyon, France, ⁸TRB Chemedica International SA, Geneva, Switzerland, ⁹Biochemistry Department, College of Science, King Saud University, Riyadh, Saudi Arabia, ¹⁰MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton, United Kingdom, ¹¹Department of Rheumatology, Bone and Joint Research Unit, Fundación Jiménez Díaz, Universidad Autónoma, Madrid, Spain, ¹²Scientific Office, Austrian Medicines and Medical Devices Agency, AGES, Vienna, Austria, ¹³Second Department of Medicine, Centre for Rheumatology Lower Austria, State

Hospital Stockerau, Stockerau, Austria, ¹⁴Aging program, National Research Council, Padova, Italy, ¹⁵Rheumatology Department, IBN ROCHD University Hospital, Casablanca, Morocco, ¹⁶Scientific Research Institute of Emergency Care n.a. I.I. Dzhanelidze, Saint-Petersburg, Russia, ¹⁷NIHR Musculoskeletal Biomedical Research Unit, University of Oxford, Oxford, United Kingdom, ¹⁸Department of Rheumatology, Hôpital Nord, CHU de St-Etienne & INSERM 1059, Université de Lyon, Saint-Etienne, France, ¹⁹Division of Musculoskeletal, Internal Medicine and Oncological Rehabilitation, Department of Orthopedics and Traumatology, Hôpital du Valais (HVS), Centre Hospitalier du Valais Romand (CHVR), CVP, Crans-Montana, Switzerland

Objectives: To gather expert opinion on the conduct of clinical trials that will facilitate regulatory review and approval of appropriate efficacious pharmacological treatments for hand osteoarthritis (OA), which there is currently no approved medication in Europe.

Methods: The European Society on Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal diseases (ESCEO) organized a working group, which consisted of clinical scientists expert in the field of OA in academia and consulting for drug development within the pharmaceutical industry, and representatives of national or European licensing authorities. Members of the group prepared a full review of the literature on the design of studies in hand OA, which were presented to the group. After the presentations, a comprehensive discussion was held within the group and shared conclusions were reached.

Results: These recommendations provide guidance, not rigid rules, which should allow for better standardization of the conduct of clinical trials and facilitate registration and approval of new pharmacological treatments for hand OA. For inclusion in clinical trials, we recommend that patients fulfill the validated American College of Rheumatology criteria for the diagnosis of hand OA, which are currently the best available criteria. Trials of symptom modifying agents should assess effect on pain as the primary outcome, which could be measured either on a visual analogue scale or the Australian/Canadian hand pain subscale. Secondary outcomes are multiple, and could include physical function, hand strength and health-related quality of life. The trial should be placebo-controlled and for a minimum duration of 3 months for a fast-acting drug, and not less than 6 months for a slow-acting drug. For structure modifying agents, the optimal study duration is for 2 to 3 years to identify structural changes. The primary endpoint of structure modifying trials should measure effect on joint structure independent of any effect on symptoms, which can be included as secondary endpoints.

Conclusions: This consensus guideline is intended to provide a reference tool for practice, and should allow for better

standardization of the conduct of clinical trials in hand OA. While the working group acknowledges that the methodology for performing clinical trials in hand OA will evolve as knowledge of the disease increases, it is hoped that this guidance will support the development of new pharmacological treatments targeting hand OA.

ESCEO3

THE FGF23/PHOSPHATE/KLOTHO/FGF-RS MACHINERY

D. Haffner¹

¹Department of Pediatric Kidney, Liver and Metabolic Diseases, Hannover Medical School, Hannover, Germany

Chronic kidney disease (CKD) is associated with an increased risk of cardiovascular mortality, infections, and impaired cognitive function. It is characterized by excessively increased levels of the phosphaturic hormone fibroblast growth factor 23 (FGF23) and a deficiency of its co-receptor Klotho. Despite the important physiological effect of FGF23 in maintaining phosphate homeostasis, there is increasing evidence that higher FGF23 levels are a risk factor for mortality and cardiovascular disease. FGF23 directly induces left ventricular hypertrophy via activation of the FGF receptor 4/calcineurin/nuclear factor of activated T cells signaling pathway. By contrast, the impact of FGF23 on endothelial function and the development of atherosclerosis are poorly understood. The results of recent experimental studies indicate that FGF23 directly impacts on hippocampal neurons and may thereby impair learning and memory function in CKD patients. Finally, it has been shown that FGF23 interferes with the immune system by directly acting on polymorphonuclear leukocytes and macrophages. In this talk recent data will be presented coming from clinical and experimental studies on the extrarenal effects of FGF23 with respect to the cardiovascular, central nervous, and immune systems.

ESCEO4

EXPRESSION OF PHOSPHATE WASTING DISORDER IN THE ADULT

K. Javaid¹

¹Associate Professor in Metabolic Bone Disease, NDORMS, University of Oxford, Oxford, United Kingdom

X-linked Hypophosphataemia (XLH) is a rare disease affecting the skeleton. Patients are usually identified in childhood and the impact of XLH in adults is poorly described. In adults, the significant clinical issues include fractures, joint and bone pain. A key outcome for patients is quality of life and understanding the impact of XLH on the physical and mental

domains informs assessment, treatment outcomes, treatment strategies and value of therapies for this rare disease.

Objectives: To describe the impact of X-Linked Hypophosphataemia on the lives of adults.

Materials and Methods: From the www.RUDYstudy.org cohort, adults with XLH were identified, and their quality of life measured using SF36 and EQ5D. These findings were then compared with patients with osteoarthritis, the normal population and reviewed with other publications in this domain.

Results: There were specific domains that were limited in adults with XLH and these varied by the comparator.

Conclusion: Quality of life is significantly impacted by XLH with domain-specific variation informing our understanding and assessment of XLH.

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ESCEO5

MANAGEMENT OF PHOSPHATE WASTING DISORDERS

L. Masi¹

¹Metabolic Bone Diseases Unit, University Hospital of Florence-AOUC, Florence, Italy

Phosphorus plays an important role in a number of biological processes and is a major component of the mineral-phase and it is required for the formation of hydroxyapatite. In addition, Pi is critical to several biologic processes, including energy transfer, cellular signaling, and the regulation of protein function. A deficiency of Pi results in a defect in the deposition of

mineral and the presence of unmineralized osteoid that characterizes osteomalacia in adults and rickets in developing animals and humans. Several studies have identified new factors that play a role in the regulation of inorganic phosphorus (Pi) transport and homeostasis that include the “phosphatonins”. The term *phosphatonin* was introduced to describe the factor(s) responsible for the inhibition of renal Pi reabsorption and for the modulation of the 25-hydroxyvitamin D 1 α -hydroxylase levels. In the seminal work of Cai et al. on tumor-induced osteomalacia (TIO) hypophosphatemia, renal Pi wasting and reduced 1,25(OH)₂D₃ disappeared after the removal of the tumor. Autosomal hypophosphatemic rickets (ADHR), X-Linked Hypophosphatemic Rickets (XLH), TIO, are characterized by hypophosphatemia and urinary Pi wasting as measured by a low tubular maximum reabsorption of Pi per deciliter of glomerular filtrate (TmP/GFR). Medical care for hypophosphatemia is highly dependent on three factors: cause, severity, and duration. Phosphate distribution varies among patients, so no formulas reliably determine the magnitude of the phosphate deficit. The average patient requires 1000–2000 mg (32–64 mmol) of phosphate per day for 7–10 days to replenish the body stores. When a treatable cause of the hypophosphatemia is known, then treatment of that underlying cause is of paramount importance and is often curative. Adequate treatment includes phosphate supplements in addition to feeding and attention to underlying eating disorders or substance abuse. Oral phosphate supplements, although not curative, are useful for the treatment of the genetic disorders of phosphate wasting and can often normalize phosphate levels and decrease bone pain. Recently, FGF23 antibody treatment has become available for individuals with some genetic forms of hypophosphatemic rickets.

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ESCEO-WHO1

A JOURNEY IN PATIENT PARTNERSHIP

J. Kirwan¹

¹Academic Rheumatology Unit, University of Bristol, Bristol, United Kingdom

For over 20 years, Outcome Measures in Rheumatology (OMERACT), an international consensus group of multidisciplinary researchers, health care providers, and patients, has worked to improve measurement of various types of arthritis, autoimmune, and musculoskeletal diseases. These include internationally recognized Core Outcome Measurement Sets to include in clinical trials, which are also used in clinical care. Patients have been recognized as primary stakeholders and integrated as active participants since 2002. Patient roles have gradually evolved to become collaborating partners, with equal voices and full participation including: moderating, reporting, analyzing and interpreting data, disseminating results through abstracts, manuscripts, presentations, and organizational and group leadership. We have iteratively developed patient-specific tools and methods (e.g. patient glossaries, buddy systems, training/orientation and debriefing meetings/discussions). Patient integration has enriched discussions for all stakeholders, contributing to content validation and feasibility assessments of measures. Actively integrating worldwide patients has facilitated global development and validation of new patient-reported outcomes (PROs), more comprehensively reflecting the patient perspective. This journey in patient partnership has lessons for patients and researchers which can be applied to more general approaches to patient involvement.

ESCEO-WHO2

PRINCIPLES FOR ENGAGING PATIENTS IN CLINICAL RESEARCH

M. De Wit¹

¹PhD, OMERACT Patient Research Partner; VU Medical University, Amsterdam, The Netherlands

For almost 20 years rheumatology has been front runner in the field of participatory outcome research, partly due to the

collaborative nature of the perennial patient-physician relationship in clinical practice. Based on published case studies, literature reviews and personal experiences scientific communities such as EULAR and OMERACT were the first to formulate sets of recommendations that provide practical guidance to researchers and patient research partners (PRP's). Although these recommendations are relatively easy to apply, researchers still report challenges in identifying suitable patient representatives and in deciding when to start with patient involvement. They also face health system barriers for implementing recommendations in research practices. During an expert meeting in Geneva in 2017 we discussed the state of the art in participatory research and formulated principles of engaging patients in clinical research.

In this presentation we will summarize the most topical principles in participatory research: Utilizing consultation methods for patient preference elicitation; equal collaboration with PRP's throughout the research process, preferably right from the start; appropriate information, support and coaching of PRP's; guarantees for adequate representativeness of the patient perspective; ensuring sustainability of the patient involvement; and evaluating its impact.

Patient involvement in rheumatology has changed research agenda's, culture and clinical outcomes. Existing recommendations have contributed to improved designs of clinical trials, in particular by selecting outcomes that matter to patients, and to the development of Patient Reported Outcomes (PRO). In other fields, such as laboratory research and HTA research, patient involvement is still challenging, although many recommendations can be effectively applied as well.

ESCEO-WHO3

PRINCIPLES FOR PATIENT ENGAGEMENT; THE REGULATORY EXPERIENCE

N. Bere¹

¹European Medicines Agency, London, United Kingdom

The European Medicines Agency (EMA) has been engaging in dialog with patients since its creation in 1995. Today,

patient involvement is an integral part of the work at EMA, with a diverse range of opportunities in place to include the patient's voice at all stages along the medicines regulatory life-cycle. Key to successful engagement has been the need for flexibility, a range of well-tested methodologies and a robust system of support and training.

EMA's journey with patients has evolved and refined over the years and progress has been steered by the implementation and assessment of various engagement tools using pilot projects to determine in practical terms what works best from all perspectives. Our experiences have shown that there is no 'one-size-fits-all' approach but rather an 'a la carte' menu of engagement methods is needed to be able to respond to each case, taking into account the particular context. Equally, meaningful engagement cannot be achieved without the provision of tailored support and training prior to and during involvement.

Patients and caregivers' real-life perspectives and unique insights complement the scientific data within EMA reviews; examples include input on proposed protocol designs (scientific advice) and participation in expert meetings or written consultations on specific medicines evaluations. They are voting members of many EMA scientific committees and they also review the medical information written for the public. Evidence from monitoring and feedback shows their contributions do make a difference which ultimately helps ensure that the Agency's outcomes are as meaningful and relevant as possible for all concerned.

Some of the key challenges and conclusions of our journey will be highlighted to serve as a guide to anyone considering a similar, rewarding path.

ESCEO-WHO4 ASSESSMENT OF PHYSICAL PERFORMANCES IN DAILY PRACTICE: SCOPE OF THE PROBLEM

R. Rizzoli¹

¹Service of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland

With advancing age, decline in muscle fiber size and number causes a loss of muscle mass. Muscle strength and muscle power decrease with even a higher magnitude. Muscle weakness compromises quality of life in the oldest old, favors the occurrence of falls, and contributes to increase fracture risk. Fall-induced injuries represent one of the most common causes of longstanding pain, disability and death in the elderly population. Various experts groups or societies have suggested that sarcopenia should be defined on the basis of muscle mass and functional capacity, including gait speed and muscle strength. Numerous tests are available to evaluate muscle mass, strength and power, and physical performance. These tests are mandatory to determine an operational definition of sarcopenia and possibly define intervention thresholds for treatment. Some

tests require the subjects' will and contribution, and/or are influenced by the investigator's information to the subjects and intervention during the test. Under these conditions, these tests should be submitted to strict standardization procedures, quality assessment and quality control, to ensure the highest accuracy and precision. This is a necessary step in the quest for a consensual operational definition of sarcopenia.

ESCEO-WHO5 PRINCIPLES FOR THE STANDARDIZATION OF THE ASSESSMENT OF PHYSICAL PERFORMANCE A. J. Cruz-Jentoft¹

¹Hospital Universitario Ramón y Cajal (IRYCIS), Madrid, Spain

Physical performance is a measure of the functional ability of an individual that allows him/her to interact with others and with the environment. Being a wide and ill-defined concept, it is quite clear now that physical performance is a strong predictor of clinically meaningful adverse events in older people, such as functional decline, falls, disability, hospitalizations, decreased quality of life and death. Measuring physical performance has become key in identifying frailty and sarcopenia in older subjects. Identification of impaired physical performance before disability establishes is important for the early implementation of strategies, both at individual and societal level, to reduce or retard physical disability and dependence.

Many tools have been proposed to measure physical performance. The most widely used – and those with the best evidence on their measurement characteristics – are gait speed, the Short Physical Performance Battery, the timed up-and-go test, 400 m and 6 min walk, and stair climbing.

The choice of a tool depends on the setting (research vs. clinical), cost, required time, need of equipment, performance characteristics of the tool, purpose of the assessment and patients characteristics (age, care setting, functional status).

Time has come for the prevention or retardation of disability in old age. Conceptualization of physical performance and the right choice of measurement tools in clinical and research settings is key in this quest.

ESCEO-WHO6 PRINCIPLES FOR THE STANDARDIZATION OF THE ASSESSMENT OF MUSCLE STRENGTH AND POWER

J. M. Bauer^{1,2}

¹Center for Geriatric Medicine, University of Heidelberg, Heidelberg, Germany, ²Agaplesion Bethanien Krankenhaus, Heidelberg, Germany

When the suitability of tests for the assessment of muscle strength and muscle power in daily clinical practice is

considered several characteristics are of special relevance. Those are primarily the following: applicability in different patient groups, performance characteristics, prognostic reliability. Values for relevant change and critical thresholds, which are also highly important in this context, have still to be defined for most of the tests.

Handgrip strength may be regarded as a reasonable option for the assessment of strength of the upper extremities. In addition, the association of grip strength with lower extremity strength is considered moderate to good. Measurement devices are portable and can therefore be used in various settings. A sufficient amount of normative data has been reported, but handgrip measurements in general appear to be of limited value for the evaluation of treatment outcomes. Two favorable options exist for hand grip measurement. The first one is the testing of hand grip strength with the help of the JAMAR dynamometer. The second option is the Martin

vigorimeter, which measures more specifically grip pressure and which can therefore be influenced by hand size. The latter method is preferred by patients with joint disease. A good correlation exists between these two approaches. It is mandatory to follow an exact protocol for all handgrip measurements. Otherwise the individual results cannot be categorized correctly. Handheld dynamometers are currently not regarded as providing reliable data for the upper and the lower extremities. In addition, problems exist with regard to validation.

At the moment, no tools can be recommended for the evaluation of power in daily clinical practice. Here functional measurements like the stair climb test and the chair rise test may be considered as reasonable options, but their limitations have to be taken into account. In the near future the assessment of power may be facilitated by accelerometry after validated algorithms have been developed.

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IOF-ESCEO1

NUTRITION AND PHYSICAL ACTIVITY IN THE PREVENTION AND TREATMENT OF SARCOPENIA: OUTCOMES OF THE IOF-ESCEO SARCOPENIA WORKING GROUPS - WELCOME AND SCOPE OF THE PROBLEM

N. C. Harvey¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom

Chronic non-communicable musculoskeletal diseases contribute an enormous burden in terms of global disability. Conditions such as osteoporosis and sarcopenia are major components of this health impact. Sarcopenia is common, and associated with adverse outcomes such as reduced survival, falls and fractures. In this symposium, participants will be given an overview of the scale and impact of the global sarcopenia-associated health burden, and the methodology and results of a comprehensive systematic review, undertaken by the IOF-ESCEO Sarcopenia Working Groups on the role of nutrition and physical activity in the prevention and treatment of sarcopenia, together with a specific exposition of the contribution of dairy products in this context. There will be scope for discussion, and participants will leave with an increased knowledge and understanding of the health burden associated with sarcopenia, and of nutritional and physical activity-based interventions which may ameliorate its impact.

IOF-ESCEO2

METHODOLOGY OF THE SYSTEMATIC REVIEW

E. M. Dennison¹

¹MRC Lifecourse Epidemiology Unit, Southampton, United Kingdom

Background: In 2013, Denison et al. conducted a systematic review including 17 randomized controlled trials (RCTs) to explore the effect of combined exercise and nutrition intervention to improve muscle mass, muscle strength, or physical performance in older people (1). They concluded that further

studies were needed to provide evidence upon which public health and clinical recommendations could be based. The purpose of the present work was to update the prior systematic review and include studies published up to October 2015.

Methods: Using the electronic databases MEDLINE and EMBASE, we identified RCTs which assessed the combined effect of exercise training and nutritional supplementation on muscle strength, muscle mass, or physical performance in subjects aged 60 years and over. Study selection and data extraction were performed by two independent reviewers. The literature search was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) statement. We searched for any additional studies published between April 2013 and October 2015 to update the previous systematic review (1). Additional studies were identified by a manual search of bibliographic references of relevant articles and existing reviews. Conference abstracts were not included. The same inclusion criteria were used as for the previous systematic review. Studies performed on children, adolescents, and young adults were excluded, as were studies in which the nutritional intervention was energy restriction to promote weight loss. Studies were also excluded if they included populations with a specific health condition. The quality of each study was independently assessed by two authors using the Jadad Score system. Because of the huge heterogeneity observed in the protocols of exercise and dietary supplementation, no meta-analysis was undertaken.

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IOF-ESCEO3

OUTCOMES OF THE IOF-ESCEO SARCOPENIA WORKING GROUPS

C. Beaudart^{1,2}

¹Department of Public Health, University of Liège, Liège, Belgium, ²WHO Collaborating Centre for Public Health

Aspects of Musculo-Skeletal Health and Aging, Liège, Belgium

Outcomes of the systematic review: Following a systematic review previously performed in 2013 by Denison et al. including 17 RCTs, we performed an update of this comprehensive systematic review and identified 21 RCTs published between April 2013 and October 2015. Thus, 37 RCTs assessing the impact of a therapeutic intervention containing both physical activity and a nutritional supplement on muscle parameters were included in the present work. The study protocols were quite heterogeneous. Different types of physical activities have been studied in different populations that varied in sex, settings and health status. Moreover, within each category of dietary supplements, the supplement dose and the length of study differed across RCTs. Among the 37 RCTs included in the systematic review, 34 RCTs assessed the impact of intervention on muscle mass in elderly subjects. In almost 80% of the RCTs (27/34 RCTs), muscle mass increased with exercise training. An additional effect of nutritional intervention on muscle mass was only found in 8 RCTs (23.5%), 4 using creatine, 3 using proteins and 1 using HMB as dietary supplement. Muscle strength increased in 82.8% of the studies (29/35 RCTs) following an exercise intervention and, once again, dietary supplementation showed additional benefits in only a small number of studies (8/35 RCTs, 22.8%) principally for creatine but only at specific muscle sites. Finally, a total of 29 RCTs assessed the impact of combined physical activity and dietary supplementation on physical performance. We observed, in the majority of studies, an improvement in physical performance outcomes following an exercise intervention (26/28 RCTs, 92.8%). Interaction of exercise and nutrition was found in only 17.8% of these studies (5/28 RCTs): one study when a multi-nutrient was used as a dietary supplement, another with creatine, a third study with vitamin D, another with tea catechin and finally, one with magnesium oxide.

In conclusion, physical exercise has a beneficial impact on muscle mass, muscle strength or physical performance in healthy subjects aged 60 years and older. However, the additional effect of dietary supplementation has only been reported in a limited number of studies. For the majority of studies included in this systematic review, the popula-

tion was composed of healthy older subjects. Studies assessing the impact of a combined exercise intervention and dietary intervention are still lacking in frail and sarcopenic populations, populations suffering from nutritional deficiency or populations at risk of malnutrition.

IOF-ESCEO4

DAIRY PRODUCTS IN THE PREVENTION AND TREATMENT OF SARCOPENIA: OUTCOMES OF THE ESCEO WORKING GROUPS

J.-Y. Reginster¹

¹Department of Public Health, Epidemiology and Health Economics, University of Liege - WHO Collaborating Center for Public Health Aspects of Musculoskeletal Health and Aging, Liège, Belgium

There is a growing body of evidence that links nutrition to muscle mass, strength and function in older adults, suggesting that it has an important role to play both in the prevention and management of sarcopenia. ESCEO recommends optimal dietary protein intake of 1.0–1.2 g/kg body weight/day with at least 20–25 g of high-quality protein at each main meal, with adequate vitamin D intake at 800 IU/day as well as calcium intake of 1000 mg/day alongside regular physical activity/exercise 3–5 times/week combined with protein intake in the immediate proximity to exercise. One of the type of foods most studied in relation to muscle mass and function is dairy products. They are important due to their whey protein content, which is high in branched-chain amino acids and that also has antioxidant properties. Amino acid balance studies suggest that ingestion of milk following resistance exercise increases amino acid uptake, indicative of net muscle protein synthesis. Benefits of soya milk consumption after exercise have not been shown. In a recent study of older adults, those with increased soy protein intake had lower gains in muscle strength during resistance training when compared to participants with increased dairy protein intakes or usual intakes. Dairy products are thus particularly important to prevent muscle wasting in aging adults.

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EUGMS-ESCEO-IOF1

ASSESSING OLDER COMPLEX PATIENTS (CORE GERIATRIC ASSESSMENT FOR NON-GERIATRICIANS)

A. J. Cruz-Jentoft¹

¹Hospital Universitario Ramón y Cajal (IRYCIS), Madrid, Spain

Organ specialists are trained to efficiently care for adult patients with a specific (index) disease that is usually the major or predominant condition of a given individual. However, as they care for an increasingly aged population, they are usually confronted with old, complex patients with many simultaneous diseases (multimorbidity) that may have atypical presentations (geriatric syndromes), who use many different drugs (polypharmacy), who may be frail or have significant physical or mental disabilities, and may also have social or financial issues that impact on their care. In most cases they never received training on how to assess and manage these aspects at medical school.

Comprehensive Geriatric Assessment (CGA) is a standardized technique used for the multidimensional diagnosis of older individuals with the purpose of planning and/or delivering health care. It is the cornerstone of Geriatric Medicine. In recent years, adapted CGA forms have been developed to be used within organ or disease specialist care. CGA includes assessment of multimorbidity, polypharmacy, frailty, nutritional, functional, sensorial and mental status, and social aspect.

CGA has been shown to be useful to improve different outcomes (that are health care setting specific), including mortality, physical function, nursing home admission, satisfaction with care and quality of life. In specialist care, it helps to tailor complex treatments, reduce adverse drug reactions, choose the appropriate intensity of care in life-threatening diseases and, potentially, to reduce health care costs.

In this presentation, some basic CGA instruments that may be introduced in the practice of busy specialist will be presented, together with recommendations on how to use the results to improve the quality of care delivered to older patients.

EUGMS-ESCEO-IOF2

UNDERSTANDING AND MEASURING COMORBIDITIES IN THE ELDERLY

F. C. Martin¹

¹President EUGMS, Geriatrician and Professor Emeritus in Medical Gerontology, King's College London, London, United Kingdom

There are many ways of aggregating data to provide a summary description of an individual's health. This can be categorical or numerical. The measurement scale is generally ordinal as health has no real numerical intervals between perfect health (however defined) and imminent death. Thus the aggregate score represents a viewpoint about what constitutes health. Thus, any claim to the validity of the measure has to be in relation to its association with some health state, and since there is no consensus on what constitutes perfect health, then the reference point is usually death.

In other circumstances however, there is a specific purpose of an aggregate measure. For example, in clinical decisions about potential benefits or dysbenefits of treatments, the purposes include comparison of an individual patient with a defined casemix from research data, to judge applicability of the research findings. In surgical decisions, one purpose is to estimate the likelihood of post operative complications. The elements of an individual's health relevant to these contexts will likely differ.

In the English Oxford dictionaries, co-morbidity refers to a medical condition that co-occurs with another. It is generally understood that it would exist simultaneously but independently. Measurement of co-morbidities is an attempt to describe the effect of all other diseases an individual patient might have other than the primary disease of interest. There are several tools used to capture the range and severity of these conditions and in some contexts, this will include the primary condition so as to reach a total health state estimate. An example is the Charlson Index, which covers a range of 22 conditions, with weighted scores depending on severity to produce a total score which has been validated in clinical

populations as predictive of one year mortality. The weightings were derived from data about the mortality associated with individual conditions. A number of variants of the Charlson have been developed.

Another tool is the comorbidity–polypharmacy score (CPS) which adds the number of conditions plus associated medications, the more medications being regarded as an indicator of severity. The CPS has also been shown to be predictive of mortality, morbidity, and hospital readmissions in some clinical populations.

In older populations there is increasing interest in measuring frailty, for the same purposes. The Rockwood deficit accumulation model incorporates co-morbidities but goes further, adding health risks, sensory and cognitive impairments and functional ability. It is a validated predictor of mortality and dependency in large populations. The Fried phenotype measure of Frailty is quite distinct, based on 5 phenotypic parameters and excluding co-morbidity, but it has fairly similar predictive performance to the deficit accumulation approach.

Finally, a word about multimorbidity. This is NOT an accumulation of many co-morbidities but is based on a distinct idea about the co-dependence of several phenotypes (including diagnosable conditions) on several underlying biomedical processes. It contests the notion of independence of individual diseases in frail older people. Measurement of this is not yet well developed.

EUGMS-ESCEO-IOF3

DECISION-MAKING IN COMPLEX OLDER PATIENTS

S. Maggi¹

¹Research Director, CNR Aging Branch-Padova, Padova, Italy

Objective: to review the complex decision to pursue surgery in complex older patients.

Material and methods: the example of hip fracture surgery in frail older patients will be used to outline the complexity of the decision-making process.

Results: there is a large body of literature supporting the evidence that a multidisciplinary, shared approach to decision-making may improve communication between patients and their providers and facilitate the complex risk assessment that characterize older patients. Recognized goals of preoperative anesthesia consultation are the evaluation of patient's health status in order to define surgical risk, and the anticipation of possible complications together with optimization and planning of preventive strategies. Pathophysiological and clinical specificities of geriatric patients together with new trends in care organization, such as implementation of models of care, team-based care and process standardization have caused a substantial evolution in the approach to peri-operative assessment in geriatric surgery. Frailty probably represents the most challenging condition, given its functional pattern of reduced resistance to stressors. This has been shown in a number of studies performed in cardiac, oncological, vascular, orthopedic and general surgery, where frailty is reported to be associated with increased mortality, postoperative complications and length of stay. The increasing number of papers investigating relationships between frailty (regardless the way it is scored) and surgery testifies about both concerns among professionals regarding surgical outcome in the oldest old, and a need for methods to univocally and effectively screen patients at major risk. However, together with an increasing awareness about frailty as risk factor for adverse surgical outcome, a misleading trend seems to emerge too: that of grouping by a unique, catch-all and coarse label of “frail” an heterogeneous patients cohort with different needs, uncritically adopting preconceived approaches in decision-making about surgery: a way to devise ageism in more modern terms.

Conclusions: the comprehensive assessment of all domains, including somatic, cognitive, sensory and psychosocial capacities represents the best approach for decision-making in older complex patients.

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ESPRM-ESCEO-IOF1

THE ROLE OF REHABILITATION IN PREVENTION AND TREATMENT OF OSTEOPOROTIC FRACTURES

J. Kujawa¹

¹Medical University of Lodz, Department of Rehabilitation, Lodz, Poland

Introduction: Fracture in osteoporosis may lead to a cycle of function impairment, driven among others by complex psychosocial factors, which have a profound impact on physical function, activity limitations and participation restrictions leading to impaired quality of life as well as work disability and loss of productivity in the work force.

Objective(s): The aim of the review is to provide an overview of the clinical evidence pertaining to the potential efficacy of comprehensive rehabilitation and the role of PRM approaches in prevention and treatment of fracture in persons with OP in order to promote patient functioning properties and to reduce activity limitations and/or participation restrictions.

Material and Methods: Review of the literature (RT, SR, Meta analyses, Guidelines, EBPP papers) in MEDLINE and Cochrane databases on diagnosis, prevention, therapeutic procedures and rehabilitation published from 2013 to 2018.

Results: There are data that all patients with suspected osteoporosis should be subjected to the selective screening including assessment of clinical factors of fracture risk. Ten-year risk 10% of fractures in major locations, or 3% concerning neck of the femoral bone should qualify the patient for further osteoporosis diagnosis and comprehensive treatment. A previous low-energy fracture in one of the major locations should result in comprehensive treatment including pharmacotherapy, lifestyle modification and rehabilitation. Rehabilitation plays a crucial role in elimination or modification of fracture risk factors and prevention of falls.

An effective method in the prevention of falls is diagnostics of instability followed by instability treatment. Several factors

contribute to instability, many of which are ageing-related: visual spatial deficit, strength reduction, weight imbalance and comorbidities. Exercise programs, progressive resistance training (PRT) and adequate nutrition, which include vitamin D, calcium and protein, are key lifestyle approaches that may simultaneously optimize bone, muscle and functional outcomes in older people, if they are individually tailored and appropriately prescribed in terms of the type and dose. However, the quality of the research varies. There is conflicting evidence on the effects of singular type of isolated physiotherapy interventions, however, there is evidence that multicomponent exercise program may reduce falls in older adults and also reduce injurious falls rather than just falls. The effectiveness of multicomponent exercise program that addressed balance, flexibility, strength, reaction time in terms of significant reduction in moderate and serious injurious falls was demonstrated. In clinical practice guidelines, physical activity is recommended more often than safe movement defined as instructions detailing specific movements and body positions that reduce the patient vulnerability to fractures and falls. Information on exercise and safe movement is different and poorly defined.

Early mobilization after osteoporotic fractures and patient education to motivate them to reach good results are suggested. One of the major barriers for patients with osteoporosis to perform physical activity was the fear of potential injury. PRM approach of the management after osteoporotic fractures include not only pharmacological and non-pharmacological interventions for pain relief but also consideration of body functions including emotions, exercise psychomotor, energy and drive, sleep and muscle power functions, activities and participation including carrying out daily routine, mobility functions such as walking, lifting and carrying objects, domestic activities, employment, family relationships, recreation and leisure as well as environmental factors categorized in the International Classification of Functioning, Disability and Health (ICF).

Conclusion(s): Multicomponent therapy and comprehensive rehabilitation are required for the management of persons with

osteoporotic fractures. PRM approaches may have an important role in accomplishing the goals of relieving symptoms, reducing impairments of body functions, activity limitations, and participation restrictions.

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ESPRM-ESCEO-IOF2

THE EFFECT OF EXERCISE ON PAIN AND FUNCTIONAL ACTIVITY IN KNEE OSTEOARTHRITIS

F. Dincer¹

¹Hacettepe Medical School Dept of PRM, Chairperson ESPRM Musculoskeletal Disorders.Com, Senior Fellow European Board of PRM, Ankara, Turkey

Objective: Knee OA is associated with symptoms of pain and functional disability. Physical disability arising from pain and loss of functional capacity reduces quality of life and increases the risk of further morbidity and mortality. Current treatments aim at alleviating these symptoms by several different methods. Our aim is to stress and emphasize the effects of structured exercise programs on self-reported disability in adults with knee osteoarthritis. Therapeutic exercise aims to improve muscle strength, joint ROM and aerobic fitness and thereby improve OA-related pain, function and quality of life.

Also Evidence Based Medicine guidelines designed by EULAR,OARSI,ESCEO and PANLAR the management of Knee Osteoarthritis is classified as pharmacological and non

pharmacological methods. Best results are achieved by the application of both methods, but among nonpharmacological procedures exercise is shown to be the best. In this lecture all these guidelines will be mentioned and discussed.

Material and Methods: In the research material especially patients with knee OA with grade 2 or 3 knee OA according to Kellgren–Lawrence radiologic criteria were included. In most of them pain was evaluated with Visual Analog Scale (VAS), functional activity with Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), muscle strength with Biodex isokinetic system, functional capacity with 6 minutes walking test and 30 seconds sit to stand test.

Results: High-quality evidence from 44 trials (3537participants) indicated that exercise reduced pain. Most of the results of literature research including RCT,CT and guidelines revealed significant decrease in VAS and WOMAC scores, and significant increase in functional capacity and muscle strength in both exercise groups.

Conclusion: In conclusion, exercise as a non-pharmacological treatment method is very important in the management of knee OA. In terms of decreasing pain, improving function and physical activities both aerobic and strengthening exercise is found to be effective. Among non pharmacological management procedures Exercise is easy to perform, have no costs and effective in reducing pain, improving function and muscle strength. Disabled persons with osteoarthritis of the knee had modest improvements in measures of disability, physical performance, and pain from participating in either an aerobic or a resistance exercise program. These data suggest that exercise should be prescribed as part of the treatment for knee osteoarthritis.

Disclosure: I have no relevant financial relationships with the manufacturers of any commercial products and/or provider of commercial services discussed in the CME activity

ESPRM-ESCEO-IOF3

THE ROLE OF REHABILITATION IN PREVENTION AND IN TREATMENT OF SPINAL DISORDERS

P. Tederko¹

¹Medical University of Warsaw, Department of Rehabilitation, Warszawa, Poland

Introduction: Despite rehabilitation has an unquestionable position among therapeutic approaches to patients with spinal disorders, some fields of this wide branch of interventions remain insufficiently evidenced.

Material/methods: The objective of this review is to analyze the feasibility of rehabilitation of patients undergoing surgical treatment of disc disease (STDD).

Results: Although proper patient selection and quality of the surgery are prerequisites of a favorable clinical outcome, standing alone surgery appears to be insufficient for the

majority of patients with neck or back pain. There is a significant rate of patients unsatisfied with the results of STDD. Rehabilitation in the context of STDD aims at 1) improving physical or psychosocial functioning, preventing complication or speeding up recovery; 2) alleviating residual symptoms of spinal disease (pain, neurological deficit), comorbidities (depression) or complications (fibrosis, abnormal biomechanics, fear of movement, dysphagia, social withdrawal). Despite rehabilitation appears to be a logical solution in patients undergoing STDD, many patients, particularly after cervical discectomies, are not referred to rehabilitation.

Profile of complaints presented after disc surgery depends on patient's age, sex, psychosomatic profile, severity and duration of symptoms, surgical variables such as localization of surgery, approach and technique applied. Disability after STDD results from combination of retention of symptoms of underlying spinal disease (pain, neurologic deficit, range of motion deficiency), psychological distress and social consequences (fear of movement, activity avoidance, not resuming work), and side effects that may be specific for surgical approach (paraspinal muscle injury, dysphagia), or related to the applied technique (spinal instability, adjacent segment degeneration, fibrosis, heterotopic ossification). Preoperative predictors of worse surgical outcomes include: higher level of disability and pain intensity, smoking, female sex, radicular involvement with muscular weakness, decreased spinal range of motion, multimorbidity, depression, ineffective coping, opioid use, compensation claims.

Rehabilitation approach to patients undergoing STDD should comprise both presurgical interventions (identification of risk factors of poor surgical outcome, conditioning, lifestyle adjustments) and postoperative treatment (multimodal pain and

depression control, activity restrain and regain, bracing, postural, aerobic exercises, training of transfers, walking, as well as other techniques improving performance of activities of daily living, back or neck-specific exercises, neuromobilization and spinal mobilization, occupational therapy, speech therapy, psychotherapy, patient education and information aimed at adoption of healthy life style, applying of ergonomic solutions or interventions aimed at work regain and retention)

Conclusions: Patients after STDD are at risk of a complex disability with a significant psychosocial component. Early detection of persons with a high risk of a poor functional outcome of STDD should be emphasized in a presurgical proceeding. Rehabilitation in patients undergoing STDD is inadequately addressed in the scientific literature and poorly evidenced. More high-quality studies are strongly needed.

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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2018): Meet-the-Expert Abstracts

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MTE1

LOCAL BONE TREATMENT IN OSTEOPOROSIS

A. Kurth^{1,2}

¹Orthopaedic Hospital, Birkenwerder, Germany, ²Center for Bone Health Berlin-Brandenburg, Birkenwerder, Germany

Osteoporosis diminishes the quality and quantity of bone, resulting in compromised bone strength and increased fracture risk in 200 million women worldwide. Hip fractures are the most devastating complication. They are associated with a 25% increase in mortality in the following year and a 4-fold increase of mortality risk in the first 3 months after fracture. The incidence of death from a hip fracture equals the breast cancer mortality rate.

Furthermore, patients with a recent hip fracture carry at least a 10% early risk of a contralateral fracture. Hence, osteoporosis is a severe and escalating socio-economic problem.

The prevention of osteoporotic fractures, especially hip fractures, remains a challenge. Currently available pharmaceutical treatments fail to address fracture risk during the early stages of therapy, taking up to 18 months to reduce fracture risk. Furthermore, efficacy is not 100% even with full compliance and compliance is, at best, around 50% after 1 year. An estimated 20% increase in bone mineral density is required to prevent a hip from fracture in a simple fall.

Hence, complementary approaches to immediately prevent hip fractures in patients at very high risk are still an unmet clinical need.

The use of protective devices, such as hip pads or an energy-absorbing floor, have been developed and investigated. However, the compliance is low and effectiveness is still unclear.

Surgical approaches, in order to augment the local bone have been proposed to strengthen fragile bone, particularly proximal femur, prior to subsequent fracture. Techniques are **prophylactic nailing**, **femoroplasty** with cement and **bone grafting** with osteoconductive or osteoinductive materials.

Prophylactic nailing: Prophylactic nailing to stabilize highly fragile osteoporotic hips is not currently performed in clinical practice. In a randomized controlled trial, contralateral hip fixation using a hydroxyapatite-coated titanium tubular screw was evaluated on the risk of recurrent fracture. Although the feasibility and safety of the procedure were confirmed, the results were not conclusive since no contralateral hip fracture occurred over the 16-month follow-up.

A device called YSTRUT®, which is indicated for contralateral percutaneous internal fixation of proximal femur in patients with a low-energy pertrochanteric fracture. This device is implanted during the same anesthesia as for the fracture stabilization. The implant consists of two interlocking peek rods linked with surgical cement (polymethylmethacrylate (PMMA)). The loadings until failure of cadaver specimens with this implant showed increased both fracture load (+18%) and energy to fracture (+32%) as compared to contralateral femur. However, peri-prosthetic fracture risk should be taken into consideration in a careful benefit-risk and cost-effectiveness analysis for any new local procedure aimed at preventing hip fractures.

Indeed, prophylactic fixation with a cephalomedullary nail was not found to be cost-effective in elderly women with hip fracture. However, the case may differ in selected patients.

Bone Augmentation: Several preclinical and clinical studies addressing the augmentation of bones by cement have been published over the last decades, investigating the augmentation of fractures of different locations, which have shown a better stability, stiffness and strength. For the hip, the augmentation of conventional osteosynthesis of femoral neck fractures and intertrochanteric fractures has been studied, as well as the effectiveness of different types of cements.

In the spine, cement-augmentation of fractured or sintered vertebral bodies, well known as Vertebroplasty and Kyphoplasty, has been introduced in clinical use several years ago and has shown significant positive outcome with regard to pain reduction.

Prophylactic cement augmentation of the proximal femur (“Femoroplasty”) may reduce fracture risk. This technique

has only been evaluated to date in cadaver or animals. The results showed 30–80% improvement in bone strength, the results being volume dependent (cement augmentations of 20 to 40 ml) and location dependent.

Despite the encouraging positive biomechanical effects of PMMA augmentation, this cement augmentation has not gained wide acceptance, as it cures with shrinkage in an exothermic reaction with possible associated bone necrosis, can compromise healing and is difficult to remove in revision surgery and the subsequent drilling and osteosynthesis with the cement left in situ might be difficult.

Furthermore, femoroplasty may be associated with the occurrence of sub-trochanteric fractures, fat embolism, circulatory damage and stress concentration. Thus, further clinical validation of the technique is mandatory.

Bone grafts with osteoconductive or osteoinductive materials: Very promising results in preclinical and clinical studies have been published for bioactive cements. They cure with a non- or less-exothermic reaction and are considered to be osteoconductive, meaning that they can be resorbed gradually with time and replaced by host bone.

Synthetic bone grafts are mainly made of calcium-phosphate (e.g. hydroxyapatite and tricalcium phosphate), bioglass and calcium sulphate. Such materials can be used as carriers for growth factors (e.g. BMPs) as well to enhance bone graft efficacy, drugs (bisphosphonates) or ions (strontium) to promote osteoblast proliferation.

In osteoporosis, the administration of osteoconductive or osteoinductive materials requires low viscosity material to avoid injection under high pressure in the trabecular bone network of the proximal femur.

One new investigational treatment to lower hip fracture risk in osteoporosis uses a minimally-invasive local osteo-enhancement procedure (LOEP) to inject a unique, resorbable, triphasic calcium sulfate/calcium phosphate implant material (AGN1) into the proximal femur with the intent of immediate increasing femoral strength by regenerating bone lost due to osteoporosis. Preclinical studies demonstrate that the AGN1 fully resorbs and is replaced with host bone, suggesting that fracture protection may be sustained over time. Furthermore, AGN1 implantation provides an adjunctive treatment to deliver targeted immediate enhancement of strength of the proximal femur. A clinical study using AGN1 was conducted to evaluate the biomechanical performance of the injected proximal femurs of 12 post-menopausal osteoporotic women (age range 56–89; hip BMD T-scores: -3.0 ± 0.7). As a result, there appeared to be newly generated integrated load-bearing bone tissue within the original implant area through the 5–7 years follow up. These results suggest that local osteo-enhancement of the proximal femur using AGN1 in osteoporotic women can substantially increase proximal femoral strength and that this benefit is apparent soon after treatment and persists for at least 5–7 years.

Conclusion: The prevention of hip fractures, the most devastating complication of osteoporosis, remains a challenge. Current medical treatment of osteoporosis, result in an increase in bone mass and reduction of fracture risk. However, there are non-responders, a lack of compliance and the effect of an antiresorptiv or osteoanabolic treatment may need a long time to achieve a sufficient gain of bone density and fracture risk reduction. Hence, complementary approaches, such as surgical procedures, to immediately prevent hip fractures in patients at very high risk are needed.

Prophylactic osteosynthesis and PMMA augmentation of osteoporotic bone has been investigated pre-clinically and in clinical studies, but have not gained clinical acceptance over the years. Some new materials are currently being developed that are synthetic, resorbable, osteoconductive and osteoinductive materials, with the aim of an early local strengthening of fragile bone, e.g. hip, to fill an unmet clinical need in the management of elderly patients with an increased imminent risk of hip fracture.

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MTE2

BONE FRAGILITY IN YOUNG PEOPLE: WHEN AND HOW TO INVESTIGATE?

S. Ferrari¹

¹Service and Laboratory of Bone Diseases, Geneva University Hospital, Geneva, Switzerland

Although traumatic fractures are extremely common in children and adolescents, low-trauma fractures are rare in younger people and should raise the suspicion of a secondary cause or a heritable disorder. Vertebral fractures are virtually non-existent in the young healthy population in absence of an accident, whereas they can be found in as much as 25% of young subjects with chronic

inflammatory diseases. Low BMD, particularly when extremely low ($<< -3Z$ - or T-score) should also raise the question of a secondary etiology, after excluding measurement errors and severe vitamin D deficiency (i.e. osteomalacia). However the diagnostic of osteoporosis at a younger age (i.e. before 50) should be restricted to those individuals with proven conditions of bone fragility, since low aBMD alone could result from a physiologically low peak bone mass in absence of bone mineral loss and microstructural decay, for instance in constitutionally lean persons.

A careful medical history and examination in the search of dental problems, skeletal deformations, and neurological symptoms, should be carried as many genetic conditions of bone fragility present as complex syndromes involving these systems. Once growth is completed, high bone turnover markers can orient towards an ongoing destructive process that warrants to be further investigated. Besides common blood tests including vitD and PTH, inflammatory markers, glucose, kidney and hepatic tests, total alkaline phosphatase should also be systematically examined since values lower than 30 U/L in absence of known causes could raise the suspicion of hypophosphatasia (HPP). Malabsorption, in particular celiac disease, should also be excluded by the appropriate serological markers¹. Eventually, a bone biopsy and/or examination of bone microstructure by high-resolution pQCT can be useful. In absence of any detectable secondary or heritable cause, the (rare) diagnosis of idiopathic juvenile osteoporosis could remain.

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MTE3

HYPOPHOSPHATASIA

M. L. Brandi¹

¹FirmoLab, University of Florence, Florence, Italy

Hypophosphatasia (HPP) is a rare inherited disease with a heterogeneous clinical expression. The adult form of HPP is often difficult to be recognized and the diagnosis is consequently delayed.

Even though the severity of HPP decrease with age at onset, severe complications can occur at any age. The burden of HPP among adult patients is indeed significant, with signs and symptoms encompassing chronic pain, fragility fractures, joint problems and severity reduced quality of life for the several disabilities.

The Working Group of the International Osteoporosis Foundation has been actively working in developing a risk card for the diagnosis of adult HPP.

The presentation will focus on this achieve the and on the phenotype/genotype that would help in recognizing the HPP patient who goes to be seen by the bone doctor without having been diagnosed as affected by this important and rare disease.

MTE4

MUSCLE FUNCTION ASSESSMENT IN DAILY PRACTICE

O. Bruyère¹, C. Beaudart¹

¹Department of Public Health, University of Liège, Liège, Belgium

It is now well recognized that poor muscle function status is a strong predictor of clinically meaningful adverse events, in older people, such as disability, functional decline, hospitalizations, falls, decreased quality of life and even death. More precisely, poor strength and reduced physical performance have the ability to predict adverse events. Therefore, in order to prevent functional loss and its resulting health consequences, in older patients, a value of a critical baseline or an armful decline of these parameters needs to be identified as earliest as possible. Given the large number of tools available to measure muscle function, the identification of the most appropriate tool to use for a particular patient remains however a challenge for clinicians. The choice of a tool should be done according to different parameters: 1) The applicability of the tool in clinical settings (cost, required time for the examination, necessity of training, complex equipment, etc.); 2) The performance characteristics of the tools (test-retest reliability, inter-rater reliability, responsiveness, floor and ceiling effects, etc.); 3) The prognostic values of the tests for adverse clinical outcomes; 4) The purpose of the assessment (intervention, screening, diagnosis); 5) The patient's characteristics (population, settings, functional status, etc.). Preventing the functional decline of older people represents an essential goal in geriatrics and musculoskeletal care, and is a well-recognized priority for public health. The assessment of the functional status in older people is now recommended in clinical practice as the "sixth vital sign".

MTE5

SOUND USE OF BONE TURNOVER MARKERS

E. Cavalier^{1,2}

¹University of Liège, Liège, Belgium, ²CHU de Liège, Liège, Belgium

Bone turnover markers (BTM) have a long history in research on metabolic bone diseases including osteoporosis and many assays have been developed to measure BTM in plasma and urine. BTM can either be proteins, particularly

type I collagen proteins, or enzymes involved in bone remodeling. They are largely used for monitoring compliance and response to osteoporosis treatment, but they are also slightly, but significantly, associated with the prediction of fracture risk. Reference intervals and biological variation of different BTM have been described, but a lack of standardization renders the comparison between assays quite complicated and hampers their use in meta-analyses. In 2010 the International Osteoporosis Foundation (IOF) – International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) Joint Working Group on Bone Marker Standards (WG-BMS) recommended one bone formation marker (serum-procollagen type I N-propeptide (PINP)) and one bone resorption marker (serum C-terminal telopeptide of type I collagen, (CTX)) be used as reference markers, to be measured by standardized assays in observational and intervention studies in order to assess their clinical performance as well as provide data by which alternatives could be assessed thus enlarging the international experience of the application of these markers to clinical medicine. In 2012 the National Bone Health Alliance extended the literature review on this subject arriving at similar recommendations. Pre-analytical (fasting status, sample type, sampling time, renal and liver function), analytical (coefficient of variation, fragments cross-reactivity, interferences) and post-analytical (reference range, least significant change) considerations are very important for BTM results interpretation.

MTE6

INTERACTION OF NUTRITION AND EXERCISE ON BONE AND MUSCLE

E. M. Dennison¹

¹MRC Lifecourse Epidemiology Unit, Southampton, United Kingdom

Physical activity and adequate nutrition are beneficial to bone and muscle throughout the life-course. It is well recognised that physical activity and nutrition in childhood and adolescence contribute to bone and muscle development. These factors may have a direct influence, or act indirectly through effects on linear growth and body composition. In studies of 4 year olds enrolled in the Southampton Women's Survey, mean daily time in moderate-vigorous physical activity and daily calcium intake at 3 years, were positively related to hip bone size and density. Relationships between physical activity and bone indices were stronger when calcium intake was above compared with below median (966 mg/day). A recent systematic review also suggests interaction between physical activity and nutrition (specifically dietary calcium intake)

in acquisition of peak bone mass. Far fewer data exist from studies of the midlife. By contrast, several epidemiological studies support the notion of a positive interaction of nutrition and exercise later in the life-course, reporting the benefits of dietary factors, specifically dietary calcium and protein intakes, and keeping physically active. However, far fewer studies have considered the possible *interaction* between diet and physical activity in musculoskeletal health, although a recent systematic review by Beaudart and colleagues summarized the effect of combined exercise and nutrition intervention on muscle mass and muscle function, suggesting that while physical exercise has a positive impact on muscle mass and muscle function in subjects aged 65 years and older, any interactive effect of dietary supplementation appeared to be limited. This workshop will review the evidence for interaction of nutrition and exercise on bone and muscle across the life-course, with a particular focus on later life.

MTE7

CALCIUM: WHAT IS GOOD AND WHAT IS BAD?

N. C. Harvey^{1,2}

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom, ²NIHR Southampton Biomedical Research Centre, University of Southampton and University Hospital Southampton NHS Foundation Trust, Southampton, United Kingdom

The efficacy and safety of calcium supplementation, with or without concomitant vitamin D supplementation, has been much debated. There have been many trials and meta-analyses of supplementation for fracture reduction, and associations with risk of myocardial infarction have been suggested in recent years. In this session I will review the evidence for the value of calcium supplementation, with or without vitamin D supplementation, for healthy musculoskeletal ageing. I will investigate the evidence for beneficial effects of calcium/vitamin D supplementation on reduction of fracture risk and the potential adverse effects of supplementation such as gastrointestinal disturbance and renal stones. I will pay special attention to the suggested links between calcium/vitamin D supplementation and myocardial infarction. Overall, the literature suggests that calcium with vitamin D supplementation leads to a modest reduction in fracture risk, and that calcium supplementation alone is not supported for this indication. Furthermore, there is more robust evidence for fracture reduction amongst institutionalised patients than as part of a community public health intervention. Side effects of calcium supplementation include renal stones and gastrointestinal symptoms, but the existing evidence base is insufficient to support recent assertions of increased cardiovascular risk consequent to calcium/vitamin D supplementation. In conclusion, calcium with

vitamin D supplementation is supported for patients at high risk of calcium and vitamin D insufficiency, and in those who are receiving treatment for osteoporosis.

MTE8

HIV AND BONE

E. Biver¹

¹Geneva University Hospitals and Faculty of Medicine, University of Geneva, Division of Bone Diseases, Geneva, Switzerland

Owing to major advances in the efficacy of antiretroviral therapy (ART) in the past 20 years, life expectancy of people living with HIV (PLWH) is now similar as in the general population. Accordingly, chronic HIV infection adds to the age-dependent bone loss and the proportion of PLWH with osteoporosis is increasing. Furthermore, recent epidemiological data, including observational studies with long-term follow-up, suggest that fracture risk is higher in PLWH than in the HIV-negative population. Fracture rate seems to increase approximately 10 years earlier in the HIV-infected versus the general male populations. The risk of fracture is higher in case of co-infection HIV-HCV. In addition to classical risk factors associated with bone fragility, which are highly prevalent in PLWH, factors specific for HIV infection itself and the type of ART regimen used contribute to bone loss. Recently, frailty has been identified as an additional risk factor for low BMD in PLWH. The majority of bone loss occurs during virus activity and at initiation of ART. Bone loss is associated with an increase of bone resorption, reflecting the up-regulation of the RANKL/OPG pathways via a crosstalk between virus activity, inflammation and the immune system. The use of some antiviral drugs, such as tenofovir or protease inhibitors, may be associated with higher bone toxicity. The reduction of tenofovir plasma concentrations with the implementation of tenofovir alafenamide (TAF) attenuates BMD loss but it remains unknown whether it will contribute to reduce fracture risk in long-term HIV-treated patients. Periodic risk assessment for osteoporosis is indicated in all HIV patients, independently of sex or age, and general preventive measures (promotion of physical activity, discontinuation of toxic habits, nutritional counseling and supplementation) should be implemented. All postmenopausal women, men above 50 years of age and patients with other significant clinical risk for fragility fractures qualify for BMD measurement. In case of prior hip or vertebral low-trauma fracture, osteoporosis in postmenopausal women and men ≥ 50 years of age, or 10-year fracture risk above the intervention threshold, anti-osteoporotic treatment and review of ART regimen in favor of more bone-friendly options, if possible, are indicated.

MTE9

BONE MICROSTRUCTURE AND FRACTURE PREDICTION

R. Chapurlat¹

¹INSERM UMR 1033, Université de Lyon, Hôpital E Herriot, Lyon, France

Most vertebral and non vertebral non hip fractures are not adequately predicted by areal bone mineral density (aBMD) at the femoral neck, which is the WHO definition of this disease. Several approaches assessing microstructure non invasively have been developed to improve the prediction of fragility fracture. We will address one technique that is widely available—the trabecular bone score (TBS)—and one research technique, high resolution peripheral QCT (HRpQCT).

The TBS is a dimensionless number that is not a direct measure, but a porous material texture analysis parameter. It evaluated the variability of grey levels on the image of the absorptiometry (DXA) scan. In prospective studies, the area under the curve of this test was not substantially different from those provide by DXA or FRAX. Some degree of reclassification of patients, however, was possible.

HRpQCT measures volumetric BMD at the distal radius and tibia, along with several microarchitectural parameters. Finite element analysis can also be performed using these images, to estimate bone strength. So far, the results of 4 prospective studies have been released. In multivariable analyses, several trabecular parameters predict fracture better than the usual risk factors including aBMD, age, prevalent fracture and FRAX. In general, the ability of HRpQCT to better predict fracture seemed to be applicable to those women younger than 75 who are essentially exposed to vertebral and non hip non vertebral fractures. During this session, we will present the general principles of these techniques, what they can bring to practice, along with their strengths and weaknesses.

MTE10

INTRA-ARTICULAR THERAPY IN KNEE OSTEOARTHRITIS ?

F. Rannou¹

¹Division of Physical Medicine and Rehabilitation, Department of Rheumatology, AP-HP Cochin Hospital, Université Paris Descartes Sorbonne Paris Cité, and INSERM U1124, Paris, France

International guidelines including the European Society for Clinical and Economic Aspects of Osteoporosis and

Osteoarthritis (ESCEO) recommend that the management of knee osteoarthritis (OA) combine both nonpharmacological and pharmacological interventions. Intra-articular (IA) therapies are considered part of this multimodal approach and are well-established Food and Drug Administration (FDA) and European Medicines Agency (EMA)-approved treatments. In this lecture we will discuss using the last high level publications, the clinical interest and the safety profile for corticosteroids, hyaluronic acid, platelet-rich plasma and botulinum toxin used as intra articular therapies.

MTE11

VITAMIN D – WHAT IS GOOD AND WHAT IS BAD

B. Dawson-Hughes¹

¹Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, United States

Despite a large body of research, the amount of vitamin D needed for optimal musculoskeletal health remains unclear. This session will focus on the relationship between vitamin D and risk of falls and fractures. It is biologically plausible that vitamin D deficiency increases risk of falling. Vitamin D deficiency is associated with loss of the fast twitch type II muscle fibers. Vitamin D is important for balance and supplementation in older insufficient adults has been shown to improve balance, as measured by quantifying sway. Vitamin D insufficiency has been associated with reduced muscle performance in several studies but this has not been a consistent finding. A number of trials have examined the effect of vitamin D supplementation on incident falls and with mixed results. Many studies have been null and others have identified fall risk reduction of 15 to 20%. The effectiveness of supplemental vitamin D in lowering fracture risk is equally controversial. Two large individual subject level meta-analyses found a net positive effect of supplementation whereas recent study-level meta-analyses have identified no benefit. Several factors likely contribute to the mixed results of the falls and fracture trials, including the starting 25(OH)D level of the study population, the dose administered, the dose schedule, and supplement compliance.

With regard to ‘what is bad’, a high dose of vitamin D administered annually increased risk of both falls and fractures. There is also indication that monthly dosing with 24,000 IU (equivalent to 800 IU/d) may increase fall risk, in contrast to daily dosing of 800 IU. Thus it appears that the association of vitamin D with fall risk is U shaped. It remains a challenge to identify the segment of the population that

requires added vitamin D and the amount they need to minimize risk of falls and fractures.

MTE12

FALL RISK ASSESSMENT AND PREVENTION

S. Maggi¹

¹Research Director, CNR Aging Branch-Padova, Padova, Italy

Objective: to review the scientific evidence and recommendations made by the main international organizations on risk assessment and prevention of falls in older people

Material and methods: The databases used included PubMed and Scopus.

Results: In spite of a large literature on risk profile and prevention for falls in the older individuals, there is no international consensus for falls risk assessment and prevention

Conclusions: Falls are one of the major causes of mortality and morbidity in older adults, they lead to moderate to severe injuries, fear of falling, loss of independence and death in a third of the cases. Falls account for about 90% of all fractures in the elderly population, the large majority due to low impact injuries in osteoporotic bones. Several recent reviews have identified the major risk factors (age, female gender, impaired balance and gait, sensory impairments, polypharmacy, and history of previous falls, cognitive decline) and have emphasized the need for guidelines for standardized screening tools and interventions to prevent falls and fractures in the older individuals. The view on the main points in the current debate in relation to the primary and secondary prevention of falls, the diagnosis and treatment of bone fragility, and the place of combined falls and fracture liaison services for fracture prevention in older people have been summarized by the Interest Group on Falls and Fracture Prevention of the European Union Geriatric Medicine Society (EUGMS), in collaboration with the International Association of Gerontology and Geriatrics for the European Region (IAGG-ER), the European Union of Medical Specialists (EUMS), the International Osteoporosis Foundation - European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (IOF-ESCEO). These recommendations should be more widely disseminated and adopted.

Reference:

1. Blain H, Masud T, Dargent-Molina P, et al. A comprehensive fracture prevention strategy in older adults: the European Union Geriatric Medicine Society (EUGMS) statement. *Aging Clin Exp Res*. 2016 Aug;28(4):797-803.

MTE13

PHARMACOLOGICAL MANAGEMENT OF OSTEOPOROSIS IN POLANDE. Czerwinski¹¹Jagiellonian University Medical College, Faculty of Health Sciences, Department of Bone and Joint Diseases, Krakow Medical Center, Krakow, Poland

Polish societies regularly publish guidelines on osteoporosis management in accordance with the IOF and other international standards. The current publications were made by: the Interdisciplinary Forum of Osteoporosis (Endocrinology 2017), the Polish Rheumatology Society (Forum Reumatologiczne 2015), the Polish Osteoarthritis Society with the Polish Orthopaedics and Traumatology Society (OTR 2017) and the European Vitamin D Association (EVIDAS 2017). Guidelines cover prevention, diagnosis, treatment of osteoporosis and osteoporotic fracture handling with a particular focus on secondary fracture prevention.

Despite these efforts from about 2,200,000,000 patients with osteoporosis only 220,000 are treated. Suggested supplementation level of vit. D range 800–1,200 UI (Evidas up to 2,000) and of calcium 1,000–1,200 g. Oral

generic bisphosphonates (BF) are the most frequently administered. In 2010 86% of patients took alendronate however the number dropped to 29% in 2017. Ibandronate was the most frequently prescribed medication 2017 (52%) in Poland while in Europe ibandronate is taken by only 12% of patients and alendronate by 33%. This phenomenon can be partially explained by patient preference for monthly administration and lower risk of GA complications. However, it seems that the unfair legal regime forced by Polish National Health Found (NHF) is the explanation which includes financial responsibility of doctors who prescribe refunded drugs.

Only weekly BF are reimbursed by NHF at 70%. Denosumab (DSB) is partially reimbursed only when used by women >60 years with fracture and contraindicated oral BF. Both BP and DSB are accepted as first line medication but DSB due to high costs is out of range for majority of patients. Teriparatide and strontium ranelate was withdrawn from the market due to unsatisfactory sale rates.

Duration of treatment and drug holidays are frequently discussed. Current guidelines suggest treatment to be continued as long as high risk of fracture persists.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2018): Committee of National Societies Abstracts

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OCs1

ONE YEAR OUTCOMES OF FRACTURE LIAISON SERVICE AT THE NATIONAL TAIWAN UNIVERSITY HEALTHCARE SYSTEM

R.-S. Yang¹, C.-H. Hong², K.-S. Tsai³, D.-C. Chan⁴

¹Department of Orthopedics, National Taiwan University Hospital, Taipei, Taiwan, ²Department of Geriatrics and Gerontology, National Taiwan University Hospital, Taipei, Taiwan, ³Superintendent Office, Far Eastern Polyclinic, Taipei, Taiwan, ⁴Superintendent Office, National Taiwan University Hospital Chu-Tung Branch, Hsin-Chu, Taiwan

Objective: To report one year outcomes for patients enrolled in the Fracture Liaison Service (FLS) at the National Taiwan University Hospital Healthcare System (NTUHS)

Methods: From Jan., 2014 to Jun., 2016. 600 patients with: 1) New hip fracture from orthopedic wards. 2) Newly identified vertebral compression fractures from geriatric wards. 3) Clinical vertebral compression fractures from outpatient clinics. Were enrolled in the FLS at NTUHS. Patients were evaluated and managed following the 13 Best Practice Framework standards from the Capture the Fracture Campaign. After baseline assessments, FLS coordinators followed patients by phone at 4, 8, 12, 18, 24 months, then annually for 10 years. First year outcomes were reported here.

Results: For the entire cohort, mean age was 77.5 ± 10.0 with 72% women. At baseline, 98.7% completed evaluations including BMD within 8 weeks of enrollments, and 90.5% of participants who were reimbursable with osteoporosis medications from National Health Insurance were treated. Participants were highly satisfied with the coordinators (87.0%) and the FLS program (85.0%). At one year, exercise rate increased from 57.8% to 69.9%, adequate protein intake rate increased from 78.7% to 91.2%, calcium intake increased from 53.8% to 80.6%, vitamin D intake increased from 51.0% to 75.9%, and fall rate in past year decreased from 59.8% to

25.0% (all $p < 0.001$). One year medication adherence rate was 92.0%, and one year mortality rate was 9.0%.

Conclusion: Enrollment in FLS was associated with high osteoporosis evaluation and treatment rate, as well as high satisfaction at baseline. At one year, improvements on exercise, adequate protein intake, calcium, vitamin D intake, and fall rate in past year were also observed. Overall medication adherence was high and mortality rate was acceptable.

OCs2

RELATIONSHIPS OF PLASMA TOTAL HOMOCYSTEINE, FOLATE AND VITAMIN B12 LEVELS TO VERTEBRAL FRACTURE AND BONE MINERAL DENSITY IN MOROCCAN HEALTHY POSTMENOPAUSAL WOMEN

A. El Maataoui¹, S. Nadifi², A. El Maghraoui³, Z. Ouzzif⁴

¹Ibn Zohr University, Faculty of medicine and pharmacy, Biochemistry department. AGADIR-MOROCCO, Agadir, Morocco, ²Hassan II University, Faculty of medicine and pharmacy. CASABLANCA-MOROCCO, Casablanca, Morocco, ³Mohamed V University, Faculty of medicine and pharmacy. Military Hospital, Rheumatology department. RABAT-MOROCCO, Rabat, Morocco, ⁴Mohamed V University, Faculty of medicine and pharmacy, Military Hospital, Biochemistry department. RABAT-MOROCCO, Rabat, Morocco

Background: A potential role of homocysteine in bone metabolism has been considered from the observation of high prevalence of osteoporosis in subjects with Homocystinuria about 50 years ago. But the mechanism linking the increased level of HCY to increased fracture risk is not clear. The objective of this study was to investigate the possible relationship between vertebral fracture, bone mineral density, homocysteine, vitamin B12 status and folates on Moroccan postmenopausal women.

Methods: One hundred and twenty-two healthy postmenopausal women gave their informed consent to participate in this cross-sectional study. Women were recruited through advertisements and mouth to mouth between January 2017 and May 2017. Bone mineral density was determined by a Lunar Prodigy Vision DXA system. Vertebral fracture assessment image was inspected visually by 2 clinicians.

Results: We found that a high level of homocysteine or low levels of vitamin B12 and folate are not associated to the bone mineral density and are not risk factors for VF in healthy postmenopausal women. Whereas, the presence of vertebral fracture was associated to the number of years since menopause and to the OC level. Probably this is due to the young age of the patients with VF involved in this study. We also showed that high level of homocysteine is associated with the number of years since menopause and not age for women.

Conclusions: We found that a high level of homocysteine or low levels of vitamin B12 and folate are not associated to the bone mineral density and are not risk factors for vertebral fracture in healthy postmenopausal women.

Keywords: Homocysteine; Vertebral fracture; Vitamin B12; Folate; Bone mineral density; Healthy postmenopausal women; Morocco

OCs3

SARCOPENIA AND QUALITY OF LIFE QUESTIONNAIRE (SARQOL®): GREEK CROSS CULTURAL ADAPTATION

M. Tsekoura¹, E. Billis¹, J. Gliatis², E. Tsepis¹, C. Matzaroglou¹, G. K. Sakkas³, C. Beaudart⁴, O. Bruyere⁴, E. Panagiotopoulos⁵

¹Department of Physiotherapy, School of Health and Welfare, Technological Educational Institute of Western Greece, Aigio, Greece, ²Department of Orthopedic Surgery, University Hospital of Patras, Rio, Greece, ³Faculty of Sport and Health Sciences, University of St Mark & St John, Plymouth, United Kingdom, ⁴Public Health, Epidemiology and Health Economics, University of Liège, Liege, Belgium, ⁵Department of Spinal Cord Injuries, University Hospital of Patras, Rio, Greece

Objective: The purpose of this study was to translate and validate into the Greek language and setting the Sarcopenia and Quality of Life Questionnaire (SarQoL®).

Material and Methods: The questionnaire was translated through a forward and backward translation procedure by 2 bi-lingual translators. For the validation procedure, participants over 60 years-old, both sarcopenic and non-sarcopenic participated in the study. Subjects were recruited from two sites (University Hospital for sarcopenic and Physiotherapy laboratory for the non-sarcopenic ones). Subjects were requested to complete 3 questionnaires; the Greek SarQoL

(SarQoL^{GR}) as developed in its final Greek version, and 2 generic ones already adapted into Greek, the Short Form-36 questionnaire (SF-36) and the EuroQoL 5-dimension (EQ-5D). Test-retest reliability was verified after a two-week interval using the intra-class correlation coefficient (ICC). At last, floor and ceiling effects were also tested. Ethical approval was given by the Ethical Committee of the School of Health and Welfare of the Technological Educational Institute (TEI) of Western Greece.

Results: 176 subjects (136 female, 40 male) with a median age of 71,19 (SD = 7,95) participated in the study, 50 (28,4%) of which (36 women and 14 men) were diagnosed sarcopenic based on the algorithm developed by the European Working Group on Sarcopenia in Older People. The SarQoL^{GR} was found understandable, applicable and practical in administration, as all participants filled it without encountering any problems. SarQoL^{GR} mean score for sarcopenic subjects was 52,12 ± 11,04 (range: 24,74–71,81) compared to 68,23 ± 14,1 (range: 24,83–94,81) for non-sarcopenic ones ($p = 0,001$). Neither a floor nor a ceiling effect was observed. The SarQoL^{GR} questionnaire data showed good correlation with some domains of the Short-Form 36 (SF-36) and the EuroQoL 5-dimension (EQ-5D). Cronbach's alpha was 0.96, indicating a high level of internal consistency for the SarQoL^{GR}. An excellent agreement between test-retest of the SarQoL^{GR} was also yielded (ICC = 0.96, 95%CI 0.95–0.97). For individual domains, the lowest ICC was found for domain of Fears (ICC = 0.64, 95%CI 0.54–0.72).

Conclusions: The Greek version of the SarQoL (SarQoL^{GR}) is now available. Its psychometric properties indicate that it is a comprehensible, applicable, valid, consistent and reliable measurement tool for sarcopenic populations and can thus, be used across Greek populations and settings.

OCs4

FRAILTY AND RISK OF FRAGILITY FRACTURES IN PARTICIPANTS WITH TYPE 2 DIABETES MELLITUS

G. Li¹, J. Prior², A. Papaioannou¹, L. Thabane¹, M. Levine¹, J. Adachi¹

¹McMaster University, HAMILTON, Canada, ²University of British Columbia, Vancouver, Canada

Objective: Type 2 diabetes mellitus (T2DM) is an independent risk factor for fragility fractures. However T2DM is strongly associated with higher bone mineral density (BMD) that is typically a protective factor for fractures. Evidence has shown that increased frailty is significantly related to higher risks of fragility fracture. Therefore this study aimed to explore whether measuring frailty status could assist in understanding of the “diabetic paradox” in T2DM (high risk of fracture but normal or increased BMD).

Methods: We used the 10-year follow-up data from the Canadian Multicentre Osteoporosis Study (CaMos). We included the participants if they: 1) had a sample for fasting plasma glucose measure, 2) self-reported that they had T2DM, and 3) had a follow-up of $\geq$ one year. The primary outcome was survival time to clinical fragility fractures, where the incident fractures were indicated on annual mailed questionnaires and confirmed by medical documents. Frailty status was measured by a frailty index (FI) of deficit accumulation, where the FI included 29 deficits, ranging from 0 to 1 and with higher scores indicating greater frailty.

Results: We included 3149 (70% women) participants for analyses (mean follow-up: 9.2 years). They had a mean age of 65 (SD: 12) years and a baseline FI of 0.17 (SD: 0.10). Participants with T2DM ($n = 138$) had higher BMD and FIs than non-diabetic participants (p -values < 0.001). During follow-up, 611 (19.4%) fragility fractures were observed: 35 (25.4%) in T2DM and 576 (19.1%) in controls. Compared with non-fractured, significantly higher FIs were found in those with incident fragility fractures in analyses conducted in all participants, in controls, and in participants with T2DM (all p -values < 0.001). A higher FI was significantly related to risk for incident fragility fractures in the adjusted models: HR = 1.02 (95% CI: 1.01–1.03), $p < 0.001$ for per-0.01 increment of the FI; HR = 1.21 (95% CI: 1.12–1.32), $p < 0.001$ for per-0.10 FI increment.

Conclusion: Frailty is significantly related to increased risk for incident fragility fractures in T2DM despite their higher BMD values. Assessing frailty status may aid in the fracture risk evaluation and management of those with T2DM.

OCs5

DIETARY CALCIUM INTAKE IN CAUCASIAN AND EAST ASIAN ADOLESCENTS: A STUDY OF EXPATRIATE MALE HIGH SCHOOLERS AGED 16–18 YEARS RESIDING IN SINGAPORE

A. D. Chandran¹, M. Chandran²

¹St Joseph's Institution International, Singapore, Singapore,

²Osteoporosis and Bone Metabolism Unit, Singapore General Hospital, Singapore, Singapore

Objectives: Adequate calcium intake during adolescence is critical for adequate skeletal mineralization and for achievement of peak bone mass. Data evaluating dietary calcium intake of adolescents *across different racial backgrounds* is very limited. We evaluated whether the diets of adolescents from two racial backgrounds; East Asian and Caucasian met the minimum RDA for calcium and whether differences existed in dietary calcium intake between the 2 groups. These 2 races are linked to distinct and unique cultures that may affect the types of food they consume.

Method: A self-administered survey based on 2 validated Food Frequency Questionnaires developed to specifically estimate calcium intake was used. 50 males aged between 16 and 18 years with 25 each belonging to Caucasian (Western Europe and North America) and East-Asian (Japan, Korea, China) heritage were studied. All the food items in the questionnaire were available in the multi-cuisine cafeterias and vending machines in the international school that was the setting of the survey and at local supermarkets and restaurants. Photographs of these were included in the questionnaire to facilitate food identification and recall.

Results: The mean calcium intake (mg) (SD) was 1083.8 (156.3) and 931.4 (64.4) among the Caucasians and East Asians respectively ($p = 0.0004$). The Caucasian group had more dietary variations between themselves, had a larger quantity of their daily calcium intake from fewer dietary sources viz. mostly dairy products(63%) and fast food(18%) whereas the East-Asian group diet was more uniform across individuals and had a more evenly spread intake from different sources including dairy(38%) and soy products (21%), fish(6%), vegetables (14%) and lentils(15%).

Conclusion: The dietary calcium intake of expatriate adolescent males living in a first-world country with easy access to multiple food choices was still below the threshold (1300 mg) of the RDA. It was significantly lower in East-Asians compared to Caucasians. The diets of Caucasian adolescents, though higher in calcium, differed more between individuals and was less varied with a large quantity of daily calcium from fewer sources whereas that of East-Asian teenagers had a more even spread and varied less between individuals perhaps due to the East-Asian students likely being more consistent in their daily food intake, portion size and source of nutrients than the Caucasians.

OCs6

THE ORGANIZATION OF SECONDARY FRACTURE PREVENTION SERVICES IN RUSSIAN FEDERATION

O. Lesnyak¹, K. Belova², O. Ershova²

¹North-Western state medical University named after I. I. Mechnikov», Saint-Petersburg, Russia, ²Yaroslavl state medical university, Yaroslavl, Russia

Background: Due to the high prevalence of osteoporotic fractures in recent years the programs devoted to organization of secondary fracture prevention services (fracture liaison services, FLS) have been set up in many countries. In 2012, the International Osteoporosis Foundation (IOF) initiated the project “Capture the fracture” for the widespread establishment and support of FLS. It was shown that the best indicators of clinical and economical efficiency can be achieved in FLS which had a dedicated nurse-coordinator.

Aim: To provide the creation of FLS in Russian Federation.

Results: In 2012 the Russian Association on Osteoporosis (RAOP) initiated the project called “Prometheus” (“Creation of the system for secondary fracture prevention in patients with osteoporosis”) to create FLS in Russia. The project includes three main directions: 1) the training of the specialists in the framework of mentorship program. At first the workshop was organized by IOF on 28 NOV 2016 in St. Petersburg (the mentor was prof. Kassim Javaid). The doctors and nurses from 10 health care institutions participated in it. Since March 2017 a one-day trainings have been held in Yaroslavl city for the specialists from different regions who wanted to organize the FLS in their hospitals. Four trainings were conducted in 2017; 2) the informational support through the RAOP website (www.osteoporoz.ru). There is a page “Secondary fracture prevention services” containing the main documents and news on the issue; 3) the organization of FLS in the regions of the country. Since 2013 the creation of FLS has started in different regions of the Russian Federation. The first FLS recognized by the IOF appeared in 2015 in Yaroslavl city. It was awarded with the “silver” level. By JAN 2018 they were seven FLS on the interactive map of the project “Capture the fracture”. Two of them were assessed to “silver” and three – to “bronze” level of achievement.

Conclusion: The project “Prometheus” initiated by RAOP includes different directions of work and successfully supports the creation of FLS in Russian Federation.

OCs7

ASSOCIATION BETWEEN OSTEOPOROSIS AND COGNITIVE IMPAIRMENT IN A COMMUNITY DWELLING OLDER POPULATION

F. Sharifi¹, G. Shafiee², R. Heshmat², I. Nabipour³, B. Larijani⁴, A. Ostovar⁵

¹Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, ²Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, ³The Persian Gulf Biomedical Research Institute, Bushehr University of Medical Sciences, Bushehr, Iran, ⁴Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, ⁵Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, Tehran, Iran

Objective: Cognitive impairment is one of common geriatric syndromes. Osteoporosis in elderly could result to

disability and mortality because of femoral and vertebral fractures. Relationship between these two disorders has not clearly be revealed. This study was designed to clarify the relationship between cognitive impairment and osteoporosis in a community representative sample of older adults in Iran.

Material & Methods: The sample of this study was representative of aged >60 years that were selected using a cluster random sample method based on the Neighborhoods of Bushehr city, Iran. Demographic data was gathered used an approved questionnaire. Cognitive status was assessed using, Mini Mental State Examination (MMSE), Animal Naming Score (ANS), Functional Assessment Test, and history of dementia (and Alzheimer’s disease). Who had problem in one of this test or had history of dementia was considered as subject with cognitive impairment and those had normal condition in all testes was assumed as subjects with normal cognition. Bone densities of neck of femur and lumbar vertebra were evaluated using x-ray absorptiometry (DXA). Osteoporosis was defined as T-score ≤ -2.5 in each of mentioned sites. Multivariate logistic regression model used for assessed association between osteoporosis and cognitive impairment. The results of association was adjusted for age, sex, and body mass index (BMI).

Results: Data of 2263 subjects from 2426 participants that had cognitive and bone densitometry assessment results were considered for analyses. Of total, 51.8% were women. Mean age of the participants was 69.28 (6.33) years. In multivariable regression model, odds ratio (OR) = 1.276 (CI 95%; 1.036–1.572 for spinal osteoporosis and OR = 1.350 (CI 95%; 0.966–1.887) for femoral osteoporosis were calculated.

Conclusion: It seems that the cognitive impairment is independently associated with osteoporosis. This association was more significant in spinal osteoporosis. It may be a similar pathway such as inflammation could be explained this relationship.

OCs8

VERTEBRAL FRACTURES CASCADE: POTENTIAL ETIOLOGIES AND RISK

H. Che¹, V. Breuil², B. Cortet³, J. Paccou³, L. Chapuis⁴, F. Debais⁵, R. M. Javier⁶, N. Mehse Cetre⁷, T. Thomas⁸, C. Roux⁹, K. Briot⁹, S. Loiseau Peres¹⁰

¹CHU Montpellier, Montpellier, France, ²CHU Nice, Nice, France, ³CHU Lille, Lille, France, ⁴Hopital Vitre, Vitre, France, ⁵CHU Poitiers, Poitiers, France, ⁶CHU Strasbourg, Strasbourg, France, ⁷CHU Bordeaux, Bordeaux, France, ⁸CHU Saint Etienne, Saint Etienne, France, ⁹CHU Cochin, Paris, France, ¹⁰CHR Orleans, Orleans, France

Background: Vertebral fracture (VF) is the most common osteoporotic fracture, and a strong risk factor of subsequent vertebral fracture. Prospective studies have shown that a recent VF increases an imminent risk of a subsequent one, and attention has been paid recently to a possible cascade phenomenon i.e. the occurrence of multiples VFs in less than one year. This cascade could have severe consequences, and we prompted a study to identify potential causes of osteoporosis and risk factors.

Methods: Vertebral fractures cascade (VFC) observations were collected retrospectively between January 2016 and April 2017. VFC was defined as the occurrence of at least 3 vertebral fractures within one year. Patients with other etiologies than osteoporosis (i.e. malignant or traumatic VFs) were excluded. The cause of osteoporosis associated with VFC was the one retained by the physician at the time of diagnosis.

Results: Ninety-five observations of VFC (80% of women, mean age of 71 years) were collected in 10 centers (9 tertiary centers and 1 outpatient center). The median number of incident VFs over 1 year was 4 (3–11). Forty-five patients (45.9%) had a previous major fracture before the VFC and 65 (70.7%) had densitometric osteoporosis (T-Score ≤ -2.5 SD either at lumbar or femoral site). Eighteen (19%) patients currently received oral glucocorticoids treatment at the time of VFC, with a mean daily dose of 20 mg. Thirty-three (35.1%) patients received systemic glucocorticoids in the past. The main comorbidities were history of cancer ($n = 19$) and chronic inflammatory diseases ($n = 21$) including asthma ($n = 7$), chronic obstructive pulmonary disease ($n = 7$) and rheumatoid arthritis ($n = 7$).

A secondary osteoporosis associated with the cascade was diagnosed in 54 patients (54.5%) with the following causes: glucocorticoid-induced osteoporosis ($n = 22$, 23.7%), benign hemopathies (mastocytosis, MGUS) ($n = 7$, 7.1%), use of aromatase inhibitors ($n = 3$, 3.1%), anorexia nervosa ($n = 3$, 3.1%), alcoholism ($n = 3$, 3.1%), pregnancy and lactation-associated osteoporosis ($n = 2$, 2.1%), primary hyperparathyroidism ($n = 2$, 2.1%) and hypercorticism ($n = 1$, 1.1%). In addition, 11 cases (11.3%) were reported following a vertebroplasty procedure.

Primary either postmenopausal or idiopathic osteoporosis was diagnosed in 48 patients (51.6%). A total of 29 (29.6%) patients previously received an anti-osteoporotic treatment. In six patients (6.3%), VFC occurred early (in the year) following discontinuation of an anti-osteoporotic treatment: 5 after denosumab and one 12 months after an infusion of zoledronic acid.

Conclusion: The results of this retrospective study show that almost half of VFC occurred in patients with secondary osteoporosis. While they suggest that a careful management has to be given to these patients in order to prevent VFC in these circumstances, prospective studies are needed to further

explore the determinants of such a severe complication of osteoporosis.

OCs9

PREVALENCE OF OSTEOPOROSIS IN THE TURKISH WOMEN, RISK FACTORS AND THEIR AWARENESS ABOUT OSTEOPOROSIS ACCORDING TO THE CAMPAIGN OF “HEALTHY BONES & STRONG WOMEN”

Y. K. Kirazlı¹, F. C. A. Atamaz Calis¹, S. T. Tuzun², O. E. El³, O. P. Peker³, B. D. Durmaz¹, S. O. Oncel³.

¹Ege University Medical School, Izmir, Turkey, ²Cerrahpasa Medical School, Istanbul, Turkey, ³Dokuz Eylul Medical School, Izmir, Turkey

Background and Aim: A campaign named “Healthy Bones & Strong Women” was conducted by the Turkish Osteoporosis Society to identify Turkish women at risk for osteoporosis, and to evaluate their awareness of osteoporosis.

Method: According to the campaign, 849 Turkish women aged 50 and older were scanned by calcaneal Quantitative Ultrasonography (QUS) in big shopping centers on the World Osteoporosis Day. Evaluation was carried out in a mobile ambulatory (motor home) with a staff composed by physicians and technicians. FRAXTM questionnaire was used for risk assessment. In addition, demographic data (such as BMI and age of menopause) was obtained, and their awareness (history of measurement BMD by DXA) was evaluated.

Results: Regarding T scores, 60 (9.9%) women were osteoporotic (age 61.2 ± 9.0), 275 (45.5%) women were osteopenic (age 60.6 ± 7.1), while 269 (44.5%) women were normal (age 57.9 ± 7.1). The awareness was significantly high in osteoporotic group ($p < 0.05$). In this group, 60% of subjects had at least 1 BMD measurement in the past. Correlation analyses revealed statistically significant moderate-high correlations between T scores and age, BMI, weight and education level ($p < 0.05$).

Conclusion: This is a National epidemiological study based on “Healthy Bones & Strong Women” campaign. It can be concluded that QUS variables and FRAX[®] major osteoporotic fracture probability without BMD are good candidates for the identification of both osteoporotic fractures.

OCs10

OSTEOPROTECTIVE BEHAVIOR AMONG IRAQI GENERAL POPULATION: AN URGENT NEED FOR BONE HEALTH RESCUE CAMPAIGN

M. N. Sahib¹, S. A. Abdulameer¹

¹Faculty of Pharmacy, Al-Rafidain University College, Baghdad, Iraq

Objective: Strategies focused on gaining information regarding knowledge, health belief, and self-efficacy toward osteoporosis are important for promoting osteoporosis-preventing behavior for high-risk populations and preserving lifelong bone health. Therefore, the aim of this study was to assess osteoprotective behavior among Iraqi general population.

Material and Methods: A cross-sectional design, with a random cluster sampling method from the community, was used. Arabic versions of osteoporosis Knowledge (OKT), Health belief (OHBS) and self-efficacy (OSES) toward osteoporosis were used to assess the osteoprotective behaviors.

Results: The results revealed low osteoporosis knowledge, health belief and self-efficacy scores (11.50 ± 3.958 , 149.95 ± 35.936 and 658.43 ± 222.014 , respectively). Different demographic data showed significant differences and associations with OKT, OHBS and OSES tools. Moreover, both exercise and calcium intake subscales of the OKT were positively correlated with all OHBS subscales. While, OSES exercise and calcium intake subscales were positively correlated with the perceived susceptibility and perceived barriers to exercise and calcium intake. Moreover, there were positive correlations between the OSES total score with total knowledge and health belief. Multivariate analysis revealed different predictors for osteoporosis knowledge, health belief and self-efficacy among Iraqi general population.

Conclusions: Beside cultural obstacles, an educational program for both gender and for all age is an urgent issue and must be tailored according to the culture needs.

Conflict of interest: The authors report no conflicts of interest in this work.

OCs11

CROSS CULTURAL ADAPTATION OF THE SARQOL QUESTIONNAIRE INTO HUNGARIAN LANGUAGE

A. I. Gasparik¹, L. Hodinka²

¹University of Medicine and Pharmacy Tirgu Mures, Tirgu Mures, Romania, ²ORFI, Budapest, Hungary

Sarcopenia, the decline of skeletal muscle tissue with age, is one of the most important causes of functional decline and loss of independence in older adults. A reduced quality of life (QoL) due to impaired physical performance has been evidenced in affected individuals. SarQol (Sarcopenia Quality of Life), a multidimensional questionnaire, consisting in 55 items, translated into 22 questions, rated on a 4-point Likert scale is the first disease specific evaluation, addressing quality of life in patients with sarcopenia.

The purpose of our study was to translate and culturally adapt the english SarQol questionnaire into Hungarian language. We followed the recommended international protocol, translating the English version via the forward-backward/blind approach into Hungarian language. The pretest process involved 40 subjects (20 sarcopenic and 20 non sarcopenic). The comparison of the backward translations with the original questionnaire as well as the quality of cultural adaptation, accuracy, context sensitivity, clarity, possible cultural insensitivity, item discrepancies or functional differences were evaluated by an expert group, composed by a methodologist, two health professionals, a linguist and the two authorized translators. http://sarqol.org/en/sarqol_form

Using the recommended best practice protocol for translation, the pre-final version is comparable with the original instrument in terms of content and accuracy.

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NS1

CANCER TREATMENT INDUCED BONE LOSS (CTIBL) – ADJ. ANTIRESORPTIVE TREATMENT EFFECTS AND MORE

P. Hadji¹

¹Head of the Department of Bone Oncology, Endocrinology and Reproductive Medicine, Frankfurt, Germany

Osteoporosis is one of the most frequent diseases in postmenopausal women leading to an increased fracture risk due to the physiologic loss of the bone protective effects of estrogen. Hereby, several risk factors for fracture such as prevalent fracture, low BMD, age, low BMI, family history, tendency to falls, smoking, use of SSRIs, glucocorticoid use etc. have been identified. Additionally, the further reduction of endogenous estrogens with chemotherapy (CHT), GnRH-analoga or aromatase inhibitors (AI) continuously increases fracture risk. Breast cancer (BC) on the other hand is the most frequent cancer type in women. Recent reports indicated a continuous increased incidence while mortality, due to early diagnosis and treatment improvements is decreasing. Dependent on specific tumor characteristics, radiation, chemotherapy (CHT), antibody treatment as well as endocrine treatment has been introduced into the adjuvant clinical treatment setting.

Some but not all of this cancer specific treatments interfere with bone turnover leading to an accelerated bone loss referred to as cancer treatment induced bone loss (CTIBL). Whereas CHT leads to an unspecific increased bone resorption, Aromatase inhibitor (AI) reduces residual serum endogenous estrogen level and is associated with a decrease of bone mineral density (BMD) and increased fracture risk. Independent of the type of AI administered, bone loss is 2–3 fold increased compared to healthy, age matched postmenopausal controls. Therefore several guidelines have emerged to help managing CTIBL in women with BC including strategies to identify and treat those at highest risk for fractures.

Recently, several studies and a meta-analysis have investigated the additional effect of Bisphosphonates on breast cancer

outcomes leading to a 34% decreased risk of bone recurrence and a 17% decreased breast cancer mortality risk. The workshop will summarize the current knowledge on CTIBL and fracture risk and indicates current treatment guidelines and intervention options as well as the additional effects of adj. Antiresorptive treatments.

NS2

TREATMENT OF METASTATIC BONE DISEASE IN WOMEN WITH BREAST CANCER - NEW INSIGHTS OF AN OLD STORY

J.-J. Body¹

¹CHU Brugmann, Université Libre de Bruxelles (ULB), Brussels, Belgium

Bone metastases (BM) often lead to skeletal complications referred to as skeletal-related events (SREs). This term (SRE) usually refers to four major objective complications: pathological fracture, need for radiotherapy to bone, need for surgery to bone and spinal cord compression. SREs, which are usually symptomatic, cause life-altering morbidity, reduce overall survival and increase health care costs. In the last two decades, it has been demonstrated that the bisphosphonates and denosumab are effective in reducing skeletal morbidity. Current bone health guidelines (ASCO, NCCN, ESMO, IOF) recommend patients should be prescribed a bone-targeting agent (BTA) when BM are diagnosed, whether they are symptomatic or not, in order to delay the first SRE and reduce subsequent SREs. However, it is often tempting not to start immediately a BTA in patients with asymptomatic BM and a good prognosis. Moreover, survival in patients with metastatic disease is increasing and BTAs are not devoid of side effects whose frequency increases with treatment duration. Hypocalcemia is usually easily manageable but the most serious adverse effect of BTAs is the occurrence of osteonecrosis of the jaw. At the therapeutic doses of BTAs used for BM, its incidence risk is about 1% per annum

during therapy. Criteria are lacking to determine whether and for how long an individual patient benefits from BTAs. Accurate prediction in an individual patient of the need for and likely benefit from BTAs is lacking. Elevated bone marker levels, a previous SRE, increasing numbers of lesions, and lytic rather than sclerotic appearance of lesions on radiograms are associated with a higher risk for SREs. There are no prospective data on the validity of intermittent treatments, and data on reduction in the frequency of zoledronic acid infusions are limited. Two studies (ZOOM and OPTIMIZE) suggest that the efficacy of 3 monthly and monthly administration of ZA is similar after about a year of monthly treatment to “load” the skeleton. Unlike bisphosphonates, denosumab is not stored in bone and interruption could be risky as a rebound effect is likely. An “individualization” of BTA therapy is highly desirable and the development and validation of a predictive model for SREs occurrence, similar to the FRAX algorithm, would be extremely useful for that matter.

NS3

REDUCING THE BURDEN OF SARCOPENIA: A HEALTHY LIFESTYLE THROUGHOUT THE LIFETIME

D. Scott^{1,2}

¹Monash University, Melbourne, Australia, ²Australian Institute for Musculoskeletal Science, Melbourne, Australia

Sarcopenia describes the age-related decline in skeletal muscle mass and function. The prevalence of sarcopenia may be as high as 30% in community-dwelling older adult populations and presence of this condition significantly increases an older individual's risk for mobility disability, loss of independence, falls and mortality. Current recommendations for preventing and reversing sarcopenia in older adults include prescription of exercise (particularly resistance training) and nutritional supplements such as protein and vitamin D. However, although sarcopenia is by definition a condition of ageing, it is important to recognise and promote the need for a life course approach to maintenance of muscle mass and function. Genetics clearly play an important role in risk for sarcopenia and twin studies have demonstrated that heritability estimates for some measures of muscle mass and strength are as high as 80%. The developmental origins of sarcopenia are also influenced by the environment during early life with several life course studies demonstrating that body weight at birth and during infancy are positively associated with muscle mass and function in older age. Thus, it follows that health behaviour choices beginning in the pre-natal environment can significantly influence muscle mass and function trajectories throughout the lifetime. This presentation will discuss lifestyle strategies that are likely to maximise the

peak lifetime muscle mass and strength achieved in early adulthood, and also minimise their rates of decline through middle and older age. Implementation of life course approaches can reasonably be expected to significantly reduce the prevalence and burden of sarcopenia in older adult populations.

NS4

IS SARCOPENIA SOCIALLY PATTERNED?

S. Brennan-Olsen^{1,2}

¹University of Melbourne, Melbourne, Australia, ²Australian Institute for Musculoskeletal Sciences (AIMSS), Melbourne, Australia

With few exceptions, non-communicable chronic diseases follow a social gradient, whereby greater prevalence and incidences are observed in social disadvantaged populations; here we suggest that sarcopenia is unlikely to be an exception. This session begins by presenting the evidence-base regarding associations between social disadvantage and upstream social determinants of modifiable risk factors for sarcopenia. We then consider the nascent evidence-base regarding the influence of social adversity, social isolation and exclusion, access issues, and health literacy on sarcopenia prevalence, including the role of these factors in influencing precursors for sarcopenia across the life course. Finally, this session presents new findings from the Tasmanian Older Adult Cohort (TasOAC), Australia, concerning longitudinal associations between individual- and area-level social disadvantage and sarcopenia over 5 years of follow up. Implications of a focus on the lifestyle-social nexus would plausibly provide another intervention point to reduce risk, and necessitates consideration in future sarcopenia research.

NS5

SARCOPENIA: IS THE RIGHT FOOD THE KEY TO PREVENTION?

S. Iuliano-Burns¹

¹University of Melbourne, Melbourne, Australia

Progression and severity of sarcopenia manifests with inadequate nutrition, in particular protein malnutrition. Additional to achieving protein adequacy, frequency of consumption and composition of proteins consumed may also alter the course to sarcopenia. Metabolic changes with aging increase protein requirement, which are higher than for healthy adults, and is suggested at 1.2 and up to 1.5 g/kg body weight daily. How protein is distributed throughout the day may also promote muscle protein synthesis, with 20-30 g protein per meal considered adequate. And finally, specific amino acids such as leucine are considered potent stimuli for muscle protein

synthesis, and so the ability to maintain muscle in old age. Within these parameters protein intake needs to be manipulated to fulfill these recommendations, whether through supplementation, fortification, via appropriate food choices, or a combination of mechanisms to ensure an adequate intake. Provision of oral protein supplements is effective in the short term, but its long-term sustainability is unclear. Fortification improves nutritional density, so is feasible to increase protein content of foods. Animal sources of protein i.e. dairy, meats, eggs and seafood provide all the essential amino acids, in particular leucine so consumption of these foods in line with recommended guidelines may assist with slowing sarcopenia development. Those at high risk of protein inadequacy include isolated elderly in the community, and those in institutionalized care. Particular attention to menu planning for, and food provision to these vulnerable elderly is critical as sarcopenia risk is high and onset may be masked by other conditions or comorbidities. A better understanding of sarcopenia development and the role of protein nutrition in its prevention will help guide strategies required to curtail the burden of sarcopenia and its associated costs that would otherwise rise as the population ages.

NS6

INTERNATIONAL DIALOGUE AND PROBLEM-SOLVING

K. Sanders^{1,2}

¹Institute for Health and Ageing, Melbourne, Australia,

²Australian Catholic University, Melbourne, Australia

Three questions will be posed to the audience for open discussion: these questions aim to stimulate dialogue to problem-solve some challenging contemporary issues regarding lifestyle and sarcopenia.

NS7

PATHOPHYSIOLOGY OF BONE FRAGILITY IN DIABETES

S. Ferrari¹

¹Service of Bone Diseases, Geneva University Hospital, Geneva, Switzerland

Whereas altered bone microstructure and material properties seem to play a prominent role in bone fragility associated with diabetes, it is not yet clear what those alterations really are. For instance higher cortical porosity has been reported in some studies on diabetes, but the mechanisms involved remain unclear since bone turnover is rather decreased, not increased, in this condition. Alterations in the quality of the bone matrix because of collagen crosslinking by AGE's, notably pentosidine, and a higher degree of mineralization, have also been suggested on some rare bone biopsy samples, but clearly

more evidence is needed. Even more intriguing are recent reports suggesting that the bone alterations in diabetes are more prominent among subjects with microvascular complications, suggesting that impairment of vascularization to the skeleton could play an important role in the pathophysiology of bone fragility in diabetes. Some reports of higher circulating sclerostin in diabetics potentially point towards a dysfunction in osteocytes function and thereby in bone formation. The situation is further complicated by the excess of fat in overweight subjects with type 2 diabetes, since fat exerts its proper positive and negative influences on bone.

Better understanding of the pathophysiology of bone disease in diabetes is required to eventually develop specific treatment strategies to prevent fragility fractures in these patients.

NS8

FRACTURE RISK ASSESSMENT IN DIABETES

E. Biver¹

¹Division of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, University of Geneva, Geneva, Switzerland

Diabetes is increasingly recognized as an independent risk factor for fractures. However, the assessment of fracture risk in diabetics is challenging, because of the complex nature of the metabolic disease and its therapy, and of its consequences on the skeleton. In type 2 diabetes in particular, BMD values are usually slightly elevated and the risk of fracture higher for a given BMD T-score and age than in the general population. Therefore, the classical clinical tool for fracture risk assessment, DXA and FRAX, underestimate fracture risk in diabetic patients. The adjustment of FRAX-derived probability by TBS only marginally improves fracture prediction. Last, fracture risk assessment in diabetics needs to take into account the duration of diabetes, the degree of glycaemic control and the numerous treatments of diabetes which have differential effects on bone homeostasis and fracture risk. In addition, the relative contribution of obesity, sarcopenia, co-morbidities and increased risk of falls to the higher fracture risk among diabetics remains to be integrated.

Studies using HR-pQCT showed some deterioration in cortical bone microstructure underlying skeletal fragility in diabetes, in particular a higher cortical porosity which has been associated with fracture risk. On another side, in vivo micro-indentation at the cortical surface of the tibia has shown reductions of bone material strength index (BMSi) in diabetics but it remains unknown how BMSi translates to the clinical risk for fracture. Commonly used bone turnover markers are often not elevated in diabetes and have not been associated with fragility fractures in this disease. The prognostic value of specific markers of bone matrix quality, such as pentosidine, AGEs, or periostin is promising but has not been systematically evaluated.

In summary, a multiplicity of determinants are involved in fracture risk in diabetes, which are only partially captured by DXA and FRAX. The development of new clinical tools and adjusted algorithms for fracture prediction constitutes thus a necessary but complicated task for this specific condition is therefore necessary to better identify “diabetoporotic” patients at increased risk of fracture.

NS9

OSTEOPOROSIS DRUGS EFFECTS IN DIABETICS

N. Napoli¹

¹Universita Campus Biomedico, Roma, Italy

Evidences on Treatment of bone fragility in patients with diabetes are scant and limited to observational or post-hoc analysis of randomized clinical trials (RCT) in osteoporosis. Alendronate has been proved to have a similar efficacy in diabetes as in post-menopausal osteoporosis in increasing BMD and preventing hip fractures with no differences between T1D and T2D. Similar effects have been observed for risedronate in the Japanese population and for raloxifene in a post hoc analysis of the MORE trial. Potential positive effects have been proposed for denosumab, with new data proving also efficacy on fasting serum glucose. However diabetes is a low bone turnover condition, and osteoanabolic therapies are well accepted therapeutic options that may be used before antiresorptive drugs. Currently, only data on teriparatide are available, showing either similar or greater effect on BMD in diabetic vs non-diabetic persons. Patients may benefit also from new anabolic agents like abaloparatide or romosozumab but more evidence is needed.

In conclusion, considering the paucity of available data, diabetic patients are treated according to general guidelines applied to postmenopausal women. With the growing number of diabetics in the world, specific RCT with anti-osteoporosis medications conducted in diabetic patients at risk of fracture are needed.

NS10

COMBINED EFFECTS OF VITAMIN D ON MUSCLE AND BONE: A REVIEW OF EVIDENCE AMONG SENIOR ADULTS AGE 65+

H. Bischoff-Ferrari¹

¹University of Zurich, Zurich, Switzerland

Recent data from clinical trials and meta-analyses have been conflicting on the role of vitamin D in the prevention of falls and fracture. Both the reduction and the promotion of fall and fracture risk has been suggested by recent clinical trials of vitamin D supplementation. In this symposium, we will discuss to what extent target populations,

dosing regimens and achieved 25(OH)D levels play a role in differential benefits of vitamin D on muscle and bone – also linking trial findings to mechanistic studies of muscle and bone biology.

NS11

NOVEL EXERCISE AND NUTRITIONAL APPROACHES TO OPTIMIZE BONE, MUSCLE AND MOBILITY INTO OLD AGE

R. Daly¹

¹Deakin University, Melbourne, Australia

Exercise is one strategy that can concurrently have a positive effect on bone, muscle and mobility in older people, but not all forms are equally effective, with the benefits being modality and intensity-dependent, and influenced by nutritional factors. Regular walking has little or no effect on bone or muscle, but as few as 50 daily multi-directional moderate impact jumps can improve bone density in older adults. Progressive resistance training (PRT) is effective at improving muscle mass and strength, but has mixed effects on bone health, muscle function and falls which may be due to the common prescription of slow and controlled movement patterns. High-velocity PRT (power training), which involves rapid muscle contractions, is effective at improving muscle function and activities of daily living, but its effect on falls risk remains unknown. High-challenging balance and rapid step training can reduce falls risk by 30–50%, and there is emerging evidence that dual-task training, which combines exercise with a secondary challenging cognitive-motor task, can improve dual task performance, cognitive function and reduce falls risk. This is important because many people fall while undertaking a secondary task. There is also evidence to support an interaction between exercise and various nutritional factors on muscle health. The ingestion of 20–35 g of high-quality protein (e.g. whey incorporating 2–4 g leucine) post-exercise or as part of a multi-nutrient supplement, may enhance the effects of exercise on muscle mass/strength, particularly in those with insufficient basal intakes or who are sarcopenic. We and others have also explored the role of whole foods, including lean red meat to a total protein intake of at least 1.3 g/kg/d and the Mediterranean diet, as well vitamin D, omega-3 fatty acids, antioxidant supplements and creatine alone or in combination, as alternative approaches to promote exercise-induced gains in muscle mass and strength, with some promising findings. However, there is little evidence that such dietary approaches can enhance the effects of exercise on mobility/function in older people. This presentation will provide an overview of the latest evidence about the role of exercise and nutritional approaches to optimize bone, muscle and mobility into old age.

NS12

PHARMACOLOGICAL TREATMENT OF OSTEOSARCOPENIA: HOW TO TARGET BONE AND MUSCLE AT THE SAME TIME?G. Duque¹¹Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne, Melbourne, Australia

Osteosarcopenia has been coined to describe frailer individuals at higher risk of falls, fractures and poor outcomes, including higher prevalence of disability and mortality. Physical inactivity, low serum levels of vitamin D, hypogonadism (in men), and poor nutrition accelerate the progression of osteosarcopenia. In this session, we will review current and future therapeutic interventions that can benefit osteosarcopenic patients while concurrently targeting muscle and bone. This will include the review of novel pathways with strong potential to become therapeutic targets in osteosarcopenia. From a translational perspective, we will review the current evidence on novel pharmacological approaches to osteosarcopenia that are still in the pipeline. This review will include anti-myostatin antibodies, anabolics, steroid hormones, and inhibitors of fatty acid synthase. This section will focus on understanding their mechanism of action and on identifying the potential of these compounds to becoming effective treatments for osteosarcopenia in the future.

NS13

GLOBAL MAP OF DIETARY CALCIUM INTAKE REVEALS LARGE GEOGRAPHIC REGIONS OF LOW INTAKE – A CALL TO ACTIONB. Dawson-Hughes¹¹Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, United States

There is concern that low calcium intake in selected regions around the globe is adversely affecting bone health. To compile information about calcium intake globally, the IOF has compiled available information on calcium intake. Searches of 13 electronic databases yielded 9780 abstracts and data from 74 countries. Average national dietary calcium intake in the 74 countries ranged from 175 to 1233 mg/d (1). Many countries in Asia have average dietary calcium intake less than 500 mg/d. For example, mean calcium intake among adults was estimated at 338 mg/d in China and at 429 mg/d in India. These intakes are far below the locally recommended intakes of 800–1000 mg/d (China) and 600 mg/d (India).

The objectives of this symposium are to demonstrate the newly developed *interactive* global calcium map, to examine evidence that low calcium intake is having a negative impact on bone, and to focus on potential strategies and actions that can

be taken to increase calcium intake. These strategies can be expected to differ in different regions, based on local diet composition, cultural norms, vitamin D status, and other factors. With support from leading local physician scientists, we will examine potentially effective approaches to addressing calcium deficiency in China and India, two large countries in which calcium intake is among the lowest.

Disclosures: Investigator-initiated research grant from Pfizer, Inc. and DSM.

Consulting: Amgen, Pfizer, Tricida.

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NS14

DIETARY CALCIUM INTAKE AND ROLE OF CALCIUM IN BONE HEALTH IN THE INDIAN POPULATIONA. Mithal¹, P. Kaur¹¹Division of Endocrinology and Diabetes, Medanta-The Medicity Hospital, Gurugram, Haryana, India

Objective: To review the data on dietary calcium intake and role of calcium in bone health in Indian population.

Methods: A thorough review of literature was done using databases, PubMed and Google scholar.

Results: The recently published global calcium map reported an average dietary calcium intake of about 400 mg/day in India (1). This is based on the National Sample Survey Office (NSSO, 2012) data. We reviewed 16 additional studies (3 were hospital based, 13 were community based). Although none of the studies were nationwide and truly representative, the findings were consistent. In one such study, mean dietary calcium intake was 264 ± 1.94 mg/day in rural and 354 ± 5 mg/day in urban population (2). The diet of the rural population was found to have a high phytate-to-calcium ratio compared to the urban diet. A case control study including young Indian children found that rickets developed when low dietary calcium intake (204 ± 129 mg/day in cases) coexisted with a low or borderline vitamin D nutrition status (3). In another study the odds ratio for developing rickets with a daily calcium intake below 300 mg was 4.8 ($p = 0.001$) (4). Dietary calcium deficiency remains a significant contributor to the development of rickets in Indian children. In one study, mean daily calcium intake in women (30–60 year age) was found to be an important determinant of BMD ($P < 0.05$) apart from body weight, age and menopause. Strategies that can be undertaken to manage the problem of calcium deficiency mainly include diversification of diet,

food fortification, external supplementation and crop bio fortification.

Conclusion: Calcium intake is below global recommendations across all age groups and regions in India and is likely associated with adverse skeletal effects.

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NS15

DIETARY CALCIUM INTAKE IN CHINA AND PACIFIC RIM REGION

W. Xia¹, N. Jiang¹

¹Department of Endocrinology, Key Laboratory of Endocrinology, Peking Union Medical College Hospital, Beijing, China

The aging population in China is growing rapidly and by the middle of this century will peak. As a result, both the prevalence of osteoporosis and the incidence of osteoporotic fracture are rapidly rising in Chinese population. In this context, bone health draws common concern of the whole society. Sufficient intake of calcium and vitamin D is important in maintaining the healthy status of bone. Currently there is a high prevalence of calcium and vitamin D insufficiency in China. According to China Nationwide Nutrition and Health Surveys 2012, the mean Ca intake is 366 mg/day/reference man, which is much below the recommended intake of 800–1000 mg/d. Calcium intake also show regional difference within China. Urban areas have average calcium intake of 412 mg/d, while rural areas have calcium intake of 321 mg/d. The low calcium intake in China may be due to plant-based diets and low milk and dairy products consumption. In recent years, many studies have investigated the effect of calcium and vitamin D supplementation but get divergent results. This review will discuss the studies in China and other Pacific Rim countries that address the role of calcium and vitamin D in bone health, the overall calcium intake in China as well as its regional difference. We will also evaluate the potential benefits and risks of increasing calcium intake in China, and discuss the appropriate strategies to increase calcium intake based on the current evidence.

NS16

COMPLEX REGIONAL PAIN SYNDROME: FACTS ON CAUSES, DIAGNOSIS AND THERAPY

M. L. Brandi¹

¹Metabolic Bone Diseases Unit, Department of Surgery and Translational Medicine, University of Florence, Florence, Italy

Complex Regional Pain Syndrome (CRPS), once indicated as algodystrophy, is a painful syndrome characterized by sensory and vasomotor disturbances, edema and functional impairment, usually diagnosed in hands and feet distal to injury. Symptoms are often out of proportion to the initiating event (i.e. a simple fracture). Earlier impression that CRPS represents a psychosomatic illness has been replaced by evidence that CRPS is a rare complication of limb injury in biologically susceptible individuals. Even though knowledge has been recently accumulated, yet the full understanding of the pathogenesis and clinical aspects of the syndrome are lacking. Also there is not gold standard in diagnosis of this entity, and a multidisciplinary approach is necessary for proper diagnosis. Diagnostic tools are required to be effective in the early phase of the disease and to distinguish the various underlying pathophysiological mechanisms (i.e. neurological, vascular, metabolic), as different causes may require a specific treatment and even a polytherapy. Evidences of effective interventions span from rehabilitation therapies to neuropathic medications, electric stimulation of the spinal cord, reduction of bone turnover. Investigational treatments include ketamine, botulinum toxin, immunoglobulins, trans cranial neuromodulation, and bisphosphonates. These several aspects of the disease will be presented to an audience of clinicians who often encounter these cases in their practice, but not always aware about the best approach to diagnosis and management of this complex syndrome.

NS17

DEFINITION OF THE COMPLEX REGIONAL PAIN SYNDROME

G. Iolascon¹

¹Department of Medical and Surgical Specialties and Dentistry, University of Campania, Luigi Vanvitelli, Naples, Italy

Few diseases like Complex Regional Pain Syndrome (CRPS) have had so many different definitions since they were first identified. The plethora of terms used to describe this condition over the past 150 years since Weir Mitchell's description bears witness to several changes in the prevalent pathogenic beliefs through the history of medicine.

Silas Weir Mitchell, in the first accurate description of the syndrome, defined its clinical characteristics represented by regional pain, disproportionate to the triggering cause, and by the presence of marked dystrophic features in the affected

soft tissues comparable to those reported by James Paget, who considered them a form of chilblains.

Although its epidemiological relevance is comparable to that of rare diseases, the scientific interest in CRPS has always been remarkable, above all due to the still unsolved questions concerning the underlying etiopathogenic mechanisms.

In the last decades, pain specialists framed algodystrophy, the term most commonly used to name the disease, in the form of Complex Regional Pain Syndromes (CRPS), as CRPS type 1, while the one originally defined by Weir Mitchell as “causalgia” is called CRPS type 2, which is caused by a documented proximal lesion of the nerve.

The term CRPS highlights the symptom of pain as a qualifying element of the algodystrophic syndrome without attributing any role to instrumental diagnostics. The definition of Budapest criteria for the diagnosis of CRPS type 1 has represented a further step in the identification of the disease, on the other hand it has shown the undoubted shortcomings related to poor sensitivity which often rules out the diagnosis of many algodystrophic conditions characterized by objective and/or subjective clinical features not easily classifiable. In my opinion, algodystrophy represents a maladaptive response, based on significant genetic susceptibility, to different injury patterns with consequent phenotypic manifestations having variable quantitative and qualitative features. It is presumable that a taxonomic classification should consider these issues in order to appropriately define CRPS.

NS18

THERAPIES FOR THE COMPLEX REGIONAL PAIN SYNDROME

G. Orsolini¹

¹University of Verona, Rheumatology Unit, Verona, Italy

CRPS is a complex entity including a type I with no nerve damage and a type II with nerve damage.

The two forms have very different therapeutic approach based on the different pathophysiology. The presentation will focus on treatments for type I with updated information on clinical evidences.

There are randomized clinical trials con corticosteroids, immunoglobulins, anti - inflammatory drugs, free radical scavengers, ketamine and bisphosphonates.

Among all, bisphosphonates have so far shown the best efficacy but there are important response predictors to take into consideration such as: time from onset, warm or cold type, triggering event and imaging findings. More problematic remains the treatment of chronic long - lasting forms where other nociceptive mechanisms come into play with resistance to medications. Thus an early diagnosis and treatment is one of the main objective in this condition.

NS19

THE EFFECTS OF EQUITY AND DIVERSITY ON RESEARCH IMPACT

C. Lamberg-Allardt¹

¹University of Helsinki, Helsinki, Finland

Objective: To review the evidence for the effects of equity and diversity on research impact.

Methods: A narrative review of the evidence, including peer-reviewed and grey literature.

Results: High-profile reports of the benefits of gender diversity in the corporate sector are common, with widely-reported associations between female representation on boards and among senior management, and company performance and profitability. However, the peer-reviewed literature suggests that effects may be smaller than reported, or mixed and depend on organisational context. For example, the beneficial association between female representation and performance may only hold for companies focused on innovation, which have inclusive cultures, or when identity group is unrelated to access to resources.

There is limited high quality research investigating the effects of gender equity and diversity on research impact but the available evidence suggests there are benefits. Several studies report that increasing diversity of research collaborations is associated with publication in higher impact journals and more citations. There are also suggestions that more diverse teams may tackle different research questions, in particular prioritising women's health questions in a context where many historical trials have excluded women. As in the corporate setting, context may matter. For example, in one study gender-integrated teams with a higher proportion of highly educated women are more productive in disciplines with a greater female faculty representation.

Conclusions: Recent calls for action to include gender in research impact assessment should be promoted and supported. While the current evidence is only cautiously positive for the effects of equity and diversity on research impact, the additional reasons of social justice and equal opportunity make their promotion an imperative.

Disclosures: none.

NS20

ADVANCE AUSTRALIA FAIR: PROGRESS IN GENDER EQUITY IN SCIENCE IN AUSTRALIA

T. Winzenberg^{1,2}

¹University of Tasmania, Tasmania, Australia, ²Menzies Institute for Medical Research, Tasmania, Australia

Objective: Gender inequity in science is a longstanding global issue. The objective of this session is to highlight recent antipodean advances in gender equity from leading Australian health and medical research organisations, namely

the National Health and Medical Research Council of Australia (NHMRC) and the Australian Academy of Science (AAS).

Materials and methods: An overview of initiatives in gender equity of NHMRC and the AAS since 2012.

Results: The NHMRC established a Women in Health Science Working Committee in 2012, to advise on gender equity issues. A major concern is a persistent pattern of grant funding rates favouring males. In 2017, NHMRC provided extra funding for an additional 34 women lead investigators on projects. Unfortunately, even with this, a gender gap remained at 1.8% but it was a serious step in the right direction. To support cultural change, other initiatives include specifying that institutions administering NHMRC funds must meet gender equity policy requirements, and putting new granting structures in place from 2020.

The AAS initiated Science in Australia Gender Equity (SAGE) to improve gender equity and diversity in Science, Technology, Engineering, Mathematics and Medicine. Its major program is the Australian Pilot of the Athena SWAN Charter, based on the UK model. This accreditation and improvement program for higher education and research organisations focuses on gender and other forms of inequality. Commencing in 2015, it has 45 member institutions. Members have identified areas requiring improvement including parental leave, return to work and caring responsibilities, recruitment, and promotions, and are putting in place concrete strategies to address these.

Conclusions: While inequities remain, high-level commitment to equity is bringing about incremental change in Australian institutions.

Disclosures: TW is Academic co-lead, University of Tasmania Athena SWAN project and Member, NHMRC Women in Health Science committee.

NS21

PRACTICAL INITIATIVES TO SUPPORT GENDER EQUITY IN SCIENCE

S. Brennan-Olsen^{1,2}

¹University of Melbourne, Melbourne, Australia, ²Australian Institute for Musculoskeletal Science (AIMSS), Melbourne, Australia

Objective: Gender inequity in science is a hot topic. This session aims to present an array of practical initiatives focused toward achieving a 50:50 gender balance in science.

Materials and methods: We reviewed published and grey literature to identify initiatives aimed at increasing the representation of women in science in different countries.

Results: Common across initiatives was the distinction between *equality* and *equity*: whereas *equality* ensures the same starting point for everyone, *equity* ensures the same finish line. To date, strategies primarily fall into one or more categories of (i) *removing obstacles*, (ii) *increasing capacity*, (iii) *changing culture*, and/or (iv) *advocacy*. International efforts aimed at *removing obstacles* to balanced gender composition in important debates and conferences include calls for gender-equitable Speaker Policies to be developed, campaigns aimed at conferences with male-only speakers, diverse and informed Program Committees, and commitment to pledges that ensure gender equitable diversity in debate and thus quality in conversation. Improving gender composition at management level, ensuring training programs enrol at least 50% women, and providing specific funding opportunities are some initiatives aimed at *increasing capacity*. Strategies aimed at *changing culture* focus on ‘fixing workplaces’ rather than archaic attempts to ‘fix women’, whilst *advocacy* for achieving gender equity in science is swelling across the world.

Gender balance is consistent with a high-quality conference program. There is no shortage of highly qualified women in science: to demonstrate this, we present a small selection of the notable accomplishments of women scientists and/or clinicians in the musculoskeletal field over the past 20 years.

Conclusion: Providing equity of opportunities in promoting high quality research and in research leadership is achievable by consciously considering diversity in identifying high-achieving individuals in our field.

Disclosures: SB-O is a Member of the ASBMR Women in Bone and Mineral Science Committee.

NS22

AN INNOVATIVE SERVICE SUPPORT MODEL FOR SECONDARY FRACTURE PREVENTION IN THE UK

D. Stone¹

¹National Osteoporosis Society, Camerton, United Kingdom

The NOS has developed an innovative service support model, and currently supports providers and commissioners of fracture prevention services or Fracture Liaison Services [FLS] in over 183 sites across the UK. An FLS systematically finds, assesses, treats and follows-up fragility fracture patients to prevent secondary fractures.

To date.

- 101 sites are receiving peer support and/or commissioning assistance to improve quality.
- 57 sites are developing new services.
- 27 new services have been commissioned or improved since April 2015.

The session will outline how this additional FLS provision to an additional 2.6 million people over 50 will prevent 2456 hip fractures over 5 years, and provide £49 million benefit for the health and social care economies in the UK.

NS23

MAKING THE CASE FOR FRACTURE LIAISON SERVICES IN PREVENTION OF DISABILITY – ANALYSIS OF NATIONAL PRESCRIBING DATA IN ENGLAND

T. Jones¹

¹National Osteoporosis Society, Camerton, United Kingdom

The NOS supports sites to demonstrate clinical and cost-effectiveness to payors from business case to post-implementation evaluation. Studies show that half of hip fractures occur after a prior fragility fracture, and 25% of hip fractures could be prevented with identification, treatment and advice on lifestyle risk factors. Fracture prevention is cost-effective in terms of both social and healthcare budgets; and at a person level, prevents disability.

This session will explore different methods of demonstrating clinical and cost effectiveness of FLS using available data. In particular, it will show how changes in prescribing trends in a small population (circa 300,000) can demonstrate, in the short-term, the effectiveness of Fracture Liaison Services (FLS) in preventing secondary fractures. Using effectiveness data can strengthen the case for continued or additional investment in FLS.

The session will include presentation of analyses of prescribing data to demonstrate effectiveness of FLS to payors/insurers. It will also cover the potential problems of using secondary fracture incidence to demonstrate the effectiveness of an FLS.

NS24

MEDITERRANEAN DIET AND BONE HEALTH

S. Maggi¹

¹National Research Council, Padova, Italy

Several studies have reported that the incidence of osteoporosis and fractures significantly vary across the world, the lowest incidence being reported in the Mediterranean area. Previous literature suggested a potential role of higher vitamin D levels in Mediterranean countries, but more recent findings reported that the serum levels of this hormone is probably lower in people living around the Mediterranean Sea. Therefore, more attention was given to the possible beneficial effect of specific eating patterns, typical of this area. Mediterranean diet contains a complex mix of naturally occurring bioactive molecules with

antioxidant, anti-inflammatory and alkalinising properties that may strongly contribute to the bone-sparing effect of the Mediterranean diet. In this sense, the epidemiological studies so far available strongly supported the role of Mediterranean diet on the prevention of osteoporotic fractures, particularly when hip is involved.

NS25

MEDITERRANEAN DIET AND MUSCULAR FUNCTION

F. Landi¹

¹Department of Internal Medicine and Geriatrics, Università Cattolica del Sacro Cuore, Rome, Italy

The pathological loss of muscle mass, that further leads to sarcopenia and frailty, is a common condition in older people with important consequences including mortality, disability and higher rate of hospitalization. Mediterranean diet is considered as a key component for healthy aging, including prevention of age-related disability, but the studies assessing the role of this healthy diet in the prevention of frailty are still limited to a few works. Regarding sarcopenia, the problematic assessment of muscle mass in large epidemiological cohorts has led to a very few studies assessing the importance of Mediterranean diet on the presence of sarcopenia. Thus, future studies with larger sample sizes and with a longitudinal design are needed to better understand the possible role of Mediterranean diet for treating and preventing the pathological muscle mass typical of older people.

NS26

MEDITERRANEAN DIET AND OSTEOARTHRITIS.

N. Veronese¹

¹National Research Council, Padova, Italy

It is largely recognized that nutrition plays a beneficial role in chronic diseases. Eating a diet high in trans and saturated fats can increase the onset of common risk factors for chronic comorbidities, including osteoarthritis, as well as exacerbate osteoarthritic symptoms. A Mediterranean type diet (abundant in vegetables, fruits, beans, whole grains, olive oil and fish, and less red meat than typical Western diets) has been associated with reduction in joint inflammation in patients with rheumatoid arthritis, another common rheumatological disease. Moreover, some recent epidemiological studies reported that higher adherence to Mediterranean diet is associated with a lower presence of osteoarthritis, probably for the anti-inflammatory of this healthy dietary pattern. However, future observational and longitudinal studies are needed to confirm these preliminary findings.

NS27

SUPPLEMENTAL VITAMIN D AND MUSCULOSKELETAL OUTCOMESB. Dawson-Hughes¹¹Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, United States

Vitamin D has been the focus of intensive research efforts in recent years, but many questions remain unanswered. It is recognized that much of the world's population is vitamin D insufficient or deficient, but the specific amounts of vitamin D needed by different sectors of the population and the specific benefits of supplementation remain uncertain. The objective of this presentation is to review and interpret recent clinical trials and meta-analyses that report the effect of vitamin D supplementation on musculoskeletal outcomes. It appears that the association of vitamin D with fall risk is U shaped, with both low and high serum 25(OH)D levels associated with increased fall risk. Vitamin D affects fracture risk indirectly through its effect on risk of falling, a major risk factor for fracture, and directly through its effect on bone mass. The role of supplemental vitamin D alone and in combination with calcium is not yet clear, as evidenced by differing results and conclusions drawn from recent trials and meta-analyses. Large randomized controlled intervention trials currently nearing completion will add important information on the role of vitamin D in promoting musculoskeletal health.

NS28

DO-HEALTH: A 3-YEAR MULTI-CENTRE RANDOMIZED CONTROLLED TRIAL OF VITAMIN D, OMEGA-3 FATS AND EXERCISE – FIRST RESULTS ON FRACTURE RISK AND MUSCLE FUNCTIONH. Bischoff-Ferrari¹¹Department of Geriatrics and Aging Research, University Hospital and University of Zurich, Zurich, Switzerland

DO-HEALTH is a 3-year 2x2x2 factorial design trial investigating whether and to what extent supplementation of vitamin D (2000 IU/day) and/or Omega-3 fatty acids (1 g/day) and/or a simple home-exercise program can increase healthy life expectancy among 2157 relatively healthy adults age 70 and older. DO-HEALTH trial centers have been established at seven universities in five European countries: Switzerland (Zurich, Basel, Geneva), France (Université de Toulouse), Germany (Charité, Berlin), Austria (University of Innsbruck), and Portugal (University of Coimbra). DO-HEALTH is ongoing since 2012. DO-HEALTH has been funded within the European Commission Research Framework 7 program. In this first international symposium at the WCO-IOF-ESCEO Krakow meeting in 2018, first results of the DO-HEALTH trial will be presented with respect to bone and muscle health.

NS29

A STRATEGIC ROADMAP TO PREVENT FUTURE FRACTURES IN PEOPLE WHO HAVE ALREADY FRACTURED: BACKGROUNDR. Adler¹¹Virginia Commonwealth University (ASBMR), Richmond, United States

Older people who have suffered a hip or vertebral fracture are at extremely high risk of another fracture, yet a majority of them do not receive recommended evaluation and treatments following their fracture. As a result, this group remains at high risk of second fractures despite the availability of interventions that are known to reduce this risk. Several large delivery systems in the US have made substantial progress towards improved care with Fracture Liaison Services, and many patients in this group are treated appropriately in other countries because of specific efforts to align clinical practice with current evidence. A major goal of the American Society for Bone and Mineral Research is to reduce the number of avoidable second fractures via development of a strategic roadmap and action plan based upon discussions during an ASBMR-supported multi stakeholder meeting held in July 2017. The meeting was organised and convened by the Centre for Medical Technology Policy (CMTP), an independent non-profit organisation dedicated to evidence based policy. Through a process of analysis and deliberation, a series of activities were identified which aim to reduce the incidence of second fracture and which will be promulgated through the collaboration of ASBMR with other organisations internationally. Elements of this strategic road map include: (1) Strengthening of working relationships with patient advocacy organisation and primary care clinician groups; (2) Clarification of the target population for the focus of efforts over the next three years; (3) Analysis of lessons learned from selected past programmes and initiatives; and 4) Specification of measurable goals to be achieved in the target population.

NS30

A STRATEGIC ROADMAP FOR SECONDARY FRACTURE PREVENTION: REVIEW OF OUTCOMES FOLLOWING SUMMIT MEETING IN JULY 2017D. Kiel¹¹Institute for Aging Research, Hebrew SeniorLife and Harvard Medical School, Boston, United States

Following discussion and analysis at an international stakeholder meeting held in Crystal City, Virginia on 19th July 2017, the ASBMR and CMTP identified a series of

activities intended to reduce the incidence of second fractures, through collaboration with a host of organizations and individuals. The recommendations of this roadmap include the development of a detailed and specific action plan, to be developed in partnership with willing groups, to guide implementation of key aspects of the strategy. Trust will be built further with the stakeholder groups, in order that the overall message can be adequately communicated through patient advocacy organizations and primary care clinician groups. The target population for focus of these efforts over the next three years will include; a) patients aged 65 years and over with a hip or vertebral fracture that comes to clinical attention or is incidentally detected. This choice is well supported by existing data on fractures, risk level and clinical consensus; b) other high risk patient populations should be the focus of a later phase of work addressed by other programmes and initiatives c) provision of accurate information on the risks and strategies to reduce the risks of atypical femur fracture (AFF) and osteonecrosis of the jaw (ONJ) due to public concern about the potential harms of drug treatment (including AFF and ONJ), as well as underscoring the risks of not being treated. The road map begins with a collection of published reports and expert input on selected past programs and initiatives aiming at secondary prevention of fracture followed by agreement on a core set of meaningful process and outcome measures to evaluate care quality in the target population. In addition the roadmap effort will involve a review of existing clinical guidelines from primary care and specialty organizations to underscore how consistent the various guidelines are with respect to the high priority target population. Finally the road map will develop a short simple clinical recommendation that will be disseminated to entrusted and prominent publications. Partnerships will be established with integrated health care delivery systems to develop system specific programmes targeted at secondary fracture prevention.

NS31

A GLOBAL OVERVIEW OF SECONDARY FRACTURE PREVENTION STRATEGIES AND SERVICE INITIATIVES WORLDWIDE

N. C. Harvey¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, United Kingdom

Despite evidence for the clinical effectiveness of secondary fracture prevention, translation into clinical services in the real-world setting remains disappointing. Where implemented, service models vary widely in terms of their scope and methodology. Whilst services may be appropriately tailored to local circumstances, the outcome achieved must be a common one, namely a reduction in subsequent fractures. In order to address the heterogeneity in secondary fracture prevention

strategies globally, the International Osteoporosis Foundation instituted the Capture the Fracture® programme, within which a Best Practice Framework (BPF) tool of criteria and standards to provide a quality benchmark was developed. Capture the Fracture® has thus established internationally endorsed standards for best practice, facilitates change at the national level to drive adoption of Fracture Liaison Services (FLS) and increase awareness of the challenges and opportunities presented by secondary fracture prevention to key stakeholders. The Best Practice Framework (BPF) sets an international benchmark for FLS, which defines essential and aspirational elements of service delivery. In this presentation the international landscape with regard to secondary fracture prevention will be reviewed, the effectiveness of instituting such changes in service delivery and the IOF Capture the Fracture® programme and BPF tool described, demonstrating their immense value as a key driver of change towards best practice for the implementation of Fracture Liaison Services globally.

NS32

AN UPDATE ON RISK ASSESSMENT AND FRACTURE PREVENTION IN EUROPEAN NATIONS

E. McCloskey¹

¹University of Sheffield, Sheffield, United Kingdom

Whilst assessment for fracture risk, and use of antiosteoporosis medications, have increased markedly over the last 20 years, there is evidence from the UK, US and continental Europe that treatment rates have declined substantially in the last 5 years. Whilst there are several reasons for these secular changes, effective risk assessment and primary prevention are a key part of ensuring adequate levels of treatment. In osteoporosis, as in any non-communicable chronic disease, there is clearly a balance between the benefits of a systematic screening approach leading to widespread treatment, with associated increased cost and risk of side-effects, and a case-finding strategy focused on those at greatest individual risk, with associated problems of under-treatment. Although DXA screening is standard in the US for older individuals, in the majority of countries population screening is not judged to be cost-effective; primary prevention is focused more on opportunistic case-finding, triggered by the presence of clinical risk factors. In the UK, the role of screening was investigated in a seven-centre randomised controlled trial of the effectiveness and cost-effectiveness of screening older women in primary care for the prevention of fractures (the UK SCOOP trial). 12,483 older women were randomised to either normal care or screening and subsequent treatment (based upon hip fracture probability from the FRAX risk assessment tool). Uptake of antiosteoporosis treatment was greater in the screening than control group at 1 year (15% vs 4%) and particularly high in the screening group who were

found to be at high risk of fracture (78% at 6 months). Importantly, the screening intervention led to a 28% reduction in hip fracture risk, and appeared safe and cost-effective, suggesting that a systematic community-based screening programme in older individuals might be an effective strategy for the primary prevention of fragility fractures.

NS33

METHODOLOGICAL CONDITIONS FOR TESTING PINP AND CTX – NBHA RECOMMENDATIONS

P. Szulc¹

¹INSERM UMR 1033, University of Lyon, Hospices Civils de Lyon, Lyon, France

Blood levels of N-terminal collagen type I extension propeptide (PINP) and C-terminal cross-linking telopeptide of type I collagen (CTX-I) are recommended as reference markers of bone formation and bone resorption. Results of measurements of bone turnover markers (BTM) depend on the assay characteristics (analytical variability) and on the factors regarding sample handling and patient characteristics (pre-analytical variability). Factors concerning sample handling include sample type, circadian rhythm, sample storage and freeze/thaw cycle. Blood CTX-I exhibits a strong circadian rhythm, related mainly to food intake. For its measurement, blood must be collected in the morning after an overnight fast. CTX-I is more stable in EDTA plasma than in serum and should be used, when the sample processing is delayed.

Sources of pre-analytical variability related to patient include controllable and uncontrollable factors. Conditions of blood collection can be adapted to reduce the impact of the controllable determinants. Blood should be collected in follicular phase. Vigorous exercise or alcohol drinking should be avoided on the day prior to sampling. The impact of season is minor in home-dwelling vitamin D-replete individuals but can be stronger in vitamin D-deplete home-bound or institutionalized elderly.

Age, sex and menopausal status are the uncontrollable factors. Therefore, respective reference values must be used. Recent fracture, chronic immobility and some diseases (e.g. primary hyperparathyroidism, renal failure, thyrotoxicosis) are associated with high BTM levels. Few diseases (e.g. hypoparathyroidism, hypothyroidism) are characterized by lower BTM levels. In some diseases (e.g. multiple myeloma, Cushing's disease), a dissociation of bone turnover is found (increased bone resorption without proportionally increased bone formation). BTM levels may vary with severity and time, e.g. CTX-I is higher in acute rheumatoid arthritis and decreases during treatment. BTM levels are modified by anti-osteoporotic drugs and other medications (e.g. corticosteroids, aromatase inhibitors). Day-to-day variation also contributes to the variability of BTM levels. This variation differs between the individuals and is difficult to assess and to manage in the clinical practice.

Adopting standard sample handling and patient preparation procedures can limit controllable pre-analytical variability. These uncontrollable factors should be noted in the medical records and considered in the interpretation of the BTM results.

NS34

A MULTICENTER STUDY TO EVALUATE HARMONIZATION OF ASSAYS FOR C-TERMINAL TELOPEPTIDES OF TYPE I COLLAGEN (CTX): A REPORT FROM THE IFCC-IOF WORKING GROUP FOR THE STANDARDIZATION OF BONE MARKER ASSAYS

E. Cavalier^{1,2}

¹CHU de Liège, Liège, Belgium, ²University of Liège, Liège, Belgium

Biochemical bone turnover markers (BTM) are useful tools to assess bone remodeling at the cellular level. C-terminal telopeptide of type I collagen (CTX) has been recommended as a reference marker for bone resorption in research studies.

In this study, we describe the results of a multicenter harmonization protocol for routine clinical laboratory assays for CTX in serum and plasma. Four centers (Athens GR, Copenhagen DK, Liege BE and Sheffield UK) collected serum and plasma (EDTA) samples from 769 patients presenting to osteoporosis clinics. Specimens were analyzed in duplicate with each of the available routine clinical laboratory methods according to the manufacturers' instructions. Passing-Bablok regressions and Bland-Altman plots for CTX values between serum and plasma specimens and between methods were used to determine the agreement between results. A general linear model was employed to identify possible variables that affect the relationship between the methods.

Imprecision of the methods, on plasma and serum, were lower than the desirable intra-individual coefficient of variation (7.2%) but variability amongst the same instrument at different sites was evident. All method comparisons of the same assay in serum and plasma presented an intercept significantly different from 0 and a slope significantly different from 1 when all data are combined, meaning that CTX results from serum and plasma cannot be combined. The slope observed between plasma and serum for IDS iSYS method was higher (1.15) compared with the 2 other methods (both at 1.02).

The major outcomes are regression equations which can be used to predict Roche Elecsys, IDS iSYS, or IDS ELISA CTX results from any other assay with a coefficient of determination (R^2) of 0.82, meaning that approximately 82% of the variance in the predicted results is accounted for by the measured result. The inclusion of site of analysis, age and weight increased R^2 to 0.91 with the site of analysis the major contributing factor.

In conclusion, use of these models in practice will require validation in an independent dataset. Further collaboration between the assay manufacturers and clinical laboratory professionals is also needed to reduce assay variation.

NS35

MONITORING ORAL BISPHOSPHONATES WITH BONE TURNOVER MARKERS: IOF/ECTS ADHERENCE WORKING GROUP ALGORITHM

R. Eastell¹, A. Diez-Perez²

¹Mellanby Centre for Bone Research, University of Sheffield, Sheffield, United Kingdom, ²Hospital del Mar Institute of Medical Investigation, CIBERFES, Barcelona, Spain

Low adherence to oral bisphosphonates is a common problem that jeopardizes the efficacy of treatment of osteoporosis. No clear screening strategy for the assessment of compliance is widely accepted in these patients.

The International Osteoporosis Foundation and the European Calcified Tissue Society have convened a working group to propose a screening strategy to detect a lack of adherence to these drugs. The hypothesis was that the bone turnover markers PINP and CTX be used to identify low adherence in patients with postmenopausal osteoporosis initiating oral bisphosphonates for osteoporosis.

In a recently published position paper, the working group recommends measuring PINP and CTX at baseline and three months after starting therapy to check for a decrease above the least significant change (decrease of more than 38% for PINP and 56% for CTX). Detection rate for the measurement of PINP is 84%, for CTX 87% and, if variation in at least one is considered when measuring both, the level of detection is 94.5%.

The decision algorithm proposes that if a significant decrease is observed at three months the treatment can continue but if no decrease occurs the clinician should reassess to identify problems with the treatment, mainly low adherence.

NS36

CHALLENGES OF FLS - GLOBAL PERSPECTIVE & RESULTS OF SURVEY

K. Javaid¹

¹Associate Professor in Metabolic Bone Disease, NDORMS, University of Oxford, Oxford, United Kingdom

22Effective, efficient and sustainable secondary fracture prevention is a global priority and requires an integrated approach to a) multidisciplinary bone health and falls prevention; b) secondary, primary and community providers c) holistic needs of the person. Within the International Osteoporosis Foundation, we have developed criteria and standards for

FLSs from identification, investigation, treatment recommendation and monitoring of interventions. The introduction of the international Capture the Fracture Map has enabled for the first time a global view on the delivery of secondary fracture prevention using these standards. The challenge now is to deliver universal and effective coverage. A key component of the delivery of secondary fracture prevention is the access to pharmacological and non-pharmacological interventions.

This talk will summarise the key findings from Capture the Fracture benchmarking audits as well as the results of a survey sent to over 230 FLSs around the world regarding the access their patient group has to both pharmacological and non-pharmacological interventions for secondary fracture prevention.

NS37

INTEGRATION WITH TRAUMA

F. Frihagen¹

¹Consultant, PhD, Division of Orthopaedic Surgery, Oslo University Hospital, Oslo, Norway

The role of the orthopaedic surgeon and nurses within the FLS may be simply a permissive role, accepting that FLS nurses and osteoporosis specialists from another department perform the case finding and continue the diagnostics and treatment outside the orthopaedic department. On the other hand it may be totally integrated with orthopaedic professionals running the FLS integrated in the department. Among the 7 departments constituting The Norwegian Capture the Fracture® Initiative (NoFRACT) most FLSs are run inside the orthopaedic department with internally recruited nurses, and one or two orthopaedic surgeons as “champions”. In these systems most consultations are with nurses, with the champions in an advisory and educational role. In addition there exists a possibility of integrating the osteoporosis treatment in the ordinary fracture follow up visits. Potential advantages and problems with this high level of integration – and hence potential lack of formal osteoporosis competence, i.e. limited training, the need for external referrals, patient satisfaction, the need for a well-defined treatment protocol, and potential for efficient resource use will be discussed, and preliminary results from NoFRACT will be presented.

NS38

TOOLS FROM CTF

T. Thomas¹

¹NSERM U1059, Lab Biologie Intégrée du Tissu Osseux, Université de Lyon, Rheumatology Department, CHU Saint-Etienne, Saint-Etienne, France

The International Capture the Fracture Map has enabled for the first time a global view on the delivery of secondary

fracture prevention using these standards. A key aim of this project was to drive improvements in service effectiveness, efficiency and patient experience for secondary fracture prevention. With over 230 FLS from over 30 countries now represented on the map, the priority is to start to engage with clinical centres where fracture liaison services have not been considered a high local priority for healthcare investment and delivery. To facilitate this there are a number of tools and resources available for health care settings that are considering setting up fracture liaison services.

The aim of this talk is to summarise the process for getting your site on the Capture the Fracture map and describe the supporting materials available.

We will review the process to getting a site on the Capture the Fracture map including issues around completing the questionnaire, the review process within the IOF, the final adjudication for getting results on the map and the renewal process. In addition, we will describe the key online supporting materials such as the framework, implementation toolkit, webinars, slide sets as well as the different types of mentoring service available.

NS39

EPIDEMIOLOGY AND RISK FACTORS FOR OSTEOPOROSIS IN WOMEN

B. Muzzi Camargos^{1,2}

¹Densitometry Unit Coordinator at Densimeter - Rede Mater Dei de Saúde. IOF Committee of Scientific Advisor, Belo Horizonte, Brazil, ²Member of the National Committee on Osteoporosis of FEBRASGO, Rio de Janeiro, Brazil

Throughout life, women are more susceptible to osteoporosis than men. Not only due to lacking of mechanical stimuli found more vigorously in men nor testosterone levels, but mainly linked to menopause and also to conditions related to a woman's reproductive life issues. The main hormonal event responsible for women's bone mass accrual is menarche. Late or lack of menarche (primary amenorrhea, gonadal dysgenesis and genetic diseases) can contribute to suboptimal peak bone mass. Abnormalities on menstrual cycles also may lead to low bone mass on girls. During reproductive years, women may need contraception. Some of these contraceptives, like medroxyprogesterone acetate (MPA), can induce partial or complete suppression of hypothalamus-hypophysis axis and promote bone loss. On the other hand, combined contraceptives may be beneficial to bone mass and prevent fragility fractures late in life. There are some conditions/diseases exclusively linked to female gender like endometriosis and *uterine leiomyomatosis*. These conditions sometimes require gynecological treatments that may be harmful to bone mass. These treatments may demand the use of high doses of progesterone or GnRH analogues, inducing hypothalamic

suppression and increasing bone loss. Also, some infertility protocols may recommend corticosteroid and heparin use, what makes the process even more harmful to bone health. Another important issue is the female athlete's syndrome, another condition that is attributed to sports women but may also occur in dancers with low body fat content. On this case, ovarian suppression is achieved through hypothalamic dysfunction (hypothalamic amenorrhea). During pregnancy, some women may need medical assistance and calcium and vitamin D supplementation to maintain bone mass and some secondary benefits during gestational period. Pregnancy itself may stimulate bone loss through different mechanisms that have in common the high calcium availability to the fetus. Much more harmful than pregnancy is lactation, when calcium is directed to breastfeed the newborn and hypothalamic axis is suppressed at same time. After pregnancy and during breastfeeding period, women may need contraception advice through a medical assisted decision in order to choose an option that may be less harmful to bone mass. Approaching menopause, bone mass begins to decline before hot flushes and/or menstrual cycle irregularities arise. Menopause transition can lead to 5% bone loss per year, on the first 3 to 5 years of this period. At this time, hormone replacement therapy may be prescribed to prevent bone loss and osteoporosis. At some point during women's lifetime, approximately 12.4% will be diagnosed with female breast cancer and its treatment is often linked to estrogen deprivation (prophylactic oophorectomy and aromatase inhibitors exposure) increasing exponentially bone loss. Women live longer and, therefore, are more exposed to osteoporosis than men.

Conclusion: physiological issues specifically linked to women, expose female's bone mass to osteoporosis much more than men. Medical doctors should pay close attention to women's bone health since early stages of life and following throughout aging process. This presentation addresses the most relevant situations where adequate medical assistance may interfere positively on the purpose of preserving bone health during women's lifespan.

NS40

UPDATE ON HORMONE THERAPY AND OSTEOPOROSIS PREVENTION

A. Orcesi Pedro^{1,2}

¹Associate Professor Depart Obstetrics Gynecology – UNICAMP Medical School, Campinas, Brazil, ²President of National Committee on Osteoporosis of FEBRASGO, Rio de Janeiro, Brazil

Postmenopausal osteoporosis affects millions of women, being estrogen deficiency the key factor in the pathogenesis of involutional osteoporosis. The various options of osteoporosis treatment are aimed to maintain bone health and decrease the

risk of fractures. In climacteric women in different stages of menopausal transition and for women with hypoestrogenism (hypogonadism, primary ovarian insufficiency or premature surgical menopause), **hormone replacement therapy (HRT)** at different types, doses and routes of administration rapidly normalizes bone turnover, preventing and/or treating osteoporosis. HRT is able to preserve and even increase bone mass at all skeletal sites, leading to a significant reduction in vertebral and non-vertebral fractures. Fractures pooled results of 5 trials ($n = 20,499$) showed a significantly reduced risk of fractures in women randomized to combined estrogen and progestin vs placebo (RR, 0.80 [95% CI, 0.68–0.94]). The Women Health Initiative trial (WHI) showed a significantly reduced risk of total osteoporotic fractures in women randomized to estrogen alone vs placebo (HR, 0.72 [95% CI, 0.64–0.80]). The difference was no longer statistically significant in the post intervention phase (duration, 10.7 years); however, this study reported only on hip fractures. In a randomized study, with 4538 women with osteoporosis, **Tibolone** (1.25 mg/d) reduced the risk of vertebral (RR, 0.55 [95% CI, 0.41 to 0.74]) and nonvertebral fracture (RR, 0.74 [95% CI, 0.58 to 0.93]) and breast cancer (RR, 0.32; [95% CI, 0.13 to 0.80]). This agent decreased fracture and vasomotor symptoms without stimulating breast or uterine tissue. **Selective estrogen modulators (SERMs)** as **raloxifene** (60 mg daily) reduces risk for vertebral fractures in postmenopausal women with osteoporosis but has no effect on risk for non-vertebral fractures. Long term use of raloxifene decreases risk for breast cancer among women at higher risk for this condition. Raloxifene may be appropriate initial therapy in some cases where patients requiring drugs with spine-specific efficacy and it may be particularly attractive in patients who are also at high risk of breast cancer. The combination of a SERM with an estrogen has been defined as tissue selective estrogen complex (TSEC). The **bazedoxifene** (20 mg/d) with conjugated estrogen (0.450 mg/d) is able to reduce climacteric symptoms, reducing bone turnover and preserving bone mass. Studies investigating the actions of **phytoestrogens** on bone mass or bone turnover are largely contradictory, making them inconclusive. At the present time, phytoestrogens cannot be recommended for postmenopausal osteoporosis. However, a recent systematic review and meta-analysis (26 RCTs; $n = 2652$) of the effects of **isoflavone** formulations against estrogen-deficient bone resorption in peri- and postmenopausal women concluded that isoflavone treatments exert a moderately beneficial effect against estrogen-deficient bone loss. The effect appears dependent on whether isoflavone treatments are in aglycone form. In **conclusion**, the use of HRT for osteoporosis prevention is based on biology, epidemiology, animal and preclinical data, observational studies and randomized clinical trials. Bone protection is one of the major benefits of HRT. Therefore, hormone therapy may be considered as a primary therapy for prevention of bone loss and fracture in

postmenopausal women at elevated risk of osteoporosis or fractures, primarily for women aged younger than 60 years or who are within 10 years of menopause onset. Hormone replacement therapy decrease the risk of vertebral and hip fracture risk. However, it is important to consider individualization of treatment taking in account additional secondary health benefits (treatment of vasomotor symptoms, genitourinary syndrome of menopause, sexual dysfunction, quality of life on symptomatic hypoestrogenic women), side effects, contraindications, cost and likelihood of adherence. Long-term HRT may be sufficient to prevent osteoporosis and fracture, but women who are adequately treated with HRT can also use simultaneously other medications for osteoporosis (e.g., bisphosphonates, denosumab or teriparatide) based on clinical needs and judgment.

NS41

OSTEOPOROSIS PREVENTION ON SPECIAL SITUATIONS DURING WOMEN'S LIFE SPAN

B.-H. Albergaria^{1,2,3}

¹Professor of Clinical Epidemiology- Federal University of Espirito Santo, Espirito Santo, Brazil, ²Technical Director - CEDOES Diagnosis and Research of Osteoporosis, Espirito Santo, Brazil, ³Vice-President of National Osteoporosis Commission - FEBRASGO, Rio de Janeiro, Brazil

Osteoporosis represents a major public health problem by virtue of later life association with fragility fractures¹. The population is aging, and anticipation of higher fracture occurrence, related morbidity and mortality, and escalating health care costs, are causes for growing concern². Osteoporosis has been described as a “silent epidemic”³ or “an underdiagnosed disease”⁴ since its first sign in postmenopausal women may be a vertebral fracture.

Human bone health begins in the womb and continues throughout life, with different challenges for different life phases. By understanding the challenges to bone health that girls and women face throughout their lives, clinicians can help them build and maintain healthier bones to last a lifetime⁵. Therefore, in the realm of osteoporosis prevention, it is necessary for physicians to survey women over a wide age range, reviewing all aspects that might influence the state of bone health in their female patients and to follow these women over time.

This presentation approaches factors that contribute to bone loss or accrual in women across the generations, including adolescence, the reproductive years, the menopause inception, and the decades thereafter. Health providers in a variety of disciplines will be faced with the spectrum of bone changes in their patients over the generations in order to promote effective interventions in a more timely manner to limit future fracture occurrence.

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NS42

TARGETS FOR OPTIMISING BONE, MUSCLE STRENGTH AND BALANCE IN MIDDLE-AGED WOMEN

F. Wu¹

¹University of Tasmania, Tasmania, Australia

Objectives: Bone mineral density (BMD), muscle strength and balance are all important determinants of fracture which start to decline rapidly in middle-age. The factors associated with these variables are understudied in this age group. This study aimed to describe associations of physical activity and sedentariness with these factors in middle-aged women.

Materials and methods: In a cohort of 346 women aged 25–44 years, we measured strenuous physical activity (SPA) and time watching television/videos (TTV) by questionnaire at baseline and moderate-to vigorous physical activity (MVPA) and sedentary time by accelerometer 12 years later when middle-aged. Outcomes were BMD, lower limb muscle strength (LMS) and balance (timed up and go test (TUG), functional reach test (FRT), lateral reach test (LRT) and step test (ST)) after 12 years.

Results: TTV at baseline was detrimentally associated with LMS (β , 95%CI = -6.8, -12.6 to -1.1 kg for 2–3 vs. ≤ 1 h/day), TUG (0.11, -0.04 to 0.26 s), ST (-0.64, -1.22 to -0.05 steps) and LRT (-1.10, -2.0 to -0.18 cm) but not FRT after 12 years. Conversely, SPA was beneficially associated with LMS and all balance tests except for LRT. Neither SPA nor TTV were associated with BMD. Cross-sectionally, MVPA was beneficially associated with femoral neck BMD (0.005 g/cm², 0.001 to 0.009), LMS (1.48, 0.45 to 2.52), ST (0.12, 0.02 to 0.23) and TUG (-0.043, -0.070 to -0.016). Except for FN BMD, these associations persisted after adjusting for sedentary time. Sedentary time was not associated with any outcome after adjustment for MVPA.

Conclusion: Both SPA and TTV in young women independently predicted LMS and balance in midlife. MVPA appears more important than sedentary time for most musculoskeletal outcomes in middle-age. These findings

should be considered when developing exercise and physical activity interventions across young adulthood to improve musculoskeletal health.

Disclosures: none.

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NS43

THE ROLE OF DIETARY PHOSPHORUS IN BONE HEALTH IN MIDDLE-AGED ADULTS

C. Lamberg-Allardt¹

¹Calcium Research Unit, University of Helsinki, Helsinki, Finland

Objectives: High dietary phosphorus (P) intake has negative effects on calcium (Ca) and bone metabolism in short-term settings. Human data on the relationship between P intake and bone mineral traits are contradictory in long-term settings. Concerns about high P intake and bone are relevant as P intake in Western countries is higher than in recommendations. Increased use of food additive P has augmented P intake. Therefore, we aimed to study if high P intake is associated with impaired bone health in adults.

Material and methods: We investigated associations between dietary P intake, bone traits in the radius and tibia, and bone turnover markers in a population-based sample of 37–47 year-old Caucasian premenopausal 333 women and 179 men living in Southern Finland (60°N). Bone traits were measured by pQCT and bone turnover by biochemical serum markers. We used regression models in an “elaboration approach” to elucidate the role of P intake in bone traits and turnover.

Results: The addition of relevant covariates to the models mainly removed the significance of P intake as a determinant of bone traits. In the final regression model (P intake, weight, height, age, Ca intake, serum 25-hydroxyvitamin D, physical activity, smoking, contraceptive use in women), P intake was slightly positively associated only with bone mineral content and cross-sectional cortical bone area in the tibia of men. Among women, inclusion of Ca removed all significance in the crude models for any bone trait. In women P intake was negatively associated with the bone formation marker, serum intact pro-collagen type I amino-terminal propeptide.

Conclusion: P intake was not deleteriously associated with bone traits in this setting. However, higher P intake contributed negatively to bone formation among women. Prospective studies on the association between high P intake, especially as food additive P, and potential bone deterioration are needed.

Disclosures: none.

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NS44

IS BONE DENSITY TESTING AN UNDER-UTILISED EDUCATIONAL TOOL IN YOUNGER WOMEN?T. Winzenberg¹¹University of Tasmania, Tasmania, Australia

Objectives: Bone densitometry is a commonly performed test. Each scan provides an opportunity to promote bone health to the patient. The objective of this session is to summarise what is known about the effectiveness of using feedback of bone density results as an educational intervention for osteoporosis prevention.

Materials and methods: Firstly, a systematic review of short-term randomised (RCT) and controlled clinical trials (CCT) of feedback of bone density (BMD) to pre- and peri- menopausal women was performed. Secondly, we undertook a ten-year follow-up of 470 premenopausal women who had participated in a 2-year CCT of feedback of relative fracture risk based on BMD, measuring osteoporosis preventive behaviours and BMD.

Results: One RCT and 4 CCTs were identified. In the RCT, in per protocol analysis, feedback resulted in a decrease in fracture risk (HR 0.73, 95% CI 0.55–0.99). Feedback of low BMD also resulted in higher use of calcium and vitamin D supplements, etidronate, and HRT. In a pooled analysis, feedback of high fracture risk was associated with 4-fold higher use of calcium supplements. A single CCT assessed vitamin D use - this was more frequent in the high risk group. In the single 2-year CCT reporting BMD, women receiving feedback of high risk had a greater increase in femoral neck (FN) (1.6% p.a. vs. 0.7% p.a., $p = 0.0001$), but not lumbar spine BMD, compared to the low risk group. Assessed ten years later, women who received feedback of high risk had a smaller annual decrease in FN BMD ($\beta = 0.0023$, 95% CI = 0.0006, 0.0041). They were also more likely to have quit smoking (RR 1.85, 95% CI 0.70, 4.89), and use calcium (RR 1.66, 95% CI 1.22, 2.24) and vitamin D supplements (RR 1.99, 95% CI 1.27, 3.11).

Conclusion: These data strengthen the case for considering bone density feedback in young women as a strategy to improve long-term bone health and prevent osteoporosis in later life.

Disclosures: none.

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NS45

WHAT DOES HRPQCT INVESTIGATION HAVE ADDED TO THE FIELD OF OSTEOPOROSISS. Ferrari¹¹Service of Bone Diseases, Geneva University Hospital, Geneva, Switzerland

Objective: To review the studies using HR-pQCT to investigate the determinants of bone fragility and treatment response in osteoporosis.

Methods: Pubmed search of articles published between 2005 and 2018.

Results: Many studies comparing women or men with / without prevalent fragility fractures have shown alterations in both the trabecular and cortical compartment at the distal radius and/or tibia using HR-pQCT. A multicenter study of 1349 PMW has confirmed that virtually each cortical and trabecular bone parameter is associated with an increased risk of fracture (approx.. 50% increased risk per SD) ¹. Importantly some parameters remain associated with fractures even after correcting for FN aBMD. Cortical bone porosity, particularly when evaluated by the Strax method, has been found to be an important component of the age- related bone fragility. Two studies have been published so far demonstrating that baseline assessment by HR-pQCT improves the prediction of incident fractures ^{2,3}, including beyond FN aBMD and FRAX. However aBMD measured at distal radius captures most of the components of bone fragility measured by HR-pQCT at the same site ³.

Several small trials have compared osteoporosis drugs on bone density and microstructure using HR-pQCT. These studies have confirmed the fundamentally different effects of bone forming agents, such as teriparatide, and anti-resorptives on the cortical compartment primarily ^{4,5}.

Conclusions: The development of HR-pQCT has allowed to specify the microstructural components of bone fragility, their potential additive value in fracture prediction, and to better understand how osteoporosis drugs improve bone strength. Whether these findings are sufficient to justify the implementation of HR-pQCT at a larger scale for clinical purposes however remains uncertain.

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NS46

WHAT DOES HRPQCT IMAGING ADD TO THE FIELD OF CHRONIC INFLAMMATORY RHEUMATISM?S. Finzel¹¹Senior attending physician and Head of Clinical Trials Unit at the Department of Rheumatology and Clinical Immunology, University Clinic of Freiburg, Freiburg, Germany

Objectives: HRpQCT is a promising imaging modality visualizing highly sensitive and specific even slightest pathological changes in periarticular bone. The talk will give an overview about the most frequent pathologies in inflammatory

rheumatic joint diseases imaged by HRpQCT. The added value of HRpQCT imaging to the field of rheumatology will be outlined.

Material and methods: Prevalence, location, and severity of erosions and osteophytes were assessed in 2D and 3D in patients with rheumatoid arthritis, psoriatic arthritis and haemochromatosis, respectively. Moreover, volumetric joint space width was computed. An HRpQCT I scanner was used for all measurements. A comprehensive literature review in the field of HRpQCT imaging will complete the talk.

Results: Bone erosions and periarticular new bone formation show a distinct pattern in different inflammatory joint diseases. [1, 2] Changes in bone microarchitecture precede erosion formation and may be of predictive value. Volumetric joint space assessment is a reliable and reproducible application. [3] Manual erosion measuring is reproducible [4–6]; however scripts for volumetric erosion assessment might be superior to the manual method and are under development. [7] First investigator initiated clinical trials now started to use HRpQCT as an outcome tool.

Conclusions: HRpQCT is a promising and highly meticulous imaging modality for inflammatory rheumatic joint diseases. However, validation of HRpQCT as an outcome tool for clinical studies is still ongoing.

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Acknowledgements: The author acknowledges the effort of the members of the SPECTRA group, who relentlessly work on the validation of HR-pQCT as an imaging outcome tool in the field of rheumatology.

Disclosures: The author has nothing to disclose.

NS47

THE ROLE OF THE FRACTURE LIAISON NURSE/COORDINATOR

S. Stephenson¹

¹National Osteoporosis Society, Camerton, United Kingdom

This session will outline the development of the FLS nurse/coordinator role since 1999. It will describe how the role currently primarily attracts nurses from a range of related areas including trauma and orthopaedics, care of the elderly, rheumatology and diagnostic imaging, though it does not exclude nurses from general medicine. The FLS coordinator role can also filled in some

instances by allied health professionals with a working interest in fracture prevention. The session will outline the potential to streamline services by developing the skills and knowledge of FLS nurse/coordinators through continuing professional development. The session will describe the enhancement of the FLS nurse role to include independent prescribing, DXA reporting, development of leadership, audit for quality improvement and a contribution to clinical redesign.

NS48

COMPETENCY FRAMEWORK FOR HEALTH PROFESSIONALS WORKING IN FRACTURE PREVENTION

D. Stone¹

¹National Osteoporosis Society, Camerton, United Kingdom

The session will provide an overview of the National Osteoporosis Society's (NOS) secondary fracture prevention resources and training for health professionals working in fracture prevention – including online training and the Competency Framework for Health Professionals working in fracture prevention (NOS 2017).

The speaker will outline the core competency areas covered by both the online training and the Competency Framework. The session will also address how accreditation in the fracture prevention specialty can be achieved, and how to use the Competency Framework in practice.

NS49

THE IMPACT OF SPINAL ALIGNMENT ON FALLS AND FRACTURES

U. Akarınmak¹

¹Istanbul University Cerrahpaşa School of Medicine, PM&R Department, Istanbul, Turkey

Hyperkyphosis is a problem of the osteoporotic as well as the ageing spine and a major cause of falls. Posture changes are very common in elderly and cause a definite propensity to falls, therefore they cause an increased risk for osteoporotic vertebral but also non-vertebral fractures. About one-third of patients with hyperkyphosis measurements had radiographic confirmation of vertebral fractures.

Hyperkyphosis of any etiology has been associated with decreased thoracic extensor muscle strength, unstable gait and increased body sway, which are important for stability during motion. $\geq 40^\circ$ is the defining cutoff for hyperkyphosis. Also decreased physical & pulmonary functions, chronic pain and increased spinal loads maybe are contributing to the vertebral fracture cascade, which is a clinical reality. When a first fracture occurs, the risk of recurrence is high. Multiple compressions cause a serious problem.

Changes in global spinal properties, besides the thoracic, changes of the cervical curvature cause a head-forward position. Also the resulting changes in spinal loading, muscle weakness of the extensor muscles, a shift of the rib cage, changes in lumbar spinal lordosis are effective on posture and risk of falling. Falls are a well recognized geriatric syndrome and usually the result of interaction of multiple diverse risk factors that have to be addressed by a multidisciplinary approach, including evaluation of osteoporosis, sarcopenia and geriatric problems.

Conclusion: Spinal postural changes, especially hyperkyphosis of the thoracic spine, have a serious impact on falls&fractures. More research about the relationship between spinal morphology and modifiable factors, especially the structural and functional parameters of core muscles, could strengthen treatment options. Preventive, corrective and rehabilitative methods towards postural changes have to be part of a comprehensive osteoporosis treatment program.

NS50

HOW TO CREATE A STABLE SPINE VIA EXERCISE IN OSTEOPOROSIS?

S. Tüzün¹

¹Istanbul University, Cerrahpaşa School of Medicine, PM&R Department, Istanbul, Turkey

Vertebral osteoporotic fractures are rapidly increasing in the aging world. Majority of patients experiencing an osteoporotic vertebral fracture remain asymptomatic reflecting the silent face of the disease. However once vertebral compression fracture has occurred, a biomechanical environment is created that favors additional fractures resulting in “vertebral fracture cascade” phenomenon. This leads to a progressive increase in kyphotic angulation, impairs biomechanics, and increases fall risk leading to a vicious circle in osteoporotic patients. That’s why taking care of the osteoporotic spine is crucial in the management of osteoporosis. Preservation of spinal stability and muscle strength via appropriate exercise prescription is crucial in the conservative management of the disease. The question is, how to create a stable spine via exercise in osteoporosis? Exercise programs like muscle re-education, resistance exercises for strengthening, improving proprioception, increasing bone mineral density, decreasing pain, and reduction of kyphosis are corner stones for exercise planning in osteoporosis. Before prescription of any exercise program, patients should be well evaluated in terms of their spinal status including posture, kyphotic angle, acute or chronic vertebral fracture, and painful paravertebral spasm. Back extensors are the most important muscle group to be strengthened in spinal osteoporosis. Exercise for the osteoporotic spine should be initiated in the sitting position for new vertebral fractures, and increased gradually. In general, loading exercises are preferable to endurance exercises to increase bone density. Strengthening of the axial

muscle group can improve the mobility of spine and decrease both kyphosis and the risk of vertebral fractures. Although they don’t increase bone mineral density, non-weight-bearing exercises such as swimming and cycling should also be included in the exercise prescription of the osteoporotic patient, since they improve neuromuscular coordination and balance.

Each osteoporotic spine is unique, and needs to be custom tailored in terms of exercise program.

NS51

TO BRACE OR NOT TO BRACE IN OSTEOPOROTIC VERTEBRAL FRACTURE?

F. Güler Uysal¹

¹Group Florence Nightingale Hospitals, PM&R Center, Istanbul, Turkey

The goals of management in osteoporotic vertebral fractures are pain control, early mobilization, prevention of deformity, and functional restoration. Bracing has been used widely for the non-operative management of these patients to provide support and stabilization of the spine by reducing the pressure and the shear forces on the injured site. Yet, there has been controversial data on the efficacy of bracing after an osteoporotic vertebral fracture. The conflict arises from the lack of high quality research on the clinical efficacy of bracing, along with the wide variety of material and design of the braces as well as the duration used. Different support is provided if the brace is made of rigid, semi-rigid or soft material. Although it seems reasonable to think that the rigid brace should stabilize the vertebrae effectively, its higher discomfort results in low compliance especially in the geriatric population. Appropriate fitting is extremely challenging due to skin irritation in lean as well as adipose patients and usually a custom tailored brace is needed. Pressure sores from rigid braces can result in decubitus ulcers and subsequent soft-tissue infections.

In a comparative study of patients managed with a soft brace, a rigid brace, or no brace, disability scores showed no significant difference between the groups. A small study of thoracolumbar bracing, on the other hand, reported improved posture, strength, and quality of life. Despite the rather inconclusive data, it would seem that semi-rigid thoracolumbar braces could be preferred to get higher compliance and to reduce pain and disability during activities of daily life in the geriatric population with the vertebral fracture.

Although bracing is commonly prescribed for six to eight weeks after an osteoporotic vertebral fracture, the evidence is limited. Prolonged bracing is not without risks, particularly in the elderly population. It may be associated with other problems such as diminished pulmonary capacity and weakening of the axial musculature. Thus, bracing must be performed for a finite period of time after which a spinal and postural rehabilitation should be designed for each patient.

NS52

SPINAL AUGMENTATION: HOW TO CHOOSE THE BEST CANDIDATE?C. Öztürk¹¹Istinye University Medical School, Orthopaedic Spine Surgery, Istanbul, Turkey

The overall management principles for treating spinal injuries focuses on maximizing clinical outcome by obtaining and maintaining spinal stability and optimizing neurologic function. An optimal treatment method should reduce the detrimental effects of injury, reduce pain and suffering, improve functional outcome and quality of life, provide the best outcome with the least amount of associated morbidity. In osteoporotic patients without neurological deficit; we can do indirect reduction and kyphoplasty, indirect reduction and titanium vertebral body stent or percutaneous cement augmented pedicle screw fixation and kyphoplasty or titanium vertebral body stent. In the presence of neurological deficit; anterior decompression with mini open or endoscopic route is necessary. When we compare the traditional kyphoplasty versus titanium implant in osteoporotic patients, literature says, the biomechanical properties of the 2 techniques are similar. There is a significantly greater amount of cement used in the kyphoplasty as compared to the titanium implant group. In addition, titanium implant maintains anterior vertebral height significantly better than the kyphoplasty. In thoracolumbar fractures in osteoporotic patients without neurological deficit, bone cement augmented posterior percutaneous pedicle screw fixation and titanium vertebral body stent is used especially in flexion-distraction type injuries and in burst fractures with flexion-distraction component. Indications for vertebral augmentation technique are deficiency of anterior bone stock detected on CT, vertebral body height loss of more than 30 %, sagittal index greater than fifteen degrees but less than twenty five degrees. If none of above in flexion-distraction type injuries; only percutaneous PSF to provide tension band effect is performed. In the presence of neurological deficit and in the presence of osteoporotic fracture undergoing to dead bone; mini open anterior support and/or decompression or endoscopic decompression and instrumentation is necessary.

NS53

THE CAPTURE THE FRACTURE PROJECT, A FLAGSHIP OF IOFK. Akesson^{1,2}¹Lund University, Clinical Sciences Malmö, Clinical and Molecular Osteoporosis unit, Malmö, Sweden, ²Department of Orthopedics, Skane University Hospital, Malmö, Sweden

It became increasingly clear that patients at the highest risk of fracture, those who have already sustained a fracture, remained unidentified for osteoporosis treatment to avoid recurrence.

An initiative by the International Osteoporosis Foundation recognized this lack of awareness and lack of recognition among those managing fracture patients, the orthopaedic departments but also among many osteoporosis clinics. Exceptions existed and become examples of best practice whereby integrated, systematic identification, investigation and intervention were key components for secondary prevention of fractures.

To increase awareness but also to increase the standards of care, The Capture the Fracture Project was initiated. The concept of Fracture Liaison Service is instrumental and the foundation for the project. The aim of CTF is to encourage and share practise by comparison to a set of standards. Through this, it became possible to evaluate and score and an interactive world map of FLS sites was developed.

The presentation will present the cornerstones of Capture the Fracture, what has been achieved but most importantly goals for the future and how to improve secondary fracture prevention further.

NS54

A DATABASE OF > 200 FLS SERVICES, WHAT CAN WE LEARN FROM THAT?K. Javaid¹¹Associate Professor in Metabolic Bone Disease, NDORMS, University of Oxford, Oxford, United Kingdom

Effective, efficient and sustainable secondary fracture prevention is a global priority and requires an integrated approach to a) multidisciplinary bone health and falls prevention; b) secondary, primary and community providers c) holistic needs of the person. Vertebral fractures are a well-documented risk factor for future fragility fractures at the spine as well as at other skeletal sites. Historically identifying vertebral fractures has been a significant challenge for secondary fracture prevention when compared with case finding for patients with fractures at other skeletal sites such as the proximal femur or distal radius. National standards have been developed for vertebral fracture identification and, within the International Osteoporosis Foundation, we have developed criteria and standards for FLSs from identification, investigation, treatment recommendation and monitoring of interventions. One component of the audit tool covers the strategies for case finding vertebral fractures. The introduction of an international benchmarking audit tool has enabled for the first time a global view on the delivery of vertebral fracture identification using these standards.

This talk will summarise the key findings from Capture the Fracture benchmarking audit as related to vertebral fractures. We have used submissions from over 230 FLSs from over six countries. The current reported delivery of vertebral fracture identification relative to other skeletal sites will be described. The geographic, healthcare systems and local FLS determinants of vertebral fracture identification will be described.

This will be useful to inform FLS of the key components for a locally effective and efficient vertebral fracture identification component to their service.

NS55

IN EVERY PATIENT THAT IS VISITING A FRACTURE LIAISON SERVICE (FLS) IN WHICH A DXA IS MADE, ALSO A VERTEBRAL FRACTURE ASSESSMENT (VFA) SHOULD BE DONE

W. F. Lems¹

¹VU University Hospital, Amsterdam, The Netherlands

Osteoporosis can be easily diagnosed nowadays, based on clinical risk factors and BMD. However, vertebral fractures were often missed, probably because they can be asymptomatic or overlooked on radiographs. Nevertheless, vertebral fractures are an independent risk factor for future vertebral and non-vertebral fractures, and are associated with decreased quality of life.

However, with a new software technique added to the DXA machine, we can nowadays easily diagnose vertebral fractures with a Vertebral Fracture Assessment (VFA). Unfortunately, implementation of VFA and correctly interpretation of VFA is poor, a missed chance.

In this lecture, I will discuss:

- epidemiology of fractures, including “the silent epidemic”, since 2/3 of vertebral fractures is missed, including VFs in patients at the FLS;
- clinical consequences (elevated future fracture risk, and decreased quality of life);
- interpretation of the VFA-results, what is the threshold for clinically relevant height loss? (should be discussed, 25% or more?);
- clinical consequences of detecting vertebral fractures.

My point of view is that we should start with the statement that “in every patient that is visiting an FLS in which a DXA is made, also a VFA should be done” (*).

NS56

THE PREVALENCE OF OSTEOPOROSIS IN PATIENTS WITH HIP OSTEOARTHRITIS

J. Glowacki^{1,2,3,4}

¹Professor of Orthopedic Surgery and of Oral & Maxillofacial Surgery, Boston, United States, ²Harvard Medical School and The Harvard School of Dental Medicine, Boston, United States, ³Department of Orthopedic Surgery, Boston, United States, ⁴Brigham and Women’s Hospital, Boston, United States

Objective: Both osteoporosis (OP) and osteoarthritis (OA) are recognized as age-related skeletal disorders.

OA is a painful, debilitating disease, whereas OP may be silent until the subject has a fragility fracture. In 1972, Foss and Byers noticed the absence of radiographic osteoarthritic changes in hips of osteoporotic patients with hip fractures.¹ It remains widely held that “osteoarthritis protects against hip fracture”.² That hypothesis was appealing because of the observations that patients with a high body mass index (BMI) are at risk for OA and those with low BMI are at risk for OP.

Methods: Original data and literature evidence of OP in OA cohorts were reviewed.

Results: Orthopedic surgeons use radiographic indices of bone quality for hip arthroplasty treatment planning, knowing that poor bone quality is a determinant of intraoperative fracture risk and poor prosthesis longevity. The Dorr classification of proximal femoral geometry, cortical thickness, and canal width is one such radiographic index. Worse Dorr types are associated with more severe osteoporosis and higher risk of intra-operative fracture.³ Measurement of Bone Mineral Density (BMD) by dual-energy x-ray absorptiometry of OA subjects provide consistent evidence of the coexistence of OA and systemic OP.^{4,5} Studies also show strong correlations between BMD T-scores and Dorr radiographic parameters in OA women.⁶ A review of studies of BMD scores in subjects with OA indicate that osteoporosis occurs worldwide in 21–32% of subjects with advanced OA.⁷ Subjects with OA and low BMD also had elevated markers of bone turnover, statistically equivalent to those with OP fracture.^{4,5} Analyses show that advanced age and low body-mass-index are major discriminating factors for osteoporosis in osteoarthritis.⁶

Conclusions: These findings reject the hypothesis that all OA patients are protected against bone loss and OP risk. Because of clinical implications of osteoporosis in patients being managed for osteoarthritis, it is important to identify and refer for osteoporosis evaluation those OA patients at risk for osteoporotic fractures.

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SELECTION OF UNCEMENTED OR CEMENTED HIP PROSTHESIS IN FRACTURE PATIENTS AND OSTEOARTHRITIC PATIENTS: IMPLANT STABILITY, PERIPROSTHETIC BONE LOSS AND PERIPROSTHETIC FRACTURES

O. Skölden^{1,2}

¹Consultant Orthopaedic Surgeon and Professor of Orthopedic Surgery, Stockholm, Sweden, ²Department of Clinical Sciences, Dandery Hospital, Division of Orthopaedics, Stockholm, Sweden

Introduction: Total hip arthroplasty (THA) has, due to consistently good results and its ability to alleviate pain and restore function, rightly been dubbed “The operation of the Century”¹. As an orthopaedic surgeon, our goal is to restore the biomechanics of the hip joint and use implants that, regardless of the patients age at surgery and functional demands, never have to be exchanged (revised) during the patients remaining life-span. To further this end, the focus of the last decades of development in THA has been on fixation of the implants, wear of the artificial joint and positioning of implants.

The implants used can also shield the surrounding bone from mechanical stress and thereby induce a local osteoporosis – stress-shielding,² which can lead to later fractures around the implants, mainly the femoral stem³.

The patient’s bone quality, the fixation method (uncemented/cemented) and the design of the implants all play a part in determining the risk of fractures after successful THA and the choices surgeons make can affect outcome many years after the primary surgery.

Materials and methods: Original data and literature review of the current evidence in THA surgery and how design, bone mineral density and patient selection affect outcome. The role of bisphosphonates and other bone-active drugs following THA will also be reviewed.

Results: Studies on patients with degenerative joint disease of the hip show that femoral periprosthetic bone mineral density (BMD) decreases between 5 and 25% following THA.^{4, 5} This decrease of BMD follows a more severe pattern in patients with THA due to femoral neck fractures (FNF) with this patient group losing larger proportions of bone and with more obvious clinical consequence in the form of periprosthetic fractures³.

Bisphosphonates have, in a number of small clinical trials, been shown to positively affect BMD following THA^{6, 7} but the effect is transient^{8, 9} and has, up until now, not affected clinically relevant endpoints i.e. periprosthetic fractures. There is also mounting evidence that, especially for FNF patients, the design of the stem plays a key-role in preventing future fractures around the implants¹⁰.

Conclusions: The design of the implants used in THA and the individual (optimal) selection of implants for patients

undergoing surgery is crucial to preserve a long-lasting, pain-free prosthetic hip joint. Future directions in this field will likely focus more on bone-sparing designs and minimize the risk of periprosthetic fractures for all patient groups undergoing THA surgery.

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NS58

DENOSUMAB IN PREVENTION OF PERIPROSTHETIC BONE LOSS IN CEMENTLESS HIP REPLACEMENT OF POSTMENOPAUSAL WOMENH. T. Aro¹¹Chief and Professor of Orthopaedic Surgery and Traumatology, Turku University Hospital and University of Turku, Turku, Finland

Objectives: Periprosthetic femoral bone loss is aggravated in cementless hip replacement of postmenopausal women with low bone mineral density (BMD). Osteoporotic female patients are also prone to initial migration of uncemented femoral stems, probably due to age-related changes of the cortical bone. In our previous trial of postmenopausal women, a single dose of zoledronic-acid had a long-lasting (up to 4 years) partially protective effect on periprosthetic BMD but the treatment did not have an influence on stem migration. Denosumab treatment is known to improve cortical bone structure. Therefore, it is reasonable to expect that denosumab could be effective not only in prevention of periprosthetic bone loss but also in reduction of femoral stem migration and thereby in enhancement of implant osseointegration.

Material and methods: This randomized, double-blinded, placebo-controlled trial enrolled 65 consecutive postmenopausal women with defined inclusion and exclusion criteria (ClinicalTrials.gov NCT01926158). The patients randomly received subcutaneous injections of denosumab 60 mg or placebo every 6 months, starting one month before cementless hip replacement. Dual-energy X-ray absorptiometry of periprosthetic BMD and model-based radiostereometric analysis (RSA) of stem migration were performed within 3 days after surgery and repeated at 12, 22 and 48 weeks. Analysis of gait, pedometer-measured walking activity, bone turnover markers and clinical scores (HHS, WOMAC, Rand-36) were performed preoperatively and at each post-operation visit.

Results: Denosumab prevented ($p < 0.001$, linear mixed effects model) periprosthetic bone loss in denosumab-treated patients compared with placebo-treated patients. In the calcar region (Gruen zone 7) periprosthetic BMD decreased by -5.3% (95% CI, -2.1 to -8.6) in the denosumab group and by -18.2% (95% CI, -14.9 to -21.5) in the placebo group within 48 weeks. RSA showed no significant intergroup differences in 3D stem migration (translation and rotation). There were no significant differences in parameters of functional recovery.

Conclusion: In postmenopausal women, denosumab was effective in the maintenance of periprosthetic bone mass but did not enhance implant osseointegration.

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UNDERLYING MECHANISMS BETWEEN DIABETES MELLITUS AND OSTEOPOROSISO. Rosero Olarte¹¹Endocrinologist. President of Asociación Colombiana de Osteoporosis Y Metabolismo Mineral, Bogota, Colombia

There is a global type 2 diabetes mellitus (T2DM) epidemic spurt. The World Health Organization, reported that 422 million people worldwide have diabetes and this number will increase up to 642 million in 2040 of people living with type 2 diabetes mellitus (T2DM)¹. The global burden of osteoporosis is also significant, with approximately 9 million new osteoporotic fractures worldwide². Both diabetes and osteoporosis have significant morbidity and mortality, no definitive cure but control under long-term surveillance. The relationship between DM and osteoporosis is that both T1DM and T2DM are associated with increased fracture risk. The meta-analysis by Vestergaard showed that adults with T1D have a 6.9 relative risk of hip fracture and adults with T2DM have a 1.3 relative risk of hip fracture. In addition, a meta-analysis by Janghorbani and colleagues⁴ showed similar results with a 6.3 relative risk of hip fracture in adults with T1DM and a 2.8 relative risk of hip fracture in adults with T2DM. On T1DM, bone mass is decreased and fracture risk is increased, so T1DM meets osteoporosis clinical pathophysiology. However, in T2DM, bone mass may be increased along with fracture risk. Thus, patients with T2DM may not fit into the classic osteoporosis pathophysiology, although their bone fragility may be increased. One reason for the occurrence of more fractures despite higher bone density in T2DM could be an increased risk of trauma, which is possibly linked to hypoglycemia or an increased number of falls because of complications from impaired eyesight, cerebral ischemia, and poor balance resulting from neuropathy. Other factors, such as impaired bone quality, may thus be responsible for the excess fracture risk in T1DM and T2DM. Some factors affecting bone biomechanical competence and/or turnover may be common amongst T1DM and T2DM, such as hyperglycemia. Others, such as the lacking of endogenous insulin secretion in T1DM and insulin resistance might also respond as possible causes for the increase on fracture risk. There is evidence that the level of glycemic control is associated to bone health. A deficit in osteoblasts is the milestone of diabetic osteopenia. Hyperglycemia impairs osteoblast function. And antidiabetic medications can also contribute to changes in bone tissue⁸. In particular, thiazolidinediones and SGLT-2 inhibitors are associated with an increased risk of fracture. In conclusion, the current body of evidence suggests that both T1DM and T2DM as so do antidiabetic medications are, indeed, extra clinical risk factors for fractures. Thus it is fundamental to fine-tune specific approach to patients with osteoporosis and diabetes.

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BONE MICROARCHITECTURE IN DIABETESM. Belen Zanchetta¹

¹Endocrinologist, Medical Director at IDIM (Instituto de Diagnóstico e Investigaciones Metabólicas), and Osteology professor at Universidad del Salvador, Buenos Aires, Argentina

Given the exponential growth projected for both T2DM and osteoporosis, diabetic bone disease will increasingly become a major clinical and public health problem. Despite the substantial fracture risk associated with T2D, clinicians may not recognize skeletal fragility as a diabetic complication because individuals with T2DM tend to have greater or normal areal bone mineral density, as measured by DXA, than those who do not have diabetes. But T2DM subjects fracture more than the non-diabetic ones. This paradox and the lacking of fully understanding of the mechanisms underlying skeletal fragility in T2DM blunt the ability to develop effective clinical strategies. High-resolution peripheral quantitative computed tomography (HR-pQCT) is a 3D imaging technology that evaluates volumetric bone density, microarchitecture, and geometry separately for cortical and trabecular compartments. Thus, HR-pQCT may provide additional insight to the mechanisms of bone fragility in patients with T2DM. Studies using HR-pQCT suggest that T2DM is associated with deficits in cortical bone, but preserved trabecular indices. Burghardt and colleagues reported higher cortical pore volume and cortical porosity at the radius in T2DM compared to controls. Patsch and colleagues showed that, amongst T2DM subjects; those with prior fracture had higher pore volume and cortical porosity at the radius than those with no prior fracture. Findings from the Hertfordshire Cohort in women and men and from the Study of Women across the Nation (SWAN) cohort in black women support an association between unfavorable cortical bone microarchitecture and T2DM. Recently, Samelson et al. evaluated a large, community-based study of older adults and found that individuals with T2DM had modest deficits in cortical bone density and microarchitecture at the tibia, as well as decreased cross-sectional area at the tibia, compared to those who did not have T2DM. In contrast, trabecular indices did not differ by T2DM status. These findings suggest that modest deterioration in cortical bone and lower cross-sectional area may characterize diabetic bone disease especially at the weight bearing skeleton in older adults. Trabecular bone seems to be preserved and that is probably why DXA cannot measure this deterioration. In conclusion, there is compelling evidence that T2D may be deleterious to cortical bone density, cortical microarchitecture, and bone area, but not trabecular bone. This, together with others factors affecting bone quality, can contribute to explain the increased fracture risk observed in older adults with T2DM.

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FRACTURE RISK ASSESSMENT ON DIABETIC PATIENTS: FRAX, BMD, BTMS & TBSB. Muzzi Camargos¹

¹Densitometry Unit Coordinator at Densimater - Rede Mater Dei de Saúde. IOF Committee of Scientific Advisor, Belo Horizonte, Brazil

FRAX - Osteoporosis incidence increases with age. Diabetes is also more frequently in the elderly. Therefore, diabetes and osteoporosis co-exist in older adults. T1DM and T2DM are associated with an increase on fracture risk even after adjustment for bone mineral density (BMD). T2DM is associated with increased risk of hip fractures, independently of bone density. It is well demonstrated that T2DM individuals have higher BMD compared to non-diabetic ones. This finding itself opens a claim for more sensitive and precise approaches to measure risk in such a “sweet environment”. In the Fracture Risk Assessment tool (FRAXTM), T1DM shall be considered as a secondary cause of osteoporosis. But T2DM is not a risk factor in the current formulation of FRAX and it is not taken into account when BMD is provided for the FRAX calculation. Majumdar and cols. Reviewed the FRAX algorithm in the presence or absence of diabetes and concluded that diabetes is an independent risk factor for major osteoporotic fractures (MOFs) but did not significantly modify FRAX risk factors or prior fracture site. Diabetes modified hip fracture risk in younger than in older individuals. A Swedish study analysed data from 225,031 adult subjects (53.8% men) between 1996 and 2014. The authors concluded that high HbA1c and T2DM duration resulted in a 45% increase on hip fracture risk in obese subjects, thus confirming that that diabetes is BMD and FRAX-independent clinical indicator of fracture risk.

BONE TURNOVER MARKERS (BTM) - Bone metabolism and insulin are definitely coupled. Whilst bone metabolism influences insulin secretion and sensitivity, insulin stimulates bone formation in animals, but similar evidence in humans is limited though. One study compared non-diabetic, normal glucose tolerance (NGT; $n = 503$) versus impaired glucose regulation (IGR; $n = 73$) men. The authors found no differences on bone BTM levels between NGT and IGR. But fasting plasma glucose was inversely associated with C-telopeptide (CTX) and P1NP, both before and after adjustment for recruitment centre, age, BMI, smoking and physical activity. Baseline bone turnover markers were neither associated with insulin sensitivity nor with insulin secretion capacity at baseline or at follow-up. Although inverse associations between fasting glucose and markers of bone turnover were identified, the study cannot support the association between insulin secretion and sensitivity in healthy, non-diabetic men.

BONE DENSITOMETRY - Dual-energy X-ray absorptiometry (DXA) provides an accurate measurement of areal bone

mineral density (aBMD) with high precision and reproducibility. Regardless DXA's precision, it doesn't seem that aBMD accuracy is the same for different situations. Studies have shown that T1DM individuals have a decreased aBMD as compared with subjects without diabetes, probably due to insulin deficiency. With regards to the association between BMD and T2DM, some conflicting results have been reported. An increased BMD in subjects with T2DM and an increased risk of incident fractures in women with DM was observed in the Study of Osteoporotic Fractures (SOF). The Rotterdam Study also evaluated the association between BMD and fracture risk on different levels of insulin resistance. The authors found that T2DM subjects had higher BMD but increased fracture risk as well. The increase in fracture risk was observed in subjects with established and treated DM. Subjects with impaired glucose tolerance (IGT) also had a higher BMD but also had a significantly decreased fracture risk compared to DM subjects. The authors concluded that subjects with T2DM and IGT have a higher BMD but the IGT subjects showed a decreased fracture risk in contrast to DM individuals who had their fracture risk boosted, by long-term complications associated with DM.

TRABECULAR BONE SCORE (TBS) - TBS is a texture parameter that measures the grayscale variation derived from dual-energy X-ray absorptiometry (DXA) images, and has been shown to significantly correlate with the 3-D bone microarchitecture. TBS showed substantial advantage over aBMD on fracture risk estimation under specific conditions. This potential superiority of TBS has been studied on patients using anti-aromatase medications, primary hyperparathyroidism, chronic corticosteroid usage, chronic kidney disease and diabetes. TBS analysis, in conjunction with other risk predictors like BMD and FRAX, increases the fracture risk prediction. For this reason, TBS has been used as an adjustment to FRAX score calculation. By its close linkage to bone architecture, low baseline TBS was associated with incident, morphometric vertebral fractures over 10 years of follow-up, independently of lumbar spine aBMD in a Japanese women population-based study. The authors concluded that, in contrast to non-diabetic age-matched subjects, DXA aBMD of T2DM subjects tends to be higher, even in the presence of increased fracture risk. Another study, derived from a long-length cohort in Manitoba – Canada. Amongst the more than 29,000 women enrolled, 2356 had diagnosis of T2DM, higher BMD but lower lumbar-spine TBS; in adjusted and unadjusted models. Another study, from Houston/USA, evaluated TBS, BMD and fractures on patients with diabetes who are concomitantly undergoing glucocorticoids (GC). TBS was not significantly different amongst the 4 groups (control, GC use, DM subjects, and GC + DM) for men. But, in the DM group, the TBS results from women were significantly

lower than the female control group ($p < 0.001$). This study had no information concerning onset, duration and severity of diabetes, or the use of diabetic medications. As well demonstrated previously, the use of thiazolidinediones have been associated with higher fracture risk in women. In conclusion, there is growing evidence that osteoporosis in diabetic patients deserves a customized approach in order to minimize discrepancies often found in this “environment”.

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INTERACTIONS BETWEEN DIABETIC TREATMENTS AND BONE HEALTH: SAME EFFICACY?

A. Medina Orjuela¹

¹Médica Internista. Endocrinóloga. Past President of Asociación Colombiana de Osteoporosis Y Metabolismo Mineral, Bogota, Colombia

Some drugs used for diabetes mellitus (DM) can affect bone health and fracture risk. Medicines for DM also have diverse effects on bone. In T1DM and some patients with T2DM, insulin has an anabolic effect and increases bone formation; however, there is an apparent increase in the risk of fracture in patients who use insulin, which may be related to the severity of DM rather than a direct effect of insulin. In patients with T2DM, metformin and sulfonylureas have mixed effects on bone, but appear to reduce the risk of fracture or have no effect. Thiazolidinediones (TZD), mainly rosiglitazone and pioglitazone, have clear adverse effects on bone, increasing net resorption, reducing BMD, and increasing the risk of fracture. TZDs are associated with low BMD. Activation of PPAR γ (peroxisome proliferator-activated receptor- γ) promotes bone adiposity by differentiating mesenchymal cells not in osteoblasts but in adipocytes and thus reducing bone formation. They also increase the levels of Dickkopf-1 (DKK1), an inhibitor of the canonical WNT pathway (bone formation pathway). The effects of new drugs, such as glucagon-like peptide-1 (GLP-1), dipeptidyl peptidase-4 inhibitors (iDPP-4) and sodium glucose cotransporter 2 inhibitors (iSGLT2), are less clear. Canagliflozin is a iSGLT2 developed to treat T2DM, and is associated with a slight reduction in BMD of the lumbar spine and total hip in 714 postmenopausal women (55–80 years old) with T2DM. The incidence of fracture in patients with canagliflozin is reported in an analysis of 8 studies in: 14.2, 18.7 and 17.6 per 1000 patient years of exposure to placebo, canagliflozin 100 mg and 300 mg, respectively (6177 patients, mean age 60 years, 42% women). More fractures of upper limbs were reported in the

canagliflozin group than in the comparator. In a recent paper, the incidence of fractures was similar with canagliflozin (1.7%) and noncanagliflozin (1.5%) in the pooled non-CANVAS (the CANagliflozin cardioVascular Assessment Study) studies. In CANVAS, a significant increase in fractures was seen with canagliflozin (4.0%) vs placebo (2.6%) with more fractures in the upper and lower limbs, again. The incidence of fractures was higher with canagliflozin (2.7%) vs noncanagliflozin (1.9%) in the overall population ($N=10,194$), with increase of fractures in CANVAS. The incidence of falls was significantly higher with canagliflozin in CANVAS, potentially related to volume depletion, older patients, cardiovascular disease, diuretic use and lower glomerular filtration rate. Despite their increased risk of fractures, diabetic patients are sub-treated for osteoporosis. In the 10-year multicenter Canadian study, CaMos, patients with T1DM or T2DM were 42% less likely to receive treatment with bisphosphonates compared with people without diabetes. There are no clinical studies in T1DM. The efficacy of osteoporosis medications in T1DM is not known. There are only conducted preclinical studies in rodents and have been evaluated alendronate, and teriparatide. Alendronate increases trabecular volume and prevents early loss of bone mineral density. Teriparatide increases trabecular volume, bone formation, BMD and bone strength. All these bone parameters were further improved by treatment with teriparatide and insulin. As with T1DM, the efficacy of osteoporosis treatments in T2DM is not well studied. Studies to date have focused on bisphosphonates, SERMs and teriparatide. There have been very few randomized trials in patients with T2DM and there are no trials that have directly compared the efficacy of osteoporosis treatments in patients with T2DM versus those without T2DM. The available evidence comes mainly from post hoc analysis of trials, case-control studies and cohort studies, and preclinical studies in animal models. In a post hoc analysis of fracture intervention trial data, alendronate increased BMD of the hip and lumbar spine to a similar degree in women with or without T2DM, and also decreased markers of bone turnover to a similar degree in women with or without T2DM. In a combined post hoc analysis of the data from the FIT and HORIZON trials, treatment with bisphosphonates (alendronate and zoledronate) reduced the risk of vertebral and non-vertebral fractures to a similar degree in women with and without T2DM. Tumoral necrosis factor (TNF) is a factor related to receptor activator of Necrosis Factor- κ B ligand (RANKL) and has been proposed as an incidental predictor of T2DM. In experimental studies, blocking RANKL resulted in an improvement in glucose tolerance. The objective of the LASCO study was to determine whether denosumab,

being a monoclonal antibody that binds to RANKL, in addition to its action on osteoclasts, improved glucometabolic profile parameters such as insulin resistance and lipid profile. No glucose parameter improved after the denosumab, except the HOMA IR at 4 weeks ($p=0.05$). In an analysis from the FREEDOM trial, diabetic patients treated with denosumab had no effect on fasting glucose in diabetic women, but there was a modest decrease in fasting glucose after use of anti-DM medication. In the Post hoc Analysis of the DANCE observational study with teriparatide, when comparing patients non-T2DM and T2DM, there was response to teriparatide with similar increases of BMD in the hip and spine, greater increase in femoral neck BMD and similar incidence to nonvertebral fragility fractures over time. Diabetes treatment may influence BMD and fracture risk - mainly thiazolidinediones - because their effect on PPAR γ and canagliflozin, whose association with fractures of upper and lower limbs was due to falls related in patients with cardiovascular diseases and volumen depletion. Improved glycemic control may reduce fracture risk, but clinical trials are required to demonstrate this. Observational studies suggest that bisphosphonates, denosumab and teriparatide are effective in preventing fractures in diabetic patients. The great majority of diabetic patients in studies to date have been T2DM, and efficacy of osteoporosis therapies in T1DM patients remains unknown. Further evaluation of the efficacy of osteoporosis therapies in the setting of diabetes is needed to provide optimal fracture prevention for this population.

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CLINICAL GUIDANCE ON MANAGEMENT OF OSTEOPOROSIS IN DIABETIC PATIENTS

L. F. Vidal Neira^{1,2,3}

¹Rheumatologist. Head of the Rheumatology Department. Hospital María Auxiliadora, Lima, Peru, ²Medical Director. Centro Diagnóstico de la Osteoporosis y Enfermedades Reumáticas (CEDOR), Lima, Peru, ³IOF Regional Advisory Councils, Lima, Peru

Low bone mineral density (BMD) is considered the most important determinant of fracture risk. However, over half of all low-trauma fractures occur in people with non-osteoporotic BMD. A major limitation of BMD measurement is that a substantial degree of BMD overlap exists between subjects with and without subsequent fractures. In T2DM the discrepancy between fracture incidence and DXA findings can be attributed in part to microarchitectural deficits not detected by areal BMD alone. Several guidelines from international societies recognize a significantly increased age-specific hip fracture risk in both T1DM and T2DM, a high risk of falls, recurrent falls, and fractures in older people with diabetes. Guidelines also recommend the requirement of a fall-risk

assessment, and a multidisciplinary fall-avoidance intervention program to all patients with a history of fall or who by virtue of other risk factors have a high risk of falling. The importance of a regular physical exercise program (aerobic exercise and strength training) to decrease the risk of falls and fractures and structured exercise programmes is also highlighted by some guidelines. The relationship between fractures and the use of thiazolidinediones (pioglitazone, rosiglitazone) that are prescribed for type 2 diabetes mellitus is well recognized, because it can also reduce bone mineralization and are associated with non-osteoporotic bone fractures. Guidelines recommend avoiding thiazolidinediones and sodium-glucose co-transporter 2 inhibitors for patients with T2DM with fracture risk factors. Therapeutic management of osteoporosis in diabetic patients are recommendations of good clinical practice, rather than evidence-based studies, and include: avoidance of glitazones, good glycaemic control, minimizing hypoglycemic episodes, prevention of diabetic complications, especially kidney disease, assess and prevent falls, supplementation with calcium and vitamin D and specific antiresorptive or anabolic treatment.

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VITAMIN D AND MUSCLE FUNCTION

O. Bruyère¹

¹Department of Public Health, University of Liège, Liège, Belgium

There is a growing body of evidence that links insufficient intakes of protein, vitamin D. The importance of, the age-related loss of skeletal muscle mass and function, is now widely recognized. The estimated direct health care cost attributable to muscle atrophy in the United States in 2000 was \$18.5 billion. However, considering that poly-medication has deleterious effects on health and quality of life, it is therefore appropriate to implement non-pharmacological interventions in order to optimize successful aging. We will discuss during this symposium recent data improving our understanding on the role of vitamin D in the pathophysiology of musculoskeletal disorders including the hypothesis for the negative results recently observed in randomized controlled trials. In fact, recent observational studies have found a low level of 25-hydroxy-vitamin D (25(OH)D), considered as the best marker of vitamin D status, in subjects with various musculoskeletal disorders including osteoporosis, sarcopenia and frailty. Most of the prospective studies consistently report that low vitamin D status is associated with an increased risk of poor outcomes. However, the results of randomized controlled trials have not been able to fully confirm the exact role of vitamin D in the management of musculoskeletal disorders.

NS65

OMEGA-3 AND MUSCLE FUNCTION

Y. Rolland¹

¹University of Toulouse, Toulouse, France

There is an increasing interest in the influence of adult lifestyle, particularly in the effects of modifiable factors such as physical activity and diet on muscle mass and function in older people, with a view to identifying intervention opportunities both to prevent and manage muscle decline. In this symposium, we will present secondary analysis of MAPT data about the effect of omega-3 in improving muscle mass (measured by dual-X-ray absorptiometry) and in improving physical performances (measured by short physical performance battery). The Multidomain Alzheimer Preventive Trial (MAPT study) was designed to assess the efficacy of isolated supplementation with omega-3 fatty acid, an isolated multidomain intervention (consisting of nutritional counseling, physical exercise, cognitive stimulation) or a combination of the two interventions on the change of cognitive functions in 1680 frail subjects aged 70 years and older (mean age: 75.3 years; female: 64.8%) for a period of 3 years. During his presentation, the speaker will show that omega-3 fatty acids improve both appendicular muscle mass and physical performances specially in the context of physical activity and could be considered as safe and low-cost preventive approach of mobility disability in the older person.

NS66

CITRULINE AND MUSCLE FUNCTION

M. Aubertin-Leheudre¹

¹Université du Québec à Montréal (UQAM), Montréal, Canada

Physical inactivity is clearly linked to losses of muscle mass and strength, suggesting that increasing levels of physical activity should have protective effects. We will present data regarding the effect of citrulline supplementation and exercise training on physical and muscle function. More specifically, citrulline (a non-proteinogenic amino acid) supplementation (CIT) was shown, in both rats and young human adults, to increase muscle protein synthesis and increase lipolysis in adipocytes. In addition, High-Intensity Interval Training (HIIT), due to its high effectiveness and short duration, is a promising avenue to prevent also muscle function decline and also metabolic disorders. Therefore, CIT may exert additional beneficial effects when combined with HIIT but their combined effects are unknown in obese older adults. Thus, we will present data from an interventional randomized controlled trial which examined the effects of CIT combined with HIIT on body composition (DXA) muscle strength and physical performance in 72 inactive obese older adults (mean age: 68 ± 5y; 50% of women).

NS67

FRACTURE EPIDEMIOLOGY IN THE CEE COUNTRIESP. Lakatos¹¹1st Department of Medicine, Semmelweis University, Budapest, Hungary

The incidence of osteoporotic fractures shows a wide variety in the Central and Eastern European (CEE) countries. Hip fracture incidence ranges from around 280/100.000 (Russia) to above 600/100.000 (Austria, Slovenia). In some countries (Austria, Hungary, etc.), the age-standardized incidence of fractures has been declining recently, partly due to a reduction in fracture incidence mostly in women. In some areas, a reduction in mortality rate can also be seen in osteoporotic patients compared to non-osteoporotic age-matched controls. In other CEE countries, a constantly increasing trend in fracture incidence can be observed (e.g. Bulgaria). Different but large percentage of individuals who have sustained an osteoporosis-related fracture or who are at high risk of fracture are untreated in these countries, and the number of patients on treatment is also decreasing. Therefore, a substantial treatment gap could be seen in osteoporosis in the CEE region. The costs of fractures and hospital care are varying greatly from country to country, as well. Expenses of a hip fracture surgery are between euro 600–6000. The differences in the incidence of osteoporotic fractures may reflect differences in genetic and environmental factors, however, it is more likely to be attributed to the differences in epidemiological approaches. The cause of varying expenses per fractures may be due to the different socio-economic backgrounds and healthcare policies.

NS68

CLOSING THE TREATMENT GAP IN POLAND - OUR EXPERIENCESJ. Amarowicz¹, E. Czerwinski¹, M. Berwecka¹¹Jagiellonian University Medical College, Faculty of Health Sciences, Department of Bone and Joint Diseases, Krakow, Poland

Number of osteoporotic fractures increases as the society is aging. At the same time percentage of patients receiving antiresorptive treatment after sustaining a fragility fracture in Poland and other European countries is low (9.3–20%). Between 2009 and 2015 the Polish Osteoarthritis Society (PTOA) organized a nationwide educational campaign “DON’T BREAK” which was addressed to physicians of all specializations who treat osteoporosis: orthopaedists, rheumatologists, endocrinologists and GPs. Medical congress organizers, upon our request, attached our educational leaflets into congress materials. Our campaign package consisted of flyers on the topic of fragility fractures, falls as well as various

preventive physical activities (Nordic Walking, Tai Chi). As the campaign proceeded over 100,000 leaflets were distributed among patients and physicians.

Our next step was to organize and implement a coordinator-based system (Fracture Liaison Service) deriving from the experience gathered at Glasgow Western Infirmary. FLS system proved to be highly beneficial both for the patients and health services in many Western European countries. In 2015, the PTOA in collaboration with the Department of Bone and Joint Diseases implemented the FLS in Poland under the name “System Zapobiegania Złamaniom (SZZ)”. It was established in 16 centres in different parts of Poland. During the preparation phase 42 healthcare professionals from 17 sites participated in courses organized by EFOM.

A total of 1579 patients were included in the SZZ, with a total of 746 DXA scans performed in that group. Patients were educated about osteoporotic fractures, including the methods of prevention (causes of fractures, problem of falls, vitamin D and calcium supplementation). The number of patients receiving antiresorptive treatment increased by 74.1%. The percentage of patients taking vitamin D and calcium supplements increased by an average of 10.8%. Although all the participating patients had suffered a fragility fracture, only 42% fulfilled the WHO clinical criteria for osteoporosis.

Secondary prevention, especially with the use of coordinator-based models, is a crucial factor that allows to improve the quality of life and the level of care over patients with fragility fractures. Our actions led to an increase in the number of patients receiving antiresorptive treatment in a group of patients who despite indications for treatment after an initial fracture were not originally offered such an option.

NS69

THE ADDED VALUE OF LABORATORY BIOMARKERSV. Palicka¹¹University Hospital, School of Medicine, Charles University, Hradec Kralove, Czech Republic

Objective: Specific role of laboratory markers in osteology is based on several requirements and specifications, which should be harmonised internationally.

Results and conclusions:

1. Standardisation:

- Preferred units (S-CTx in ng/L, S-P1NP in µg/L, Vitamin D in nmol/L).
- Methods recommended (third-generation for PTH, LC-MS/MS as reference for Vitamin D).
- Proper selection of markers (CTx and P1NP for routine practice).

- Proper timing of testing (before the next medication dose).

2. Predictive role of BTM:

- Rapid response to therapy should be detected latest at the 3rd month after therapy initiation.
- Adherence to the therapy is detectable by BTM markers and should be verified every 6–12 months.
- During drug holiday BTM are the best biomarker to monitor turnover increase. Appropriate frequency of monitoring is 6–12 months.

3. New markers bring new information about bone metabolism, risk of fracture, therapy monitoring and fracture healing.

The most promising are.

- microRNA (bone remodelling, fracture healing).
- circulating periostin (cortical bone, fracture healing).
- Dickkopf-1 protein (bone loss during aging).
- DNA methylation (precision medicine in osteology).
- Kynurenine (age-induced bone loss).
- Osteoprotegerin (fracture risk).

4. Interaction between bone metabolism and other tissues and organs are mediated by specific bone markers with the interesting perspectives for future development (undercarboxylated osteocalcin and insulin production, e.g.). Microbiome and bone metabolism should be analysed in future.

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SIMPLE BUT ACCURATE TOOLS IN THE FRACTURE RISK ASSESSMENT

C. Poiana¹

¹Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

Low bone mass density (BMD) is associated with increased fracture risk but relying solely on BMD underestimates the risk. Numerous clinical risk factors (old age, prevalent fragility fractures, chronic corticotherapy, alcohol or tobacco use, parental hip fracture, low body mass index) should also be evaluated. The Fracture Risk Assessment Tool model (FRAX) estimates the absolute fracture risk over 10-years (hip and major osteoporotic fractures) using an individual set of risk factors, even without the BMD value. FRAX is used mainly in untreated patients (as it does not reflect accurately the fracture risk decrease during treatment). FRAX also underestimates fracture

risk in certain populations (e.g. those with multiple or recent fractures, high-dose corticotherapy, diabetes mellitus) – corrected algorithms for these conditions are not yet validated. Trabecular bone score (TBS) is a software used on newer DXA machines that converts lumbar spine DXA images in a grey-level texture index. TBS is a surrogate measure of bone microarchitecture, offering additional information to BMD, FRAX and clinical risk factors. Direct correlation exists between TBS and fragility fractures (prevalent and future) in different populations. TBS can be used with the FRAX algorithm and it enhances the predictive accuracy. It is especially useful in patients in whom BMD and FRAX underestimates the risk (e.g. type 2 diabetes mellitus); in these cases the combined use of TBS and FRAX (without BMD) increases the accuracy of risk prediction.

Quantitative ultrasonography (QUS) is less commonly used but can also predict the total and hip fracture risk. It cannot be used for diagnosis or treatment monitoring.

Accurate fracture risk quantification can be improved in the future by integrating the current tools and correction factors for certain subpopulations in whom BMD measurement is misleading.

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TREATMENT FAILURE: DEFINITIONS DIFFERENCES AMONG CENTRAL AND EASTERN EUROPEAN COUNTRIES

J. Payer¹, P. Kuzma¹, P. Jackuliak¹, P. Vanuga², S. Tomkova³, Z. Killinger¹

¹Comenius University Faculty of Medicine, 5th department of Internal Medicine, University Hospital Bratislava, Bratislava, Slovakia, ²National Institute of Endocrinology and Diabetology, Lubochna, Slovakia, ³Department of Internal medicine, 1st Private hospital, Košice-Šaca, Slovakia

The efficacy of drug treatment in osteoporosis depends on the demonstration of a reduction in the risk of fracture. For antiresorptives, efficacy is defined by three measureable parameters - reduction in fracture risk supported by an increase in bone mineral density (BMD) and a decrease in markers of bone turnover. It should be mentioned that effective treatment intervention decreases the risk of fracture but does not eliminate the risk. Another problem is that failure of treatment is compounded by some reimbursement agencies that categorize first- and second-line drugs. In clinical trials, a second or third fracture during therapy is generally markedly reduced by 80–90% in comparison to the placebo-treated. Therefore, occurrence of a second fragility fracture could be used to define treatment failure. Problem of BMD-defined treatment failure is that precision error of the measurement of BMD at site is approximately the same as the normal postmenopausal BMD

decrease. But, decreases in BMD greater than the least significant change LSC 5–6% are rarely found in patients who adhere to therapy. In the case of the markers, the precision error is much higher (5–10-fold greater) but is offset by the larger response to treatment. It is recommended by IOF that serum C telopeptide of type I collagen (β CTX) and serum procollagen I N-propeptide (PINP) are considered as reference markers and LSC estimates for serum β CTX and PINP are approximately 25%. According to International Osteoporosis Foundation, if these response criteria are not fulfilled within a year of starting treatment, modification of treatment, including review of adherence and a search for occult secondary causes of osteoporosis, should be considered. In this presentation we would like to compare differences of treatment failure definitions between central and eastern European countries and discuss the rationale of different approaches to osteoporosis treatment.

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MANAGEMENT OF OSTEOPOROSIS IN POLAND

E. Czerwinski¹, P. Glusko²

¹Jagiellonian University Medical College, Department of Joint and Bone Diseases, Krakow, Poland, ²National Institute of Geriatrics, Rheumatology and Rehabilitation, Warszawa, Poland

Updated version of Polish guidelines of treatment and prevention of osteoporosis worked up by experts by 12 specialists will be presented. Guidelines emphasised 10-year fracture risk should be estimated using FRAX-PL in all patients who are over 50 years of age, and in Poland, the threshold ³10% for therapeutic intervention should be adopted. FLS was advocated as the optimum system from secondary fracture prevention. The guidelines of the European Vitamin D Association (EVIDAS) of vitamin D supplementation and treatment of the deficiency in primary and secondary osteoporosis will be presented. A minimum vit. D dose of 1000 IU/day is mandatory in osteoporosis treatment, while the efficacy of pharmacotherapy of primary and secondary osteoporosis depends on maintaining serum 25(OH) D levels at optimal concentration (75–125 nmol/L). For adults and elderly with laboratory confirmed vit. D deficiency, indicated by 25(OH)D concentration lower than 50 nmol/L, vitamin D treatment doses of 7000–10,000 IU/day should be implemented. In a longitudinal observation over a period of five years in a randomly selected sample of 802 women were assessed for fracture incidence and the algorithm for fracture risk incidence was established. In this group there were found: falls (33.8%), early menopause (14.7%) and smoking (11.4%). 28% of subjects presented prior osteoporotic fracture. Stand and Go test (SAG) revealed that subjects with a prior fracture had a significantly higher

SAG than subjects without fractures FN BMD was positively influenced by rural residence and working in standing position. In a cohort of 1284 women with 10-year observation the sensibility of BMD, t-score, z-score and prediction of fracture risk was assessed and combination of t-, z-, and BMD was verified. The sensitivity of DXA was the highest for total hip T-score (0.701) and total hip Z-score (0.742). The values of the 10-year fracture RR associated with 1 SD reduction for proximal femur was for spinal T-score: 1.32 and total hip T-score: 1.78. The sensitivity and specificity of DXA was decreased with age – it reaches its highest values at the age of 50–60 and subsequently falls in the population of >70. TBS analyses were performed in a group of 16,041 patients. The mean TBS result was 1.26 in men and 1.2 in women. Data regarding prevalent low-energy fractures was available for 1101 women. In the non-fractured group the mean TBS was 1.24 (partly degraded). In the group with prevalent low energy fractures of any kind TBS equaled 1.19 (degraded). The mean TBS in the group with prevalent non-spinal fractures was 1.20 and in the group of women with spinal fractures 1.16.

NS73

THE REVIEW OF THE 2017 UPDATED POLISH GUIDELINES FOR THE DIAGNOSIS AND MANAGEMENT OF OSTEOPOROSIS

P. Glusko¹, R. Lorenc²

¹National Institute of Geriatrics, Rheumatology and Rehabilitation, Warszawa, Poland, ²Somed, Warszawa, Poland

In the quickly ageing Polish society osteoporosis is a growing epidemiological problem. According to the most current reports 80% to 90% patients suffering from osteoporosis, including osteoporosis accompanied by fractures, do not receive adequate pharmacotherapy.

A Multidisciplinary Osteoporosis Forum Guideline Working Group (12 experts in the fields of orthopedics, rheumatology, biochemistry, endocrinology, diabetology, oncology, rehabilitation, internal medicine, geriatrics, nephrology and medical engineering) updated the existing Polish guidelines concerning management of osteoporosis, taking account of the latest literature (MEDLINE and COCHRANE databases), availability and reimbursement of drugs, and current health care organisation. The panel voted on the direction and significance of each of the proposed recommendation. In the 2017 revised guidelines, experts postulate that tasks are divided between primary care physicians (stage 1) and specialists in osteoporosis management (stage 2). Guidelines emphasise the necessity of early initiation of pharmacotherapy and rehabilitation in all patients with low-energy fractures.

The 10-year fracture risk should be estimated in all patients (including those without fractures) who are over 50 years of age, and in Poland, the threshold ³10% for therapeutic intervention should be adopted (FRAXPL). Routine strategies of drug choice and therapy monitoring based on densitometric and biochemical procedures are recommended and basic guidelines concerning prevention of falls, rehabilitation, dietary procedures, and elimination of environmental and other fracture risk factors are defined. Revised guidelines point to two vital elements for improving osteoporosis management: 1/ strategy of supervision over fractures management – Fracture Liaison Service (FLS), and, optimally, 2/ strategy of short-term monitoring of the therapeutic efficacy with the use of biochemical markers.

NS74

MANAGEMENT OF OSTEOPOROSIS IN POLAND: CALCIUM AND VITAMIN D

E. Marcinowska-Suchowierska¹, P. Płudowski²

¹Department of Geriatric, Internal Medicine and Metabolic Bone Disease, Centre of Postgraduate Medical Education Warsaw, Warsaw, Poland, ²Department of Biochemistry, Radioimmunology and Experimental Medicine, the Children's Memorial Health Institute, Warsaw, Warsaw, Poland

Although a regular supplementation of both calcium and vitamin D seems optimal to decrease the rate of bone loss and fracture risk, the low calcium intake (50%) and vitamin D (90%) insufficiency are prevalent in Polish population aged 50+ yrs. For patients with limited intake of dairy products it is recommended to supplement calcium salt in daily dose of 1200 mg. The guidelines of the European Vitamin D Association (EVIDAS) indicate that a minimum vitamin D dose of 1000 IU/day is mandatory in osteoporosis treatment, while the efficacy of pharmacotherapy of primary and secondary osteoporosis depends on maintaining serum 25(OH) D levels at optimal concentration (75–125 nmol/L), and compensating the calcium-phosphonate balance.

For adults and elderly with laboratory confirmed vitamin D deficiency, indicated by 25(OH)D concentration lower than 50 nmol/L, vitamin D treatment doses of 7000–10,000 IU/day (175–250 µg/day) or 50,000 IU/week (1250 µg/week) should be implemented. For patients with intestinal malabsorption, vitamin D should be administered in large oral or intramuscular doses or by vitamin D skin synthesis stimulation with UVB rays (one medical erythema dose 2–3 times a week). The follow-up evaluation of 25(OH)D concentration should be done 12 weeks after the initiation of treatment.

Patients with a severe liver dysfunction or chronic kidney disease are the only groups that require the use of activated vitamin D metabolites. In chronic liver disease, it is recommended to use calcifediol (25-hydroxylated form). For chronic kidney disease – alfacalcidol or calcitriol (1- and 25- hydroxylated forms) are optimal. For patients with granulomatous diseases (e.g., sarcoidosis), primary hyperparathyroidism, chronic renal failure, and coexisting vitamin D deficiency, the treatment should start with vitamin D, but hypercalcemia should be ruled out at the initial phase and during maintenance. In such patients, a lower doses should be used, while the treatment safety should be assured by the monitoring of serum calcium, 1,25(OH)₂D and PTH concentrations. The aim of a treatment is to attain a lower-optimal 25(OH)D concentrations due to obtain health benefits and prevent hypercalcemia.

NS75

RAC-OST-POL – POPULATION BASED POLISH EPIDEMIOLOGIC STUDY ON POSTMENOPAUSAL OSTEOPOROSIS

W. Pluskiewicz¹

¹Metabolic Bone Diseases Unit, Medical University of Silesia, Katowice, Poland

The aim of the RAC-OST-POL – population based Polish epidemiologic study was the assessment of various aspects of postmenopausal osteoporosis.

Material: Population studied ($n = 625$, mean age 66.4 ± 7.8 y.) were randomly selected from the whole female population of Raciborz district.

Results: Among clinical risk factors for osteoporosis and fracture risk the most common were: falls (33.8%), early menopause (14.7%) and smoking (11.4%). 28% of subjects presented prior osteoporotic fracture, and 9.6% had FN BMD below -2.5 (Lunar DPX, GE). Mean daily calcium intake was 390 ± 265 mg and 438 ± 274 mg in fractured and unfractured populations, respectively and differed significantly ($p < 0.05$). Mean daily calcium intake was significantly lower ($p < 0.05$) in subjects with FN T-score below -2.5 than subjects with T-score above -2.5 (360 ± 226 mg and 431 ± 263 mg, respectively). Functional status established by Stand and Go test (SAG) revealed that subjects with prior fracture had significantly higher SAG than subjects without fractures (11.0 ± 3.2 s. and 12.4 ± 6.8 s., $p < 0.001$). Also in women with fall in previous year SAG was greater than in women without fractures (10.9 ± 4.2 s. and 12.2 ± 5.2 s., $p < 0.01$). FN BMD was positively influenced by rural residence and working in standing position.

In a longitudinal observation over a period of five years were noted 78 new osteoporotic fractures in a study cohort ($n =$

802). A statistical analysis have shown factors with an impact for fracture incidence and the following algorithm was established:

Conclusion: The RAC-OST-POL study presents data on postmenopausal osteoporosis. Obtained data should be used in preventive procedures as well in patients' management especially with the use of algorithm for fracture risk.

NS76

VALUE OF T- AND Z-SCORES IN FRACTURE PREDICTION

P. Borowy¹, E. Czerwinski²

¹Krakow Medical Center, Krakow, Poland, ²Jagiellonian University Medical College, Department of Joint and Bone Diseases, Krakow, Poland

The result of a densitometric examination of the spine and proximal femur remains a primary criterion for the diagnosis of osteoporosis. However, the major goal in osteoporosis diagnostics is to assess the risk of an osteoporotic fracture. Numerous articles stress the limited sensitivity and specificity of the DXA examination when it comes to fracture prediction. The values of these parameters vary with age, gender, race or place of residence. Yet, there are no comparable studies on the Polish population. The chief purpose of our study was to assess the sensitivity and specificity of BMD, T- and Z-scores in predicting the risk of osteoporotic fractures in the population of Malopolska and calculating the 10-year relative risk (RR) of fracture. An additional goal was to seek a combination of T- and Z-scores that best predicts the fracture risk as well as to determine whether the sensitivity and specificity of DXA changes with age. The prospective observation in the years 1997–2013 (mean - 10 years) incorporated the analysis of 5092 randomly selected postmenopausal women from the database of Krakowskie Centrum Medyczne of which 1284 met the inclusion criteria and met no exclusion criteria.

Results: The sensitivity of DXA was the highest for total hip T-score (0.701) and total hip Z-score (0.742). None of the analyzed combinations of Z- and T-scores showed a higher sensitivity and specificity in fracture prediction than total hip, although all the results were statistically significant ($p = 0.005$). The values of the 10-year fracture RR associated with 1SD reduction of T- and Z-score for the study population was different for different parameters - for vertebral fractures: spine T-score: 1.44 and total hip T-score: 1.66. For proximal femur respectively: spine T-score: 1.32 and total hip T-score: 1.78. These results are close to those presented by Johnell and Marshall. The study also showed that the sensitivity and specificity of DXA decreases with age - it reaches its highest values at the age of 50–60 (AUC for T-score hip

–0.854) and subsequently falls in the population of >70 (AUC for T-score hip –0.608).

NS77

CORRELATION BETWEEN TBS, AGE AND FRACTURE IN POSTMENOPAUSAL WOMEN

E. Czerwinski^{1,2}, M. Berwecka¹, A. Kumorek³, J. Amarowicz¹, M. Warzecha¹, D. Hans⁴

¹Jagiellonian University Medical College, Faculty of Health Sciences, Department of Bone and Joint Diseases, Krakow, Poland, ²Krakow Medical Center, Krakow, Poland, ³Healthy StatistiC, Krakow, Poland, ⁴Center of Bone Diseases, Bone & Joint Department, Lausanne University Hospital, Lausanne, Switzerland

The threshold of –2.5 BMD T-score has been used as a criterion for diagnosing osteoporosis (OP), however 50–70% of fractures are sustained by patients above this threshold. It is due to the fact that there are multiple factors influencing bone strength, e.g. its structure.

A major advance in osteoporosis diagnostics is Trabecular Bone Score (TBS), a method to indirectly assess bone structure based on lumbar spine DXA in clinical routine.

TBS was assessed from lumbar spine DXA image in Lausanne, blinded from clinical outcome in a group of 16,041 patients of Krakow Medical Centre, including 13,749 women (mean age 61 ± 12 SD) and 1,724 men (mean age 59 ± 15 SD). All statistics were performed in Krakow.

The mean TBS result was 1.263 ± 0.11 SD (1.263 ± 0.11 SD in women and 1.267 ± 0.11 SD in men). Mean spine BMD was 0.872 ± 0.17 SD (0.861 ± 0.16 SD in women and 0.941 ± 0.16 in men) TBS decreased with age in the entire group $R = -0.47$ ($p < 0.0001$), in women $R = -0.49$ ($p < 0.001$), in men $R = -0.36$ ($p < 0.0001$) while the corresponding correlations between spine BMD and age were $R = -0.16$ ($p < 0.001$), $R = -0.2$ ($p < 0.001$), $R = 0.11$ ($p < 0.001$) respectively.

Data regarding prevalent low-energy fractures were available for 1,088 women. In non-fractured group (mean age 67 ± 7.6 SD) the mean TBS was 1.241 ± 0.10 SD (partly degraded). In the group with prevalent low energy fractures of any kind (mean age 70 ± 8.2 SD) TBS equaled 1.205 ± 0.10 SD ($p < 0.001$ after age and BMI adjustment). The mean TBS in the group with prevalent non-spinal fractures was 1.212 ± 0.10 SD and in the group of women with spinal fractures 1.165 ± 0.09 SD (fully degraded) ($p < 0.01$ after age and BMI adjustment).

Conclusions: A significant reduction of TBS with age was demonstrated in the entire group. The mean TBS in non-fractured women showed a partial bone structure degradation, whereas in patients with prevalent fractures of any kind the mean was within the scope of degraded structure.

NS78

ADAPTED PHYSICAL ACTIVITY USING GERONTECHNOLOGY AS THE SOLUTION TO COUNTERACT MUSCLE FUNCTION IN FRAIL POPULATIONM. Aubertin-Leheudre¹¹Université du Québec à Montréal (UQAM), Montréal, Canada

In Western countries, about 25% of the population is constituted by older persons, and 20% of these individuals live in nursing home (NH). The number of people with functional declines as well as the number of individuals living in institutional settings are expected to rise in the next decades around the world. Nursing homes are supposed to deliver high quality and complex medical care. Overall, NH residents have different concomitant clinical issues, such as functional limitations, disabilities, cognitive impairment, multiple and interacting chronic diseases, polypharmacy.

In addition, it is important to note that 65% of health care costs are related to the elderly population. It has been recently reported that minor injuries can trigger worsening of physical function in 15–18% previously independent seniors up to 6 months post-injury and may mask an underlying and not yet undetected frailty status. Although some studies have investigated the burden of co-morbid diseases in older adults, few studies have quantified the risk of hospitalizations and emergency department (ED) visits according to the type of co-morbidities in NH residents.

Finally, preliminary evidence suggests that exercise might produce beneficial effects when implemented as preventive and therapeutic intervention in older NH residents. Although about one-third of NH residents attends sessions of physical exercises, only 9% of all the residents can be considered as sufficiently active. Such a high level of sedentariness might contribute to the aggravation of their physical functional status. Even if the presence of physical therapists can increase the rate of active elderly individuals, it is unfeasible for these healthcare professionals to meet the needs of all the possible beneficiaries among NH residents. Therefore, it has been proposed that programs of adapted physical activity (APA) developed with the use of gerontechnology could represent a novel and promising possibility for counteracting sedentariness and frailty.

Thus, the results are presented of studies conducted for ascertain the feasibility and potential benefits of APA gerontechnology interventions in elderly individuals having experienced recent injuries and/or living in nursing home.

NS79

REHABILITATION OF SARCOPENIC ELDERLYY. Dionyssiotis¹¹M.D., Ph.D, Thessaloniki, Greece

Sarcopenia is defined as a disease (M62.84) characterized by progressive and generalized loss of skeletal muscle mass and strength, associated with a risk of adverse outcomes such as physical disability, poor quality of life and death. These negative outcomes affect mainly the aged subjects. Sarcopenia requires a rehabilitation program to improve physical performance but also nutrition. Malnutrition is a commonly occurring condition in older adults and results in numerous and substantial negative outcomes to the patients and the health care system, including hospitalization rates, morbidity and mortality. In the rehabilitation setting malnutrition has been shown to be related to functional decline, worse functional status and poor recovery. The implementation of physical activity for elder populations should be done throughout a good organized program tailored to the individual and his comorbidities with the aim to improve muscular mass and/or strength, to reduce risk of falls etc. In elderly population balanced protein supplementation of 1 to 1.5 g/kg/day combined with exercise may be useful in preventing and reversing sarcopenia, as a part of a multimodal therapeutic approach. Leucine-enriched balanced amino acids and creatine enhance muscle strength, and vitamin D supplementation in doses sufficient to raise levels above 100 nmol/L should be given as adjunctive therapy. Nevertheless, current evidence of nutritional support to treat or prevent sarcopenia in the setting of rehabilitation in elderly persons with impairments is limited.

NS80

CORRELATION BETWEEN SARCOPENIA AND OSTEOPOROSIS IN PATIENTS WITH POST POLIOMYELITIS SYNDROMEM. Lissens¹¹Thomas More - Orthopedie - Campus Geel, Geel, Belgium

Sarcopenia, muscle mass, muscle strength, muscle density, exercise and physical activity are well known factors to be correlated with bone mass, bone density and osteoporotic fractures. Both bone and muscle decay and dysfunction are seen in ageing. However, in neurological disorders resulting in muscular atrophy, bone loss may be seen also at younger ages.

We measured bone mineral density (BMD) both in the femoral neck and in the lumbar spine using dual X-ray absorptiometry in 30 patients with so called post poliomyelitis syndrome, 18 women and 12 men, with a mean

age of 56,3 years (ranging from 37 till 70). Mean age in men was 56 and in women 56,5 years. Eight women were postmenopausal.

Femoral neck BMD was $-22,76\%$ or -1.86 SD and lumbar BMD was $-13,21\%$ or -1.25 SD. Low femoral bone mass was found in 80% of the patients (12 men and 12 women, of whom 5 were postmenopausal) and low lumbar bone mass was seen in 63% (9 men and 10 women, of whom 8 were post-menopausal). Six patients (all women) had normal femoral BMD and 11 had normal lumbar BMD, whereas 6 (3 male and 3 female) had osteoporotic femoral BMD-scores (< -2.5 SD) and 3 (1 man and 2 women) had osteoporotic lumbar BMD. The remaining patients had osteopenia: 18 femoral osteopenia (< -1 SD) and 16 lumbar osteopenia.

A significant difference in femoral (cortical) BMD between men and women was found:

$-27,72\%$ or $-2,24$ SD in men and $-19,46\%$ or $-1,62$ SD in women. Only small sex differences were seen in lumbar (trabecular) BMD: $-13,85\%$ or -1.37 SD in men and $-12,78\%$ or $-1,17$ SD in women. The lowest (mainly cortical) BMD scores were present in (mainly male) patients with visible and clear lower limb muscle atrophy.

In summary, a correlation is shown between low muscle mass and low cortical BMD which can be explained by neurogenic bone loss, both due to muscle atrophy and disturbed regulation of bone by the central nervous system (e.g. poliomyelitis and spinal cord injury).

NS81

THE FINANCIAL BURDEN OF VERTEBRAL FRACTURE

T. Jones¹

¹National Osteoporosis Society, Camerton, United Kingdom

Vertebral fracture is one of the most important clinical risk factors for osteoporosis, indicating an increased relative risk of 2.8 for hip fracture and 5.4 for further vertebral fractures. Vertebral fractures, and the hip fractures they predict, place a financial burden on healthcare services.

This session will address the expected incidence and prevalence of vertebral fractures and the potential financial benefits of early identification of vertebral fracture vs late identification. It will cover the potential costs of vertebral fracture for inclusion such as kyphoplasty, vertebroplasty, GP visits, outpatient and pain clinic attendances, and increasing medication costs. It will also look at other cost implications of vertebral fracture including non-osteoporotic medical complications and social care costs.

NS82

UNDERSTANDING THE CLINICAL GUIDANCE FOR THE IDENTIFICATION OF VERTEBRAL FRACTURES IN THE UK

S. Stephenson¹

¹National Osteoporosis Society, Camerton, United Kingdom

Standard 1 of the FLS Clinical Standards (NOS 2015) asserts that all patients over 50 years with a newly reported vertebral fracture will be systematically and proactively identified. However 70% of vertebral fractures remain undiagnosed. This will be substantiated in the session using the findings of the NOS rolling gap analyses (against FLS Clinical Standards) of FLS sites in the UK since 2015. The session is underpinned by the publication in November 2017 of the NOS Clinical Guidance for the Effective Identification of Vertebral Fractures.

The session will cover the development of a patient pathway for vertebral fracture identification as outlined in the new National Osteoporosis Society (NOS) *Clinical Guidance for the Effective Identification of Vertebral Fractures*. It will address the inherent challenges posed by systematic identification of patients with vertebral fracture; where the fracture is clinically suspected and where it is identified as an incidental finding by diagnostic imaging. It will also describe the key responsibility of reporting practitioners in diagnostic imaging departments to use clear and unambiguous terminology and actionable reporting to alert referring clinicians to the clinical significance of vertebral fractures and highlight the need for appropriate assessment.

NS83

NON-IRRADIATING OSTEOPOROSIS DIAGNOSIS: TECHNOLOGIES DESCRIPTION

F. Conversano¹

¹National Research Council, Institute of Clinical Physiology, Lecce, Italy

Objective: To review the working principles of the main available technologies for non-ionizing osteoporosis diagnosis.

Materials and methods: The only available methods for osteoporosis diagnosis without X-ray employment are based on quantitative ultrasound (QUS) approaches. However, the term QUS identifies a wide and heterogeneous family of ultrasound-based technologies, which differ from each other for the adopted insonification mode (i.e., pulse-echo, through-transmission, axial transmission), for the possible bone targets (i.e., selected peripheral sites such as calcaneus or tibia vs. axial sites such as lumbar spine and/or proximal femur), and for the diagnostic output parameters (e.g., bone mineral density, ultrasound attenuation, stiffness index, etc.). Single QUS methodologies

have been reviewed, emphasizing their actual clinical potential taking into account their specific intrinsic features.

Results: Most of QUS approaches are applicable only to peripheral skeletal sites (e.g., heel, radius, etc.), whereas the reference anatomical sites for osteoporosis diagnosis are lumbar vertebrae and proximal femur. Nevertheless, the International Society for Clinical Densitometry (ISCD) recognizes to validated QUS devices for heel applications, which adopt a through-transmission approach, the capability of predicting the risk of fragility fractures in people over 65. On the other hand, the recently introduced methods working on the axial sites, such as the Radiofrequency Echographic Multi Spectrometry (REMS), exploit a pulse-echo technique and show the most interesting potential for early diagnosis, or even prevention, of osteoporosis through mass screenings on young subjects.

Conclusion: QUS-based assessment of osteoporosis has some actual clinical usefulness referred to calcaneal examinations. However, the most promising perspectives are represented by the extended clinical investigations of novel approaches directly applicable to the reference axial sites.

NS84

AN INTERNATIONAL CLINICAL EXPERIENCE

A. Diez-Perez¹

¹Department of Internal Medicine, Hospital del Mar, Autonomous University of Barcelona and CIBERFES, Barcelona, Spain

Objective: To illustrate clinical experience on the use of non-ionizing techniques for osteoporosis diagnosis at the Department of Internal Medicine, Hospital del Mar (Barcelona, Spain).

Materials and methods: Different QUS devices are being developed in order to overcome the limitations related to the employment of DXA, the Gold Standard technique for the diagnosis of Osteoporosis. Among the QUS devices, the most common are referred to peripheral sites such as phalanges, calcaneus or tibia and not to the central anatomical sites such as lumbar spine or proximal femur. The only commercially available non-ionizing technique applicable to the reference axial sites, femur and spine, is represented by Radiofrequency Echographic Multi Spectrometry (REMS) [1, 2]. This technique is currently used in our center for the assessment of a large cohort of patients (women from 50 to 70 y and BMI $\leq$ 30 kg/m²) who underwent both DXA and REMS examination on spinal or femoral site.

Results: The comparison between the diagnostic results obtained by DXA and REMS showed a very high accuracy of the innovative technique in the discrimination between osteoporotic and healthy patients, referring to both the investigated anatomical sites, obtaining sensitivity of 83% and 89% and specificity of 92% and 94% for spinal or femoral site, respectively.

Conclusion: The obtained preliminary results from Spanish clinical experience revealed the potential of this innovative axial technique to be employed for osteoporosis early diagnosis and to provide beneficial impact in the management of patients with osteoporosis. This clinical experience with the use of this non-ionizing REMS approach, referred to central sites, offers advantages in precision and clinical relevance in comparison with peripheral QUS devices.

References:

- 1 Casciaro S, et al. *UMB* 2016; 42:1337–56.
- 2 Conversano F, et al. *UMB* 2015;41:281–00.

NS85

SYMPOSIUM TAKE HOME MESSAGE

P. Leszczynski¹

¹Poznan University of Medical Sciences, Dept. of Rheumatology and Rehabilitation, Poznan, Poland

Objective: To compare the non-irradiating alternative techniques for bone mineral mass measurement applied at peripheral and axial sites.

Materials and methods: The non-irradiating evaluation of bone health and osteoporosis diagnosis can be performed by the use of the well-known quantitative ultrasound (QUS) approaches, which provide some advantages with respect to the Gold Standard DXA, in terms of absence of ionizing radiation, portability, low cost and others. All these techniques are identified by specific features. The non-irradiating devices can investigate the peripheral sites (e.g., calcaneus, phalanges) by using a through-transmission insonification mode or the axial reference sites (spine and femur) through a pulse-echo approach; all of them provide diagnostic output parameters different from each other. In this work, the clinical usefulness of these methodologies have been compared.

Results: The international guidelines for the management of *osteoporosis* indicate to establish osteoporosis diagnosis by analyzing the status of the bone at the axial reference sites (proximal femur and lumbar vertebrae). Nevertheless, the most common QUS approaches are applicable only to peripheral skeletal sites. On the other hand, a novel non ionizing-technology, the Radiofrequency Echographic Multi Spectrometry (REMS), allows to obtain osteoporosis diagnosis directly on femur and spine (as well as DXA) by using a fast and easy-to-use automatic approach.

Conclusion: In order to manage osteoporotic disease by using an approach directly applicable to the reference axial sites, REMS technology could be very promising for the standard assessment of bone. This innovative technology could improve the outcome of osteoporosis diagnosis through early diagnosis and fracture risk estimation.

In addition, it opens new interesting perspectives for short-term drug efficacy follow-up programs and novel prevention strategies.

NS86

MANAGEMENT OF ACUTE OSTEOPOROTIC VERTEBRAL FRACTURES IN TURKEY

O. Peker¹

¹Dokuz Eylul University Medical School, Department of Physical Therapy and Rehabilitation, Izmir, Turkey

Osteoporotic vertebral fractures are associated with acute pain, loss of function and spinal deformities. Recurrent vertebral fractures influence the quality of life, mobility and mortality. The treatment of acute vertebral fractures includes different types of trunk orthoses, partial bed rest, effective pain management. Kyphoplasty or vertebroplasty can be recommended to patients when conservative treatment fails. Calcium, vitamin D and pharmacologic agents are the part of treatment program.

Turkish Osteoporosis Society aimed to investigate the treatment options of clinicians in acute osteoporotic vertebral fractures in Turkey. A survey instrument considering questions about the management of vertebral fractures was created. Eligibility criteria included the Turkish clinicians treating patients with vertebral fractures. A total of 283 physiatrists filled out the survey.

In all %75 (n:210) of the clinicians preferred to prescribe dorsolumbar spinal brace in acute vertebral fracture. %32(n:92) of the participants suggested 3 weeks and %30 (n:86) suggested 3–7 days of bed rest. Most of the clinicians %89(n:278) recommended adequate intake of calcium and vitamin D and %60 (n:170) of them prescribed antiresorptive agent immediately to the patients. %72(n:203) recommended vertebroplasty within 2 months to patients with no change in pain intensity. The majority of the clinicians preferred to switch teriparatide therapy in patients with recurrent vertebral fractures under the treatment of antiresorptive treatment.

Clinicians responses suggest that patients with acute osteoporotic fractures are treated effectively in Turkey.

NS87

A HIDDEN PROBLEM: OSTEOPOROTIC VERTEBRAL FRACTURES

Y. Gokce Kutsal¹

¹Hacettepe University Medical School, Department of Physical Therapy and Rehabilitation, Ankara, Turkey

Osteoporosis is a silent problem without any evidence of disease until a fracture occurs. Health consequences from osteoporotic fractures in patients include disability and have a

negative impact on the quality of life. It is well known that, patients who develop a vertebral compression fracture are at substantial risk for additional fractures. These compression fractures can occur in vertebrae anywhere in the spine, but they tend to occur most commonly in the lower thoracic spine and because the majority of damage is limited to the front of the vertebral column, the fracture is usually stable.

For people with advanced osteoporosis, the vertebral fracture can even occur with a minor activity, such as coughing, getting in or out of the bathtub. The main clinical symptoms of vertebral compression fractures typically include one or a combination of the following symptoms: sudden onset of back pain, which is increased by standing or walking. The pain decreases by lying on one's back. Spinal mobility is limited and due to several fractures; height loss, deformities and disability can be observed.

Musculoskeletal pain is very common in elderly people, giving rise to functional and psychological impairments. Clinical or subclinical vertebral fractures are a common cause of back pain. The problem at this point is; the vertebral fractures are not always recognized or accurately diagnosed, because the patient's pain is often just thought of as back pain resulting from soft tissue injuries or spondylosis or as a common part of aging. That is the reason why approximately two thirds of the vertebral fractures that occur each year are not diagnosed and therefore not treated. Another issue that should be taken into consideration is; it has been demonstrated that despite the absence of vertebral fractures, bone resorption due to OP may also cause low back pain.

It seems likely that osteoporosis and fragility fractures are not negligible findings among patients hospitalized in different clinics. Attention should be drawn to the importance of a thorough physical examination to reveal the underlying cause of back pain in elderly osteoporotic patients spondylosis or osteoporosis itself. Also it should be kept in mind that, the treatment of osteoporotic vertebral fractures is complicated because of the comorbid conditions of the elderly patient. The key for good outcome may be a combination of interdisciplinary treatment approaches. Early diagnosis is the key to resize the impact of osteoporosis on healthcare system. In this context, not only attention must be focused on the identification of high fracture risk among osteoporotic patients, but public awareness should be increased as well.

NS88

MEDICAL TREATMENT OF OSTEOPOROSIS

O. El¹

¹Dokuz Eylul University Medical School, Department of Physical Therapy and Rehabilitation, Izmir, Turkey

Osteoporosis is an important public health issue. Early intervention can prevent osteoporosis in most people. For patients

with established osteoporosis, medical intervention can halt its progression. Therapy should be individualized based on each patient's clinical scenario, with the risks and benefits of treatment discussed between the clinician and patient. Treatments can be broadly divided into two categories: anti-resorptive and anabolic agents. Anti-resorptive agents, which include oestrogen, selective estrogen receptor modulators and bisphosphonates (BP), reduce bone resorption (and subsequently bone formation), preserving bone mineral density. Anabolic agents, which include full-length parathyroid hormone (PTH1–84) and teriparatide (PTH1–34) stimulate bone formation (and subsequently bone resorption), thereby increasing BMD. Strontium ranelate is another agent that reduces fracture risk. It has weak effects on bone remodeling and probably improves bone strength mainly through effects on bone material properties. Calcium and vitamin D alone are not sufficient to treat osteoporosis and should be given in conjunction with other treatments. BP are the most commonly used medications for osteoporosis. ASBMR report provides guidance on BP therapy duration with a risk-benefit perspective. According to this report; after 5 years of oral BP or 3 years of intravenous BP, reassessment of risk should be considered. In women at high risk, continuation of treatment for up to 10 years (oral) or 6 years (intravenous), with periodic evaluation, should be considered. Approved agents with efficacy to reduce hip, nonvertebral, and spine fractures including alendronate, risedronate, zoledronic acid, and denosumab are appropriate as initial therapy for most patients at high risk of fracture. Teriparatide, denosumab, or zoledronic acid should be considered for patients unable to use oral therapy and as initial therapy for patients at especially high fracture risk. Raloxifene or ibandronate may be appropriate initial therapy in some cases where patients requiring drugs with spine-specific efficacy. Successful treatment of osteoporosis is defined as stable or increasing BMD with no evidence of new fractures or fracture progression.

NS89

ORTHOSES AND EXERCISES FOR OSTEOPOROTIC VERTEBRAL FRACTURES

F. Calis¹

¹Ege University Medical School, Department of Physical Therapy and Rehabilitation, Izmir, Turkey

Vertebral compression fractures are a serious debilitating complication of osteoporosis (OP). Their conservative treatment consists of bed rest, narcotic analgesics, orthoses and exercises. The ideal treatment choice is challenging due to the variety in fracture patterns and the unpredictable prognosis of these fractures. There is evidence that physical exercise increases BMD, while the combined training of the trunk muscles and balance training prevent the risk of falling and new fractures. In order to help all

requested rehabilitation programs such as spine muscle strengthening and postural correct behavior, the spinal orthoses could be valuable instruments. In acute thoracolumbar vertebral fractures, cruciform anterior sternal hyperextension (CASH) or Jewett brace provide forces to encourage hyperextension. In Turkey, physical and rehabilitation medicine (PRM) specialists are more involved in the management of osteoporotic vertebral fractures. They are able to recommend the right kind of orthoses best fitted for the patients and aware about the advantages and disadvantages of using orthoses. At the same time, PRM specialists have a significant role for other treatments like exercise. Exercise which has long been used for the prevention of OP is the powerful intervention the PRM specialists utilize. Bone gain through exercise programs including high impact activity with high magnitude resistance training and balance exercises including gait, coordination and 3D exercises were prescribed for the patients in hospital settings or outpatient clinics.

NS90

SCREENING TURKISH POSTMENOPAUSAL WOMEN WITH CALCANEAL ULTRASOUND AND FRAX

Y. Kirazlı¹

¹Ege University Medical School, Department of Physical Therapy and Rehabilitation, Izmir, Turkey

A campaign named “Healthy Bones & Strong Women” was conducted by the Turkish Osteoporosis Society to identify Turkish women at risk for osteoporosis, and to evaluate their awareness of osteoporosis. The campaign was started in Izmir, on World Osteoporosis Day. Throughout that week, panels to increase the awareness of osteoporosis in public were given by the academic staff of the Directory Board of the Turkish Osteoporosis Society. Then, the project was carried on in Istanbul and Antalya in a mobile vehicle (motor home) with a staff composed by physicians and technicians. Women aged 50 and older in big shopping centers were scanned by heel ultrasound. Fracture probability by FRAXTM questionnaire and One Minute Risk Test were also assessed. Four questions were also asked to this population to understand the level of their knowledge on osteoporosis and also to increase their awareness of osteoporosis. This questionnaire involved questions to investigate if the women had heard of the disease, had DXA scanning in the past, if osteoporosis was seen frequently as a disease, and if fractures are seen as a consequence of this disease. Some demographic and other data which is not involved in the FRAX questionnaire (The exact age of menopause, the age of menarche, Type II diabetes etc.) was also obtained. 1454 women were scanned with heel ultrasound. The questionnaire which involved 4 questions was also asked to other 7983 women online through facebook. Before the campaign, the Head of the Chronic Diseases Department of

the Ministry of Health was visited by the President of Turkish Osteoporosis Society. Spreading the project “Healthy Bones & Strong Women” to different parts of Turkey and reaching a greater number of people became the priority of the Turkish Osteoporosis Society and The Ministry of Health.

NS91

AUTOIMMUNE SARCOPENIA – CURRENT KNOWLEDGE AND PERSPECTIVE

M. Radic¹

¹University Hospital Center Split, University of Split, School of Medicine, Department of Medicine, Division of Rheumatology and Clinical Immunology, Split, Croatia

Objective: Sarcopenia is defined as age-associated loss of muscle mass, strength and function with profound impact on functionality as well as on mortality. “Secondary sarcopenia” has now been described in the context of severe and chronic disease such as malignant disease or inflammatory disorders and been linked to poor clinical outcome. There is currently no widely accepted definition of sarcopenia in autoimmune diseases.

Methods: A systematic literature search was carried out in MEDLINE; EMBASE; Cochrane Library and ACR/EULAR meeting abstracts.

Results: Inflammatory signaling is highly associated with sarcopenia. Mechanistically, increased tumor necrosis factor- α levels lead to inflammation via nuclear factor kappa B activation and finally result in muscle wasting. In rheumatoid arthritis (RA), there are many factors able to increase the risk of sarcopenia. Among them: decrease in physical activity, elevated tumor necrosis factor α and interleukin 1 β levels, increased energy expenditure during rest, high C-reactive protein levels, immobility secondary to stiffness, and pain. Previous studies have shown that unhealthy body composition—especially rheumatoid cachexia, sarcopenic obesity—were related to disease activity, disability scores and rheumatoid factors. Furthermore, there is a high prevalence of sarcopenia in patients with systemic sclerosis (SSc) even among younger patients. Taking a higher number of immunosuppressive or other drugs was identified as a risk factor for sarcopenia in SSc patients. In SSc the prevalence of autoimmune sarcopenia is increased which is associated with inflammation and impaired strength of upper and lower extremities. However, a significantly high proportion of systemic lupus erythematosus (SLE) patients could be classified as sarcopenic, as compared with non-inflammatory controls. The excessive waste of fat-free mass found in SLE could attribute to disease activity and decreased physical activity. Additionally, the catabolic effect of high corticosteroid doses, such as those used in severe lupus, might have contributed to the more frequently sarcopenia observed in SLE patients.

Controversy exists whether cardiovascular risk is increased in rheumatic patients with autoimmune sarcopenia.

Conclusion: Autoimmune sarcopenia affects the quality of life and promote the increasing of morbidity in SLE, RA and SSc. Several pro-inflammatory cytokines, a reduction in protein synthesis in myocytes, insulin resistance, inadequate protein intake and deficiencies in muscle regeneration, may play a role in autoimmune sarcopenia.

NS92

RISK OF SARCOPENIA IN RHEUMATOID ARTHRITIS PATIENTS

T. Vlak^{1,2}

¹University Hospital Center Split, Institute of Rehabilitation Medicine and Rheumatology, Šoltanska 1, Split, Croatia,

²University of Split, School of Medicine, Department of Physical Medicine and Rehabilitation, Šoltanska 2, Split, Croatia

Objective: Rheumatoid arthritis is most frequently associated with development of sarcopenia among chronic inflammatory disease group. Risk of adverse outcomes, such as physical disability, poor quality of life and higher mortality rates, in rheumatoid arthritis is increasing with the development of sarcopenia. Therefore, we performed systematic literature search to provide closer look in causal factors and risks for development of sarcopenia.

Methods: A systematic literature search was carried out in MEDLINE; Cochrane Library, PEDro and ACR/EULAR meeting abstracts.

Results: Although the exact mechanisms for sarcopenia development in rheumatoid arthritis still remains to be elucidated, several factor have been proposed such as increased production of pro-inflammatory cytokines, mainly tumor necrosis factor-alpha and interleukin-1 beta, hormonal changes, oxidative damage, reduced protein synthesis in myocytes, insulin resistance, inadequate protein ingestion, physical activity limitation and pain. Furthermore, it is shown that some reumatoid arthritis associated disease and treatment characteristics can also contribute to development of sarcopenia such as: increasing joint deformity, self-reported disability scores, C-reactive protein levels, rheumatoid factor seropositivity, and a lack of current treatment with disease-modifying antirheumatic drugs. Sex and age differences should also be taken in to account when considering body composition phenotypes of rheumatoid arthritis. The good news is that most of above mentioned factors could be alleviated but in order to start with the treatment of sarcopenia we have to be aware of high prevalence of sarcopenia among rheumatoid arthritis patients and improve clinical detection tools.

Conclusion: Risk of sarcopenia development in rheumatoid arthritis is rather high and can have devastating consequences on quality of life, morbidity and mortality. In the management

of rheumatoid arthritis patients, we should consider prevention and treatment of sarcopenia as one of main strategies.

NS93

RISK OF SARCOPENIA IN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS

M. Mayer¹

¹University Hospital Center Zagreb, School of Medicine Zagreb, Department of Medicine, Division of Clinical Immunology and rheumatology, Kišpatićeva 12, Zagreb, Croatia

Objective: The unintentional loss of muscle mass and strength may have a significant impact on quality of life as well as on mortality in systemic lupus erythematosus (SLE). In this lecture, evidence based data regarding SLE-related sarcopenia and its impact on disease outcomes are presented. Practical points to consider in daily care for the SLE patient regarding autoimmune sarcopenia are discussed.

Methods: A systematic literature search was carried out in MEDLINE; EMBASE; Cochrane Library and ACR/EULAR meeting abstracts.

Results: High proportion of SLE patients could be classified as sarcopenic, as compared to the non-inflammatory

controls. The excessive waste of fat-free mass in SLE patients is attributed to higher and persistent disease activity, decreased physical activity and functioning. Corticosteroids are inevitable component of long term treatment in SLE. High corticosteroid doses, contribute to the more frequent and pronounced sarcopenia observed in severe SLE patients as compared to other autoimmune diseases. Other important contributing risk factors for sarcopenia are discussed. Sarcopenia in SLE has large impact on disease prognosis and the quality of life. The importance of recent myokine pathways research and understanding is explained as it holds a great promise for both understanding of the pathogenesis of physical disability and developing new treatment modalities of autoimmune sarcopenia in SLE.

Conclusion: Autoimmune sarcopenia adversely affects the quality of life and correlates with worse prognosis, important comorbidities and the increased mortality in SLE. Recognizing muscle dysfunction and sarcopenia as a separate prognostic marker and disease component is very important for the development of new disability and mortality prevention strategies in SLE.

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2018): Poster Abstracts

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P101

MICRORNA-1915-3P IN SERUM EXOSOME IS ASSOCIATED WITH DISEASE ACTIVITY OF RHEUMATOID ARTHRITIS IN KOREA

J. Yoo¹, M. K. Lim¹, D. K. Sheen¹, S. A. Kim²

¹Internal Medicine ²Pharmacology, Eulji University, Daejeon, South Korea

Background: Rheumatoid arthritis (RA) is a chronic inflammatory disease that is characterized by severe tissue damage and chronic synovial inflammation. Using analysis of gene polymorphism, biochemical assays, and proteomics approaches, several promising biomarkers for treatment response have been proposed, including red blood cell MTX polyglutamate levels, as well as serum levels of proteins such as cytokines, growth factors, and autoantibodies. However, these markers need further development and refinement to attain sufficient sensitivity and specificity.

Objectives: In this study, we used a miRNA array approach to identify new miRNA in exosome that are related to disease activity in patients with RA who showed inadequate response to treatment. We also examined the relationship between the levels of expression of the RNAs and various serologic parameters of the patients.

Methods: Forty-two RA patients were included in the study. Disease activity was measured using the 28-joint disease activity score with ESR (DAS-28-ESR). Patients with RA were stratified according to the following criteria: the clinical remission (CR) group (n=22), DAS-28-ESR ≤ 2.6 ; and the non-CR group (n=20), DAS-28-ESR > 2.6 . By exosome preparation, miRNA array, and reverse transcription-qPCR reactions, several miRNAs were as potent markers for disease activity.

Results: After data processing for relative quantification of miRNA in exosome between the CR and non-CR groups, we identified 47 miRNAs with a relative fold change (non-CR/CR) > 2 . The expression levels of 37 miRNAs were found decreased in non-CR group, while 10 miRNAs increased in non-CR group. To validate these results, five miRNAs were selected (hsa-miR-1915-3p, hsa-miR-4516, hsa-miR-6511b-5p, hsa-miR-3665, hsa-miR-3613) showing at least 2-fold change between the CR and non-CR groups. Both levels of hsa-miR-1915-3p and hsa-miR-6511b-5p were significantly increased in CR group; hsa-miR-1915-3p was 43.75 in the CR group and 24.68 in the non-CR group ($p=0.004$), and hsa-miR-6511b-5p was 3.02 in the CR group and 2.45 in the non-CR group ($p=0.03$).

Conclusions: hsa-miR-1915-3p showed promise as additional markers for evaluating disease activity in patients with RA. Prospective investigation of hsa-miR-1915-3p may facilitate development of new diagnostic tools to assess disease activity and prognosis in RA and other autoimmune diseases.

P102

THE STABILITY OF RHEUMATOID FACTOR AND ANTI-CCP ANTIBODY IN ARCHIVED SAMPLES OF BLOOD

M. K. Lim¹, J. Yoo¹, D. H. Sheen¹, S. A. Kim²

¹Eulji University Hospital ²Pharmacology, Eulji University, Daejeon, South Korea

Background: Recently, there has been an increasing demand for analyzing a large amount of specimen at the same time and for stably storing those specimens for clinical research. Therefore, the role of the biobank that collects and preserves the samples for research and supplies them stably is very important. Anti-CCP antibody and RF predated the onset of RA by several years, which indicates that citrullination and the production of anti-CCP and RF autoantibodies are early processes in RA. In addition, RA patients with anti-CCP antibody had more swollen joints and more severe radiological destruction.

Objectives: The purpose of this study is to evaluate the stability of RF and anti-CCP antibody after preserving the remaining samples for a long time and to determine the usefulness of the remaining samples that were kept for future research.

Methods: Serum samples used in this study were collected from 50 patients with RA in Eulji university hospital in 2011. The patients had baseline measurement at the time the samples were obtained and had more than one serum aliquots stored for archived samples. At baseline measurement, rheumatoid factor was quantified with turbid immunometry and anti-CCP was measured by an ELISA analyzer. All specimens were kept in a freezer where temperature monitoring was carried out for 24 h to keep the temperature below -70 . Six years later, the samples were slowly thawed at 4 and measured by the same method of the baseline measurement.

Results: The mean age for 50 patients from which the samples were collected is 51.22 years. It was an average of 6.0 years (range: 5.6–6.1 years) for the samples to be stored at the biobank. We observed a slight decrease in concentration of RF and anti-CCP. There were significantly difference in concentration of RF and anti-CCP ($Z=-5.10$, $p\text{-value}<0.001$; $Z=-3.81$, $p\text{-value}<0.001$). The correlation between baseline sample and archived sample is strong (RF: $\rho=0.973$, $p\text{-value}<0.001$; anti-CCP: $\rho=0.938$, $p\text{-value}<0.001$).

Conclusions: This study assessed the stability of RF and anti-CCP antibody in archived samples of blood. Our results showed that serum concentration of RF and anti CCP antibody remain stable for up to 5 years at -70 . There was a slight decreased in the level overtime that was correlated with baseline value. These data indicated that the archived human samples in human cohorts could be used to examine for research and could be estimated according to the regression analysis.

P103

EFFECT OF HIGH-INTENSITY INTERVAL OR MODERATE-INTENSITY CONTINUOUS TRAINING ON BODY COMPOSITION AND PHYSICAL PERFORMANCE IN OBESE-OSTEOPENIC ELDERLY WOMEN

P. Noirez¹, M. Dulac², L. P. Carvalho², G. El Haj Boutros², V. Marcangeli², P. Gaudreau³, J. A. Morais⁴, G. Gouspillou², M. Aubertin-Leheudre²

¹Université Paris Descartes, Paris, France, ²UQAM, Montreal, Canada,

³Université de Montréal, Montréal, Canada, ⁴McGill University, Montréal, Canada

Objective: Ageing is associated with functional incapacities which lead to falls, loss of autonomy and mortality. Being obese and osteopenic seems to worsen physical health more than each of these conditions alone. Physical activity (aerobic training) is recognized to be an efficient strategy to improve many health-related outcomes. We aimed to compare the effect of high-intensity interval training (HIIT) and moderate-intensity continuous training (CONT) on body composition and physical performance in obese-osteopenic elderly women.

Methods: Nineteen inactive (<10,000steps/d), obese (fat mass: 43 ±6%) and osteopenic (BMD<-1 T-score) older women (67±3y) were randomly divided into 2 groups and completed a 12-week exercise intervention: HIIT (n=9, elliptical device; cycle: 30 sec at 85% and 90sec at 65% of maximal age-predicted heart rate; 3x30min/week) and CONT (n=10, treadmill at 65-75% maximal age-predicted heart rate; 3x1h/week). Hip circumference, body composition (DXA: fat-free and fat masses), muscle function (leg power, handgrip strength) and functional capacities (4 m gait speed, 6 min walking test (6MWT), chair and step tests) were measured pre- and post-intervention. Significance was set at p<0.05.

Results: HIIT improved significantly hip circumference (112±15 to 109 ±14 cm), whereas CONT improved significantly leg (12.6±2.8 to 11.7 ±2.6 kg) and appendicular fat (15.3±3 to 14.5±3.1 kg) masses. HIIT improved significantly leg power (102±26 to 137±30 W), step test (28 ±3 to 34±3) and chair test (19±3 to 16±4 s); whereas CONT improved significantly handgrip strength (21.6±4.4 to 24.2±5.4 kg). Only 6MWT increased significantly in both groups (+16% in HIIT and +6% in CONT).

Conclusion: HIIT, at half the training volume, seems more effective to improve physical performance and function in inactive obese-osteopenic older women than CONT aerobic exercise. Clinicians should consider HIIT as a strategy to prevent physical disability in obese-osteopenic women, although further investigations with larger sample sizes are still needed to confirm our findings.

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P104

EPIGENETIC REGULATION OF OSTEOCLAST DIFFERENTIATION

W. An¹

¹University of Southern California, Keck School of Medicine, Los Angeles, CA, USA

Osteoclasts are multinucleated bone-resorbing cells and generated by the fusion of mononuclear precursor cells of the monocyte-macrophage lineage. A group of genes regulating osteoclast differentiation positively or negatively have been identified, and the deregulated expression of these genes has been documented to cause various skeletal diseases. Given the fact that all genes encoding osteoclastogenic factors are expressed in the context of chromatin, a fundamental mechanism underlying osteoclast differentiation should involve chromatin-dependent epigenetic regulatory pathways. MMP-9 is a member of MMP family that has been studied mainly with respect to its role in extracellular matrix remodeling.

Unexpectedly, however, we found that MMP-9 moves into the nucleus and mediates histone H3 N-terminal tail proteolysis at osteoclastogenic genes in RANKL-induced osteoclast precursor (OCP) cells. Our observation that MMP-9 knockdown abrogates H3 N-terminal tail proteolysis and osteoclastogenic gene expression is supportive of the idea that MMP-9 is the major protease responsible for H3 N-terminal tail proteolysis-mediated gene activation occurring in OCP-induced cells. Furthermore, our follow-up studies indicate that specific patterns of histone posttranslational modification are key regulators of MMP-9 protease activity toward target chromatin domains in OCP-induced cells.

Cancer cells frequently spread to bone and secrete soluble signaling factors to accelerate osteoclast differentiation and bone resorption. Since chromatin signaling and regulatory factors have been implicated in epigenetic control of cancer metastasis, we also investigated their possible roles as modulators of metastatic potential of cancer cells to bone. We found that specific histone modification and histone variant tightly regulate cancer bone metastasis and osteoclast differentiation. The observed effects require epigenetic control of genes encoding secreted factors that influence cancer cell metastasis and osteoclast differentiation. Consistent with these data, osteoclastogenesis and osteoporosis are significantly affected following the administration of recombinant forms of secreted factors into mice. More interestingly, our mechanistic studies reveal that histone modification functionally interacts with histone variant to alter the expression and functional properties of metastasis-associated genes in cancer cells in the bone microenvironment. Taken together, our data establish combinatorial roles for H3 N-terminal tail proteolysis, histone modification, and histone variant in dictating osteoclast differentiation and bring new possibilities for developing therapeutic strategies to treat osteolytic bone destruction.

P105

BISPHOSPHONATES AND LOW-IMPACT FEMORAL FRACTURES IN ELDERLY

M. Angulo Tabernero¹, N. Pardina Lanuza¹, C. Laga Cuen¹, E. Gonzalez Buesa¹, C. Tejedor Carreño¹, I. Puyuelo Jarne¹

¹Hospital San Pedro, Logroño, Spain

Several recent medical articles have described multiple cases of unusual low-impact subtrochanteric stress fractures or completed fractures of the femur in patients who have been on the bisphosphonate alendronate for several years for osteoporosis or osteopenia. Some patients have experienced such fractures in both femurs.

The fractures are often preceded by pain in the affected thigh, may have a typical x-ray appearance, and many have delayed healing. It has been hypothesized that in some patients, long-term alendronate causes oversuppression of bone turnover, resulting in bones that are brittle despite improved bone density. In patients with atypical or low-impact fractures of the femoral shaft, consider the possible connection with alendronate use. Some bone specialists now recommend stopping alendronate in most patients after 5 years.

We present the case of a femoral atypical fracture.

P106

PERIPROSTHETIC FEMORAL FRACTURE IN OSTEOPOROTIC PATIENT

N. Pardina Lanuza¹, M. Angulo Tabernero¹, C. Tejedor Carreño¹, E. Gonzalez Buesa¹, I. Puyuelo Jarne¹, C. Laga Cuen¹

¹Hospital San Pedro, Logroño, Spain

Periprosthetic femoral fractures are becoming more common, increasing according to an increment in number of patients that present arthroplasty. Patients with periprosthetic fractures are typically elderly and frail and have osteoporosis. No clear consensus exists regarding the optimal

management strategy because there is limited high-quality research. The Vancouver classification facilitates treatment decisions. We present the case of a female patient aged 84, after a spontaneous fall, she suffered a periprosthetic femoral fracture. We expose our choice of treatment, following the current recommendations, and their results in this patient.

P107

UNSTABLE STRUCTURE TO ADJUST LOWER LIMB MOTION BASED ON OXFORD FOOT MODEL IN ORDER TO CONTROL FOOT ARTHRITIS

H. Y. Zhou¹, Y. Y. Zhang¹, Y. D. Gu¹, G. Fekete²

¹Faculty of Sports Science, Ningbo University, Ningbo, China, ²Faculty of Informatics, Eötvös Loránd University, Szombathely, Hungary

Background: Analysis of foot kinematics between unstable shoes and control shoes can determine the influence of the unstable sole structure. It may have benefit to people with foot arthritis and provide theoretical basis for motion control.

Methods: The study group consisted of 12 healthy female subjects. They were asked to walk through a 10-m experimental channel with normal speed wearing unstable shoes and control shoes, respectively. Triplanar motion of the forefoot, rearfoot and hallux during walking were determined using a three-dimensional motion analysis system incorporating with Oxford Foot Model (OFM).

Results: Compared to the control group, subjects wearing unstable shoes demonstrated greater peak forefoot dorsiflexion, forefoot supination and longer time of hallux plantar-flexion in support phase. Additionally, peak forefoot plantarflexion and rearfoot dorsiflexion were significantly smaller in unstable group than control group. The range of rearfoot motion in sagittal and frontal plane are also reduced. There is no significant difference between the groups in transverse plane.

Conclusions: The unstable shoes with unstable structural elements lead to instability of foot motions. The stimulation of unstable change the movement of foot joints. The greater forefoot supination is inferred a control effect to strephexopodia people. The stimulation also reduce the range of rearfoot motion in sagittal and frontal planes to control the gravity center. It may prevent the pain caused by foot overactivity and alleviate foot arthritis. The greater dorsiflexion and smaller motion range of hallux will maintains the shape of the grip in order to keep balance.

P108

SIMULATIONS OF DIFFERENT FOOT STRIKES CAUSING INTERNAL METATARSALS STRESS LEVEL VARIETY

J. Q. Xie¹, Y. Zhang², Y. D. Gu¹, S. R. Shao¹

¹Faculty of Sports Science, Ningbo University, Ningbo, China, ²Lodz University of Technology, Lodz, Poland

Background: Foot strike pattern is a major determinant of lower extremity loading during running. Forefoot strike and rearfoot strike are two common landing styles of running. Forefoot strike means the ball of foot impacting with ground first then the rearfoot follows during landing phase. Due to limitations of experimental approaches, comparison of internal deformation and stress of the foot structure between forefoot and rearfoot landing is still unknown.

Methods: Subject-specific geometry of the FE foot model was obtained from computer tomography of a health male foot. 3D foot model was reconstructed using mimics and then meshed by hypermesh. Then the hex and Tet combined mesh of the foot model was imported to Abaqus for finite element analysis.

Results: The first metatarsal bearing relatively high stress as well as high stress increasing rate from initial touching down to fully contact in both rearfoot and forefoot strike. In addition, the forefoot strike showed obvious higher average stress in metatarsals during entire landing phase than the rearfoot strike.

Conclusions: This study built a finite element model to evaluate internal loading responses of foot bony structure of the foot during simulated forefoot and rearfoot strike. Therefore, changing strike pattern from rearfoot strike to forefoot may increase the potential of metatarsals injury due to the high stress level and stress increasing rate. Future study may involve more foot model data to build an averaged foot geometry data.

P110

MRI-DETECTED OSTEOPHYTES OF THE KNEE: NATURAL HISTORY AND STRUCTURAL CORRELATES OF CHANGE

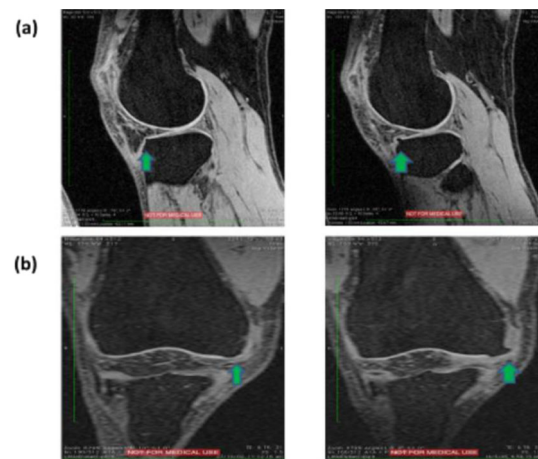
Z. Zhu¹, W. Han¹, S. Zheng¹, F. Cicutini², C. Ding¹, G. Jones¹

¹Menzies Institute for Medical Research, Hobart, Australia, ²Department of Epidemiology and Preventive Medicine, Melbourne, Australia

Objective: To describe the natural history of knee MRI-detected osteophyte (OP), and to determine if knee structural risk factors are associated with change of MRI-detected OP in a longitudinal study of older adults. **Methods:** 413 randomly selected older adults (mean age 63 years) had MRI at baseline and approximately 2.6 years later to measure knee OP, cartilage defect, cartilage volume, bone marrow lesions (BMLs), meniscal extrusion, infrapatellar fat pad (IPFP) quality score/maximum area and effusion-synovitis. Weight, height, BMI were measured by standard protocols.

Results: 85% participants had MRI-detected OP at baseline. Over 2.6 years, the average OP score increased significantly in all compartments. The total MRI-detected OP score remained stable in 53% of participants, worsened in 46% (≥ 1 -point increase) and decreased in 1%. Baseline cartilage defects (RR, 1.25-1.35), BMLs (RR, 1.16-1.17), meniscal extrusion (RR, 1.22-1.33) and IPFP quality score (RR, 1.08-1.20) site-specifically and independently predicted an increase in MRI-detected OP (p all ≤ 0.05), after adjustment for covariates. The significant associations between baseline cartilage volume and increased OPs at medial and total compartments became non-significant after further adjustment for other knee structural abnormalities. Presence of IPFP abnormality was significant associated with increased MRI-detected OPs but became nonsignificant after adjustment for other structural abnormalities. Total (RR, 1.27) and suprapatellar pouch effusion-synovitis (RR, 1.22) were both associated with increased MRI-detected OPs at the lateral compartment only (both $p < 0.04$). Age sex and smoking status were not associated with increased OPs over time.

Conclusion: Knee MRI-detected OPs are common in older adults and are likely to progress. The associations of baseline structural abnormalities with worsening MRI-detected OPs suggest MRI-detected OP could be a consequence of multiple knee structural abnormalities.



P111

THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND MRI-DETECTED OSTEOPHYTE IS MODIFIED BY COMMON RISK FACTORS FOR OSTEOARTHRITIS

Z. Zhu¹, W. Han¹, K. Wang¹, F. Cicuttini², C. Ding¹, G. Jones¹¹Menzies Institute for Medical Research, Hobart, Australia, ²Department of Epidemiology and Preventive Medicine, Melbourne, Australia

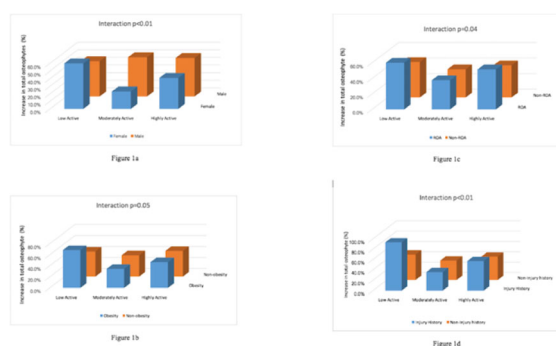
Objective: To investigate the longitudinal association between objectively measured physical activity (PA, steps per day) and knee MRI-detected osteophytes (OPs), and to test whether this relationship was modified by common risk factors for OA including gender, obesity, disease severity and knee injury history.

Methods: 408 community-dwelling adults aged 51-81 were randomly selected from local community and measured at baseline and 2.6 years later. T1-weighted fat-suppressed MRI was used to evaluate knee OPs at baseline and after 2.6 years. PA was assessed at baseline by pedometers (steps per day) and categorized as 3 groups: low active (≤ 7500 steps per day), moderately active (7500-10000 steps per day) and highly active (>10000 steps per day). Radiographs were obtained and scored for individual features of radiographic osteoarthritis (ROA). Knee injury history was recorded by questionnaire. BMI were measured using standard procedures. Log binomial regression were used in longitudinal analyses.

Results: Participants who were moderately active (7500/10000 steps per day) had a 27% reduced risk of having an increase in MRI-detected OPs, compared to those with sedentary/low activity levels (RR=0.73, $p=0.03$), after adjusting for age, sex, BMI, ROA and/or knee injury history. The protective effect of being moderate active (7500/10000 steps per day) was mostly present in females (RR=0.42, $p<0.01$), obese participants (RR=0.50, $p<0.01$), participants with ROA (RR=0.68, $p=0.02$) and participants with knee injury history (RR=0.27, $p=0.02$) (all interaction terms $p<0.05$). Highly active PA (≥ 10000 steps per day) was not associated with an increase in MRI-detected OPs in the total sample or subgroups.

Conclusions: Being moderately active is protective against an increase in MRI-detected OPs, especially in females, those with ROA, those who are obese and those with a prior history of knee injury. These findings indicate that moderately active level of PA is beneficial for individuals with risk factors for knee OA.

Figure 1. Effects of interactions between PA and potential mediators on increases in total MRI-detected OPs. There was a significant interaction on increased total OPs between (a) gender and PA; (b) obesity and PA; (c) radiographic OA and PA; (d) knee injury history and PA.



P112

BMD AND BONE METABOLISM BIOCHEMICAL MARKERS IN PATIENTS UNDER REGULAR HEMODIALYSIS

M. R. Tamadon¹, J. Moghimi¹, V. Semnani¹¹Semnan University of Medical Science, Semnan, Iran

Introduction: Chronic kidney disease (CKD) is associated with bone and mineral metabolism disorders.

Objectives: This investigation studied BMD and bone metabolism biochemical markers in patients with CKD at the hemodialysis treatment among Iranian adults and also the association between possible risk factors or biochemical parameters with BMD.

Methods: In this cross-sectional study, 77 patients with CKD stage 5D at the hemodialysis treatment, from September 2016 to February 2016 were selected. BMD was measured by DXA at the anteroposterior lumbar spine (LS) (L1-L4) and left proximal femur. Biochemical markers, including calcium (Ca), phosphorus (P), intact PTH (iPTH), serum specific alkaline phosphatase (serum AP) and 25-hydroxyvitamin D (25hD) were used for the prediction of BMD loss.

Results: Around two (2.6%) patients had normal levels of 25hD (mean levels 17.67 ± 11.66 $\mu\text{g/L}$). We found a reduction of BMD in comparison with age- and gender-matched normal population values at the FN (T-score = -1.92 ± 1.29), at the TH (T-score = -1.79 ± 1.25) and at the LS (T-score = -1.55 ± 1.84). The prevalence of T-scores ≤ -2.5 SD was 28.6%, 35.1% and 13.0% according to the LS, FN and three bone site T-scores, respectively. BMD negatively correlated with age at the proximal femur, with serum ALP at the lumbar spine and with age of menopause at the femoral neck.

Conclusion: Patients with endstage renal disease at the hemodialysis treatment had a high prevalence of osteoporosis in the general population. BMD at the all bone sites was below the expected average for gender and age.

P113

A SIMPLE METHOD TO MEASURE THE LEAKAGE OF RADIOPHARMACEUTICALS FROM SYNOVIAL JOINT SPACE DURING RADIOSYNOVECTOMY

M. Sohaib¹¹Nuclear Medicine and Oncology Division, PAEC, Islamabad, Pakistan

Radiation synovectomy is the restoration of synovia of human synovial joints as a therapy for diseases like rheumatoid arthritis, hemophilic arthropathy, osteoarthritis and other disorders with joint pain. Also referred to as radiosynovectomy or more specifically radiosynoviorthesis, it is performed by injecting a radiopharmaceutical into the joint space. The radiopharmaceuticals used for this purpose are particulate compounds that are labeled with a β -emitting radioactive isotope. After their injection into the joint cavity, such preparations are taken up by the macrophage cells in the lining of the synovial space and auto-irradiate the inflamed membrane. Ideally if all of it resides in the joint until it decays, all of its energy should be deposited in or around the joint. But there is always leakage of a portion of the compound which remains the major concern about this type of therapy.

The radioactivity injected in a cavity without any escape should disappear with the half-life of the radionuclide injected. However, if there is a progressive removal of the activity from the space, it will disappear more than physical decay process. Hence difference between the radioactivity calculated at a given time and the measured activity over the joint space will give cumulative leakage from the cavity at that time point. This simple method is presented here that uses the percent error in radioactive decay of the radionuclide injected inside the joint space.

¹⁷⁷Lu labeled hydroxyapatite particles were injected in the right knees of four rabbits which were imaged under gamma camera sequentially for about one month. A control sample comprising of ¹⁷⁷LuCl₃ from the same batch of ¹⁷⁷Lu labeled hydroxyapatite particles was similarly imaged sequentially under gamma camera. Radioactive counts were extracted from this series of digital images and decay curves were constructed on semi-log scales. Half-lives of the disappearance of radioactivity from the knee joint spaces were hence measured and compared with the control sample to determine the leakage in percentage. This method is easy to

perform that can be adopted in the clinical settings individually for each patient.

P114

MESENCHYMAL STEM CELLS IN HYALURONIC ACID SCAFFOLD IN THE ONE-STEP TREATMENT OF CARTILAGE DEFECTS

R. Hart¹, M. Komzak¹

¹General Hospital, Dept. of Orthopaedics and Traumatology, Znojmo, Czech Republic

Objective: Cartilage defects can be treated with many techniques. But there are only few of them which are generally available, not too much expensive, providing hyaline-like cartilage and especially realizable as an one-step procedure. The objective of our study was to prove the reliability of the below described technique.

Methods: In our prospective study we have used hyaluronic acid scaffold saturated with bone marrow concentrate where the mesenchymal stem cell concentration was $1.74 \times 10^4/\text{L}$ on average (range, $1.06\text{--}1.98 \times 10^4/\text{L}$). We treated 30 patients with chondral defects of femoral condyles of the knee. In all cases MRI examination was performed one year after the surgery.

Results: In all cases the scaffolds showed very good integration in the defects. No complications were observed. All but one patient achieved the normal level of their activity.

Conclusion: This technique seems to be very promising. Colleagues from Italy proved that it provides hyaline-like cartilage (Gobbi et al., Cartilage 2015), also in patients 45 years and older (Gobbi et al., Knee Surg Sports Traumatol Arthrosc 2016).

P115

RADIOLOGICAL AND CLINICAL RESULTS AFTER PLATELET-RICH PLASMA TREATMENT IN EARLY OSTEOARTHRITIS OF THE KNEE

R. Hart¹, M. Komzak¹

¹General Hospital, Dept. of Orthopaedics and Traumatology, Znojmo, Czech Republic

Objectives: Recently an articular cartilage repair has been given much attention in the orthopaedic field. Cartilage regeneration capacity is very limited. Optimal approach seems to be a delivery of natural growth factors. Autologous platelet-rich plasma (PRP) contains proliferative and chemoattractant growth factors. The objective of the present study was to determine if PRP can increase tibiofemoral cartilage regeneration and improve knee function.

Methods: 80 consecutive and strictly selected patients, affected by Grade II or III chondromalacia, underwent one year treatment (9 injections) with autologous PRP in a liquid form with 2.0- to 2.5-fold platelet concentration. Outcome measures included the Lysholm, Tegner, IKDC, and Cincinnati scores. MRI was used to evaluate cartilage thickness. To evaluate the cartilage condition (histology), arthroscopy was performed before and after the treatment. A control group of 80 patients underwent hyaluronic acid (HA) treatment.

Results: The study demonstrated significant improvement in Lysholm ($p < 0.05$), Tegner ($p < 0.05$), IKDC ($p < 0.05$), and Cincinnati ($p < 0.05$) scores in both groups. Results improved at 12 months follow-up. Cartilage assessment revealed regeneration in terms of chondrocytes and proteoglycans ($p < 0.05$). There were no adverse events reported.

Conclusions: Both, PRP and HA significantly reduced pain and improved quality of life in patients with low degree of cartilage degeneration. MRI did not confirm any significant cartilage growth. Concentration of proteoglycans and chondrocytes increased in both groups significantly.

P116

TEARS OF THE SUPRASPINATUS MUSCLE SUTURED WITH ADDED MESENCHYMAL STEM CELLS

R. Hart¹, P. Smid¹

¹General Hospital, Dept. of Orthopaedics and Traumatology, Znojmo, Czech Republic

Objective: The study was conducted as prospective randomised blinded and controlled. The objective was to demonstrate the effect of concentrated bone marrow stem cells (MSCs) to the healing of the sutured tendon of the supraspinatus muscle in comparison to the same procedure performed without MSCs.

Methods: Between 2012-2015, we included prospectively in the study 50 patients selected at random into two groups who met the indication criteria for the isolated supraspinatus rupture surgery. 25 patients in Group I received MSCs (concentration was $1.74 \times 10^4/\text{L}$ on average, range $1.06\text{--}1.98 \times 10^4/\text{L}$) filled in collagen scaffold into the tendon-bone contact point (footprint) at the site of the suture during surgery. A control group of 25 patients was treated with same open suture technique but without the use of MSCs (Group II).

Results: 13 cases (52%) in Group I showed significantly better clinical outcomes during the whole 1 year follow-up in comparison to the preoperative examination. In Group II, 11 patients (44%) showed improvement during the whole follow-up period. 6 months postoperatively average values in Group I were: 1 point for the VAS score; 72 points for the Constant score; 82 points for the ASES score. In Group II we found 1 point for the VAS score, 68 points for the Constant score, and 77 points for the ASES score. When compared results between both groups one year postoperatively, p-value for the VAS score was 0.0176, for the Constant score 0.0355, and for the ASES score 0.0846. The MRI findings at 1 year follow-up showed fully healed and well-integrated tissue of the rotator cuff tendon attachment in 17 patients (68%) in Group I, but only in 9 patients (36%) in Group II.

Conclusion: MSCs enhance the healing of the sutured supraspinatus tendon to its humeral footprint.

P117

IS MUSCLE DAMAGE LESS SUBSTANTIAL AFTER A PARASPINAL OR MIDLINE SURGICAL APPROACH TO THE LUMBAR SPINE?

R. Hart¹, D. Nahlik¹

¹General Hospital, Dept. of Orthopaedics and Traumatology, Znojmo, Czech Republic

Objective: The paraspinal posterior approach to the lumbar spine modified by Wiltse et al has been assessed as less risky in terms of wound healing problems, infection and blood loss than the standard midline approach to the lumbar spine (Street et al, J Neurosurg 2016). An intermuscular plane between the multifidus and the longissimus parts of the sacrospinalis muscle is split using this approach and that's why the surgery should be less invasive. The objective of the prospective, randomised, controlled and blinded study was to determine if there is a significant difference in muscle damage when comparing the Wiltse and midline approaches.

Methods: 40 patients were prospectively selected at random for 1- or 2-level posterolateral instrumented fusions for degenerative lumbar spine pathology through either a Wiltse (20 patients) or midline (20 patients) approach and evaluated using MRI before and 2 years after the surgery. An experienced radiologist blinded regarding to the approach used during the surgery assessed the MRI. A statistical analysis was performed to evaluate results.

Results: Before the surgery, no fatty degeneration of the paraspinal muscles was found on MRI in any patient. A fatty degeneration of the these

muscles was found in 5 cases after the Wiltse approach and in 7 cases after the midline approach ($p>0.05$).

Conclusions: Despite the description of the Wiltse approach as the less invasive, the fatty degeneration of the paraspinal muscles occurs after this approach in the same extent as after the standard midline approach.

P118

POSTPARTUM BILATERAL FEMORAL NECK FRACTURE DUE TO PREGNANCY ASSOCIATED OSTEOPOROSIS FOLLOWING THE TWIN PREGNANCY: REPORT OF A RARE CASE

M. Zabihyeganeh¹, A. Mirzaei¹, K. Gharanizadeh¹, S. Piri²

¹Bone and Joint Reconstruction Research Center, Iran University of Medical Sciences, ² National Association Of Iranian Gynecologists & Obstetrician, Tehran, Iran

Objective: Pregnancy associated osteoporosis is a rarely observed skeletal pathology, which might lead to the fractures of femur before and after delivery. Femoral venous stasis due to pressure from the pregnant uterus, marrow hypertrophy, immobilization and the ressure of pregnant uterus on the obturator nerve are the possible causes. Its potential complications can be prevented through limiting complete bed rest and prevention of weight-bearing activities. Postpartum bilateral femoral neck fracture (BFNF) is a rare condition. We report a case of BFNF due to excessive corticosteroid consumption, twin pregnancy, immobility and vitamin D deficiency.

Case presentation: The patient was a 32 year old Iranian woman with bilateral femoral insufficiency fracture five days after emergency cesarean section due to preterm labor, twin pregnancy and the history of a previous cesarean section at 33 weeks. Antenatal repeated courses of betamethasone injections for fetal lung maturity, daily oral use of prednisolone for the history of miscarriage, immobilization, and vitamin D deficiency were the important contributing factors in her past medical history and lab investigations. The BMD examination showed low bone density for the expected age. The patient was advised to discontinue breastfeeding, while her medical treatment was initiated with daily subcutaneous injection of teriparatide (20 µg/d) along with calcium and vitamin D supplementation. The fracture of right femoral neck was managed by close reduction and internal fixation along with dynamic hip screw, while CRIF and screw were used for the fixation of left femoral neck fracture.

Conclusion: Clinicians who deal with pregnant women should consider the diagnosis of BFNF in any pregnant woman with pelvic pain. Awareness of risk factors and avoiding use of excessive and unnecessary corticosteroid might help to reduce the rate of BFNF.

P119

DOSE MICROSTRUCTURAL AND MECHANICAL CHANGE EFFECT ON CHANGE OF STRESS DISTRIBUTION ON THE DISTAL FEMUR WITH OSTEOARTHRITIC CHANGE?

K. Kim¹

¹Konyang University Hospital, Daejeon, South Korea

Objective: The knee joints are weight bearing joints and have several motions in various directions. Loads applied to the distal femur are different depending on regions. The purpose of this study is to analyze regional differences of stress distribution and to evaluate the microstructural and mechanical property's effect on stress distribution on the distal femur.

Methods: Distal femur specimens were obtained from ten donors composed of ten women with OA (mean age of 65 years, ranging

from 53-79). As controls, the normal distal femur was sampled from age and gender matched donors consisting of ten women (mean age of 67 years, ranging from 58-81). The areas of interest were six regions of the condyles of the femur (lateral-anterior, middle, posterior; medial-anterior, middle, posterior). A total of 20 specimens were scanned using the µCT system. µCT images were converted to micro-finite element model using the mesh technique, and micro-finite element analysis was then performed for assessment of the mechanical properties.

Results: Stress is not different in anterior, middle and posterior section within each compartment regardless OA change ($p=0.237$). Part of microstructure parameter, which are BV/TV, Tb.Th and SMI, are different in the intersectional comparison between advanced OA group and control group ($p=0.012$). There are no difference in stress except middle-medial region between advanced OA group and control group ($p=0.285$). In middle-medial region, control group is higher stress than advanced OA group (0.002).

Conclusion: In the control group, stress is distributed differently depend on region of distal femur, but stress is evenly distributed with advanced OA change. Regional difference in microstructure are likely related to the adaptive bone remodeling for more even stress distribution in advanced OA.

P120

DOSE NAIL LENGTH EFFECT ON OPERATIVE RESULT OF ATYPICAL SUBTROCHANTERIC FEMUR FRACTURE?

K. Kim¹

¹Konyang University Hospital, Daejeon, South Korea

Objective: Severe anterior bowing of the femur can result in mismatch between the nail and the alignment of the femur. Such mismatch is a risk factor for anterior cortical perforation of the distal femur with subtrochanteric fractures, and leg length discrepancy with fractures of the femoral shaft. Moreover, there is more chance in radiation exposure during fixing distal interlocking screw in full length nail than partial length nail. The purpose of this retrospective study was to evaluate whether length of nail would influence on the radiologic and hemodynamic outcomes in the treatment of atypical insufficiency subtrochanteric fractures.

Methods: 72 consecutive fractures with atypical insufficiency subtrochanteric fractures who had undergone intramedullary fixation using proximal femoral anti-rotation nail (PFNA, diameter, 10, 11, 12 mm; length, 200,240, 300, 340, 380 mm; Synthes, Oberdorf, Switzerland) between March 2010 and March 2016 were followed up for over 12 months. Patients were classified partial nail used group (200, 240 mm) and full length nail used group (300, 340, 380 mm). For radiological assessment, time to union, change of neck-shaft angle, and leg length discrepancy (LLD) were measured. For hemodynamic parameter evaluation, operation time and total blood loss until postoperative 24 h were investigated.

Results: Radiologically, there was no significant difference between partial length nail group and full length nail group in union period, change of neck-shaft angle and LLD (in order, $p=0.429$, $p=0.273$, $p=0.359$). Clinically, there was no significant difference total blood loss but difference in operation time (in order, $p=0.249$, $p=0.034$). There were three operation related complications. One lateral cortical thinning around nail tip occurred in short nail used group. Four intraoperative iatrogenic fractures on ipsilateral side occurring nail insertion occurred in long nail used group. There was one ipsilateral secondary fracture after operation in partial nail length groups.

Conclusion: Full nail length PFNA for atypical insufficiency subtrochanter fracture was not more efficient except ipsilateral femoral secondary fracture and has disadvantage in respect of long operation time.

P121

ANALYSIS OF THE ROLE OF TOLL-LIKE RECEPTOR SIGNALING IN THE PATHOGENESIS OF RHEUMATOID ARTHRITIS

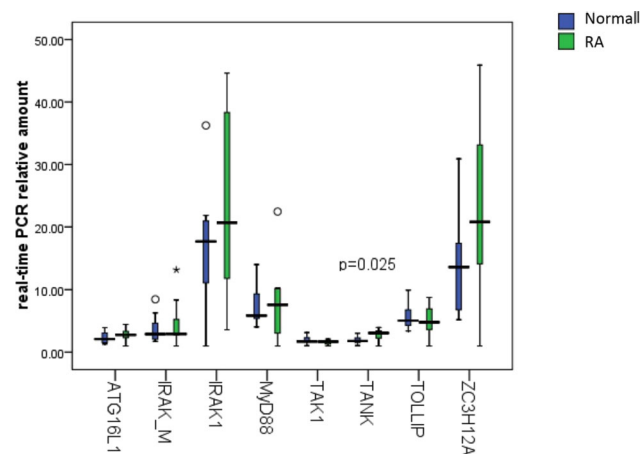
J. T. Tsao¹¹Koo Foundation Sun Yat-Sen Cancer Center, Taipei, Taiwan

Background: Toll-like receptor (TLR) activation plays an important role in regulating immune responses and has been linked to the pathogenesis of rheumatoid arthritis (RA) as TLRs expressed by cells within RA joint and a variety of endogenous TLR ligands present within the inflamed joints of RA patients.

Method: This study collected peripheral blood mononuclear cells from RA patients and normal individuals. CD4 T cells were isolated and activated with anti-CD2, anti-CD3 and anti-CD28 antibodies. Then, CD4 T cells were subsequently analyzed for mRNA expression levels of TLR signaling component genes and TLR signaling regulator genes.

Results: The results of RA patients were compared to those of normal individuals statistically. The results showed that the transcript level of most negatively regulators of TLR signaling including ATG16L1, IRAK-M, TAK-1, TOLLIP and ZC3H12A in activated CD4 T cells were not significantly different between RA patients and normal individuals, except one of the negative regulators of TLR signaling as TNF receptor associated factor (TRAF) family member-associated NF κ B activator TANK (TANK) was found to be expressed highly in RA patients than in normal individuals. The results reached statistical significance. Besides, MyD88, one of its mediators, IRAK-1, and one downstream linker molecule, TAK1, were not statistically different between RA patients and normal individuals.

Conclusions: This study showed that the regulation of TLR signaling pathway may play an important role in RA disease mechanism. One of the genes involved in TLR signaling as a regulator, TANK, become potential biomarkers of disease activity.



P122

RELATION BETWEEN FRAX INDEX AND ACPA SERUM LEVEL IN PREMENOPAUSAL RHEUMATOID ARTHRITIS PATIENTS

M. M. Hassan¹, N. A. Aboeladi², S. S. Eltawab¹¹Faculty of Medicine, Alexandria University, Alexandria, ²Faculty of Medicine, Helwan University, Cairo, Egypt

Background: Rheumatoid arthritis (RA) is the most common form of inflammatory arthritis in adults and is characterized by synovial inflammation and hyperplasia, autoantibody production: rheumatoid factor (RF) and

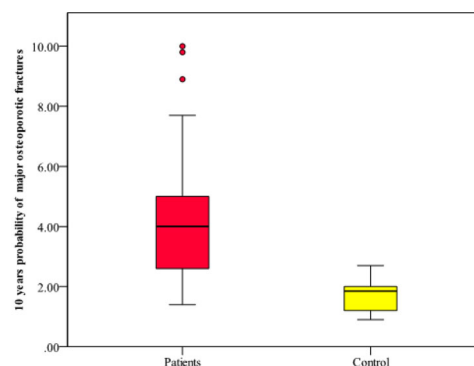
anti-citrullinated protein antibody (ACPA), cartilage and bone destruction, and systemic features, including cardiovascular, pulmonary, psychological and skeletal disorders. Fracture risk assessment tool (FRAX) is a computer-based algorithm developed by the WHO Collaborating Centre for metabolic bone diseases and first released in 2008. The outputs of FRAX are the 10-year probability of a major osteoporotic fracture (hip, spine, humerus or wrist fracture) and the 10-year probability of hip fracture.

Objective: To study the relation between fracture risk detected by FRAX and serum level of ACPA and whether the raised disease serum markers will increase the fracture risk in premenopausal RA patients or not.

Methods: The study included 25 premenopausal RA patients and 20 healthy subjects. The serum ACPA level was assessed by using ELISA technique while RF was measured by using Rose Waaler test in IU/ml. BMD (g/cm²) were measured for all subjects enrolled in the study by a Lunar Prodigy Advanced DXA scanner system and were carried out by the same technician. FRAX index was calculated for all members in both groups by using online FRAX calculator. Probability is calculated from age, sex, BMI and dichotomized risk factors comprising prior fragility fracture, parental history of hip fracture, current tobacco smoking, ever use of long-term oral glucocorticoid use, rheumatoid arthritis, other causes of secondary osteoporosis and high alcohol consumption. Femoral neck BMD also was added to enhance fracture risk prediction.

Results: 80% of our patients were ACPA positive. The range of ACPA in the patients group ranged between 11.40-525.0 U/ml. While RF range was from 8.30-648.0 IU/ml. Strong statistically significant difference between both groups was found where FRAX index was significantly higher in patients group compared to control group as regards major osteoporotic and hip fractures ($p < 0.001$). Serum ACPA and RF level showed insignificant correlation with FRAX index in premenopausal RA patients (p 0.058 and 0.564, respectively).

Conclusion: FRAX index was found to be high in RA patients but it was not correlated to ACPA nor RF serum level.



Box plot graphic representation of FRAX index (major osteoporotic fractures) in patients and control groups

P123

DIABETES MELLITUS ACCELERATES PROGRESSION OF OSTEOARTHRITIS IN STREPTOZOTOCIN-INDUCED DIABETIC MICE BY DETERIORATING BONE MICROARCHITECTURE, BONE MINERAL COMPOSITION AND BONE STRENGTH

H. Wang¹, X. Zheng¹, S. Luo¹, Z. Zha¹¹The First Affiliated Hospital of Jinan University, Guangzhou, China

Introduction: Diabetes mellitus (DM) has been demonstrated to be an independent risk factor of osteoarthritis (OA). This new phenotype “diabetic osteoarthritis” which associates the two most prevalent diseases worldwide will definitely cause significant functional impairment in activities of daily living and in the quality of life of the elderly people. The OA patients with

diabetes are more severe in symptoms and structural damage and also are younger in age for morbidity compared to the OA patients without diabetes. Additionally, diabetes increases the complications and revision rate of arthroplasty procedures. Nevertheless, there are very few studies directly addressing the potential mechanisms and the severity or progression of OA with diabetes. Recent findings have shown subchondral bone (SB) to be crucial for the initiation and progression of osteoarthritis. SB has been shown to be an important shock absorber and providing supportive functions in joints. Moreover, it plays an important role in articular cartilage metabolism. Any histopathology changes in SB will affect the biomechanical properties of the overlying joint cartilage and their intertwined biological relationship, ultimately becoming a crucial contributor to OA pathogenesis. The purpose of this study was 3-fold: 1) to develop a DM-OA mice model which would allow for clinical relevant and biological research; 2) to validate that diabetes aggravates OA pathogenesis *in vivo*; and 3) to evaluate the microarchitecture, chemical composition and biomechanical properties of SB as a consequence of the damage induced by diabetes OA.

Methods: 8 wk old male C57BL/6J mice were randomly divided into three groups: DM-OA group, OA group and sham group. After acclimatization, the DM-OA group was injected intraperitoneally with 150 mg/kg streptozotocin (STZ) to induce diabetes, while the other two groups were given a PBS vehicle. On the third day after STZ injection, glucose levels were evaluated and mice with a level above 300 mg/dL were considered diabetic. Then OA was surgically induced in the DM-OA and OA groups by transection of the anterior cruciate ligament (ACL) of the right knee. The sham group was subjected to a similar procedure without the transection of the ACL. Animals were sacrificed at 4, 8, and 12 weeks after the operation. Blood glucose levels, body weight and food intake of all animals were recorded weekly during the entire experimental period. The pancreas was stained with hematoxylin-eosin. The right knee joints from each group at all time intervals were decalcified and prepared for histological analysis, immunohistochemistry and were scored using a semiquantitative grading system (OARSI) to grade cartilage and SB degeneration. The undecalcified joints were used to evaluate the properties of trabecular SB using confocal Raman microspectroscopy to measure the chemical composition (mineral-to-collagen ratio), and microindentation to measure biomechanical properties. Additionally, μ CT imaging was performed to evaluate microarchitectural parameters, with subsequent mechanical compression of the SB to investigate fracture properties. ANOVA and the Student Newman Keuls post hoc were used for statistical analyses between the groups.

Results: Glycemic monitoring and pancreas pathological results indicated stable high blood glucose and massive destruction of pancreas and islet cells in the DM-OA group. The OARSI score of the DM-OA group joint was higher than other two groups at 8 and 12 weeks (Figure 1). The number of osteoclasts in the DM-OA group joint was higher than in the other two groups at 8 and 12 weeks. Conversely, the mineral-to-collagen ratio and microindentation elastic modulus and hardness of the DM-OA group joint was lower than other two groups at 8 and 12 weeks. Microarchitectural parameters showed bone volume fraction, trabecular thickness and BMD of the DM-OA group joint to be lower than in other two groups at 12 weeks. On the other hand, trabecular spacing and structural model index was higher compared to the other two groups at 12 weeks (Figure 2). Fracture properties, including stiffness and fracture load, of the DM-OA group were also reduced at 12 weeks.

Discussion: The glycemic and pancreatic pathological results indicated the DM-OA model to be a simple and reliable model induced by STZ and surgery. The pathology results from DM-OA group were worse compared to the other two groups at all-time points, proving diabetes to aggravate OA pathogenesis *in vivo*. Diabetes elevated the number of osteoclasts around trabecular bone and deteriorated the structure of SB. Trabecular biomechanical properties declined due to a decrease in BMD induced by metabolic derangements in the DM-OA group. All of these histopathology impairments weakened the biomechanical properties of bone and the supportive function of SB, making it more vulnerable to failure. To our knowledge, this work is the first to describe the pathogenesis of diabetic osteoarthritis through diabetes and SB.

Significance: This work proved that diabetes aggravated OA pathogenesis in a novel DM-OA mice model which could be helpful for clinical and basic science research. More importantly, the results showed the mechanisms in which diabetes accelerates OA by damaging and deteriorating the functions SB including microarchitecture, chemical composition and biomechanical properties.

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References: [1] King KB, Rosenthal AK. Osteoarthritis Cartilage 2015;23:841.

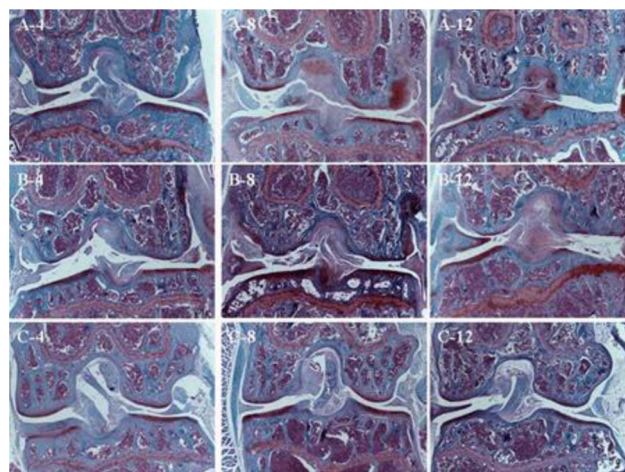


Figure 1. Histology images of knee joint from DM-OA group (A), OA group (B) and sham group (C) at each time point of sacrifice.

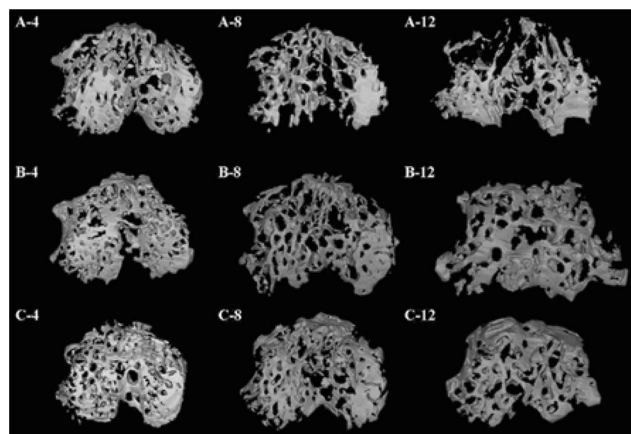


Figure 2. Tibial subchondral bone from DM-OA group (A), OA group (B) and sham group (C) were imaged with μ CT at each time point of sacrifice (4, 8 and 12 weeks after operation).

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HIP FRACTURES WITH END STAGE RENAL FAILURE PATIENTS HAVE SIGNIFICANTLY INCREASED LENGTH OF STAY WITH SUBSTANTIALLY HIGHER ACUTE HOSPITAL BILL SIZE

Y. H. Ou Yang¹, N. N. Lo¹, S. B. Koh¹, T. S. Howe¹, L. Lo², S. J. Yeo¹, A. K. Mitra¹, C. C. Chang¹, Y. L. Xu²

¹Singapore General Hospital, ²National University of Singapore, Singapore

Introduction: Recent efforts to expand bundled care payments (BCP) from elective arthroplasty surgery to hip fracture patients have been complicated by the need to account for a more heterogeneous group of patients who are generally more unwell. Renal failure has traditionally been associated with increased risks of hip fractures and adverse outcomes including peri-operative mortality. Centers with established dialysis units may receive a higher proportion of hip fractures with ESRF patients, potentially being disadvantaged by skewed healthcare financing needs. Null hypothesis: ESRF has is not associated with increased comorbidities and has no impact on length of stay (LOS), acute hospital bill size and peri-operative mortality.

Objective: This study compares hip fracture patients with ESRF undergoing surgical intervention with a matched cohort in terms of comorbidity loads, acute hospital LOS, acute hospitalization bill size and 1 year mortality.

Methods: Hip fracture and ESRF patients from June 2007 to June 2012 within a tertiary hospital were identified and matched to two other controls without ESRF based on secondary features of sex, age, fracture subtype and surgery. Data was collected for American Society of Anesthesiologist (ASA) score, duration of surgery (DOS), LOS, 30-day and 1 year mortality as well as the presence of 10 other comorbidities: diabetes mellitus (DM), hypertension (HTN), hyperlipidemia (HLD), ischaemic heart disease (IHD), arrhythmia (ARR), cerebrovascular disease (CVA), dementia (DEM), asthma (ASTH), peripheral vascular disease (PVD) and anemia (ANE) from electronic medical records. Costs were calculated for the acute hospitalization episode. Chi-square tests were used to determine significance of difference in categorical variables, and Mann-Whitney tests were used for continuous data.

Results: 41 of 46 patients with ESRF were successfully matched with 82 controls. Patients with ESRF had higher ASA scores (3 vs. 2, $p=0.0001$), had 75% higher LOS (21d vs. 12d, $p<0.0001$), were associated with 67% higher healthcare expenditure (median \$20542 vs. \$12236, $p<0.0001$), and 1 year mortality (OR 19.6, $P<0.0001$). There were no significant differences in DOS (median 60 min vs. 60 min $p=0.73$). ESRF was significantly associated with the presence of DM (OR: 2.8), HTN (OR: 3.5), IHD (OR: 3.6) and ANE (OR: 10.1) ($p<0.05$) but not with HLD, PVD, ARR, CVA, DEM or ASTH. ESRF patients had an average of 4.1 comorbidities per patient compared to 1.84 in the control group.

Conclusion: ESRF patients have more comorbidities and are less fit prior to surgery. While surgical durations are similar, they incur markedly higher acute episodic care costs with increased adverse events. The presence of the comorbidity ESRF should prompt mitigation for poorer outcomes in value-based reimbursement strategies. Risk adjustment financing should be applied to a BCP targeting hip fractures to reduce the potential for inadequate funding in centers with a higher percentage of such patients.

P125

MEDICARPIN PREVENTS POSTMENOPAUSAL POLYARTHRITIS VIA MODULATING TH17/TREG RATIO IN DBA/1J MICE

M. N. Mansoori¹, A. Raghuvanshi¹, P. Shukla¹, A. Goel¹, D. Singh¹

¹CSIR-Central Drug Research Institute, Lucknow, India

Objective: Autoimmune diseases are characterized by alteration in balance of various cytokines. Rheumatoid arthritis is well known inflammatory disease leading to destruction of cartilage at knee and hands. In this study, we have investigated the role of medicarpin a known pterocarpin with known anti-osteoclastogenic activities in postmenopausal polyarthritis model of DBA/1 mice.

Methods: For this, animals were ovariectomized and CIA was induced in Ovx animals with primary immunization. After 21 days booster dose was injected in Ovx mice to develop postmenopausal polyarthritis mice

model. Medicarpin treatment in mice was started after 21 days of primary immunization for one month of time period.

Results: Medicarpin prevents alteration of TH-17/Treg ratio in CIA model leading to reduced osteoclastogenesis which prevents cartilage erosion. μ CT analysis has demonstrated medicarpin prevents cartilage erosion in joints and prevents loss of trabeculae parameters in distal tibia. Treatment with medicarpin also prevented alteration of various cytokines level by down regulating various pro-inflammatory cytokines like TNF- α , IL-6 and IL-17A while upregulating anti-inflammatory cytokine IL-10 in CIA model of arthritis. Biological marker of arthritis is cartilage oligomeric matrix protein (COMP is considered as marker for disease severity and effect of treatment. COMP level was up regulated in CIA induced mice while treatment with medicarpin has significantly restored the serum level of COMP in CIA mice compared with untreated groups. Cartilage staining by Safranin-O also indicates the cartilage destruction in joints of CIA mice was prevented by medicarpin treatment.

Conclusion: From this study, we can conclude that medicarpin is effective in preventing arthritis in postmenopausal conditions.

P126

HERBAL EXTRACT AND FRACTIONS FROM PLANT 3002/C002 HAS OSTEOPROTECTIVE ACTION IN OVARECTOMIZED ESTROGEN DEFICIENT RAT AND PROMOTES FRACTURE HEALING

P. Shukla¹, M. N. Mansoori¹, K. Dev¹, R. Maurya¹, D. Singh¹

¹CSIR-Central Drug Research Institute, Lucknow, India

Objective: Osteoporosis is a global aging problem affecting nearly 200 million people worldwide. Main objective of the study was to identify the osteoprotective and bone healing effect in plant 3002/C002. The activity has been localized in leaf part of the plant and thus no environmental risk is associated.

Methods: For the study, animals were ovariectomized and left for 90 days for osteopenia to develop and treated with crude and fractions for 3 months. A drill-hole injury was created in sham animal. Treatment started from next day onwards at the doses of 200 mg/kg crude extract, 50 mg/kg butanolic fraction, and 50 mg/kg aqueous fraction was administered orally. Femur bones were collected for microarchitecture analysis.

Results: It was observed that ethanolic extract of leaves at 100.0 and 200.0 mg/kg body weight dose restored ovariectomy induced loss of trabecular bone microarchitecture and also improved bone biomechanical strength in osteopenic Sprague Dawley rats. Butanolic and aqueous fraction also exhibited similar effect in osteopenic rats. Apart from osteoprotective effect in osteopenic rats, ethanolic extract of leaves of plant 3002/C002 and its butanolic and aqueous fraction exhibited faster bone healing and regeneration in the rats with drill hole injury in femur diaphysis compared to untreated rats. Bone healing was observed with the extract and fraction at days as early as day 10.

Conclusion: Our studies thus support the use of ethanolic extract and fraction in indication like osteoporosis and fracture healing and other related bone disorders.

P127

WHAT ARE THE RISK-BENEFITS OF ANTI-OSTEOPOROSIS TREATMENTS?

D. F. Ferguson¹, A. H. Hassan², G. K. Konstantopoulos¹

¹Royal London Hospital, London, ²Tunbridge Wells Hospital, Pembury, UK

Background: Osteoporosis is a major public health concern in the developed world. Older women are at the highest risk of the morbidity and

mortality associated with osteoporotic fractures and as such the majority of research into anti-osteoporosis therapy has necessarily focused on women leaving men an under represented population. An array of multiple therapies exist to reduce the impact of osteoporosis each with their own unique benefits and risks. Bisphosphonates are typically the first line treatment and the benefits and risks of bisphosphonates as anti-osteoporosis treatment in men is considered within this review.

Methods: A literature search of Pubmed was performed with 16 suitable studies identified with a total study population of 2765 men. Both oral and intravenous bisphosphonate delivery methods were included.

Conclusions: Despite the global health burden there remains at present a relatively small literature base assessing the benefits and risk of bisphosphonates therapy in men. From the available studies there is good evidence to suggest the beneficial effects of improved BMD and reduced fracture rates as observed in women are transferrable to men. The association between bisphosphonate therapy and osteonecrosis of the jaw and atypical femoral fracture observed in other literature sources was not present within the material reviewed.

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EFFICACY AND SAFETY OF BISPHOSPHONATE TREATMENT IN NARESUAN UNIVERSITY HOSPITAL

A. Jarusriwanna¹, P. Assawaboonyadej¹, B. Chinwatanawongwan¹

¹Department of Orthopaedics, Faculty of Medicine, Naresuan University, Phitsanulok, Thailand

Objectives: Osteoporosis is a systemic disease of compromised bone mass and causes premature mortality by fragility fractures as the end point of the disease. Bisphosphonate was proved to increase bone strength and reduce fracture risk. This study was aimed to evaluate the efficacy of bisphosphonate treatment in osteoporosis patients in Naresuan University Hospital, a tertiary care teaching hospital in the lower northern region of Thailand.

Methods: A retrospective review of 120 patients who met indication of osteoporosis treatment and received bisphosphonate during May 2015 and June 2016. The outcomes of this study were the percent change of BMD at lumbar spine, femoral neck, and total hip after one year of treatment. The major adverse events which occurred during medication and led to discontinuation of drug administration were reported.

Results: Most patients were female with an average age of 69 ± 9.3 years. The primary bisphosphonate prescription was generic alendronate (88.3%). The percent change of BMD increased at all sites after one year of bisphosphonate treatment (lumbar spine 5.56 ± 13.41 , p -value < 0.001 ; femoral neck 2.38 ± 8.44 , p -value $= 0.016$; total hip 2.24 ± 6.18 , p -value $= 0.001$). Patients with stable, increased, and decreased BMD after treatment were shown at Table 1. The adverse effects were reported in patients who received a monthly risedronate, with none of the events occurred in a weekly alendronate administration.

Conclusions: A bisphosphonate treatment should be encouraged and provided in patients with osteoporosis with a rigorous protocol and follow-up plan. A monthly medication should be prescribed with caution of adverse effects which might occur during treatment.

BMD sites	Overall bisphosphonate treatment	Alendronate 70 mg/week				
Increased	Stable	Decreased	Increased	Stable	Decreased	
Lumbar spine	67 (65.7%)	24 (23.5%)	11 (10.8%)	65 (67%)	22 (22.7%)	10 (10.3%)
Femoral neck	27 (25.5%)	65 (61.3%)	14 (13.2%)	26 (25.5%)	63 (61.8%)	13 (12.7%)
Total hip	27 (25.5%)	69 (65.1%)	10 (9.4%)	26 (25.5%)	66 (64.7%)	10 (9.8%)

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VERTEBRAL FRACTURES IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

V. V. Vadzianava¹, A. P. Shepelkevich², E. E. Malevich¹, A. N. Mikhailov¹, N. S. Karytska², N. A. Vasilyeva³

¹Belarusian Medical Academy of Postgraduate Education, ²Belarusian State Medical University, ³Republican Medical Rehabilitation and Balneotherapy Centre, Minsk, Belarus

Objective: The assessment of the vertebral fractures (VFX) in patients with type 1 diabetes mellitus (T1DM) up to 50 years.

Methods: We examined 97 patients with T1DM (28 males, 69 females, age: $31 (24.9-37.7)$ y, duration of DM: $11(7-19.5)$ y, HbA1c: $8.6 (7.1-10)\%$, BMI: $23.1 (21.9-25.7)$ kg/m²). The control group consisted of 77 healthy age- and BMI-matched persons (20 males, 57 females). BMD and VFX were measured with DXA.

Results: T1DM patients had lower BMD both at spine (T1DM $0.4((-1.6)-0.4)$ vs. controls: $0.3((-0.7)-0.8)$, $p=0.001$, respectively) and at femoral neck (T1DM: $-0.6((-1.5)-0)$ vs. controls: $0.1((-0.5)-0.7)$, $p<0.001$, respectively), higher prevalence of VFX (T1DM: 18.56%, $n=18$ vs. controls: 1.3%, $n=1$, $F=0.076$, $p<0.001$, respectively) compared to controls. 38.9% ($n=7$) T1DM patients had VFX in spite of Z-score BMD higher than -2, and herewith 9 patients had 2-3 VFX of different types at the same time. With OR and 95%CI there is a high risk of VFX in patients with T1DM compared with the control

group (OR=3.28, 95%CI=1.28-8.44). Age, diabetes duration, age of diabetes manifestation and the prevalence of chronic complications were not different between T1DM patients with and without VFX. T1DM patients with VFX had lower BMD (Z-score) both at spine (T1DM with VFX: $-1.7((-2.3)-(-1.0))$ vs. T1DM without VFX: $-0.3((-1.1)-0.5)$, $p<0.001$, respectively) and at femoral neck (T1DM with VFX: -1.4 ± 1.1 vs. T1DM without VFX: -0.5 ± 1.05 , $p=0.002$, respectively) and higher daily insulin dose per kg (T1DM with VFX: $0.89(0.76-1.25)$ vs. T1DM without VFX: $0.69(0.54-0.9)$, $p=0.010$, respectively). In the logit regression analysis VFX were associated with BMD spine and daily insulin dose or BMD femoral neck and daily insulin dose.

Conclusions: Type 1 diabetic patients have low BMD, high prevalence of VFX. VFX were associated with BMD spine and femoral neck and daily insulin dose.

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VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES MELLITUS

V. V. Vadzianava¹, A. P. Shepelkevich², E. E. Malevich¹, A. N. Mikhailov¹, N. S. Karytska², N. A. Vasilyeva³

¹Belarusian Medical Academy of Postgraduate Education, ²Belarusian State Medical University, ³Republican Medical Rehabilitation and Balneotherapy Centre, Minsk, Belarus

Objective: To assess the frequency of occurrence of vertebral fractures (Vfx) in type 2 diabetes mellitus (T2DM) postmenopausal women.

Methods: We examined 94 T2DM women, age: 59.6(55.1-63.2) y, duration of DM: 7(4.5-11) y, duration of menopause 8.5(4-13) y, HbA1c: 7.3(6.6-9.8%). The comparison group (gr.) consisted of 89 women without DM (age: 58.3 (52.8-61.2) y, duration of menopause 8(3-11) y). BMD at lumbar spine and femoral neck and Vfx were measured with DXA. Nonvertebral fractures were self-reported.

Results: It has been established that the BMD (T-score) of the lumbar spine (T2DM: -1((-1.9)-0.1) vs. comparison gr.: -0.8((-1.8)-0.1), $p=0.815$, respectively) and of the femoral neck (T2DM: -0.7((-1.3)-0.2) vs. comparison gr.: -0.7((-1.3)-0.1)), $p=0.730$, respectively) in patients with T2DM is comparable with the comparison group, while the BMD of the proximal femur is higher in women with T2DM (T2DM: 0.3((-0.7)-1.4) vs. comparison gr.: -0.1((-0.9)-0.7) $p=0.037$, respectively). Vfx occur statistically significantly more often in patients with T2DM (T2DM: 19.15%, $n=18$ vs. comparison gr.: 7.87%, $n=7$, $X^2=4.935$, $p=0.026$). In patients with type 2 diabetes considering the OR and 95%CI, the high risk of Vfx 1, 2, and 3 degrees has been found in comparison with the women without DM (OR=2.77, 95%CI=1.098-7.012). The obtained results testify to the larger frequency of retinopathy ($p=0.039$), height reduction of >3 cm after 40 y ($p<0.001$), previous low-energy fractures ($p<0.001$) in group of T2DM with the presence of Vfx in comparison with the T2DM without Vfx.

Conclusions: Vfx statistically occur significantly more often in women with T2DM regardless of BMD. The obtained results testify to the larger frequency of retinopathy, height reduction of >3 cm after 40 y, previous low-energy fractures in group T2DM with the presence of Vfx.

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PREOPERATIVE OSTEOARTHRITIS INFLUENCES MID-TERM RESULTS FROM ARTHROSCOPIC PARTIAL MENISCECTOMY IN PATIENTS OVER 40 YEARS OLD

H. Fujii¹

¹Joint Replacement Center, Ogori Daiichi General Hospital, Yamaguchi City, Japan

Objective: The operative indication for arthroscopic partial meniscectomy (APM) has been controversial. In this study we investigated mid-term results from APM in patients over 40 years of age and assessed the influence of co-existing preoperative osteoarthritis on the results.

Methods: Eighty-three knees for APM in patients aged >40 years were included in the study. The mean age at surgery was 61.0 years. Medial meniscus tear was found in 63 knees and lateral meniscus tear in 20 knees. X-rays, an observer-based knee scoring system from the Japanese Orthopaedic Association (JOA score) and visual analogue scale (VAS) were assessed preoperatively for each patient, as well as at 6 months postoperatively and at the final visit (mean of 5.8 years after surgery, range 3-11 years). The Kellgren-Lawrence grading scale (K-L grade) was used to assess osteoarthritis in standing anteroposterior radiographs.

Results: At the final visit, 53 of 83 patients (63.9%) showed good clinical results with VAS<3.0 and JOA score ≥ 80 . Radiographically, 51 of 83 patients (61.4%) showed good results with the change of K-L grade being ≤ 1 and no bilateral difference. The relationship between the severity of preoperative osteoarthritis and postoperative results for APM was investigated. The proportion of patients with good clinical and radiographical results was 59% for light OA (0 to 1 in K-L grade), 43% for moderate OA (2 in K-L grade), and 11.8% for severe OA (3 to 4 in K-L grade).

Discussion: Short-term results of APM for middle-aged patients without osteoarthritis were recently reported as showing no significant benefit compared to sham surgery or nonoperative treatment. Even for patients judged to have light to moderate osteoarthritis using the Western Ontario

and McMaster universities osteoarthritis index, APM did not show significantly better results after 6 months follow up compared to patients receiving physical therapy only. Interestingly, 30% of patients who received physical therapy only wanted to undergo APM at the conclusion of the study. In summary, we report the severity of preoperative osteoarthritis strongly influenced the postoperative results for APM in patients older than 40 years. Therefore, the indication for APM should be determined carefully in conjunction with co-existing preoperative osteoarthritis.

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GEOMETRIC PARAMETERS OF THE FEMUR IN MEN WITH TYPE 1 DIABETES MELLITUS

V. V. Vadzianava¹, A. P. Shepelkevich², E. E. Malevich¹, A. N. Mikhailov¹, N. S. Karytska², N. A. Vasilyeva³

¹Belarusian Medical Academy of Postgraduate Education, ²Belarusian State Medical University, ³Republican Medical Rehabilitation and Balneotherapy Centre, Minsk, Belarus

Objective: Bone strength is determined by many components including BMD and bone architecture (geometry). The aim of this study is to assess the geometric parameters of the femur in men with type 1 diabetes mellitus (T1DM).

Methods: We examined 24 males, age: 29.5(23.5-37.8) y, duration of DM: 12.5(8-21.5) y. HbA1c: 9.5(8.6-10.1)%, BMI: 22.3(20.9-25.1) kg/m². The control group consisted of 20 healthy age- and BMI-matched males. BMD at femoral neck was measured with DXA. Geometric parameters were determined using Advanced Hip Analysis program.

Results: BMD (Z-score) of the femoral neck in the group of men with T1DM was significantly lower (T1DM: -1((-1.8)-(-0.1)) vs. controls: -0.2((-0.5)-0.6), $p=0.002$, respectively) compared to the control group. Previous low-energy fractures occurred more frequently in men with T1DM (T1DM: $n=5$ (20.8%) vs. controls: $n=0$ (0%), $F=0.107$, $p=0.039$, respectively). The hip axis length, femur strength index, neck-shaft angle in both groups were comparable. In men with T1DM such geometric parameter as cross-sectional area (CSA) was significantly lower compared to the control group (T1DM: 159(136-180) vs. controls: 183.5(161.5-202.5), $p=0.005$ - left femur; T1DM: 166(139.5-178) vs. controls: 189(160.5-207.5), $p=0.009$ - right femur, respectively). Geometric parameter cross-sectional moment of inertia (CSMI) was significantly lower in men with T1DM (T1DM: 15930(10435-18263) vs. controls: 17309(14405-22585), $p=0.043$, respectively) compared to the control group only in left femur with equal of dispersion.

Conclusions: In men with T1DM, geometric parameter CSA was statistically lower than in the control group. The geometrical parameter CSMI was lower in male with T1DM only in left femur. The results of our own research potentially indicate the structural changes of the hip geometry in men with T1DM. A larger study had to be performed to confirm these data.

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THE STRUCTURAL CHANGE EVALUATION IN THE FEMUR GEOMETRY IN WOMEN WITH TYPE 1 DIABETES MELLITUS

V. V. Vadzianava¹, V. V. Zhukouskaya², A. P. Shepelkevich³, E. E. Malevich¹, N. S. Karytska³

¹Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus, ²Department of Clinical Medicine and Surgery, Division of Endocrinology, University of Naples, Naples, Italy, ³Belarusian State Medical University, Minsk, Belarus

Objective: Hip geometry parameters are interrelated with hip strength and risk of fractures (Fx). Since type 1 diabetic (T1D) patients are at

higher fracture risk in comparison to general population, the aim of study was to assess whether femur geometric parameters are connected with Fx in T1D females.

Methods: We examined 68 T1D 31 yrs old (25-37.6) females with disease duration of 11 (7-17) yrs and the average HbA1c equal to 8.5 (6.9-10.4)%. The control group consisted of 53 healthy age- and BMI-matched females. BMD was measured with DXA at lumbar spine and femoral neck. Nonvertebral fragility Fx were self-reported, and vertebral fractures (VFX) were analyzed with DXA. Geometric parameters were determined using Advanced Hip Analysis program. CSI-compression strength index and BSI –bending strength index were calculated using the formulas of Karlamangla.

Results: T1D females had lower BMD at femoral neck (T1D: Z-score -0.5((-1.1)-0.2) vs. controls: Z-score 0.1 ((-0.6)-0.7), $p=0.006$, respectively), higher frequency of fragility Fx (T1D: $n=10$ vs. controls: $n=2$, $p=0.042$, respectively), VFX (T1D: $n=12$ vs. controls: $n=1$, $p<0.01$, respectively) compared to controls. T1D females had shorter hip axis length (HAL) than in control group (HAL 106(100.2-110.2) T1D vs. 107.5(105.2-110.8) control, $p=0.035$, respectively). When evaluating the femoral neck strength indices, T1D females had lower CSI (4.5(3.9-5.3) T1D vs. 4.92(4.49-5.47) control $p=0.012$, respectively) and ISI (0.29(0.25-0.34) T1D vs. 0.32(0.29-0.37) control, $p=0.008$, respectively) compared to control group. T1D females with VFX had lower CSMI (cross-sectional moment of inertia) (T1D with VFX: 7836 (6533-10377) vs. T1D without VFX 10140(8770-12522), $p=0.035$, respectively) and CSA (cross-sectional area) (T1D with VFX: 122(104-137) vs. T1D without VFX 144(129-165) $p=0.006$, respectively) compared with T1D females without VFX.

Conclusions: Hip geometry structural changes might potentially predispose to higher fracture risk in T1D females.

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PROGNOSTIC FACTORS IN HIP FRACTURES: WHAT IS THE IDEAL PATIENT PROFILE FOR AN OPTIMAL TREATMENT OUTCOME

K. G. Makridis¹, S. E. Zourntou¹, T. S. Karachalios², L. S. Badras³, K. N. Malizos²

¹IASO Thessalias, Larisa, ²University of Thessaly, Larisa, ³IASO Thessalias, Volos, Greece

Objectives: To determine the prognostic factors that affect the postoperative evolution after a hip fracture and define the ideal patient profile for an optimal treatment outcome.

Methods: From 2008-2012, 800 patients were recorded, of whom 498 (62.2%) were women and 302 (37.8%) were men. The mean age of the patients was 81.3 years (range 60-95) and the mean BMI 25.6 (range 19.5-33.5). The clinical assessment included both objective and subjective assessment scales. Sixteen parameters were analysed as potential risk factors (sex, BMI, age, fracture type, time to operation, hospitalization days, iron intake, haemoglobin levels, transfusion, albumin levels, anti-osteoporotic drugs, Charlson index, ASA score, physical therapy, dementia and social environment).

Results: Mean follow-up was 70 months (range 1-96). Patients showed clinical improvement, but hip functionality did not reach the preoperative levels. Anti-osteoporotic medication is an independent factor for improving mobility, daily life activities and quality of life. Dementia levels is critical and should be always evaluated. Sex, BMI, fracture type, hospitalization days, transfusion, haemoglobin levels, iron intake, albumin levels, physical therapy and social environment did not prove to be independent factors for the functional outcome. Kaplan-Meier analysis showed better survival rates with the use of DHS and anti-osteoporotic drugs regarding hardware complications. No difference in survival rates was found regarding the type of the fracture, type of hemiarthroplasty and sex. Mortality rate is higher in patients >80 years and with ASA III or IV.

Conclusions: Patients <80, with low dementia levels, having an operation within the first 48 h, with an ASA I-II and receiving anti-osteoporotic treatment may constitute the ideal patient profile for an optimal treatment.

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COMPARING TWO INTRAMEDULLARY DEVICES FOR TREATING TROCHANTERIC FRACTURES: A PROSPECTIVE STUDY

K. G. Makridis¹, S. E. Zourntou¹, T. S. Karachalios², L. S. Badras¹

¹IASO Thessalias, Larisa, ²University of Thessaly, Larisa, Greece

Objectives: Intertrochanteric fractures are surgically treated by using different methods and implants. The optional type of surgical stabilization is still under debate. However, between devices with the same philosophy, different design characteristics may substantially influence fracture healing. This is a prospective study comparing the complication and final functional outcome of two intramedullary devices, the intramedullary hip screw (IMHS) and the ENDOVIS nail.

Methods: 215 patients were randomized on admission in two treatment groups. Epidemiology features and functional status was similar between two treatment groups. Fracture stability was assessed according to the Evan's classification. 110 patients were treated with IMHS and 105 with ENDOVIS nail.

Results: There were no significant statistical differences between the two groups regarding blood loss, transfusion requirements and mortality rate. In contrast, the number of total complications was significantly higher in the ENDOVIS nail group. Moreover, the overall functional and walking competence was superior in the patients treated with the IMHS nail.

Conclusions: These results indicate that the choice of the proper implant plays probably an important role in the final outcome of surgical treatment of intertrochanteric fractures. IMHS nail allows for accurate surgical technique, for both static and dynamic compression and high rotational stability. IMHS nail proved more reliable in our study regarding nail insertion and overall uncomplicated outcome.

P136

MANAGEMENT OF INFECTION AFTER INTRAMEDULLARY NAILING OF LONG BONE FRACTURES: TREATMENT PROTOCOLS AND OUTCOMES

K. G. Makridis¹, S. E. Zourntou¹, P. V. Giannoudis²

¹IASO Thessalias, Larisa, Greece, ²Leeds University, Leeds, UK

Objectives: To collect and analyse the existing evidence related to the incidence and management of infection following intramedullary (IM) nailing of long bone fractures and to recommend treatment algorithms that could be valuable in everyday clinical practice.

Methods: We searched the PubMed Medline databases, from January 1992 to December 2012, to retrieve relevant articles reporting on the management of infection following IM nailing of long bone fractures. We manually searched the bibliographies of identified articles and we also used the “related articles” options in PubMed Medline. We restricted our research to studies in English. The keywords used in the subject headings search included: “intramedullary” and “nailing” and “infection”.

Results: 1270 articles were found related to the topic during the last 20 years. The final review included 28 articles that fulfilled the inclusion criteria. Only few prospective studies were found to report on the management of infection following IM nailing of long-bone fractures.

Conclusions: Stage I infections only require antibiotic administration with/without debridement. Stage II infections can be successfully treated with antibiotic nails, exchange nailing or removal of the nail after fracture union and IM reaming. Infected nonunions are best treated with exchange

nailing, antibiotic administration with/without grafting at a later stage. Stage III infected nonunions can successfully be treated with nail removal and Ilizarov frame application, especially when large bone defects exist.

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CLINICAL AND MRI RESULTS IN 67 PATIENTS OPERATED FOR GLUTEUS MEDIUS AND MINIMUS TENDON TEARS WITH A MEDIAN FOLLOW-UP OF 4.6 YEARS

K. G. Makridis¹, S. E. Zourntou¹, P. Djian², M. Lequesne², H. Bard²

¹IASO Thessalias, Larisa, Greece, ²Clinique Nolle, Paris, France

Objectives: Although various techniques can be used to repair gluteal tendon tears, the long-term outcome is unclear and published studies typically involve only a small number of patients. The goals of this study were to determine (1) if functional improvement can be obtained, (2) if the repairs are continuous based on MRI, and (3) which factors determine success.

Methods: 73 patients were operated on between 2003-2010. Of these patients, 67 (62 women, 5 men) were available for review consisting of functional clinical tests and MRI of the hip and pelvis. A double-row repair was performed on all tendon tears, no matter the type of injury. Age, BMI, fatty degeneration and muscle atrophy were also evaluated to determine if these variables affected the outcome.

Results: The average follow-up was 4.6 years (range 1-8). The pre-operative scores had improved at the last follow-up: (1) pain (VAS): 8.7 ± 1.1 vs. 1.7 ± 2.7 at the follow-up ($P < 0.001$), (2) Lequesne index: 12.3 ± 2.6 vs. 4.0 ± 4.0 at the follow-up ($P < 0.001$), (3) Harris hip score: 50.5 ± 8 vs. 87.9 ± 15.5 at the follow-up ($P < 0.001$). There were 11 failures (16%) including two repeat tears that were reoperated successfully. In the other 56 patients, the MRI showed no signs of the initial tear or bursitis. Of the four factors (age, BMI, fatty degeneration, muscle atrophy) that were potential predictors of the outcome, only muscle atrophy had a negative impact on functional outcome ($P < 0.05$).

Conclusions: Using an open double-row technique to repair gluteal tendon tears led to 85% of patients having good clinical results with significant improvement in symptoms and disappearance of abnormal findings on MRI. This technique can be used with all types of tendon tears, but should be performed before muscle atrophy sets in.

P138

ARTHROSCOPIC RETROGRADE OSTEOCHONDRAL AUTOGRAFT TRANSPLANTATION FOR CARTILAGE LESIONS OF THE TIBIAL PLATEAU: A PROSPECTIVE STUDY

K. G. Makridis¹, S. E. Zourntou¹, A. Wajsfisz², P. Djian²

¹IASO Thessalias, Larisa, Greece, ²Clinique Nolle, Paris, France

Objectives: To present a detailed description of arthroscopic retrograde osteochondral autograft transplantation of the tibial plateau as well as to provide its advantages and disadvantages in comparison with other techniques.

Methods: Four patients (3 men and 1 woman; mean age, 31.2 years) suffering from tibial plateau cartilage lesions underwent surgery. In each case, the lesions were caused by sports injuries. There were 3 lateral and 1 medial tibial plateau defects. The International Knee Documentation Committee (IKDC) score and Knee injury and Osteoarthritis Outcome Score (KOOS) were recorded preoperatively and postoperatively. Radiological assessment was made by plain radiographs, CT arthroscans, and MRI.

Results: The mean follow-up was 55 months (range, 52-60). The mean preoperative IKDC score was 53.5 (range, 37-66), while the mean postoperative IKDC score at final follow-up was 95.4 (range, 93.1-97.7). Regarding the KOOS calculation, there was significant improvement concerning each parameter after surgery. All patients were satisfied with the surgical procedure and returned to their previous activity level.

Postoperative imaging showed very good adaptation and incorporation of the osteochondral autografts.

Conclusions: Treatment of tibial plateau cartilage defects with arthroscopic retrograde osteochondral autograft transplantation could be performed on a routine basis in clinical practice. The results were encouraging and showed good incorporation of the graft, a minimal failure rate, and satisfactory functional outcomes of patients.

P139

NO DIFFERENCE IN OSTEOARTHRITIS AFTER SURGICAL AND NONSURGICAL TREATMENT OF ACL-INJURED KNEES AFTER 10 YEARS

K. G. Makridis¹, S. E. Zourntou¹, D. Tsoukas²

¹IASO Thessalias, Larisa, ²Hygeia Hospital, Athens, Greece

Objectives: To record and compare the functional and activity level as well as the manifestations of osteoarthritis after isolated ACL ruptures between patients with conservative treatment and ACL reconstruction with hamstrings tendon graft.

Methods: 32 patients diagnosed with ACL rupture were recorded. Clinical examination included the Tegner and Lysholm activity scale, the International Knee Documentation Committee Subjective Form and KT-1000 arthrometer. Narrowing of the medial and lateral joint spaces was assessed using the IKDC knee examination score.

Results: Median follow-up was 10.3 years (range 10-11). Fifteen patients were conservatively treated (median age 33 years, range 25-39). Seventeen patients were operated (median age 31 years, range 20-36). There was significant difference between the mean values of IKDC scores in favour of the ACL-reconstruction group of patients, 86.8 (SD 6.5) vs. 77.5 (SD 13.8), respectively ($p = 0.04$). The mean value of anteroposterior tibial translation was 1.5 mm (SD 0.2) for ACL-reconstruction group of patients, while the corresponding mean value for ACL-conservative group was 4.5 mm (SD 0.5), $p = 0.03$. Four patients in ACL-reconstruction group had radiological findings of grade C or D according to IKDC form. In ACL-conservative group, five patients presented similar signs (n.s.).

Conclusions: ACL reconstruction using hamstrings autograft resulted in better functional outcome and laxity measurements than ACL-conservative management. However, the incidence of radiological osteoarthritis was similar between the two groups and independent on the pre-operative grade of laxity and functional status of the patients. Equally, bone bruises were not found as a risk factor for the development of osteoarthritis after ACL rupture.

P140

THE RESULTS OF COMBINED TREATMENT OF THE DIFFUSE FORM OF THE PIGMENTED VILLOUS-NODULAR SYNOVITIS OF THE KNEE JOINT

V. Protsenko¹, V. Chomeyi¹

¹State Institution "Institute of Traumatology and Orthopedics of NAMS of Ukraine", Kiev, Ukraine

Objective: Pigmented villous-nodular synovitis is a tumor-like disease of soft joint tissues with a benign course characterized by the growth of the synovial membrane, the formation of brown knots in the tendons and/or joints with the deposition of hemosiderin, the formation of villi. It is more common at the age of 20-50 years, distinguishes between local and diffuse forms. It occurs outside the joint in 9.2 cases and in 1.8 cases within the joint per 1 million of the population. Causes of the disease in half of the cases are trauma and local disturbance of lipid metabolism. Fertilization of pigmented villous-nodular synovitis is observed in 2.5% of cases and may be transformed into fibrosarcoma, which is polymorphic sarcoma or synovial sarcoma. Localized lesions are more common than diffuse and account for 77% of the total number of lesions. The ratio of

the local form to diffuse is 3.3/1. Diffuse form of pigmented villous-nodular synovitis affects mainly the knee joint (66-80%).

Methods: Combined treatment (surgery and radiotherapy) was performed in 19 patients with diffuse pigmented villous-nodular synovitis of the knee joint. At the first stage, surgical treatment was performed in form of total sinocapsule-ectomy, radiotherapy on the second stage. Radiation therapy was carried out at the radiological departments 3 weeks after the operation. A single dose of radiation therapy was 1.5-2.0 Gray, the total dose was 25 Gray. The most important task of the postoperative period was restoration of joint function. For this purpose, from the 2nd day after the operation, the patients proceeded to isometric muscle strains, and from the 5th day to active movements of the affected joint. Joint development was carried out during the day, in addition, the fixation of the joint was assigned in the position of the maximum achieved flexion or extension. Within 1.5-2 months after the operation, the joint relief regimen was prescribed, the patients moved only with the help of crutches, then gradually switched to walking with a cane. During the period of irradiation, the patients maintained the regimen of joint relief and continued physiotherapy exercises.

Results: As a result of combined treatment complications were not revealed, relapses of pigmented villous-nodular synovitis were detected in 2 (10.52%) patients, degeneration into synovial sarcoma was observed in 1 (5.26%) patient. In cases of synovial sarcoma, the treatment was carried out according to the protocol of treatment of soft tissue sarcomas (polychemotherapy, radiation therapy, surgery).

Conclusion: The use of combined treatment allows to avoid recurrence of the process and to obtain a satisfactory functional result.

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VITAMIN D: APPLICATIONS EN TRANSPLANTATION RÉNALE

B. A. Benglia Abderrezzak¹

¹hopital militaire d'oran.algerie, Oran, Algeria

Introduction: Les atteintes ostéo-articulaires sont parmi les plus fréquentes complications iatrogènes de la transplantation rénale et sont à l'origine de douleurs et d'un handicap souvent importants, altérant la qualité de vie des patients et amoindrissant le bénéfice global de la transplantation. L'ostéoporose peut être prévenue et traitée, notamment par les suppléments en calcium et vitamine D et surtout l'utilisation des bisphosphonates. Chez les patients transplantés rénaux, l'insuffisance en vitamine D, définie comme une concentration sérique de 25(OH)-vitamine D inférieure à 30 ng/ml, est très fréquente puisqu'elle concerne plus de 80% des patients. le dosage de vitamine D permet de prévenir les atteintes ostéo-articulaires.

l'objectif du travail: étudier l'Insuffisance en 25OHD après transplantation rénale (<30 ng/ml)

matériels et méthodes:

-Etude prospective.

-N=30 patients greffés.

- Évolution des concentrations sériques de 25(OH)D, de PTH, de calcémie totale et de phosphatémie dans le groupe traité (A) et dans le groupe contrôle (B). Entre le quatrième et le sixième mois après la greffe, les PTR du groupe traité ont reçu du cholécalférol à raison de 100 000 UI tous les 15 jours pendant 2 mois.

les résultats:

une posologie de vitamine D3 de 25 000 UI/mois (soit l'équivalent de 830 UI/j) administrée pendant les 12 mois suivant la transplantation rénale à 30 PTR s'est révélée insuffisante pour atteindre le seuil de 30 ng/ml de 25(OH)D (concentration sérique de 25(OH)D=24,5±12,8 ng/ml avant traitement et 26,8±9,3 ng/ml après traitement. Nous avons montré que la correction de l'insuffisance en vitamine D après transplantation rénale nécessitait la prescription de doses élevées de vitamine D native, tant en traitement de correction qu'en traitement d'entretien

Conclusion: Outre ses effets endocriniens classiques sur le métabolisme phosphocalcique, la vitamine D a de nombreux effets non

phosphocalciques qui concernent, pour la plupart d'entre eux, des pathologies fréquemment rencontrées après la transplantation rénale. Il existe actuellement peu d'études contrôlées vs. placebo confirmant les effets extra-osseux de la vitamine D. Dans la population générale, comme chez les PTR, la correction de l'insuffisance en vitamine D pourrait réduire le risque de fractures de multiples façons.

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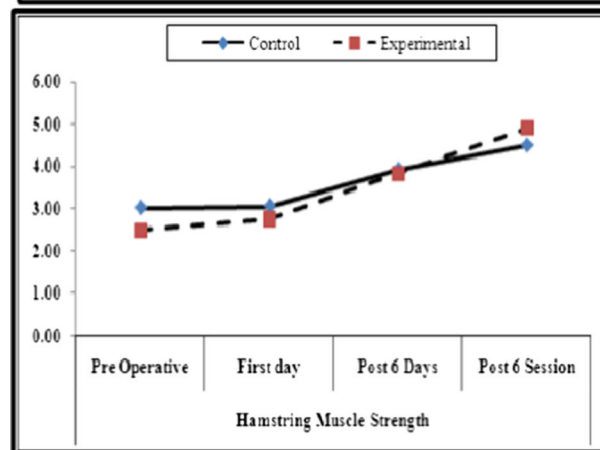
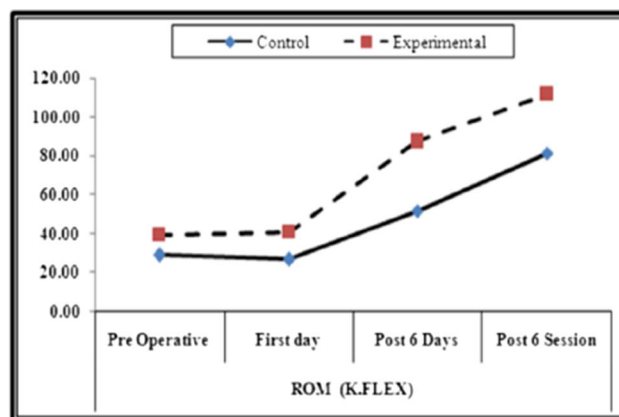
EFFECT OF CONTINUOUS PASSIVE MOTION (CPM) EXERCISES ON POST TOTAL KNEE ARTHROPLASTY (TKA) REHABILITATION

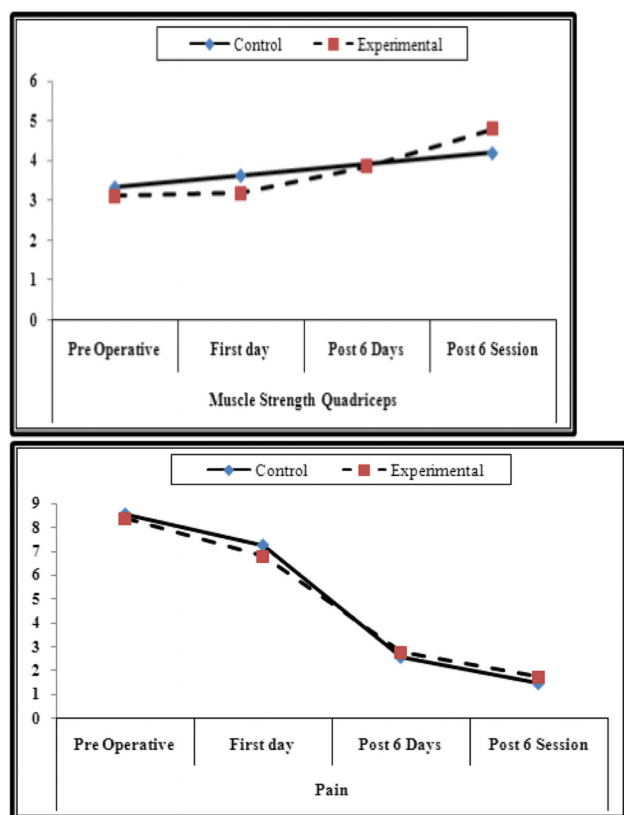
A. Alobaidi¹, A. Mahmood¹

¹Private Clinic, Baghdad, Iraq

Objective: To evaluate the role of CPM exercises developed in the rehabilitation program applied postoperatively for TKA patients

Methods: 120 patients (mean & SD age, 56.17 & 8.04 years, body mass 32.33 & 7.10 kg/m), 100 females and 20 males participate in this controlled clinical trial. The study sample had been referred to the Medical City Teaching Hospital in Baghdad, Iraq from Oct. 2016 till Sept. 2017 for unilateral TKA, diagnosed with knee osteoarthritis regardless the etiology. The sample was divided into two groups: Control group (60 patients) treated by traditional physical therapy rehabilitation program, the other 60 patients (Experimental group) were treated by traditional physical therapy plus CPM exercise program from the 1st day after surgery. The level of pain by visual analogue scale (VAS), range of knee motion (ROM) and strength of both quadriceps and hamstring muscles for both groups were measured pre- and post-operatively. The responses were scored accordingly and the mean value of the whole group on each scale were calculated and analyzed by using Friedman test.





Discussion: The highly significant improvement in muscle strength of both the quadriceps and hamstrings and ROM of the knee were noticed clearly after finishing the 6th rehabilitation session following discharge, the same results was found regarding the pain in spite of the insignificant reduction during the 6 postoperative days.

Conclusions: Failure to achieve proper rehabilitative flexion following TKA can cause considerable pain and scar tissue and ultimate dissuading of the patient from effective joint motion. By introducing CPM exercises to the post TKA rehabilitation program the problem of pain and stiffness of the knee would not be a concern.

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CALCIDIOL [25(OH)D₃]: FROM DIAGNOSTIC MARKER TO THERAPEUTICAL AGENT

M. L. Brandi¹

¹Department of Surgery and Translational Medicine, University of Florence and FIRMO Foundation, Florence, Italy

Involuntal osteoporosis, the most common form of bone fragility, results from age-related impairment of the muscle/skeletal strength. Over time the individual's capacity to build bone and muscle decreases, as the synthesis of vitamin D and of its metabolism, with consequent decline of

calcium absorption and increased resorption of bone tissue. The control of the "hormone" vitamin D levels through an appropriate supplementation becomes central in the intervention in involuntal osteoporosis syndrome.

The measurement of serum levels of calcidiol still represents the preferred biomarker for the assessment of the vitamin D status, even though a vitamin D standardization program is currently underway to make the measurement of calcidiol accurate and comparable over time, location and laboratory. Accumulated evidences indicate a threshold level range of serum calcidiol between 21-30 ng/ml to be recommended in fragile seniors, especially before commencing any antiresorptive therapy.

The most common form of vitamin D supplementation used today is cholecalciferol, also known as native or parental vitamin D₃, however not sufficient to correct rapidly vitamin D deficiency unless administered as megadose bolus. Today evidences have been accumulated to advise to avoid administration large doses of cholecalciferol to seniors at increased risk of fragility fractures.

Calcidiol, the direct precursor of the active vitamin D₃, calcitriol, and also a very hydrosoluble product can represent an alternative strategy to enhance circulating serum vitamin D levels. The administration of calcidiol is preferable in several conditions, as in alteration of the enzyme 25-hydroxylase, in intestinal malabsorption, in obesity, in hypogonadism, etc. In recent controlled pharmacokinetic studies calcidiol was shown to be superior when compared to cholecalciferol, providing evidence also its higher effectiveness in several clinical endpoints.

In a recent study the short-medium term efficacy of calcidiol as well its safety on multiple parameters related to mineral and bone metabolism was proven in postmenopausal women.

Altogether these evidences make calcidiol a good alternative to cholecalciferol in the treatment of the widespread vitamin D deficiency/inadequacy and related musculoskeletal consequences and even the supplement of choice when specific conditions hamper the efficacy of parental vitamin D.

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OSTEOPOROSIS IN MALES: EDUCATION TO POPULATION AND PROFESSIONALS ABOUT A CASE

I. Puyuelo Jame¹, N. Pardina Lanuza¹, C. Laga¹

¹Medical resident, Traumatology, Hospital San Pedro, Logroño (La Rioja), Spain

Osteoporosis is considered a "woman's disease" because its prevalence and fracture rate are much higher in women than in men. This, mainly, is due to differences in DMO, bone size and strength between men and women. It should be noted that, although women fracture more frequently, men tend to have worse results after fractures, which, among other things, is due to the fact that they present lower treatment and prevention rates than women, in terms of osteoporotic fractures. In addition to that it has been proved that an additional education on osteoporosis in men is necessary, both in health professionals and in the rest of the population. We review this statement from the presentation of a clinical case based on a 53-year-old male patient who came to the emergency room for back pain without current trauma. As a personal history, we find with a crushing L1 two years ago. Reviewing the clinical history it shows us that the patient has not received treatment for osteoporosis at any time and that he was only prescribed a corset for the acute treatment of this fracture. We performed a RX thoracolumbar spine and a TAC, finding the crushing of five vertebrae, last thoracic and first lumbar. In addition, it presents a T-score of -2.55.

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CLINICAL ASPECTS OF DETERMINING ANTIBODIES TO FIBRONECTIN IN PATIENTS WITH RHEUMATOID ARTHRITIS

O. A. Rusanova¹, I. P. Gontar¹, O. I. Emelyanova¹, A. N. Krasilnirov², I. A. Zborovskaia¹¹Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovsky", ²Federal State Budgetary Educational Institution of Higher Education "Volgograd State Medical University" of the Ministry of Healthcare of the Russian Federation, Volgograd, Russia**Objectives:** Determining fibronectin and related antibodies in blood serum of individuals with RA using fibronectin-based high-capacity immobilized magnetocontrollable adsorbents.**Methods:** 117 patients with RA were examined at Municipal Hospital 25 in Volgograd. Low disease activity was noted in 12%, moderate in 56.4%, and high in 31.6% of patients. The level of antibodies to fibronectin was determined using an original variety of immunoenzyme assay with magnetocontrollable adsorbents.**Results:** Correlation analysis revealed an association between the concentration of antibodies to fibronectin, and ESR ($r=0.27$, $p<0.03$), circulating immune complex ($r=0.43$, $p<0.05$), the index of exudative inflammation, and the degree of pain syndrome ($p<0.05$). The level of plasma fibronectin in the control group was 351.0 ± 65.1 $\mu\text{g/ml}$, the average concentration of specific antibodies in donor sera was 0.031 ± 0.0029 absorbance units. A concentration of plasma fibronectin exceeding normal values was detected in 39 patients with RA. Patients with low activity of the disease showed plasma fibronectin content of 522.8 ± 25.9 $\mu\text{g/ml}$, patients with moderate activity 520.9 ± 56.9 $\mu\text{g/ml}$, in those with high activity it was 556.5 ± 58.0 $\mu\text{g/ml}$. The mean concentration of serum antibodies to fibronectin in patients with RA was 0.095 ± 0.014 absorbance units, which was higher than the value in the control group ($p<0.05$). In the group with low activity of the disease the mean concentration of serum antibodies to fibronectin was 0.067 ± 0.02 absorbance units, in the group with moderate activity 0.090 ± 0.02 absorbance units, and in the group with high activity 0.114 ± 0.014 absorbance units.**Conclusions:** An elevated content of antibodies to fibronectin can serve as a criterion of severity of the condition.

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PREDICTING EFFICACY OF DENOSUMAB TREATMENT IN JAPANESE ELDERLY PATIENTS WITH OSTEOPOROSIS

S. Ota¹, Y. Okamoto¹, Y. Joyo¹, T. Doi¹¹Department of Orthopaedic Surgery, Shizuoka Medical Center, National Hospital Organization, Shizuoka, Japan**Objective:** Denosumab (DMB), a human monoclonal antibody to RANKL, was approved in 2013 in Japan for osteoporosis. DMB was increased BMD by inhibition of bone resorption. However the predictor of the efficacy has not been investigated. The aim of this study was (1) to investigate the efficacy of DMB treatment in BMD and bone turnover markers (BTM) in Japanese elderly patients with osteoporosis, and (2) to analyze the influencing factors on increasing BMD to predict the efficacy of DMB.**Methods:** A retrospective chart review was conducted of Japanese osteoporotic patients who start DMB administration (60 mg subcutaneously every 6 months) over 2 years. A total of 101 patients were identified (22 males and 79 females; mean age, 81.8 ± 8.4 years) and were measured BMD of lumbar spine (L-BMD) and femoral neck (F-BMD) and BTMs (serum intact type I procollagen N-propeptide (PINP), serum undercarboxylated osteocalcin (ucOC) and serum tartrate-resistant acid phosphatase-5b (TRACP5b)) every 6 months during the DMB treatments. We divided the patients into 2 groups;responder (defined as the percent change of L-BMD $>2.5\%$ at 6 months or F-BMD $>2\%$ at 12 months) and nonresponder, and clarify the influencing factors for the responder using t-test or chi-square test.**Results:** L-BMD significantly increased by $2.5\pm4.8\%$ ($P<0.05$) change from baseline at 6 months after the treatment. F-BMD was delayed in increase by $2.2\pm5.7\%$ ($P<0.05$) at 12 months. BTMs were rapidly reduced at 6 months after the treatment (TRACP5b; 321 ± 135 at 0 month and 266 ± 106 MU/dl at 6 months, PINP; 106 ± 58 and 37 ± 18 ng/ml, ucOC; 6.6 ± 4.6 and 3.2 ± 3.1 ng/ml at 6 months, respectively, $P<0.05$). The responders of L-BMD had significantly higher values of TRACP5b (responders; 371 ± 220 , nonresponders; 289 ± 121 MU/dl) and ucOC (responders; 6.5 ± 8.6 , nonresponders; 3.8 ± 3.0 ng/ml) before DMB administration ($P<0.05$), and significantly decreased ucOC change from baseline at 6 months (responders; -48 ± 36 , nonresponders; $-19\pm80\%$, $P<0.05$). The responders of F-BMD had significantly decreased PINP change from baseline at 6 months (responders; -51 ± 35 , nonresponders; $-31\pm43\%$, $P<0.05$).**Conclusion:** DMB treatment was rapidly effective in increase of BMD. Percent change of BTM at 6 month might be useful in predicting the effectiveness of BMD response to the therapy.

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MOLECULAR HYDROGEN AS AN EMERGING THERAPEUTIC TOOL FOR SEVERAL DISEASES INCLUDING INFLAMMATORY DISEASES

R. A. Amir¹¹Centre de Santé des Fagnes, Chimay, Belgium**Objective:** Potential therapeutic effects of molecular hydrogen for a wide range of disease models and human diseases have been investigated since 2007. Prominent effects are observed especially in oxidative stress-mediated diseases including neonatal cerebral hypoxia, Parkinson's disease, ischemia/reperfusion of spinal cord, heart, lung, liver, kidney and intestine.**Methods:** The effects, have been reported in essentially many organs covering 31 disease categories that can be subdivided into 166 disease models, human diseases, treatment-associated pathologies and pathophysiological conditions of plants with a predominance of oxidative stress-mediated diseases and inflammatory diseases.**Results:** Collation of the 321 original articles reveals that most communications address the anti-oxidative stress, anti-inflammatory, and anti-apoptotic effects. Moreover, medical studies and scientific research have indicated that consumption of molecular hydrogen and specifically hydrogen water can provide a better quality of life for people in many circumstances for instance in the case of patients treated with radiation against cancerous cells. The FDA has recently issued a notice that molecular hydrogen is generally regarded as safe to be formulated in beverages. Reactive oxygen species or free radicals are one of the major offenders to render oxidative damage to biological macromolecules. The non-toxicity at high concentrations and rapid cellular diffusion features of molecular hydrogen ensure the feasibility and readiness of its clinical translation to human patients. Hydrogen water at a concentration of 1.6 mg/L would have more "antioxidant" molecules than 100 mg of vitamin C, as there are more total molecules in 1.6 mg of hydrogen compared 100 mg of vitamin C. Reduced water produced by electrolysis of tap water has a higher pH (8.5-9.5), lower oxidation reduction potential, lower dissolved oxygen and higher dissolved hydrogen than non-electrolyzed water.**Conclusion:** Many further studies are required to improve our capabilities and technical difficulties in preparing a high concentration of hydrogen water for the patients and optimisation of the modalities of treatment taking in account the difference between acute and chronic diseases. Further large-scale and long-term clinical studies are expected to demonstrate clearly the effects of hydrogen in humans.

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10-YEAR FRAX CALCULATIONS WITH AND WITHOUT FEMORAL NECK BMD IN MEXICAN POPULATION

T. Flores¹, P. Clark², E. Denova²¹Clinical Epidemiology Research Unit, Hospital Infantil de México Federico Gómez, ²Faculty of Medicine, Universidad Nacional Autónoma de México (UNAM), Mexico City, Mexico

Introduction: The WHO has recommended the FRAX algorithm, to compute the 10-year probability of major fracture. FRAX models could be computed including or not including the estimation of BMD. However, the use of FRAX, particularly in the absence of BMD, has been subject of some debate.

Objective: To calculate and compare the 10-year probability of major and hip fracture using FRAX algorithm with and without femoral neck BMD in Mexican population.

Methods: In the present analysis 413 men and 405 women of the Latin American Vertebral Fracture Study (LAVOS) were included. Briefly, a random sample of Mexican adult population (from Puebla) were visited in their homes and a trained interviewer applied a questionnaire to obtain information about demographics, lifestyle factors, and risk factors for osteoporosis. Additionally, DXA scan from the hip and spine were performed. Finally, fracture probabilities (with and without BMD) were computed with the FRAX algorithm for Mexican population.

Results: In general, the 10-year probability of major and hip fracture using FRAX algorithm, including or not including BMD, were higher in women than in men. In men, the 10-year probability, among patients with a previous vertebral fracture, of major osteoporotic and hip fracture were higher when we used FRAX without femoral neck BMD (5.6 vs. 4.4 and 3.1 vs. 1.9 respectively, $P<0.001$).

FRAX® ESTIMATES	Men			Women		
	Vertebral fracture		p*	Vertebral fracture		p*
	YES Median (min-max)	NO Median (min-max)		YES Median (min-max)	NO Median (min-max)	
Major Fracture	5.60 (5.11-7.17)	4.10 (4.47-5.07)	0.001	11.00 (9.93-13.43)	7.00 (7.81-9.08)	0.001
Hip Fracture	3.10 (2.63-4.42)	1.40 (1.90-2.41)	0.001	4.70 (4.41-6.91)	1.70 (2.69-3.49)	0.001
Major Fracture with neck DMO	4.40 (4.40-6.93)	4.00 (4.24-4.86)	0.178	11.00 (10.78-15.35)	7.45 (8.25-9.72)	0.002
Hip Fracture with neck DMO	1.90 (2.05-4.40)	1.20 (1.65-2.17)	0.501	4.60 (4.50-8.16)	1.80 (2.82-3.88)	0.001

Conclusion: Our data suggest that the use of clinical risk factors alone in the calculation of FRAX provides some discriminative values in the categorization of major and hip fracture risk.

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DXA-BMD DYNAMICS RATHER THAN ASSESSMENT OF DXA AND FRAX-RISK AT ONE POINT IS MORE ADEQUATE TO INTEGRATE THE CLINICAL PICTURE OF MENOPAUSAL NONFUNCTIONING ADRENAL TUMORS WITH POTENTIAL AUTONOMOUS CORTISOL SECRETION

M. Carsote¹, R. Petris¹, O. Radu², A. Valea³, N. Dumitru¹, A. Ghemigian¹, C. Dumitrache¹, D. Paun¹¹C.I. Parhon National Institute of Endocrinology, Departments of Gonads, Bone and Adrenals, Bucharest, ²C. Davila UMPH, Bucharest,³Clinical County Hospital, Department of Endocrinology, Cluj-Napoca, Romania

Objective: Nonfunctioning adrenal tumours (NFAT) or incidentaloma may display autonomous cortisol secretion without franc Cushing's syndrome features but potential bone damage especially for high-risk subjects as menopausal women. Aim was to compare BMD and 10-year absolute risk of fracture based on FRAX-included factors like prevalent fractures, age, alcohol intake, etc. (www.sheffield.ac.uk) in subjects $\pm$ NFAT; to compare BMD changes after 2 years in patients with NFAT $\pm$ tumour removal.

Methods: This is a retrospective study (between 2012-2017), at a tertiary centre of endocrinology; inclusion criteria: menopause for at least 12 months, informed written consent, and confirmation of NFAD. Exclusion criteria: prior diagnosis of osteoporosis, or specific medication for it; active cancers/bone metastases; clear secretor adrenal tumours. BMD is provided by a Lunar Prodigy DXA; NFAD diagnosis is based on adrenal tumour at computed tomography with negative secretor pattern except for inadequate suppression after 1 mg overnight dexamethasone (DXM) suppression test: second day morning plasma cortisol between 1.9-5 μ g/dL (normal <1.8 μ g/dL) $\pm$ suppressed or low-normal ACTH (adrenocorticotrophic Hormone) normal levels between 3-66 pg/mL. Statistical analyze used SPSS23 (significance at $p<0.05$).

Results: Baseline data included 160 patients (27% of them with NFAT=group I; 118 without NFAT=group II or control group). Transversal evaluation between group I and II showed similar age (58.8 vs. 60.6 y, $p=0.29$), and years since menopause (14, $p>0.05$); higher cortisol after DXM test (2.3 vs. 1.8 μ g/dL, $p<0.05$), and lower baseline ACTH (13 vs. 18 pg/mL, $p<0.05$), similar lumbar, femoral neck and hip BMD (1.032 vs. 1.021 g/cm²; 0.859 vs. 0.876 g/cm²; 0.884 vs. 0.955 g/cm², $p>0.05$), and FRAX-based major osteoporotic, respective hip fracture risk (3.86 vs. 4.59%, vs. 0.95 vs. 1.2%, $p>0.05$). Longitudinal data included: group I-I (34 patients with NFAT conservatively treated) and I-II (8 subjects with tumour removal). Group I-I had lower BMD after 2 years for all sites: lumbar- $p<0.00001$; neck- $p<0.001$; hip- $p<0.00001$; for group I-II BMD increased one year after surgery for all sites ($p=0.001$) and decreased during the following year but remained higher than pre-operative.

Conclusion: BMD loss is observed after 24 months of conservative management for NFAT while its increase is registered after 12 months since adrenalectomy.

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RELATIONSHIP BETWEEN SERUM LEVELS OF LEPTIN AND HOMOCYSTEINE IN RHEUMATOID ARTHRITIS PATIENTS WITH OR WITHOUT EXTRA-ARTICULAR MANIFESTATIONS

Y. Abdelmotaleb Gazar¹, M. Magdy Ghit¹¹Rheumatology Department, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Objective: To determine the relationship and correlation between serum homocysteine and leptin levels in patients with rheumatoid arthritis (RA) without extra-articular manifestation (nonExRA) (Group-A) and RA patients with extra-articular manifestation (ExRA) (Group B) and disease progression.

Methods: 80 patients diagnosed as rheumatoid arthritis (according to ACR/EULAR 2010 classification criteria) and selected as follows: (Group A) 40 patients without extra articular manifestation (nonExRA) and (Group B) 40 patients with variable extra-articular manifestation (ExRA), control group (C) another 40 apparently healthy persons as controls. RA patients were divided into three groups based on disease activity scores in 28 joints (DAS-28) as low disease activity, moderate disease activity, and high disease activity groups. Of the patients

(nonExRA), 11 (27.5%) had low disease activity (DAS-28=2.6-3.2), 15 (37.5%) had moderate disease activity (DAS-28=3.2-5.1), and 14 (35.0%) had high disease activity (DAS-28≥5.1). Laboratory investigations were performed for all patients, including determination of hemoglobin concentration (Hb), erythrocyte sedimentation rate (ESR), and C-reactive protein. Serum concentrations of tTNF- α , IL-6, homocysteine and leptin were measured.

Results: Significant differences were found between RA patients (group A + group B) and controls healthy group (group C) with regard to the mean levels of Hb, ESR, TNF- α and IL-6 ($p<0.05$). As regards to serum leptin, nonsignificant level differences between healthy control group (20.43±8.73 ng/ml) and patient groups (group II and III) (22.43±7.73 ng/ml), while a statistically significant higher mean level serum homocysteine concentration ($p<0.05$) was found in patients (group A and B) (11.79±8.72 μ mol/L) than in control (group C) (8.8±1.58 μ mol/L).

Significant differences were found between non ExRA (group A) and ExRA (group B) with regard to the mean levels of Hb, ESR, TNF- α and IL-6 ($p<0.05$). A statistically nonsignificant difference in mean level of serum leptin concentration ($p>0.05$) was found in group A (22.43±5.73 ng/ml) than in group B (24.43±5.73 ng/ml). While a significant mean level of serum homocysteine concentration (P value <0.05) was found in group B patients (19.43±1.08 μ mol/L) than in group A (11.79±13.05 μ mol/L) ($p<0.05$). Positive significant correlations were detected between serum homocysteine and ESR, TNF- α , IL-6, and DAS-28 ($p<0.05$) in group B. While no correlation was found between serum homocysteine and CRP ($p>0.05$). Multiple linear regression analysis showed that DAS-28 and ESR were the main variables associated with serum homocysteine in RA patients ($p<0.05$).

Conclusion: Serum leptin cannot be considered of value as an inflammation marker in monitoring RA patients. Serum homocysteine can be used as a marker for probability of extra-articular complication of RA.

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APPLICATION OF QUANTITATIVE BONE SCAN USING KBONE VALUES TO IDENTIFY REGIONAL BONE METABOLISM CHANGES IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN TREATED EITHER WITH ALENDRONATE OR TERIPARATIDE

B. Garg¹, V. Dixit¹, G. Parida¹, S. Sen¹, H. C. Sati¹, R. Kumar¹

¹AIIMS, New Delhi, India

Context: Safety and efficacy of teriparatide and alendronate in the treatment of postmenopausal osteoporosis.

Design and setting: This was an experimental study conducted at Department of Orthopaedics, All India Institute of Medical Sciences, New Delhi.

Objectives: To compare and analyze the visual changes in the whole body 99mTc-MDP bone scan images in patients receiving either alendronate (AL) or teriparatide (TP) with bone scans at baseline, 3 and 12 months of treatment. Our secondary aim was to analyze these bone scan changes with bone turnover markers level in serum as well.

Methods: A total of 14 postmenopausal women with osteoporosis were included followed by written consent. Diagnosis of osteoporosis was made by DXA scan (T-score <-2.5 or below). Patients were categorized into two treatment groups (group 1 & 2) by random allocation methods. Group 1 and 2 were designated as AL arm and TP arm, respectively. The changes recorded in patients were observed at baseline, 3 and 12 months of therapy either with AL or TP. Patients were injected with 600 MBq 99mTc-MDP and diagnostic bone scan images were assessed at 3.5 h. Additionally, whole-body scans at (10 min, 1, 2, 3 and 4 h), further analyzed for 99mTc-MDP skeletal plasma clearance (Kbone). Regional Kbone differences were obtained for the whole skeleton and following six regions (calvarium, spine, pelvis,) lower extremities, upper extremities

and whole skeleton sites. Bone turnover markers for bone resorption such as urine NTx, BCTx and bone formation markers such as BSAP and PINP were also measured for further correlation with observed regional bone scan changes. Two-sample Wilcoxon rank-sum (Mann-Whitney) test was used. Data are represented in median (min-max) values and p -value was considered significant as <0.001 .

Results: The mean age, height and weight of patients were 59.68±8.01 y, 149.17±6.00, and 54.88±9.40, respectively. The BMD, PTH, vitamin D, calcium, ALP and phosphorous were 3.9±0.8 g/cm³, 49.23±17.30 pg/ml, 48.40±34.33 ng/ml, 9.17±0.54 mg/dl, 194.62±73.38 Ka/IU and 4.05±0.98 mg/dl, respectively. Upon comparison of different regional bone changes in two groups, values were analyzed within and between groups at scheduled follow-ups.

Conclusion: By and large, TP & AL provides comparable results but TP therapy seems moderately better than alendronate for the improvement at specific regional bones. However, it would be too early to frame a conclusion due to small sample size were studied. None the less, AL being equally effective with affordable and thus may be kept preferred among populations.

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LABORATORY MARKERS OF INFLAMMATION IN PATIENTS WITH RHEUMATOID ARTHRITIS

Y. Akhverdyan¹, B. Zavadovsky¹, J. Polyakova¹, L. Seewordova¹, I. Zborovskaya¹

¹Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology", Volgograd, Russia

Objective: To study relationship between serum levels of nicotinamide phosphoribosyltransferase and laboratory markers of inflammation in patients with rheumatoid arthritis (RA).

Methods: We determined nicotinamide phosphoribosyltransferase level in sera of 140 patients with RA (96 women and 44 men) by indirect enzyme-linked immunosorbent assay (RaiBiotech, cat No. EIA-VIS-1). The control group consisted of 20 women and 10 men aged 22-55 y without complaints of pain in the joints throughout life. The mean duration of disease was 5.94±0.37 y.

Results: We divided all RA patients into 2 groups: one group (118 patients) with elevated levels of nicotinamide phosphoribosyltransferase serum (>3.9 ng / ml) and second group (22 patients) with normal range. In each of the two groups, the levels of CRP and ESR were determined. Patients with elevated levels of Nampt had the following laboratory parameters (M+m): ESR 37.83±1.57, CRP 56.09±3.73 (rate - <5.0 mg/l). The second group had following data: ESR 22.46±0.56, CRP 21.65±1.38. Thus, patients with elevated levels of nicotinamide phosphoribosyltransferase had significantly higher concentrations of ESR and CRP ($p<0.001$).

Conclusions: There is the relationship between the level of nicotinamide phosphoribosyltransferase serum and laboratory markers of inflammation in RA (CRP and ESR). The data indirectly confirm the hypothesis that increased levels of nicotinamide phosphoribosyltransferase in RA patients is associated with disease activity.

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DIETARY PROTEIN INTAKE ABOVE THE CURRENT RDA AND BONE HEALTH: A SYSTEMATIC REVIEW AND META-ANALYSIS

T. C. Wallace¹, C. L. Frankenfeld²

¹Department of Nutrition and Food Studies, ²Department of Global and Community Health, George Mason University, Fairfax, USA

Objectives: Dietary intake of protein is fundamental for optimal acquisition and maintenance of bone across all life stages; however, it has been hypothesized that intakes above the current recommended dietary allowance (RDA) might be beneficial for bone health.

Methods: We utilized the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines when preparing and reporting this systematic review and meta-analysis. A literature search strategy through April 11, 2017, was developed for the following 3 databases: PubMed, Ovid Medline, and Agricola. Included studies were those randomized controlled trials and prospective cohort studies among healthy adults ages 18 and older that examined the relationships between varying doses of protein intake at or above the current U.S. RDA (0.8 g/kg/d or 10–15% of total caloric intake) from any source on fracture, BMD/bone mineral content, and/or markers of bone turnover.

Results: Twenty-nine articles were included for data extraction (16 randomized controlled trials and 13 prospective cohort studies). Meta-analysis of the prospective cohort studies showed high vs. low protein intakes resulted in a statistically significant 16% decrease in hip fractures (standardized mean difference D 0.84, 95%CI, 0.73, 0.95; I2 D 36.8%). Data from studies included in these analyses collectively lean toward the hypothesis that protein intake above the current RDA is beneficial to BMD at several sites.

Conclusions: This systematic review supports that protein intakes above the current RDA may have some beneficial role in preventing hip fractures and BMD loss. There were no differences between animal or plant proteins, although data in this area were scarce. Larger, long-term, and more well-controlled clinical trials measuring fracture outcomes and BMD are needed to adequately assess whether protein intake above the current RDA is beneficial as a preventative measure and/or intervention strategy for osteoporosis.

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NEW APPROACH IN TREATMENT OF COMORBID OSTEOPOROSIS

V. I. Strukov¹, A. I. Kislov¹, N. V. Eremina¹, R. T. Galeeva¹, M. N. Maksimova¹, D. G. Elistratov², O. V. Jones³

¹Penza Institute of Advanced Training of Doctors, Penza, Russia, ²LLC "Parapharm", Penza, Russia, ³Mansfield Medical Center, Fort Worth TX, USA

Objective: Comorbid osteoporosis is relevant to polypragmasia. Aim was to investigate drugs of the Osteomed group for personified therapy of osteoporosis (Op).

Methods: From 2006–2017 observed were 167 women at the age of 47–88 years with comorbid Op with 3 and more diseases. Patients were divided into 2 groups: I (79 patients) was treated with various bisphosphonates to suppress osteoclast activity, plus Ca carbonate 500 mg, vitamin D₃ 500 IU per tablet 2 times per day during 12 months; to support bone cells, the II group (88 patients) received anabolic, i.e., one of 3 drugs of the Osteomed group, by the same procedure as in the I group. Osteomed 1 (1 tablet contains Ca citrate - 500 mg, drone brood - 50 mg) was prescribed to patients with the mild forms of Op with deficiency of mineralization. Osteomed Forte was prescribed for patients with severe Op, low BMD, cavity formations and bone fractures: 1 tablet twice a day. (1 tablet contains Ca citrate 500 mg, vitamin D₃ 500 IU, drone brood 100 mg). In patients with excess weight, BMD was insignificantly decreased, but they had often deficiency of vitamin D. They received Osteovit D₃ 1 tablet twice a day (1 tablet contains vitamin D₃ 1000 IU, drone brood 100 mg). BMD was determined by the X-ray method before and after the treatment. Criteria of effectiveness of treatment were: ability of the drug to increase BMD, to close or reduce the size of cavity formations, improvement of hormonal status, and absence of new fractures. Statistical analysis of obtained data was performed using the program Stat Soft for Windows XP.

Results and discussion: The most of patients of both groups showed improvement after treatment. However, the 2nd group of women receiving anabolic steroid Osteomed Forte demonstrated better results: closing and decrease of cavities was noted in 75 ±6% patients, in comparison with 12±3% in the 1st group (p<0,05). BMD increased from -2.8±0.2 CO to -1.7±0.15 CO (p<0.005). Concentration of general testosterone in the 2nd group heightened from 1.15±0.40 to 2.4±0.5 nmol/l, in the 1st group from 1.15±0.40 to 1.3±0.6 nmol/l (p<0.05). We explain the received result by the fact that combined use of Ca citrate, vitamin D and drone brood contribute to bone remodeling normalization, mineralization of bones due to improvement of hormonal status, possibility of individual approach in therapy, and decrease of a polypragmasia.

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OBJECTIVELY MEASURED PHYSICAL ACTIVITY IN RELATION TO BODY COMPOSITION AND SARCOPENIA: FINDINGS FROM THE HERTFORDSHIRE SARCOPENIA STUDY

L. D. Westbury¹, H. P. Patel¹, R. M. Dodds², H. E. Syddall¹, A. M. Baczynska², S. C. Shaw¹, E. M. Dennison¹, H. C. Roberts², A. A. Sayer³, C. Cooper¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ²Academic Geriatric Medicine, University of Southampton, Southampton, ³NIHR Newcastle Biomedical Research Centre, Newcastle University and Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle, UK

Objective: To examine the cross-sectional associations between objectively measured physical activity and both body composition and sarcopenia among older people participating in a population-based UK cohort study.

Methods: Physical activity was measured over 7 days using the GENEActiv accelerometer for 32 men and 99 women (aged 74–84 years) who participated in the Hertfordshire Sarcopenia Study (HSS). Minutes per day spent in nonsedentary and moderate-to-vigorous (MVPA) physical activity levels were derived. Body composition was ascertained using DXA; muscle strength by grip dynamometry; and customary walking speed over 3 m was measured as a marker of muscle function. Sarcopenia was defined according to the EWGSOP diagnostic algorithm. Linear and Poisson regression was used to examine the associations between physical activity measures and the following outcomes: fat mass, appendicular lean mass index, grip strength, walking speed and sarcopenia. Men and women were pooled and gender- and fully-adjusted associations, accounting for anthropometric and lifestyle characteristics, were explored.

Results: Participants spent a median (inter-quartile range) of 181.3 (117.2, 237.1) min/d engaging in nonsedentary activity but only 10.1 (2.1, 21.9) min/d in MVPA. An increase in nonsedentary time was associated with reduced fat mass (p<0.001), increased appendicular lean mass index (p=0.03), faster walking speed (p=0.001) and decreased risk of sarcopenia (p=0.02); associations regarding fat mass, walking speed and sarcopenia were robust in fully-adjusted analyses. For example, a standard deviation increase in non-sedentary time was associated with a reduction in the risk of sarcopenia of 36% (95%CI: 2%, 58%) and an increase in walking speed of 0.27 (95%CI: 0.08, 0.46) SDs in fully-adjusted analyses. Associations regarding MVPA were weaker. Physical activity was not associated with grip strength.

Conclusion: Physical activity at all intensity levels in later life may have a beneficial impact on adiposity and protect against sarcopenia. Targeted exercise interventions may help to decelerate age-related declines in musculoskeletal fitness.

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GIANT CELL TUMOR OF THE BONE: HER3/ PHER3 AS TARGET FOR NEO-ADJUVANT THERAPY WITH DENOSUMABJ. Baldi¹, V. Laquintana², D. Attala³, U. Tarantino⁴, R. Biagini¹, R. Falcioni⁵, C. Zoccali¹¹Regina Elena National Cancer Institute, Orthopedics, Rome, ²Regina Elena National Cancer Institute, Pathological Anatomy, Rome, ³Sant'Anna Hospital, Orthopedics, Pomezia, ⁴University of Rome "Tor Vergata", Policlinico Tor Vergata, Orthopedics, Rome, ⁵Regina Elena National Cancer Institute, Rome, Italy

Objectives: The giant cell tumor (TCG) of the bone accounts for approximately 4-5% of all primitive bone tumors; locally aggressive, expresses a tendency to relapse and the ability to produce (2% of cases) pulmonary metastases. Sarcomatous transformation is <5%. Surgery is proportional to the biological aggressiveness of the disease, the onset site and the anatomical extension. The discovery of high RANKL expression by TCG's spindle cells suggests the use of denosumab, for inhibiting its function. The purpose of the study is to investigate the possible coupling of the RANK/RANKL/ NFkB axis with the HER family receptors in the intracellular signaling mechanism to explain local survival and aggressiveness of bone TCG and the sensitivity of the disease to denosumab.

Methods: A total of 61 patients, 25 males and 36 females with an average age of 36 years (min 13, max 74) were all included in the study, all with histologic diagnosis of TCG. All the subjects included, underwent surgery between 2005-2017 in the Oncologic Orthopedics Unit of the National Tumors Institute "Regina Elena" of Rome. For morphological analysis and immunohistochemical characterization of the tumor, we selected 15 of the 61 patients treated, on the basis of the affected site, for formalin-fixation and paraffin-encapsulation.

Results: The most common affected site was the proximal tibia (27.88%) followed by distal femur (19.67%), distal radius (14.75%), distal tibia (11.47%), sacro (8, 20%), distal peron (6.55%), proximal femoral and proximal humerus (3.28% each), distal humerus, proximal radius, and tarso (1.64% each). Curettage of the lesions was performed in 56 cases, resection and prosthetic reconstruction only in 5 cases (8.20%). The overall rate of recurrence was 23% vs. 77% of cases free from recurrence during the follow-up. Only 1 patient developed pulmonary metastasis. The immunohistochemical investigation performed to detect the expression of HER3 and pHER3 on bone TCG samples revealed a strong positivity for all analyzed samples (15/15 pcs).

Conclusions: The standard for TCG is the intralesional treatment that allows greater conservativeness vs. a little number of local recurrence rate and metastatic. The first immunohistochemical tests performed on pathological tissue from patients with histologic diagnosis of TCG undergoing neo-adjuvant therapy with denosumab showed complete shutdown of HER3 activated form (pHER3) in all analyzed samples confirming their involvement in the pathogenesis of disease. The local and systemic control of TCG obtained with denosumab as neo-adjuvant or adjuvant therapy is safe support to a rather standardized surgery. One problem remains the length of treatment carried out; suspending the therapy for 6-9 months, because of drug wash-out, the disease achieves again the same biological characteristics.

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TRIPLE COMBINATION OF GLUCOSAMINE, CHONDROITIN SULFATE AND METHYLSULFONYLMETHANE: EFFICIENT AND SAFE CONSERVATIVE TREATMENT OF KNEE OSTEOARTHRITISV. S. Vardanyan¹, K. V. Ginosyan¹, A. K. H. Simonyan¹, A. K. H. Petoyan², T. N. Grigoryan³¹Yerevan State Medical University, ²Scientific Research Institute of Cardiology, ³Aramyants Medical Center, Yerevan, Armenia

Objectives: Osteoarthritis (OA) is the primary cause of disability in elderly. The most prevalent OA localization is the knee joint. Nonsteroidal anti-inflammatory drugs although effective are associated with gastrointestinal side effects. Although COX2-inhibitors have less GI toxicity, they may cause thromboembolic complications. Due to recent safety concerns, patients have turned to dietary supplements, mainly glucosamine and chondroitin sulfate, that claim to be safer in the long-term treatment of OA. Beside their efficacy record, both are safe medications. Unfortunately, there are no published trials of the two preparations combined. Methylsulfonylmethane (MSM) is another drug that is often sold in combination with glucosamine and chondroitin sulfate. Many properties have been attributed to MSM, which include expressed anti-inflammatory activities. The aim of this study was to determine the efficacy of combination of glucosamine and chondroitin sulfate with MSM in treating patients with knee OA.

Methods: 50 patients (32 women and 18 men, mean age±SD 65.50±8.22 y) with confirmed knee OA were enrolled in the study. Exclusion criteria included inflammatory arthritis, other chronic pain syndromes, intra-articular injections in the previous 3 months. Patients using NSAIDs were required to undergo a 15-d washout period before enrollment. All patients received combination preparation, each tablet of which contained glucosamine 400 mg, chondroitin sulfate 500 mg, and MSM 300 mg (2 tablets a day) for a follow-up period of 12 weeks. Patients were assessed at baseline and at 12 weeks. The primary outcomes were the aggregated locomotor function (ALF) test that evaluates each patient's physical function, the SF-36 quality of life health survey and the visual analogue scale (VAS, 0-100 mm) for pain.

Results: The measurement of primary outcomes had shown the following results at baseline: mean ALF 26.6±5.11 s; mean VAS 65.48±14.58 mm; mean SF-36 51.2±14.69. All enrolled patients completed 12 weeks of treatment. Preparation was well tolerated, no serious adverse events occurred. At the end of study period significant differences were found in ALF measure (2.2 s [95%CI: 1.7-2.7]; p<0.01) and in VAS score for pain (20.56 mm [95%CI: 16.84-24.27]; p<0.01). There was a nonsignificant difference in SF-36 total score between treatment groups (-0.5 [95%CI: -0.64 to -0.15]; p=0.08).

Conclusions: The combination of glucosamine and chondroitin sulfate with MSM may reduce the pain and improve physical function in patients with OA of the knee. Larger and long-term studies may find additional and greater improvements in knee OA symptoms and efficacy in OA of other localizations. Further trials on MSM are recommended to define the safety, efficacy and appropriate dosage of MSM.

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P158

THE EFFECT OF ROS IN APOPTOSIS OF OSTEOCLASTS: A POTENTIAL THERAPEUTIC PATHWAY FOR OSTEOPOROSIST. W. Tai¹¹Department of Orthopaedics, National Cheng Kung University Hospital, Tainan, Taiwan

Inhibiting osteoclasts and osteoclast precursors to reduce bone resorption is an important strategy to treat osteoclast-related diseases, such as osteoporosis, inflammatory bone loss, and malignant bone metastasis. However, the mechanism by which apoptosis is induced in the osteoclasts and their precursors are not completely understood.

We found that caspase-3-mediated cell apoptosis occurred following the nitrogen-containing bisphosphonate zoledronic acid (ZA) treatment. Reactive oxygen species (ROS) were also generated in a time-dependent manner. Following knockdown of the p47^{phox} expression, which is required for ROS activation, or cotreatment with the ROS inhibitor, N-acetyl-L-cysteine, ZA-induced apoptosis was significantly suppressed in both

osteoclast precursors and mature osteoclast-like cells. The ROS-activated mitogen-activated protein kinases pathways did not trigger cell apoptosis. However, a ROS-regulated Mcl-1 decrease simultaneously with glycogen synthase kinase (GSK)-3 β promoted cell apoptosis. These findings show that ZA induces apoptosis in osteoclast precursors and mature osteoclast-like cells by triggering ROS- and GSK-3 β -mediated Mcl-1 downregulation. This is a potential therapeutic pathway for osteoporosis.

P159

CHANGES IN LYMPHOCYTIC SUBSETS IN RHEUMATOID ARTHRITIS TREATED WITH BIOLOGIC DMARDS

M. Novella-Navarro¹, J. L. Cabrera-Alarcon², M. M. Muñoz-Gomez³, M. Pavo-Blanco³, J. Salvatierra-Ossorio³, E. Raya-Álvarez³

¹Department of Rheumatology, HM Hospital Madrid Norte Sanchinarro, Madrid, ²Diagnostic Center of Molecular Disorders (CEDEM), Universidad Autonoma Madrid, Madrid, ³Departament of Rheumatology, Complejo Hospitalario Universitario de Granada, Granada, Spain

Objectives: Several studies have tried to evaluate changes in lymphocytic subsets in rheumatoid arthritis (RA), in order to estimate their possible role as biomarkers in response to treatment with biologic DMARDs. Rituximab (antiCD20+monoclonal antibody) has demonstrated that an effective depletion in CD20/CD19 cells is related to better response to treatment. In addition to this, we can also find experimental studies (no applicability in clinical practice) with tocilizumab, abatacept an anti-TNF. The aim of our study was to analyze the lymphocytic subsets available in our laboratory and to be able to establish lymphocytic profiles in response to treatment in daily clinical practice.

Methods: Prospective observational study from 87 patients (16 male and 71 female) diagnosed with RA, which started treatment with biologic DMARDs between September 2014 and June 2016 (abatacept 28 patients, tocilizumab 42 patients, rituximab 17 patients). Variables were determined at baseline and after six months. These variables were total count of lymphocytes; lymphocytic subsets available in our laboratory (CD3, CD4, CD8, CD19, NK); rheumatoid factor (RF), anticyclic citrullinated peptide antibodies (anti-CCP); CRP; ESR; corticosteroid dose, methotrexate dose, DAS-28, previous DMARDs, chronic pulmonary disease, chronic renal disease, HAQ index and serious infection during the follow-up period. Statistical analysis: hypothesis contrast for paired samples T-test (parametric) and Wilcoxon signed-rank test (nonparametric), R Statistics 3.2.2 (2015).

Results: We observed a generalized decrease of lymphocytic subsets, significant in CD3 ($p=0.0098$), CD4 ($p=0.04$), CD19 ($p=0.0093$). With regard to treatment groups, the global decrease of CD19 was due to rituximab, and lower levels of CD3/CD4 were referable to tocilizumab. CD8 and NK did not show significant differences, as well as total count of lymphocytes. The decrease of lymphocyte subsets were related to DAS-28, that showed a significant downgrade ($p=0.0002$).

Conclusions: According to our results, CD3 and CD4 lymphocytic subsets could be useful in control of patients treated with tocilizumab; as well as CD19 depletion is useful for monitoring the treatment response in patients treated with rituximab. In this case, the results are still preliminary because we had a small sample, so it would be advisable to increase sample size in order to support these results.

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EFFECTS OF ALENDRONATE 70 MG AND CALCIFEDIOL COMPARED TO ALENDRONATE 70 MG AND CHOLECALCIFEROL ON BMD AND BONE TURNOVER SERUM MARKERS IN PATIENTS AFFECTED BY OSTEOPOROSIS

E. Giampa¹, M. Di Bonito², V. Ferretti³, G. Nuvoli⁴, F. Paoletti⁵, M. Piazzini⁶, M. Ranieri⁷, M. A. Tuveri⁸, V. Vinicola⁹

¹Albanian Institute of Manual Medicine, Tirana, Albania, ²ASL Napoli 2 Nord, Naples, ³Salus Institute, Genoa, ⁴ASSL Sassari, Sassari, Italy,

⁵ASREM S. Francesco Caracciolo Hospital, Agnone, Isernia, ⁶ASL Sud Est - Grosseto, Grosseto, ⁷P.T.A. Tagliacozzo, Tagliacozzo, L'Aquila, ⁸ASSL Oristano, Oristano, ⁹I.R.C.C.S. Santa Lucia Foundation, Rome, Italy

Objective: Primarily to assess efficacy and safety of alendronate 70mg + cholecalciferol [Vit D3], compared to alendronate 70mg + calcifediol [25(OH)D], administered to a population of women affected by osteoporosis. Secondly we wanted to verify which formulation of alendronate gives the lower incidence of gastrointestinal side effects and higher adherence to treatment.

Methods: The study is a multicentric observational retrospective cohort study. Data were collected from 409 women during routine outpatient visits. Inclusion criteria were: diagnosis of postmenopausal osteoporosis or osteopenia; daily calcium intake equal 1000 mg; administration of alendronate 70 mg weekly in whatever formulation; administration of Vit D3 or 25(OH)D at monthly total dose of 625 μ g. Exclusion criteria were: therapy duration <12 months; malabsorption syndrome. Data collected both at baseline (T0) and at follow up after at least 12 months of therapy (T1) were: demographic characteristics, BMI, full medical history, lumbar T-score, femur T-score, calcium, phosphorus, osteocalcin, alkaline phosphatase, PTH and Vit D level.

Results: Based on inclusion and exclusion criteria 362 patient were enrolled in the study. Alendronate 70mg + calcifediol [A+25(OH)D] group consisted of 202 patients while 160 patients were treated with alendronate 70mg + cholecalciferol [A+D3]. In the [A+25(OH)D] group we observed a significant increase in lumbar T-scores value (0.26 ± 0.35 vs. 0.13 ± 0.3) and serum Vit. D (20.64 ng/ml $\pm$ 20.71 vs. 6.07 ng/ml $\pm$ 7.61) levels compared to [A+D3] group ($p<0.05$). The lowest incidence of gastrointestinal side effects were observed among patient taking alendronate 70mg in drinkable solution form ($p<0.05$). None of the patients enrolled in the study suffered from hypercalcemia during the follow up period.

Conclusions: Alendronate 70mg with calcifediol gives a better outcome in patients affected by osteoporosis testified by significant increase of lumbar T-score and Vit D serum level seen at 1 year follow up compared to alendronate 70mg with cholecalciferol. Both drugs did not show to cause hypercalcemia in this study. Alendronate 70mg in drinkable solution form is also associated with lowest incidence of gastro intestinal side effects.

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CIRCULATING ADIPOKINES IN POSTMENOPAUSAL WOMEN WITH AND WITHOUT HIP FRACTURES: THE CONCEPT OF “REVERSE EPIDEMIOLOGY”

M. S. Shargorodsky¹, F. Z. Feldbrin¹

¹Wolfson Medical Center, Holon, Israel

Objective: Circulating adipokines, such as leptin and adiponectin, specifically and highly expressed in human adipose cells, are considered to have a major role in the bone-fat relationship. The present study was designed to determine the possible impact of adiponectin, leptin and LAR on hip fracture prediction in postmenopausal women hospitalized due to fragility fracture. Methods: This monocentric, prospective study consisted of 104 postmenopausal women divided into two groups: Group 1 consisted of 49 subjects hospitalized due to the diagnosis of nontraumatic hip fracture and Group 2 contained 55 postmenopausal women without a history of hip fracture.

Results: Circulating adiponectin and leptin levels were significantly higher in Group 1 than in Group 2 ($p=0.005$ and $p=0.044$, respectively). LAR was significantly lower in postmenopausal women with hip fracture than women without fracture. (2.1 ± 2.2 vs. 4.0 ± 4.5 , $p=0.011$). In the general linear model, there was no between-group difference in circulating leptin as well as adiponectin. Nevertheless, significant by-group differences in terms of LAR persisted even after adjustment ($p=0.016$).

Conclusions: We found that LAR is an independent predictor of hip fracture in postmenopausal women. Our findings implicate LAR as a preferred marker of hip fracture prediction rather than leptin and adiponectin alone, and are consistent with the concept of “reverse epidemiology”, whereby the association between a predictor and disease in the general population is inverted in patients with more advanced disease.

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OSTEOPONTIN LEVELS IN PLASMA, MUSCLES AND BONE IN PATIENT WITH NONHEALING DIABETIC FOOT ULCERS: A NEW PLAYER IN WOUND HEALING PROCESS?

M. S. Shargorodsky¹, F. Z. Feldbrin¹

¹Wolfson Medical Center, Holon, Israel

Objective: Osteopontin, as one of the important non-collagenous components of the extracellular matrix, contributes to bone remodeling and homeostasis of the skeletal system. The present study was designed to investigate the impact of osteopontin (OPN) in different tissue (e.g., plasma, muscles and bone) on amputation rate (in-hospital and during one year follow-up) for nonhealing diabetic foot ulcers (DFUs).

Methods: This pilot study consisted of 30 diabetic patients, hospitalized due to nonhealing DFUs. Patients were divided into two groups: Group 1 included 14 patients who underwent limb-preserved debridement procedure without amputation; Group 2 included 16 subjects who underwent amputation. Additionally, recurrent amputation rate during 1 year follow-up has been investigated.

Results: Plasma OPN was higher and bone OPN was lower in Group 2 compare to Group 1 ($p=0.016$ and $p=0.004$, respectively). In the logistic regression analysis, bone OPN emerged as a significant independent predictor of amputation (OR=0.042, 95%CI 0.003-0.699, $p=0.027$). Plasma OPN was also associated with amputation such that each unit increase in plasma OPN was associated with increase in odds of amputation of 17.7% (95%CI 0.997-1.388, $p=0.045$). Additionally, the study participants were divided into two groups according amputation during 1 year follow-up: Group 1 included 11 patients who underwent amputation; Group 2 included 19 patients who did not need amputation at one year follow-up. Plasma OPN were higher and bone osteopontin was lower in Group 1 than in Group 2. However, in GLM analysis bone OPN was only marginally associated with one year amputation.

Conclusions: Decreased levels of OPN in bone and increased plasma OPN are independently associated with in-hospital amputation in patient with non-healing diabetic foot ulcers.

P163

ROLE OF BMI AND ADIPONECTIN IN PREDICTION OF ARTHROSCOPY ASSESSED CARTILAGE DAMAGE SEVERITY IN PATIENTS WITH SYMPTOMATIC KNEE OSTEOARTHRITIS

M. S. Shargorodsky M¹, F. Z. Feldbrin Z.¹

¹Wolfson Medical Center, Holon, Israel

Background: Osteoarthritis (OA), the prevalent joint-affecting disease characterized by cartilage damage, is the leading cause of disability in adults and contributes to the excess of morbidity and healthcare costs. We performed the current trial to evaluate prognostic factors, specifically adiponectin (ADP) in serum and synovial fluid, associated with cartilage damage severity assessed by arthroscopy, in patients with symptomatic knee osteoarthritis. **Methods:** The 40 subjects (mean age 51.8, mean BMI 28.8) with symptomatic knee osteoarthritis were divided into four groups according to arthroscopy assessed cartilage damage, using Outerbridge grading. Group I included minor damage while Group IV included severe damage. During arthroscopy, synovial fluid of the affected knee joint was obtained and assessed for synovial ADP. Metabolic parameters and insulin resistance markers were determined. **Results:** Although all groups were similar in terms of serum adiponectin levels, significant between groups difference in synovial fluid ADP was

found: synovial ADP was lower in patients with severe cartilage damage than in other study groups ($p<0.037$). However, in multiple regression analysis, BMI only was significant independent determinants of cartilage damage, such that each 1-unit increase in BMI was associated with a 21.7% increase in risk of cartilage damage (OR1.217, 95% CI 0.998-1.483, $p=0.005$). **Conclusions:** BMI was a significant independent predictor of cartilage damage assessed by arthroscopy in patients with knee osteoarthritis. Although between groups difference in synovial fluid ADP was found, after controlling for the age, synovial ADP levels were not associated with cartilage damage severity.

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ASSESSING RISK FACTORS ASSOCIATED WITH OSTEOPOROSIS IN PATIENTS ATTENDING RHEUMATOLOGY CLINICS, IN A TERTIARY CARE HOSPITAL IN KARACHI, PAKISTAN

H. Alam¹, T. Perveen Umer¹, L. Nazir¹

¹Liaquat National Hospital, Karachi, Pakistan

Objective: Osteoporosis is a common, potentially disabling disorder of bone as it leads to bone fragility and fractures. Data from 9 industrialized countries shows prevalence of osteoporosis at 1-8% for men and 9-38% for women above age of 50 years. Factors like age, female gender, menopause, smoking, alcohol intake, hysterectomy, obesity have been linked to increased risk of osteoporosis.

Methods: This is a cross-sectional observational study done in a rheumatology department in a tertiary care hospital.

Results: 207 patients enrolled in our study out of which 188 (90.8%) were female and 19 (9.2%) male. 149 (72%) patients had age 65 or less, while rest above 65 years. Mean age was around 60.63 in both genders. 9.7% patients had history of smoking, 15% had diabetes, 28% hypertension, 2.4% had both. Thyroid illnesses were in 1.5% cases, 2.9% rheumatoid arthritis and 2% spondylarthropathies. Out of the total 188 females, 185 (98.4%) were postmenopausal. 21 (11.2%) patients had history of hysterectomy. Out of total patients 50 (24.2%) had prior fractures. Family history of osteoporosis was in 62 (30%) patients. Parental fractures were seen in 38 (18.4%).

Conclusion: This is an ongoing study. Based on the results up till now we can vouch for early screening for osteoporosis in postmenopausal women and in those who have risk factors.

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CHARACTERISTICS OF A COHORT OF PATIENTS DIAGNOSED WITH VASCULITIS IN A PRIVATE HEALTH CENTER IN MADRID (SPAIN)

P. Alcocer¹, M. Novella-Navarro¹, J. J. González¹, A. Gómez¹, C. Marín¹, F. Aramburu¹, E. Calvo¹, T. Rodríguez-Araya¹, S. Rodríguez-Rubio¹, M. Valero¹, P. García de la Peña¹

¹Department of Rheumatology, HM Hospital Madrid Norte Sanchinarro, Madrid, Spain

Objectives: Vasculitis are a very heterogeneous group of diseases, however, they have a common main characteristic, which is the presence of inflammatory infiltrates in wall vessels. Clinical features of vasculitis are determined by their etiology, pathogenesis and the involved vessels and/or organs. The aim of this study is to describe the characteristics of patients with vasculitis treated in our center, since in Spain it is uncommon to follow this type of patients outside the National Public Health System.

Methods: Observational study from 18 patients diagnosed with vasculitis, between 2010-2017. Demographic variables, clinical aspects, and treatment were analyzed as percentages and frequencies.

Results: Eighteen patients were diagnosed with vasculitis (10 women, 8 men). Out of these 18 patients, 77.7% were diagnosed with primary vasculitis and 22.3% with secondary vasculitis, mainly in IgG4-related disease. Out of the total of primary vasculitis, 4 were large vessel, 6 small vessel, 2 variable vessel and 2 organ-specific vasculitis.

***Laboratory findings:** ANCA antibodies were detected in 27.7% of patients (2/18 c-ANCA, 2/18 p-ANCA, 1/18 atypic-ANCA, 2/18 PR3 and 1/18 MPO). Other immunological markers were determined such as RF (1/18), ANA (1/18), hypocomplementemia (1/18) and increase of IgG4 serum levels. Cryoglobulines, circulating immune complex and antiphospholipid antibodies were detected in no case. Acute phase reactants such as CRP and ESR were elevated in 50% patients. Mean values of CRP were 69.4 mg/l and 55.6 mm/h for ESR.

***Clinical features:** The following symptoms were present at the onset of disease: musculoskeletal pain (38.8%), pulmonary symptoms (33.3%), ORL (27%), cutaneous (22.2%), neurological (22.2%), haematological (16.6%), thrombotic events (11.1%).

***Treatment:** Glucocorticoids were required in all patients. Immunosuppressant agents were used at the onset of symptoms (cyclophosphamide, methotrexate, rituximab, azathioprine, gamma globulins) and also for maintenance therapy.

Conclusion: Despite the advances in knowledge about vasculitis, their lower incidence and their heterogeneous characteristics; they remain a significant challenge for rheumatologists. Vasculitis are one of the most complexes and serious diseases in rheumatology, so that, it is required an appropriated diagnostic approach and early treatment.

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SIRT1 AMELIORATE SYNOVIAL INFLAMMATION OF OSTEOARTHRITIS VIA MODULATION OF NLRP3 INFLAMMASOME

S. W. Lee¹, W. T. Chung¹, S. Y. Lee¹, J. S. Kim²

¹Dong-A University, Pusan, ²Je-Jue National University, Je-Jue, South Korea

Objectives: The role of metabolism in the pathogenesis of osteoarthritis is an emerging field. Metabolic alterations maybe a role in OA pathogenesis and these changes influence joint destruction via several cytokine. IL-1 β is a common proinflammatory factor believed to be involved in osteoarthritis and levels of IL-1 β are elevated in the synovial fluid, synovial membrane, and subchondral bone. IL-1 β is first synthesized as an inactive precursor to pro-IL-1 β , which requires cleavage of its N-terminal region by caspase-1 to change into the secreted active form. Caspase-1 activity is tightly controlled by innate immune complexes defined as inflammasomes. The NLR family member NLRP3 (NACHT, LRR, and PYD domains-containing protein 3), along with the adaptor protein ASC, can activate caspase-1 through inflammasome assembly and result in the secretion of mature IL-1 β . However, the role of NLRP3/caspase-1/IL-1 β axis in OA synovium is unknown. If this axis is involved, it might be a target for specific therapy. In this study, we examined that SIRT1 suppresses IL-1 β through inhibiting NLRP3 inflammasomes in OA synovium and SIRT1 ameliorates OA inflammation.

Methods: OA fibroblasts were isolated from synovium of OA patients. IL-1 β and NLRP3 were detected in synovium of OA patients by immunohistochemistry. LPS stimulated the expression of IL-1 β mRNA in OA fibroblasts and combination of LPS and ATP increased more the production of active IL-1 β in OA fibroblasts. Production of IL-1 β was measured by western blot and ELISA assay. NLRP3 inflammasomes complex were measured by western blot.

Results: OA fibroblasts treated with LPS and ATP were increased level of caspase-1 p20 (active form) and IL-1 β , that were dose-dependently increased in OA fibroblasts. But, SIRT1 suppressed release of IL-1 β as well as activity of caspase-1 p20, despite of the expression of NLRP3, ASC, and caspase-1 in OA fibroblast.

Conclusion: These results suggest that SIRT1 is a modulator of NLRP3 inflammasomes in OA synovium and ameliorate IL-1 β , so expression of SIRT1 in OA fibroblast maybe a potential strategy for OA inflammation treatment.

References:

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METABOLISM OF BONE TISSUE IN TYPE 1 DIABETES MELLITUS

S. S. Safarova¹

¹Azerbaijan Medical University, Department of Internal Diseases, Baku, Azerbaijan

Objective: Studying for urgency of secondary forms of osteoporosis according to the recommendations of WHO experts, one of the promising areas is the study of diabetic osteopathy in type 1 diabetes mellitus, which is considered as one of the chronic complications of the disease and prevalence is about 30-50%. Study of pathogenetic mechanisms of formation of low bone mass, general population and diabetes-specific risk factors for osteoporosis are important from the point of view of the formation of risk groups and the timely conduct of preventive measures in patients with type 1 diabetes. Our aim was to evaluate the effect of changes in the body in men and women with type 1 diabetes on the state of BMD and its metabolic rate. Determination changes of the directionality in serum markers of bone remodeling and BMD in both sexes in this disease.

Methods: 98 patients with type 1 diabetes (57 women and 41 men) were included into the study. Evaluated anthropometric data (height, weight, BMI). The average of patients with type 1 diabetes was 55.89 $\pm$ 0.7 y, the duration of diabetes was 16.6 $\pm$ 0.6 y, BMI was 26.07 $\pm$ 0.2 kg/m², HBA1c was 7.47 $\pm$ 0.2%. The control group was 82 people (48:34). Parameters of phosphorus-calcium metabolism (Ca, Ca 2+, P), level of bone formation markers (alkaline phosphatase (ALP), N-terminal propeptide of procollagen type I (PINP)) and bone resorption (C-terminal telopeptide (b-CTX)) was studied. The study of bone markers was performed on an automatic electrochemiluminescent analyzer Cobas e41. The level 25 (OH)D3 study was performed by the method of immune-enzyme analysis. The BMD was determined on a DXA densitometer at the lumbar spine (L1-L4), the proximal femur and femoral neck. Statistical analyses were performed with standard software package BioStat Pro 6.2.2.0. For all analyses, a two-sided *p*-value<0.05 was considered statistically significant.

Results: In patients with type 1 diabetes, there were no statistically significant difference in ALP level as a marker of bone formation in both groups. The decrease in PINP was statistically significant compared to the control group (*p*<0.05), whereas the level of bone resorption marker b-CTX in patients with diabetes was significantly higher (*p*<0.05) compared with the control group. PINP in patients with diabetes showed a slight correlation with BMD in the lumbar spine (*r*=0.011, *p*=0.926). b-CTX showed a significant negative correlation with the T-score of the MIC of the lumbar spine (*r*=−0.431, *p*=0.000) and a slight negative correlation with the BMD of the femoral neck (*r*=−0.246, *P*=0.075) in patients with diabetes.

Conclusion: In the results of T-score studying, confirmed that in both men and women with diabetes, in comparison with the control, the bone density in the vertebrae was reduced. In men with type 1 diabetes, changes in the T-score in the spine were found to be less intense than in women. The level of b-CTX showed a statistically significant negative correlation with the DXA of the lumbar spine, consisting essentially of a spongy bone with high metabolic activity. This indicates that bone metabolism markers and DXA are associated with the duration of diabetes, the state of bone metabolism and capture changes in bone tissue, which could have importance of early diagnosis and evaluation of the effectiveness of the therapy.

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THE EFFECT OF SPINAL BRACES ON BALANCE OF ELDERLY SUBJECTS WITH THORACIC HYPERKYPHOSIS: PROTOCOL FOR A SYSTEMATIC REVIEW

A. Aboutorabi¹, M. Hashemiyari²

¹University of Social Welfare and Rehabilitation Sciences, ²Tehran University of Medical Sciences, Tehran, Iran

Objective: Thoracic hyperkyphosis is one of the most common spinal disorders in older people creating impairment, postural instability, gait disorders and a reduced quality of life. The use of spinal orthoses and/or postural taping may be feasible conservative interventions, but their efficacy is uncertain. The aim of this review is therefore to investigate the effectiveness of spinal orthoses and taping on the balance and gait of older people with hyperkyphosis.

Methods: We will include randomized controlled trials and clinical trial studies which assess the efficacy of spinal orthoses and taping using the WHO International Classification of Functioning, Disability and Health (ICF) outcome measures in older people with hyperkyphosis of the thoracic spine. A search will be performed in PubMed, SCOPUS, ISI Web of Knowledge, CENTRAL, EMBASE, CINAHL, AMED, PEDro, REHAB DATA and RECAL databases with no restriction of language. Two independent reviewers will perform the study selection and data extraction. Quality assessment will be implemented using modified Down and Black checklists. Publication bias and data synthesis will be assessed by funnel plots, Begg's and Egger's tests and plots using STATA software version 12.1 version.

Risk of bias in individual studies: The methodological quality of the primary studies will be assessed according to the Modified Downs and Black checklist. Two authors (AA and MAB) will complete these forms separately and disagreements will be resolved by consensus. A total of 15 out of 27 items of the checklist will be used for the quality assessment of the studies. These will consist of 15 appropriate items that report on and assess the internal and external validity of the primary studies and power study assessment.

Assessment of heterogeneity: We will assess the intervention effect heterogeneity based on the Q Cochrane test and the related 'p' value for analysis. Furthermore, we will use I^2 as measure of categorization for heterogeneity between studies. If the measure proves to be 50–74.9% or >75%, we will have severe and highly severe heterogeneity, respectively. To investigate the potential sources of heterogeneity, we will use a subgroup analysis method. We will assess the intervention efficacy according to different trial designs (randomized vs. nonrandomized, blind vs. open label/ nonblind, etc.), participants' characteristics (gender, age groups, hyperkyphosis, etiology, etc.), and intervention-related factors (types of orthoses, duration of wear, follow-up).

Assessment of reporting bias: We will assess the publication or reporting bias by funnel plot, Begg's and Egger's tests and plots. Furthermore, if bias is nonignorable, we will use the Fill & Trim method to correct the final result.

Statistical analysis and data synthesis: We will perform a meta-analysis in each outcome measure will be possible. First, we will choose the appropriate effect-size measure for evaluating the intervention efficacy based on the outcome variable types (continuous, nominal, ordinal, etc.). The appropriate measure will be standardized mean difference (SMD) or relative risk (RR).

Then, the data required for calculating the effect-size measure will be collated in a 2 x 2 table, using the outcome variable mean, standard deviation and sample size in two intervention and comparison/control groups. The primary outcome variable data in addition to the secondary outcome variables data and the related data (e.g., quality score, first author, publication year, study time/year, study location or geographical area) will be entered into STATA version 12.1 version. The study level appropriate effect-size measure (SMD or RR) will be combined by 'fixed effect' or 'random effect' models according to the study characteristics. Forest plots will be used to present the combined measure and the different study level measures. To investigate potential sources of heterogeneity we will use a subgroup analysis or meta-regression method for assessing relationships between the study qualities (risk of bias) measure/score and the intervention efficacy. If the intervention effect in low quality studies is greater than high quality studies, we will use a sensitivity analysis technique to correct or adjust the bias. In cases of severe methodological heterogeneity where meta-analysis is not possible, we will use metasynthesis or narrative synthesis.

Discussion: Our systematic review and meta-analysis will determine the level of efficacy associated with the use of spinal orthoses and postural taping for older people with hyperkyphosis. We anticipate that this knowledge will help clinicians, and researchers to determine the most effective orthotic treatment and rehabilitation plans, utilizing the most appropriate devices, and thereby increasing the quality of care for affected people.

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OSTEOPOROSIS AND FRACTURE RISK IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): A UK BASED POPULATION-BASED COHORT STUDY

R. K. Akyea¹, T. M. McKeever¹, J. E. Gibson², J. Scullion³, C. E. Bolton¹
¹Nottingham Respiratory Research Unit, NIHR Nottingham Biomedical Research Centre, School of Medicine, University of Nottingham, Nottingham, ²Division of Epidemiology and Public Health, School of Medicine, University of Nottingham, Nottingham, ³University Hospitals of Leicester Glenfield Site, Institute for Lung Health, Leicester, UK

Objectives: To assess prevalence and incidence of osteoporosis and hip fracture or major osteoporotic fractures (MOF) in patients with COPD compared to non-COPD subjects; to evaluate the use and performance of fracture risk prediction tools in patients.

Methods: A cohort study using The Health Improvement Network GP health records included patients with an incident COPD diagnosis from 2004–2015 and age, sex and GP-practice matched non-COPD subjects (same index date). Prevalence and incident diagnoses of osteoporosis, MOF and hip fractures were calculated. Stratified Cox proportional hazards models (stratified matched cohort analyses) were used. Area under receiver operating curve assessed the predictive accuracy of fracture risk prediction tools.

Results: Prevalence of coded osteoporosis at diagnosis was greater for patients (5.7%) compared to non-COPD subjects (3.9%), $p < 0.001$. In those without prior osteoporosis, patients ($n = 73,084$) had a greater incidence of osteoporosis than non-COPD subjects ($n = 264,544$), (adjusted hazard ratio (aHR), 1.13, 95%CI 1.05–1.22). COPD patients had an increased risk of MOF (HR, 1.60, 95%CI 1.52–1.69), although this appeared largely mediated through oral corticosteroid use, BMI and smoking, (aHR, 1.04; 95%CI 0.96–1.12). Fracture risk prediction scores were rarely coded in COPD patients nor were other osteoporosis diagnostics done around time of COPD diagnosis. Retrospectively calculated accuracies for MOF were FRAX[®]: 71.4% (95%CI: 70.6–72.2%), QFracture[®]: 61.4% (95%CI: 60.5–62.3%) and for hip fracture both 76.1% (95%CI: 74.9–77.2%).

Conclusions: Those with COPD are at increased risk of osteoporosis and fractures. Despite this, there was no systematic assessment for osteoporosis or fracture in clinical practice. Fracture risk tools identify patients with COPD at high-risk of fracture.

Disclosures: Investigator sponsored study, supported by Pfizer COPD "OpenAir" research grant.

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PARTICULAR ISSUES OF LIVER FUNCTION IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS MANAGED PROLONGED METHOTREXATE TREATMENT

N. O. Panko¹, N. S. Shevchenko¹, Y. V. Khadjynova²

¹V.N. Karazin Kharkiv National University, Department of Pediatrics N2,

²SE "Institute of children's and Adolescent's Health Care of NAO MS", Kharkiv, Ukraine

Objectives: Juvenile idiopathic arthritis (JIA) is a chronic and socially significant disease as it leads to quick disability in childhood despite treatment. The "gold standard" of JIA management is methotrexate

(MTX), which is metabolized by liver. The aim was to determine the particular issues of the liver function in patients with JIA who have been treated with MTX for prolonged time.

Methods: The study included 14 patients with joints form of JIA from 3-18 years old. Patients were divided for 3 groups corresponding to duration of MTX taking. I group consisted of children with duration of MTX treatment from 6 months to 1 year, II group from 1-5 years, III group from 5-14 years. They were investigated by measurement of alanine aminotransferase (ALAT), aspartate aminotransferase, haptoglobin, triglycerides, gamma glutamine transferase (GGT), apolipoprotein-A (Apo-A), a2-macroglobulin, cholesterol levels. The equation for calculating the FibroTest score regression coefficient had been done according U.S. patent 6.631.330. Student-Fisher test, Mann-Whitney U-test were used for the statistical processing.

Results: In spite of MTX treatment, progression of JIA was determined according assessment of joints functional class and radiological stage ($p < 0.05$). Increased level of ALAT was prominent (40%) in children of II group in comparison with other studied patients ($p < 0.05$). It might have been associated with hepatotoxicity of the most active MTX treatment at that moment and as a sign of liver cytolysis. Only 17% of children of III group had increased GGT content, which most probably was caused by damage of liver cellular membrane under the prolonged autoimmune inflammation. Metabolic liver function was not changed because levels of Apo-A, haptoglobin, total bilirubin, cholesterol were within normal limits due to all stages of MTX taking. The increased level of a2-macroglobulin as a predictor of liver fibrosis was determined in all studying groups with the average frequency 36% and it did not correspond to the duration of MTX treatment. According FibroTest score regression 14% of patients had liver fibrosis F1, which did not depend on duration of MTX treatment.

Conclusion: According to our findings, patients using MTX for JIA management had joint damage progresses despite usage of MTX. Hepatic cytolysis is most frequently appeared while 1-5 years of MTX taking. Liver fibrosis does not depend on duration of MTX treatment.

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PREDICTING EFFICIENCY OF NEUTROPHILIC $\text{Na}^+\text{-K}^+\text{-ATPASE}$ ACTIVITY ESTIMATION FOR ASSESSMENT OF ETIDRONATE EFFECT IN OSTEOPOROTIC SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS

E. G. Korenskaya¹, A. S. Trofimenko², O. V. Paramonova¹, E. A. Bondarenko¹

¹Volgograd State Medical University, ²Research Institute for Clinical and Experimental Rheumatology, Volgograd, Russia

Objective: There are no simple and effective approaches for correction of osteoporosis (OP) in systemic lupus erythematosus (SLE) patients until now. One of promising bisphosphonates is potassium-sodium etidronate (ET, Moskhimpharmpreparaty, Moscow). A potential candidate biomarker for ET efficiency prediction is estimation of $\text{Na}^+\text{-K}^+\text{-ATPase}$ (ATPase) activity in neutrophils. Aim was estimation of ATPase activity in circulating neutrophils as a predictor of ET effect in OP SLE patients.

Methods: OP was confirmed using ultrasound calcaneal densitometry (UBIS-3000 densitometer, France), and SLE activity was assessed with SELENA-SLEDAI score. Patients were treated with ET according to the manufacturer's instruction. Therapeutic effect was assessed by repeated densitometry after one-year treatment. Activity of ATPase was estimated using Wachstein and Meisel histochemical technique and expressed as percentage of enzyme-positive cells, with normal values up to 34.4%. Results are expressed as mean $\pm$ SD.

Results: 49 patients with SLE and OP were included in the trial. Mean SLE activity at the beginning of the treatment was 8.2 ± 0.9 points. Initial MBD indexes were as follows: BUA 57.7 ± 1.1 dB/MHz, Z = -1.6 ± 0.2 , T = -2.4 ± 0.3 , and initial enzyme activity was $59.3 \pm 3.2\%$. After one year, 16

patients were revealed significant decrease of at least one of these indexes, and they were referred as nonresponders, otherwise patients were considered responders. In responders similar means were 58.6 ± 1.2 , -1.3 ± 0.2 , -1.8 ± 0.3 , and $70.4 \pm 1.5\%$, respectively, whereas in nonresponders they were 56.2 ± 1.0 , -1.4 ± 0.3 , -1.6 ± 0.2 , and $50.3 \pm 1.5\%$, respectively. Difference in BUA and mean ATPase activity between the groups was significant ($p = 0.025$ and 0.014 , respectively), as opposed to Z- and T-indexes. Final SLE activity had no significant differences in these groups. Sensitivity and specificity of the initial enzyme estimation for discrimination between these groups were 58.1% and 76.4%.

Conclusion: Neutrophilic ATPase activity measurement is a promising candidate biomarker for prediction of ET effect in osteoporotic SLE patients.

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PTH (1-34) AMELIORATED KNEE OSTEOARTHRITIS AND FUNCTION IN RATS BY DECREASING CHONDROCYTE TERMINAL DIFFERENTIATION AND APOPTOSIS VIA AUTOPHAGY

C. H. Chen¹, L. H. Chang², L. Kang³, Y. S. Lin², S. Y. Lin², S. C. Wu², J. K. Chang², M. L. Ho²

¹Kaohsiung Municipal Ta-Tung Hospital, Kaohsiung City, ²Kaohsiung Medical University, Kaohsiung City, ³National Cheng Kung University, Tainan, Taiwan

Anterior cruciate ligament (ACL) tear can leads to osteoarthritis (OA). However, PTH (1-34) was found to alleviate OA progression in a papain-induced OA model. Autophagy is a protective mechanism in normal cartilage, and its aging-related loss is linked with chondrocyte death and OA. Thus, we examined the roles of autophagy in PTH treatment on OA after ACL transection (ACLT). Thirty-six rats were randomized into three groups: control group, ACLT-induced OA (ACLT-OA) group, and OA with intra-articular PTH (1-34) treatment group. Knee function was evaluated by weight-bearing and treadmill tests. Cartilage matrix was determined by a histological evaluation of glycosaminoglycan (GAG), the OARSI score, chondrocyte apoptosis, and immunohistochemistry. Rats in the ACLT-OA group had significantly decreased weight-bearing and running tolerance. The histological results indicated that functional markers (GAG, collagen type II) and chondrocyte autophagy had decreased, but that the OARSI score, terminal differentiation markers (collagen type X, Indian hedgehog), and chondrocyte apoptosis had increased in the OA group. Additionally, PTH (1-34) treatment significantly improved weight-bearing and treadmill test scores, preserved functional markers, and reduced the OARSI score and terminal differentiation marker. Finally, PTH (1-34) ameliorated chondrocyte apoptosis by regulating the expressions of autophagy-related proteins, through reducing mTOR and p62, and enhancing LC3 and Beclin-1. Reconstructive surgery after ACL rupture cannot prevent OA occurrence. Intra-articular PTH (1-34) treatment can alleviate OA progression after ACLT, and improve joint function and histological molecular changes. Possible mechanisms are reducing chondrocyte terminal differentiation and apoptosis, with increasing autophagy.

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VITAMIN D STATUS AND INSIGHTS INTO PATTERNS OF VITAMIN D SUPPLEMENTATION IN GERIATRIC ACUTE CARE PATIENTS

K. S. Goh¹

¹Changi General Hospital, Singapore

Objectives: Vitamin D deficiency is prevalent in the elderly, and the musculoskeletal benefits of achieving adequate levels are well recognized. Despite a myriad of guidelines recommending vitamin D supplementation for the elderly, the actual prescribing patterns in local geriatric

inpatients are unknown. This study aims to examine the prevalence of vitamin D deficiency in geriatric inpatients, as well as study the prescribing preferences of vitamin D supplements by geriatricians.

Methods: A cross-sectional study involving 206 patients admitted consecutively to a geriatric acute care unit in a Singapore tertiary hospital was conducted. Information on prescription of vitamin D supplements within 3 days of routine serum 25-hydroxyvitamin D measurement by electrochemiluminescence immunoassay was collected. Vitamin D deficiency was defined as <20 ng/ml; and insufficiency defined as 20–30 ng/ml. Multivariate logistic regression was performed to assess the association of vitamin D supplementation with patient characteristics.

Results: Vitamin D deficiency and insufficiency were highly prevalent: <20 ng/ml, 40.8%; 20–30 ng/ml, 27.7%, >30 ng/ml, 31.5%. Mean level was 23.9 ± 11.9 ng/ml. 57.3% were prescribed vitamin D supplements. Nine different prescribing regimens were identified. More patients received vitamin D supplements in the vitamin D deficiency and insufficiency groups, compared to those with normal levels ($p=0.001$). The most common supplement prescribed for the deficient group was cholecalciferol, followed by ergocalciferol. The most common supplement prescribed for the insufficient and normal groups was cholecalciferol. Low 25-hydroxyvitamin D level (<30 ng/ml) and Malay race were significant predictors of receiving supplementation ($p=0.001$; 0.003). Patients with poorer premorbid function were less likely to receive supplementation ($p=0.007$).

Conclusions: There is marked heterogeneity in the prescribing patterns of vitamin D supplements for geriatric inpatients by geriatricians, in a population which has high prevalence of hypovitaminosis D. This study reveals factors influencing geriatricians in prescribing supplementation, such as premorbid functional status, consistent with the individualised, person-centered management approach generally practiced by geriatricians.

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VERTEBRAL COMPRESSION FRACTURES IN OSTEOPOROTIC PATIENT

A. C. Laga¹, M. Angulo², N. Pardina¹, C. Tejedor¹, E. Gonzalez¹, I. Puyuelo¹

¹Hospital San Pedro, Logroño, ²Hospital Miguel Servet, Zaragoza, Spain

Vertebral compression fractures are the most common type of osteoporotic fracture, becoming a public health problem in the last decade due to the increased number of osteoporotic patients. However, the comparison of clinical guidelines shows that there is no evidence for the different types of treatment recommendations. Comorbid factors limit aggressive interventions, so in the past years conservative treatment has become more common. We report the case of a woman aged 81 with multiple vertebral compression fractures treated in a conservative mood.

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BMD AND BODY COMPOSITION CHANGES FOLLOWING A 6-WEEK WALKING PROGRAM WITH A WEARABLE ROBOTIC EXOSKELETON DIFFER BETWEEN OSTEOPENIC AND OSTEOPOROTIC ADULTS WITH A CHRONIC SPINAL CORD INJURY

L. P. Carvalho¹, D. H. Gagnon², M. J. E. Castillo², M. Vermette², G. El Hajj-Boutros¹, M. Aubertin-Leheudre¹

¹Université du Québec à Montréal, ²Université de Montréal (UdeM), Montreal, Canada

Objectives: Spinal cord injury (SCI) typically leads to a rapid and substantial decline in BMD, weight gain (obesity) and muscle atrophy that increases the risk of fractures and metabolic impairment. Sedentary lifestyle of individuals with SCI accelerates this vicious

circle. Standing and walking with a wearable robotic exoskeleton system (EXO) may represent a promising intervention for this population to prevent these adverse effects. Our objectives: 1) examine its effect on BMD and body composition; and 2) whether BMD status impacts on EXO responses.

Methods: Twelve long-term wheelchair users with a traumatic complete motor SCI were divided in 2 groups: Osteopenic (OPN: $n=7$, 39 ± 12 y, years of SCI = 5.3 ± 2.6 , BMI = 26.6 ± 3.3 kg.m⁻², $VO_{2max} = 14.6 \pm 4.9$ mL.kg⁻¹.min⁻¹ [criteria: $-1.0 < T-Score_{femur} < -2.5$ SD]) and osteoporotic (OPS: $n=5$, 43 ± 10 y, years of SCI = 14.1 ± 10.9 , BMI = 21.2 ± 1.2 kg.m⁻², $VO_{2max} = 15.2 \pm 6.8$ mL.kg⁻¹.min⁻¹ [criteria: $T-Score_{femur} \leq -2.5$ SD]). Participants completed a 18-session progressive walking program using EXO over a 6-to-8-week period. Body composition (total and segmental body fat [BF%]; muscle mass index [MMI=LM/height²]); total, femoral and hip BMD were determined using DXA. Cross-sectional areas (in% of limb area) of total (Fat_{tot}), intramuscular (IMAT), subcutaneous (SCF) fat and muscle (MM) masses; and femur BMD (BMD_{femur}) were determined using pQCT. Level of physical activity was estimated by a maximal aerobic capacity test (VO_{2max}). All measurements were obtained pre- and post-training.

Results: Aside for BMD (by design), both groups were similar at baseline. Within-group comparisons demonstrated that both groups decreased trunk BF and Fat_{tot}. OPN decreased SCF and gynoid BF and increased BMD_{femur} whereas OPS decreased IMAT, android BF and increase MM and appendicular MMI. Between-group comparisons (delta changes) demonstrated that OPN decreased IMAT and increased leg BMD more than OPS. Contrarily, OPS had the greatest decrease in android/gynoid ratio. Finally, 43% ($n=3$) of the OPN group progressed to nonosteopenic and 20% ($n=1$) of the OPS progressed to osteopenic status after training.

Conclusion: OPN and OPS individuals with SCI may have health benefits after a walking program using EXO but through different pathways. These results are important to clinical practice and need to be confirmed in larger cohorts.

P176

JN-2, A CXCR3 ANTAGONIST, INHIBITS COLLAGEN-INDUCED ARTHRITIS PROGRESSION THROUGH NF-KB SIGNALING PATHWAY

B. Kim¹, H. Kim¹, J. Kim¹, Z. H. Lee¹

¹Seoul National University School of Dentistry, Department of Cell and Developmental Biology, Seoul, South Korea

Rheumatoid arthritis (RA) is a chronic autoimmune disease that is characterized by uncontrolled joint inflammation and destruction of bone and cartilage. Previous studies have shown that C-X-C motif chemokine 10 (CXCL10) has important roles in RA development and that blocking CXCL10 expression effectively inhibits arthritis progression in animal models. However, clinical study using anti-CXCL10 monoclonal antibody (MDX-1100) to block CXCL10 expression in patients with RA did not show significant effectiveness. Therefore, we turned our attention to C-X-C motif chemokine receptor 3 (CXCR3), which is a receptor for CXCL9, CXCL10, and CXCL11, to treat RA. In the present study, administration of JN-2, our newly developed CXCR3 antagonist, ameliorated the progression of arthritis in a collagen-induced arthritis animal model. JN-2 also inhibited CXCR3-induced cell migration and pro-inflammatory cytokine expression of bone marrow-derived macrophages and CD4⁺ T cells *in vitro*. In addition, we found that CXCL10 formed an auto-amplification loop through activation of NF-κB. Furthermore, Phosphorylation of p65 at serine 536 played an important role in the auto-amplification of

CXCL10. Overall, the present results demonstrated that JN-2 decreased inflammation by inhibiting CXCR3-enhanced cell migration and pro-inflammatory cytokine expression, which then ameliorated arthritis progression.

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FACTORS INFLUENCING INITIATION OF ORAL ANTIRESORPTIVE THERAPY AFTER HIP FRACTURE SURGERY: INSIGHTS FROM A SINGAPORE ORTHOGERIATRIC HIP FRACTURE PROGRAMME

K. S. Goh¹

¹Changi General Hospital, Singapore

Objectives: Antiresorptive treatment is a cornerstone of secondary prevention of fragility fractures; oral bisphosphonates (BPs) being the mainstay of treatment in Singapore. This study aims to provide insight into factors influencing the initiation of oral antiresorptive therapy after surgical repair of hip fracture in the elderly.

Methods: 296 patients aged ≥ 65 admitted consecutively to a rehabilitation unit postsurgical fixation of hip fracture were included in this prospective study; as part of a comprehensive hip fracture programme integrating best practices for peri-operative care, rehabilitation and a fracture liaison service. In this protocol, calcium, vitamin D supplements and oral BP treatment were initiated within 28 days of surgery by doctors, aided by osteoporosis nurse counselling. Reasons for noninitiation of oral BPs were recorded, triggering referral to the specialist clinic for parenteral antiresorptives. Logistic regression was performed to examine factors associated with noninitiation of oral BPs, adjusting for age and gender.

Results: The mean age of subjects was 80.1 ± 8.3 ; median creatinine clearance (CrCl) was 46.1 ml/min (IQR 34.3–59.8). 64.2% were not started on oral BPs; they tended to be older, have non-weight bearing (NWB) status, lower pre-morbid new mobility score (NMS) and lower CrCl (all $p < 0.05$). Log-transformed NWB status and log-transformed CrCl were significantly associated with noninitiation of oral BPs in the multivariable model: odds ratio 4.49 (95%CI 1.69–11.95; $p = 0.003$); 0.06 (95%CI 0.02–0.16; $p < 0.001$), respectively. This was consistent with most common recorded reasons for noninitiation: chronic kidney disease (CKD; 43.7%), NWB status (18.8%), patient refusal (11.6%) and gastro-oesophageal disease (9.4%).

Conclusions: CKD is common in the elderly with hip fracture, thus affecting secondary prevention, as evidence for safety and efficacy of BPs is marginal in advanced CKD. NWB status could reflect poor bone quality; with implications on fracture healing if given BPs. Patients with poor pre-morbid functional status (NMS) are likely more frail, with complex comorbidities. The results provide insight into the limitations and challenges of commencing oral BPs in this elderly hip fracture cohort and gives impetus to further address the osteoporosis care gap.

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THE ASSOCIATIONS BETWEEN HANDGRIP STRENGTH, BMD AND FRACTURE PROBABILITY IN ELDERLY WOMEN

V. Alekna¹, A. Cernovas¹, R. Stukas¹, A. Mastaviciute¹, M. Tamulaitiene²

¹Vilnius University, Faculty of Medicine, ²Vilnius University, Faculty of Medicine; National Osteoporosis Center, Vilnius, Lithuania

Objective: To investigate the associations between handgrip strength, femoral neck BMD and fracture probability over ten years in women aged 60–74 years.

Methods: The cross-sectional study was performed on women aged 60–74 years who in 2016–2017 were the patients of National Osteoporosis Center in Vilnius. Exclusion criteria were severe cognitive impairment and mobility disorders. Femoral neck BMD (FN-BMD, g/cm²) was measured by DXA (iDXA, GE LUNAR, USA). We used hydraulic hand dynamometer (JAMAR, Patterson Medical, UK) to measure handgrip strength (HGS, kg/m²). HGS measurement was performed three times for each arm; the maximal result was used for further analysis. 10-year probability (%) of hip and major osteoporotic fractures was evaluated by fracture risk assessment tool (FRAXTM). Data was analyzed using “SPSS 18.0 for Windows” program.

Results: The study was performed on 188 women. Mean age of the study subjects was 68.03 ± 3.43 years. Mean and standard deviation of explored values were: HGS – 29.3 ± 4.38 kg/m², FN-BMD – 0.87 ± 0.12 g/cm², hip fracture probability – $1.62 \pm 2.06\%$, major osteoporotic fracture probability – $7.29 \pm 3.79\%$. Our study showed that age was negatively weakly correlated with HGS ($r = -0.22$, $p = 0.002$) and positively with 10-year probability of hip fractures ($r = 0.35$, $p < 0.001$). FN-BMD was positively weakly associated with handgrip strength ($r = 0.25$, $p < 0.001$), negatively very strongly with 10-year probability of hip ($r = -0.88$, $p < 0.001$) and strongly with major osteoporotic ($r = -0.65$, $p < 0.001$) fractures. Further correlation analysis revealed the negative weak associations between HGS and ten year probability with of both hip ($r = -0.3$, $p < 0.001$) and major osteoporotic ($r = -0.13$, $p = 0.04$) fractures.

Conclusion: In women aged 60–74 years, handgrip strength was positively associated with femoral neck BMD, and each of them were negatively associated with probability of hip and major osteoporotic fractures.

P179

SEASONAL VARIATIONS OF 25-HYDROXYVITAMIN D3 LEVELS AND ITS RELATION TO PTH LEVELS

M. A. Teran-Tinedo¹, C. Pijoan-Moratalla¹, W. A. Sifuentes-Giraldo¹, M. Vázquez-Díaz¹

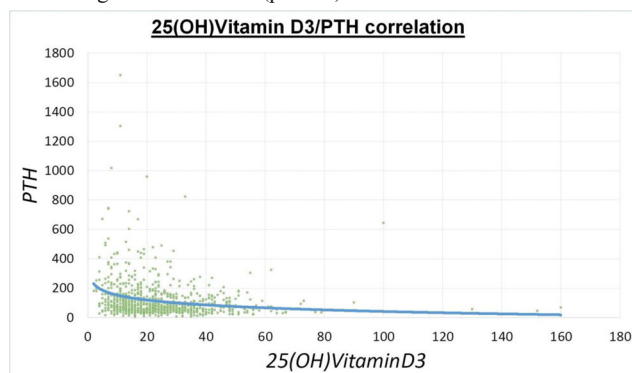
¹Hospital Universitario Ramón y Cajal, Madrid, Spain

Objective: To analyze the relationship between 25-hydroxyvitamin-D3 (25OH-D3) and PTH levels and to determine its variation between the different seasons of the year.

Methods: We conducted an observational descriptive study collecting and analysing 25OH-D3 and PTH serum levels of patients seen in our center between January and August 2017. The distribution of the frequencies of both variables was compared and Pearson's correlation coefficient was used to analyze if linear relationship between them existed. The results were classified by date in three seasons: winter, spring or summer, assessing the mean seasonal oscillations of each variable and calculating correlation in each case. Different levels of 25OH-D3 were evaluated in order to identify differences in the grade of correlation.

Results: Serum samples from 847 patients were recollected. In the frequency distribution analysis, 58.84% of the patients had 25OH-D3 levels lower than 25 ng/ml and 79% had PTH levels lower than 156 pg/ml. Correlation between both groups was analysed, resulting in a negative correlation of -0.207 ($p < 0.01$) (Figure 1). The mean values of 25OH-D3 were calculated for each seasonal period, establishing a mean level of 22 ng/mL for winter, 25 ng/mL for spring and 29 ng/mL for summer. Regarding PTH levels, the mean values for each season were 118 pg/ml, 101 pg/ml and 72 pg/ml for each season (winter, spring and summer, respectively). PTH/vitamin D correlation was also assessed for each period: The result of Pearson's correlation coefficient during the winter was -0.169 ($p < 0.01$), in spring -0.249 ($p < 0.01$), and in summer 0.069 ($p = 0.52$). Correlation calculated with deficiency levels of

25OH-D3 (<30 ng/ml) was -0.18 ($p<0.01$), and with levels inferior than 10 ng/ml was -0.108 ($p<0.24$).



Conclusion: Linear correlation between levels of 25OH-D3 and PTH could not be established in our study, not even using levels classified as vitamin D deficiency. 25OH-D3 levels were found to increase from winter to summer whereas PTH levels decreased inversely during these time periods, without any linear correlation.

P180

COMPARISON OF 25-HYDROXYVITAMIN D3 SERUM LEVELS IN PATIENTS WITH PSORIATIC ARTHRITIS WITH OR WITHOUT PSORIASIS SKIN INVOLVEMENT

C. Pijoan-Moratalla¹, J. R. Quiñones-Torres¹, M. Vázquez-Díaz¹

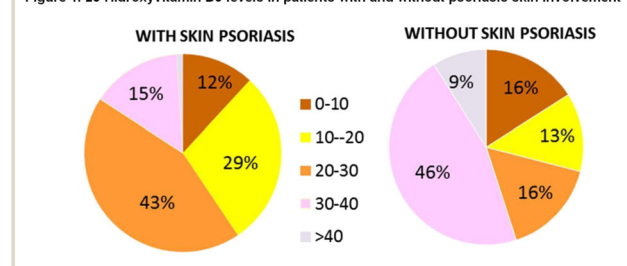
¹Hospital Universitario Ramón y Cajal, Madrid, Spain

Objective: To determine 25-hydroxyvitamin D3 (25OH-D3) serum levels in patients with psoriatic arthritis (PA) and to assess differences according to the presence or absence of psoriasis skin involvement.

Methods: We conducted an observational retrospective study including patients with diagnosis of PA according to the CASPAR classification criteria who had at least one serum determination of 25OH-D3 in the last 36 months. Clinical and epidemiological data were collected, including arthritis distribution, age of diagnosis, presence of psoriasis skin involvement, treatment and serum 25OH-D3 levels. Patients receiving oral vitamin D supplements were excluded.

Results: Sixty patients met the inclusion criteria and were analyzed. 42 were female (70%), with a mean age of 47.6 years (range: 30-82). Psoriasis skin involvement was present in 40 patients and preceded onset of arthritis in 80% of them (20% with psoriatic nail dystrophy). Regarding 25OH-D3 levels, mean value was 17.99 ± 13.23 ng/dL. In the global analysis, 7 patients (11.6%) had levels between 0-10 ng/dL, 22 patients (36.6%) between 10-20 ng/dL, 23 patients (38.3%) between 20-30 ng/dL, 6 patients (10%) between 30-40 ng/dL and 2 patients had ≥ 40 ng/dL. In our sample, 58.53% of patients with psoriasis skin involvement had 25OH-D3 levels higher than 20 ng/dL in contrast to the group without skin involvement, who reached sufficiency levels only in 37.5% of the cases. In the comparative analysis, patients with psoriasis skin involvement had a mean 25OH-D3 serum level of 20.88 ng/dL whereas patients without skin involvement had lower levels (mean value 19.42 ng/dL). Similarly, patients with skin psoriasis had more frequently 25OH-D3 levels between 20-30 ng/dL (insufficiency) compared to those without this manifestation, who presented lower levels (44% vs. 16%) (Figure 1) but without statistically significant difference.

Figure 1. 25-Hydroxyvitamin D3 levels in patients with and without psoriasis skin involvement



Conclusion: In patients with PA, the presence of psoriasis skin involvement correlates with higher 25OH-D3 serum levels. This finding could be explained by the treatment received in these patients for moderate-severe skin involvement, which includes topical vitamin D analogs and phototherapy that could increase 25OH-D3 serum levels.

P181

GLUCAGON-LIKE PEPTIDE 1 RECEPTOR (GLP-1R) ANTAGONIST IMPAIRS THE BMD OF FEMUR AND THE BONE TURNOVER IN DIABETES MELLITUS (DM) INDUCED BY STREPTOZOTOCIN (STZ)

P. L. Alves¹, R. F. Alporti¹, P. F. Silveira¹

¹Instituto Butantan, Laboratory Pharmacology, Sao Paulo, Brazil

Objectives: To identify the mediation of C-terminal telopeptide of type-1 collagen (CTX-1), osteocalcin (OCN), calcitonin (CT), BMD of femur (BMDF) and procollagen type 1 N-terminal propeptide (P1NP) by GLP-1R in DM-STZ. For this purpose, the effects of the competitive antagonist of GLP-1R, exendin (9-39) (E9), were evaluated and compared with those previously reported for EXE on these parameters in DM-STZ.

Methods: 6-day-old male Wistar rats received 70 mg STZ in 0.05M citrate buffer, pH 4.5 per kg. At 60 days of age, diabetic animals were selected by preprandial glycemia ≥ 150 mg/dL measured by a digital glucometer. Diabetic rats received daily subcutaneous 100 μ g E9/kg (STZ-E9), or remained untreated (STZ) for 20 days. Untreated healthy rats with the same age were used as control (C). OCN, CT, CTX-1 and P1NP were measured by ELISA and BMDF by X-rays.

Results: In STZ, CT (6.90 ± 0.78 , $n=4$) did not differ from C, but OCN (3.03 ± 0.14 , $n=5$) and CTX-1 (2.20 ± 0.37 , $n=5$) were higher in STZ than in C. The treatment of STZ with E9 restored OCN (1.80 ± 0.37 , $n=3$), increased CTX-1 (5.05 ± 0.47 , $n=3$) and decreased CT (1.64 ± 0.09 , $n=3$) and BMDF (1.32 ± 0.01 , $n=3$). P1NP was similar among C, STZ and STZ-E9.

Conclusion: High CTX-1 and OCN imply a tendency for bone fragility in DM-STZ. It is known that E9 worsens glycemia, insulin resistance and glucose tolerance in DM-STZ. The present study shows that E9 also worsens CTX-1 in DM-STZ. All these effects are opposite to those described for EXE in DM-STZ. However, similarly to EXE, E9 restores OCN and worsens CT, suggesting that these two actions in DM-STZ extrapolate the GLP-1R binding and/or that EXE and E9 act as selective modulators with different actions in different targets, thereby granting the possibility to selectively inhibit or stimulate these GLP-1R actions in various tissues. Furthermore, E9 impairs BMDF, which is known to be not affected by EXE in DM-STZ. Data show that

changes in CTX-1 and BMDf contribute to bone homeostasis in DM-STZ and strongly suggest that these alterations are mediated directly by GLP-1R.

Acknowledgment: Supported by Fapesp and CNPq

P182

ALENDRONATE ATTENUATES THE GENE EXPRESSION OF PROINFLAMMATORY CYTOKINES AND MMP-8 IN APICAL PERIODONTITIS OF OVARECTOMIZED RATS

P. C. Romualdo¹, M. P. Lucisano¹, F. W. G. Paula-Silva¹, R. A. B. Silva¹, L. A. B. Silva¹, P. Nelson-Filho¹

¹School of Dentistry of Ribeirão Preto, University of São Paulo, Department of Pediatric Dentistry, Ribeirão Preto, Brazil

Objective: To evaluate the gene expression of proinflammatory cytokines and matrix metalloproteinases in apical periodontitis (AP) of ovariectomized (OVX) rats treated or not with alendronate (ALD).

Methods: Twenty-five 12-week-old female Wistar rats were submitted to OVX or sham surgery and followed by 9 weeks. Then, the dental pulp of upper first molars was exposed to the oral environment for induction of AP. The groups were as follows: sham-AP, OVX-AP and OVX-AP-ALD. After 21 days of AP induction, the animals were euthanized and the blocks containing teeth and bone were collected to be analyzed by RT-PCR for quantification of pro-inflammatory cytokines and matrix metalloproteinases genes (*Il1b*, *Tnfa*, *Il6*, *Mmp8* and *Mmp13*).

Results: AP in OVX rats showed increased expression of *Il1b*, *Il6* and *Mmp8* compared with AP in sham rats ($p < 0.05$). ALD treatment reduced IL-6 and MMP-8 expression to the same level as the AP in sham group ($p < 0.05$).

Conclusion: AP in OVX rats have increased expression of pro-inflammatory cytokines (*Il1b* and *Il6*) and matrix metalloproteinase (*Mmp8*) genes and ALD treatment reduced *Il6* and *Mmp-8* to the same level as the AP in sham group. So, we speculate that the hypoestrogenic condition aggravates inflammation and degradation of extracellular matrix components and ALD treatment attenuates this condition.

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P183

IMPACT OF CHEMOTHERAPY ON BONE TURNOVER MARKERS IN PATIENTS TREATED WITH AROMATASE INHIBITORS

J. Loarce-Martos¹, W. A. Sifuentes-Giraldo¹, L. V. Maldonado-Romero¹, M. Ahijón-Lana¹, C. Velázquez-Arce¹, N. Martínez-Jañez¹, M. Vázquez-Díaz¹

¹Hospital Universitario Ramón y Cajal, Madrid, Spain

Objectives: To assess the impact of chemotherapy before treatment with aromatase inhibitors (AI) on bone turnover markers (BTM) in postmenopausal patients with breast cancer (BC) in a tertiary hospital in Spain.

Methods: We conducted a cohort study in postmenopausal patients treated with AI before initiation of adjuvant chemotherapy (CT group) or after surgery (non-CT group), followed during a period of two years. Blood levels of calcium (Ca), phosphorus (P), 25-hydroxyvitamin D (25OH-D), PTH, C-terminal and N-terminal propeptides of type I procollagen (PICP and PINP, respectively) were measured in both groups, before initiation of AI treatment (after chemotherapy) and after two years of AI treatment.

Demographic data, neoplastic disease data and classic risk factors for osteoporosis were also collected.

Results: A total of 46 postmenopausal patients diagnosed with BC attended in our hospital between August 2011 and December 2014, 28 patients in the CT group and 18 in the non-CT group were included. The mean age at diagnosis was 60.86 ± 6.75 years. The AI used in both groups was letrozole. There were no statistically significant differences in the baseline demographic characteristics. There were no statistically significant differences in the value of PICP and PINP between both groups in the baseline determinations or at 2 years. There were no statistically significant differences in the baseline determination of Ca, P, 25OH-D and PTH (Table 1).

	CT group (mean $\pm$ SD)	Non-CT group (mean $\pm$ SD)	p-value
PTH(ng/ml)	57.72 $\pm$ 18.26	60.27 $\pm$ 19.78	0.340
Ca(mg/dl)	9.76 $\pm$ 0.42	9.82 $\pm$ 0.32	0.313
P (mg/dl)	3.35 $\pm$ 0.27	3.51 $\pm$ 0.47	0.097
25OH-D (ng/ml)	27.55 $\pm$ 11.98	24.64 $\pm$ 8.88	0.204
PICP (ng/ml)	0.62 $\pm$ 0.32	0.63 $\pm$ 0.18	0.461
PINP (ng/ml)	64.57 $\pm$ 38.62	54.59 $\pm$ 17.88	0.162
PICP 2 years (ng/ml)	0.60 $\pm$ 0.22	0.64 $\pm$ 0.14	0.300
PINP 2 years (ng/ml)	66.98 $\pm$ 30.81	61.56 $\pm$ 13.54	0.257
PICP in patients with OP (ng/ml)	0.6 $\pm$ 0.17	0.64 $\pm$ 0.11	0.332
PINP in patients with OP (ng/ml)	70.59 $\pm$ 35.87	55.82 $\pm$ 12.08	0.156

Conclusions: The results of our study do not show that CT prior to treatment with AI in postmenopausal patients with BC alters significantly BTM levels, even after adjusting for BMD.

P184

DETECTION OF SERUM LEVEL CHANGES OF MATRIX METALLOPROTEINASE-13 AND INTER LEUKIN-1 BETA DURING REMISSION AND FLARE-UPS OF PRIMARY OSTEOARTHRITIS OF THE KNEES

Y. Abdelmotaleb Gazar¹

¹Rheumatology Department, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Objective: The diagnosis of osteoarthritis is currently based on radiographic criteria (e.g., joint space width) and clinical symptoms (e.g., pain and loss of function). The evaluation of new disease-modifying osteoarthritis drugs (DMOADs) is performed on the same basis, since the regulatory bodies currently require evidence for an impact on radiographic joint space narrowing (JSN) and an impact on symptoms. However, the limitations of radiography have led to research into alternative parameters for monitoring osteoarthritis that could serve as biomarkers in drug development. Our aim was detection of the serum level of MMP-13 and IL-1 β in OA of the knee during remission and exacerbation and if these biomarkers can be validated as gold biomarkers in assessing OA progression and drug development in OA.

Methods: This study was performed on 60 patients with knee osteoarthritis, 18 males (30%) and 42 females (70%), all diagnosed as osteoarthritis of one or both knees. Their ages ranged from 40-65 y. The duration of their disease ranged from 1-15 y. The control groups were 8 males (32%) and 17 females (68%). Their ages ranged from 40-65 y. We have excluded:

- Significant conditions of the spine, hips, or feet that affect the ability to walk
- Significant medical conditions that affect the ability to walk and function
- Inflammatory arthritis, such as rheumatoid or gouty arthritis
- Degenerative arthritis secondary to other conditions, such as hemochromatosis, Wilson's disease, or ochronosis
- Current significant soft tissue rheumatism such as fibromyalgia, or trochanteric bursitis
- Significant trauma and surgery (including arthroscopy) or intra-articular corticosteroid injection to the index knee within 6 months of enrollment

The patients were allowed to continue on the medications that they have pro-inflammatory cytokines (IL-1 β) and degradative enzymes (MMP-13) are measured. Assessing the flare-ups using Knee Osteoarthritis Flare Ups Score (KOFUS)

Results: Patients who had 3 flare-ups showed the statistically significantly highest mean IL-1 β and MMP-13 levels. There was no statistically significant difference between patients with no flare-up, 1 flare-up and 2 flare ups; all of them showed statistically significantly lower mean levels. Control group showed the statistically significantly lowest mean IL-1 β level. There was a statistically significant positive (direct) correlation between IL-1 β , disease duration, KL, VAS, stiffness score, pain score, functional score, WOMAC and KOFUS. An increase in all these variables is associated with an increase in IL-1 β and MMP-13.

Conclusions: There is a potential role for IL-1 β and MMP 13 biomarkers in assessing the development in osteoarthritis. IL-1 β and MMP-13 were found to be correlated positively in patients with knee OA, this correlation sounded right as the expression of MMP-13 depends on the level of IL-1 β . Although all medications groups failed to lower the level of IL-1 β and MMP-13, yet there was a numerical difference in favor of diacerine and NSAID. Patients on both diacerine and NSAID had the lowest rate of flare-ups.

P185

ONE YEAR TREATMENT OF SUBCUTANEOUS TNF ADMINISTRATION IS NOT ENOUGH TO REVERSE SYSTEMIC BONE RESORPTION

M. J. Lim¹, W. Park¹, S. R. Kwon¹, K. H. Jung¹
¹Inha University Hospital, Incheon, South Korea

Objectives: We investigated systemic bone resorption before, 6 and 12 months after subcutaneous TNF administration in seropositive RA patients.

Methods: Twenty-five seropositive RA patients were enrolled. They had been refractory to antirheumatic drugs and anti-TNF- α therapies including etanercept and adalimumab were administered for a year. Weekly and biweekly administration of etanercept 50 mg and adalimumab 40 mg were given to 11 and 14 patients, respectively. Blood sampling was done at baseline, 6 months and 1 year after the treatment. Peripheral blood mononuclear cells were cultured and number of osteoclasts was counted. Bone turnover markers including c-terminal telopeptide (CTX), bone specific alkaline phosphatase (BSALP) were measured using enzyme linked immunosorbent assay. BMD was measured at baseline and one year after treatment. In addition, RA disease activity such as DAS-28 and serum level of IL-6 were assessed.

Results: After 1 year of subcutaneous TNF treatment, number of cultured osteoclasts from peripheral blood decreased (Table 1) while RA disease activity was improving with rapid decline of serum IL-6 (Table 2). However, bone resorption pit by osteoclasts did not respond to treatment and BMD on femur and total hip declined after one year of treatment.

Table 1. Systemic osteoclastogenesis, bone turnover markers and BMD

		At baseline	At 6 months	At 12 months
Ex vivo	Number of osteoclasts (per well)	496 $\pm$ 279.7	331 $\pm$ 168.7	299 $\pm$ 207.4*
Bone resorption pit by osteoclasts (%)	2.5 $\pm$ 5.59	1.1 $\pm$ 2.05	1.0 $\pm$ 0.75	
In vivo	CTX (ng/mL)	0.57 $\pm$ 0.42	0.67 $\pm$ 0.51	0.45 $\pm$ 0.21
BSALP (U/L)	24.78 $\pm$ 9.18	25.99 $\pm$ 8.88	25.84 $\pm$ 7.83	
BMD	L spine (g/cm ²)	1.14 $\pm$ 0.159	-	1.12 $\pm$ 0.176
Femur (g/cm ²)	0.86 $\pm$ 0.133	-	0.83 $\pm$ 0.153*	
Total hip (g/cm ²)	0.93 $\pm$ 0.167	-	0.9 $\pm$ 0.18*	

Table 2. Systemic inflammation and RA disease activity

	At baseline	At 6 months	At 12 months
IL-6 (pg/mL)	34.15 $\pm$ 38.55	2.6 $\pm$ 4.98**	3.29 $\pm$ 2.69*
DAS-28-ESR	6.57 $\pm$ 0.86	4.2 $\pm$ 1.02**	3.38 $\pm$ 0.93*
DAS-28-CRP	6.24 $\pm$ 0.82	3.85 $\pm$ 0.69**	3.18 $\pm$ 0.57*

* denotes $p < 0.05$, at baseline vs. at 12 months

**denotes $p < 0.01$, at baseline vs. at 6 months

Conclusion: One year treatment of subcutaneous anti-TNF administration failed to show improvement in systemic bone resorption. Although, number of cultured osteoclasts from peripheral blood declined in accordance to improved systemic inflammation, activity of osteoclasts was not reduced and systemic bone resorption was shown to be active, reflected by worsened BMD. Therefore, we believe longer than one year treatment period of anti-TNF therapy is required for seropositive RA patients to reverse systemic bone resorption.

P186

CHALLENGES OF OSTEOPOROSIS MANAGEMENT IN MEN

R. Dumitriu¹, E. Nedeltcheva Petrova¹, A. Buruiana¹, A. Ghemigian¹
¹National Institute of Endocrinology "C. I. Parhon", Bucharest, Romania

Objectives: We present the challenges and the difficulties of the management of osteoporosis in men. Although it is considered a women's health problem, DXA should be performed in men who are at risk. Osteoporosis in men is becoming an important public health problem. Male osteoporosis is a heterogeneous entity, with multiple underlying causes. Fragility fractures, corticosteroids therapy, androgen deprivation therapy are considered risk factors.

Methods: We present a clinical case concerning a 56-year-old man diagnosed with secondary osteoporosis, vitamin D deficiency, hypertension. Bone profile evaluation included: DXA, PTH, total serum calcium, and serum 25-hydroxyvitamin D (25-OH D).

Results: A 56-year old man with Riedel thyroiditis, moderate hypertension was evaluated for fatigue, asthenia, diffuse polyarticular pain. He had a negative family history for osteoporosis, was a heavy

ex-smoker, ex-drug user, physical inactive, with a history of oral glucocorticoid treatment for Riedel thyroiditis (for six months). Evaluation of calcium metabolism showed a normal PTH (61.28 pg/ml, normal range: 15–65 pg/ml), normal serum calcium (9.86 mg/dl, normal range: 8.9–10.3 mg/dl) and low 25-OH D levels (15.28 ng/ml, normal range: 30–100 ng/ml). DXA revealed a low BMD of 0.882 g/cm² with T-score of -2.8 and Z-score -2.3 (lumbar spine). FRAX predicted a 3.5% of major osteoporotic fracture and 0.6% risk of hip fracture. The patient was prescribed oral alendronate, vitamin D supplementation and oral calcium. One year follow-up showed a discrete improvement of the bone profile parameters (lumbar spine: BMD of 0.897 g/cm², T-score -2.7 and Z-score -2.2). The treatment was switched to risendronate (oral administration).

Conclusion: Frequently, osteoporosis is underdiagnosed and undertreated in men. Osteoporosis-related fractures are a major cause of mortality and morbidity in women and also in men. The therapeutic agents should be chosen based on multiple criteria, but bisphosphonates remain the first-line agents. Also, all men should receive adequate intake of calcium and vitamin D.

P187

THE EFFICACY OF INTRA-ARTICULAR KNEE INJECTIONS ON GAIT OF SUBJECTS WITH KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

A. Aboutorabi¹, M. Hashemiyari²

¹University of Social Welfare and Rehabilitation Sciences, ²Tehran University of Medical Sciences, Tehran, Iran

Objective: Intra-articular injection has been widely used in for the treatment of knee osteoarthritis (OA). The aim of this systematic review was to evaluate efficacy of platelet-rich plasma (PRP), hyaluronic acid (HA) and corticosteroid (CS) injections on gait parameters of subjects with knee OA. **Methods:** We searched PubMed, SCOPUS, ISI Web of Knowledge, Cochrane library, ProQuest and Google Scholar to identify relevant studies including randomized controlled trials (RCTs) and clinical trials that assessed efficacy of PRP, HA and CS injections on gait variables in subjects with knee OA. Risk of bias assessment was implemented using the physiotherapy evidence database (PEDro) scale. If possible, meta-analysis was accomplished.

Results: Results for 1195 individuals were described in 16 articles of which 12 studies involved RCT. The effects of HA on gait parameters in subjects with knee OA was assessed in 14 studies, PRP in 2 studies and CS injections in 5 papers. There was significant difference in the pooled results for velocity (SMD: 0.25, 95%CI 0.02–0.48) with HA injection. Stride length was increased with HA injection compared to control group, although this difference was not significant (SMD: 0.16, 95%CI -0.07 to 0.39). For the other variables, including the ground impact, vertical force and knee angles no statistically significant differences were observed between the HA and control groups.

Conclusion: There are limited evidence suggesting clinical benefits with the use of PRP and CS, so superiority effect over each other on gait of subjects was not determined. However, HA is still assumed more effective than placebo and no intervention on the basis of present evidence. Further high quality comparative studies are required to determine which intervention is more beneficial in function and walking of subjects with knee OA.

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INCREASED MORTALITY RISK IN MEN WITH HIGH DIETARY CALCIUM INTAKE BUT NOT IN WOMEN

A. J. Rodriguez¹, D. Scott¹, B. Khan², A. Hodge³, D. R. English³, G. G. Giles³, B. Abrahamson⁴, P. R. Ebeling¹

¹Bone & Muscle Health Research Group, Department of Medicine, School of Clinical Sciences at Monash Health, Monash University,

Melbourne, Australia, ²Australian Institute of Musculoskeletal Science, Melbourne Medical Centre, University of Melbourne, Melbourne, Australia, ³Centre for Epidemiology & Intelligence Division, Cancer Council Victoria, Melbourne, Australia, ⁴Odense Patient Data Explorative Network [OPEN], Department of Clinical Research, University of Southern Denmark, Odense, Denmark

Background: The association of dietary calcium with all-cause and cardiovascular (CV) mortality is controversial. A study of Swedish women suggested higher calcium was associated with a higher mortality risk, while a study of Australian men and women suggested higher intakes were associated with lower mortality risk.

Design: The Melbourne Collaborative Cohort Study (MCCS), a prospective study of 41,514 individuals initiated in 1990–1994 was designed to examine lifestyle factors associated with cancer risks and mortality.

Participants: 34,627 individuals (women: 20,834 [60.2%]) with mean $\pm$ SD age of 54 $\pm$ 8 years at baseline after excluding those with pre-existing CV disease, cancer or incomplete data.

Methods: Analysis of MCCS data for men and women using calcium intake thresholds derived from the Swedish study to facilitate direct comparison. Dietary calcium was estimated from a food frequency questionnaire. Clinical and demographic information was obtained during clinic visits. Deaths were ascertained from government registries over 12.5 years of follow-up. Calcium intakes (mg/day) were energy-adjusted and divided into groups: <600; 600–999; 1000–1399; $\geq$ 1400. Cox proportional hazard models were fitted to estimate the risk of mortality from all-causes, cardiovascular (CV) and myocardial infarction (MI) relative to 600–999 mg/day (consistent with the Swedish report) controlling for multiple risk factors.

Results: In men, a calcium intake of $\geq$ 1400 mg/day was associated with a 41% higher all-cause mortality risk relative to 600–999 mg/day [HR=1.41; 1.01, 1.97] in multivariable adjusted models. There was a trend toward increased CV mortality [HR=1.77; 0.92, 3.13] in multivariable models. No hazard estimate reached significance for any mortality outcome in women.

Conclusion: Higher calcium intakes may have sex-specific effects on all-cause and cardiovascular mortality risk in Australian adults. Contrary to prior findings from a similar study conducted in Swedish women, Australian women, showed no increase in mortality risk with high calcium intakes. This may reflect differences in calcium handling dynamics, diet or lifestyle factors between the two countries. We confirmed the reported increased risk in the analysis for men.

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PATIENTS GENOTYPE AND OSTEOARTHRITIS TREATMENT EFFICACY

L. Smolina¹, L. Khimion¹

¹Shupyk National Medical Academy of Postgraduate Education, Family Medicine Department, Kyiv, Ukraine

Objective: It is known that some genes (FDPS, LCT, VDR) which determine the calcium, vitamin D, lactate metabolism can have impact on osteoarthritis (OA) development and course, and thus, has a possible influence on OA treatment efficacy. The study of the influence of genetic factors on the OA treatment efficacy (standard treatment and with the use of the platelet autologous plasma-PAP) has a significant scientific and practical importance. Our aim was to determine the influence of genetic factors (genotyping of FDPS, LCT, VDR) on the efficacy of standard and modified (with use of the PAP) treatment in the early stages of knee OA. **Methods:** The WOMAC index and the frequency of genotype variants for the FDPS, LCT, and VDR genes were studied in 96 patients (57 women, 38 men, 41.7 $\pm$ 1.2 years old) with primary knee OA (X-ray stage I–II). All patients had OA exacerbation with no clinical evidence of synovitis. Enrolled patients were divided into 2 groups: the first group consisted of 49 patients (27 women, 22 men, mean age 41.7 $\pm$ 1.2 years) who agreed

to receive standard OA treatment (NSAID, exercises, orthopaedic devices as needed) and 3 intra-articular PAP injections (2 courses in 12 month, plasma volume 12–15 ml/course, total platelet count per injection $1260.24 \pm 22.1 \times 10^9$). The second group of 47 patients with OA who received standard treatment. Both groups were comparable by age, gender, BMI and initial WOMAC. Genetic parameters and its influence on OA course and treatment efficacy was analyzed during 12 months of supervision.

Results: The earliest age (37.2 ± 2.01 years) of clinical manifestation of knee OA was connected to homozygous genotype variants: LCT (relative risk 6.3:1), FDPS (relative risk 6.5:1) and VDR (relative risk 6.8:1). The best positive WOMAC changes was determined in patients with the CC genotype of LCT both in first and second groups. The WOMAC index showed lower treatment efficacy in patients with CC genotype of FDPS and VDR in both groups, but results of patients who received PAP were better and their remission was longer (in 1.7 times) than in the standard treatment group.

Conclusion: The age of first OA clinical signs and the treatment efficacy (both standard and with the use of platelet autologous plasma) has genetic predisposition.

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DEVELOPMENT OF VITAMIN D VARIABILITY MODEL IN OUTPATIENT SETTING

A. A. Petrushkina¹, E. A. Pigarova¹, L. K. Dzeranova¹, L. Y. A. Rozhinskaya¹

¹Endocrinology Research Centre, Moscow, Russia

Objective: Lots of factors with complex relationship may contribute to the development of vitamin D deficiency, and factors may vary between the populations; in Russian population only single studies were performed to determine major contributing factors.

Methods: 93 volunteers which underwent evaluation of serum 25(OH)D during winter and spring season in Endocrinology Research Centre, agreed to fill in an anonymous questionnaire alongside with receiving the result of the test. Only data from fully filled questionnaires were included in the study.

Results: We observed an increased risk of revealing a vitamin D deficiency (25(OH)D <30 ng/mL) in patients with history of fractures in first-degree relatives, complaints of difficulties in keeping a balance and alterations in tactile sensitivity, and in patients which consume carbonated soft drinks; a decreased risk in patients who receive cholecalciferol medications, are physically active in daily living and have a regular dairy consumption; 40% of 25(OH)D level variability was determined by four independent factors – use of cholecalciferol medications, moderate alcohol consumption (median alcohol intake for drinkers was 1.0 drink per day), BMI and presence of alterations in tactile sensitivity.

Conclusion: In this pilot study we revealed the major factors associated with vitamin D level in outpatient setting; further investigations are required for developing a more valid model of vitamin D variability.

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DEVELOPMENT OF HIGH-DOSE ORAL VITAMIN D SUPPLEMENTATION REGIMEN

T. S. Tarasova¹, E. A. Pigarova¹, A. A. Petrushkina¹, L. Y. A. Rozhinskaya¹, L. K. Dzeranova¹, A. V. Il'Yn¹, L. V. Nikankina¹

¹Endocrinology Research Centre, Moscow, Russia

Objective: Long-term improvement of vitamin D status may be challenging with low-dose treatment. Development of efficient and safe high-dose treatment regimen could provide a solution.

Methods: 24 apparently healthy volunteers were included in the study: Group 1 (11/24) with blood serum levels of 25(OH)D <10 ng/mL and Group 2 (13/24) with 25(OH)D levels 10–20 ng/mL. At baseline all patients received bolus dose of cholecalciferol (single dose of 200 000 IU of

cholecalciferol oil solution orally). Assessments were made at baseline, 3 h; 3, 7 and 28 d after intake: 25(OH)D total, PTH, Ca_{tot} , Ca_{ion} , P, creatinine blood serum levels and Ca, creatinine in first void urine. 8 participants from Group 1 and 10 participants from Group 2 continued follow-up every 28 d and received above-noted cholecalciferol bolus dose in case 25(OH)D level decreased below 30 ng/mL.

Results: By 28th day 41.6% participants achieved target 25(OH)D levels >30 ng/mL. During the follow-up period from the end of 1st month to the end of 6th month we observed persistent improvement of 25(OH)D level in both groups. In the end of the follow-up period we observed target levels of 25(OH)D >30 ng/mL in 37.5% and 60% in Group 1 and Group 2, respectively. Average number of cholecalciferol bolus doses required to maintain target 25(OH)D level (above 30 ng/mL) was 4.0 and 3.0 in Group 1 and Group 2, respectively. Mean level of PTH decreased significantly by 28th day in both groups and remained steady during the follow-up; there were no significant changes in Ca_{tot} , Ca_{ion} , P blood serum levels and urine Ca-creatinine ratio levels during all the study.

Conclusion: In this study we demonstrate a high-dose treatment regimen with estimated need of receiving 200 000 IU of cholecalciferol every 2 months that appears to be safe and effective in young patients regardless of baseline severity of vitamin D deficiency.

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THE IMMEDIATE EFFECT OF A SOFT KNEE BRACE ON DYNAMIC KNEE INSTABILITY IN PERSONS WITH KNEE OSTEOARTHRITIS

T. Cudejko¹, M. van der Esch², J. Schrijvers¹, R. Richards¹, T. Wrigley³, J. van den Noort⁴, M. van der Leeden², L. D. Roorda², W. Lems⁵, J. Harlaar⁶, J. Dekker¹

¹Department of Rehabilitation Medicine, VU University Medical Center Amsterdam, Amsterdam, The Netherlands, ²Amsterdam Rehabilitation Research Center, Reade, Amsterdam, The Netherlands, ³Department of Physiotherapy, University of Melbourne, Melbourne, Australia, ⁴Department of Radiology and Nuclear Medicine, Musculoskeletal Imaging Quantification Center (MIQC), Academic Medical Center, Amsterdam, The Netherlands, ⁵Jan van Breemen Research Institute, Reade, Amsterdam, The Netherlands, ⁶Delft University of Technology, Delft, The Netherlands

Objective: Wearing a soft knee brace has been shown to reduce self-reported knee instability in persons with knee osteoarthritis (OA) [1]. There is a need to assess whether a soft knee brace reduces objectively assessed dynamic knee instability as well. The aims of the study were: (i) to evaluate the immediate effect of a soft knee brace on dynamic knee instability, and (ii) to assess the difference in effect between a tight and a non-tight knee brace in persons with knee OA.

Methods: A within-subject cross-over design was used, comparing wearing a knee brace with not wearing a knee brace, and comparing wearing a tight brace (standard fit) with wearing a non-tight brace (one size larger) (GENUTEX A2, Human I). The order of brace type was randomized. Participants were subjected to two tasks during walking on a treadmill (GRAIL system, MOTeKForce Link, The Netherlands): (i) level walking and (ii) walking with mechanical perturbations. Mechanical perturbations comprised five lateral and five medial translations (2 cm displacements) of the treadmill belts occurring during 20–50% of the gait cycle. 3D movement of the lower legs, pelvis and trunk were captured via markers on anatomical landmarks at 100 Hz using a motion-capture system (Vicon, Oxford, UK). Dynamic knee instability was expressed by the Perturbation Response (PR), i.e., a measure reflecting deviation in the mean knee varus-valgus angle after a controlled mechanical perturbation, in respect to level walking. Lower PR values indicate less deviation in the mean varus/valgus angle. Linear mixed-effect model analysis was used to evaluate the effect of a brace on dynamic knee instability.

Results: Thirty-eight persons with knee OA and self-reported knee instability from the Amsterdam Osteoarthritis Cohort participated in the study.

Wearing a brace significantly reduced the PR compared to not wearing a brace ($P<0.05$). The PR value reduced from 0.48 when not wearing a brace to 0.32 when wearing a brace, which corresponds to a reduction of 33% in dynamic knee instability. There was no difference between a non-tight and a tight brace ($P>0.05$).

Conclusions: This study is the first to report that wearing a soft brace results in an improvement of objectively assessed dynamic knee instability, beyond the previously reported subjective improvement.

Reference: 1. Cudejko T et al. *Arthritis Res Ther* 2017;19:260.

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DECREASE IN SELF-REPORTED PAIN AND DYNAMIC KNEE INSTABILITY MEDIATES THE ASSOCIATION BETWEEN WEARING A SOFT KNEE BRACE AND REDUCTION IN ACTIVITY LIMITATIONS IN PERSONS WITH KNEE OSTEOARTHRITIS

T. Cudejko¹, M. van der Esch², J. Rijnhart³, J. van den Noort⁴, M. van der Leeden⁵, L. D. Roorda², W. Lems⁵, J. Harlaar⁶, J. Dekker¹

¹Department of Rehabilitation Medicine, VU University Medical Center Amsterdam, Amsterdam, ²Amsterdam Rehabilitation Research Center, Reade, Amsterdam, ³Department of Epidemiology and Biostatistics, VU University Medical Center Amsterdam, Amsterdam, ⁴Department of Radiology and Nuclear Medicine, Musculoskeletal Imaging Quantification Center (MIQC), Academic Medical Center, Amsterdam, ⁵Jan van Breemen Research Institute, Reade, Amsterdam, ⁶Delft University of Technology, Delft, The Netherlands

Objective: We have previously shown that wearing a soft knee brace reduced activity limitations in persons with knee osteoarthritis (OA) [1]. Several underlying mechanisms have been proposed via which a soft knee brace reduces activity limitations in persons with knee OA [2]. However, to our knowledge, no study has identified mechanisms explaining these effects. Therefore, the aim of the study was to identify mechanisms explaining the beneficial effect of wearing a soft knee brace on activity limitations in persons with knee OA.

Methods: This was an exploratory analysis of data from 44 participants with knee OA from Amsterdam Osteoarthritis cohort, who enrolled in a single-session within-subject crossover design study, comparing a soft brace with no soft brace, and comparing a non-tight soft brace with a tight soft brace (GENUTEX A2, Human I). A mediation analysis was performed and the mediation effect was calculated based on the product of coefficients approach. Confidence intervals were calculated with a bootstrap procedure. The outcome measures were activity limitations assessed with the 10-m walk test and the Get up and Go test. The studied mediators were the changes in: knee joint proprioception, self-reported pain, pressure pain threshold (PPT) and objective dynamic knee instability. Knee joint proprioception was assessed by the active movement extent discrimination assessment; self-reported pain with the Numeric Rating Scale (NRS); PPT with a hand-held pressure algometer, and dynamic knee instability with the Perturbation Response i.e., a measure reflecting deviation in the mean knee varus-valgus angle after a controlled mechanical perturbation on the treadmill, in respect to level walking.

Results: Both a decrease in self-reported pain during walking and a decrease in dynamic knee instability mediated the association between wearing a soft knee brace and reduction in time to complete both the 10-m walk test and the GUG test ($p<0.05$). Changes in proprioception and PPT did not mediate these associations ($p>0.05$). Magnitudes of the mediation effects were similar for a non-tight and a tight soft knee brace.

Conclusion: The decrease in activity limitations in persons with knee OA who wear a soft knee brace might be explained by a decrease in self-reported pain and a reduction in dynamic knee instability.

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1. Cudejko T et al. *Arthritis Res Ther* 2017;19:260.
2. Cudejko T et al. *Arch Phys Med Rehabil* 2018;99:153.

P194

EARLY CLINICAL RESULTS OF THE EFFECTIVENESS OF LOCAL THERAPY OF PLATELET RICH AUTOLOGOUS PLASMA AND CONDITION OF ARTICULAR CARTILAGE: USING TECHNIQUES T2 MAPPING AMONG PATIENTS WITH OSTEOARTHRITIS OF THE KNEE

M. N. Lobanov¹, L. G. Grigoricheva¹, D. I. Kazantsev¹, A. V. Popovceva¹

¹Federal State Budgetary Institution "Federal Center of Traumatology, Orthopedics and Endoprosthesis Replacement of the Ministry of Health of the Russian Federation", Barnaul, Russia

Objective: The use of autologous platelet-rich plasma (PRP) has recently become widely used in the treatment of osteoarthritis of the knee (OA) to reduce the severity of pain and as a factor of influence on reparative processes of articular cartilage (AC). The aim of this study was to evaluate early clinical results of the effectiveness of local therapy of PRP and condition of AC, using T2 mapping among patients with OA.

Methods: In the study, results were obtained in 12 patients with OA, stage II - 8 persons, stage III - 4 (Kellgren-Lawrence grading scale), mean age 57.4 ± 9.8 years. The effectiveness of the therapy was assessed according to the visual analogue pain intensity scale - VAS (score), WOMAC (%) index and Lequesne index (score) in 3 months. PRP was injected intra-articularly to 5.0 ml, 3 times in a 2-week interval. All patients had 1.5T MRI of knee joints before and 3 months after therapy. To assess the degree of hydration of the AC, T2 mapping was used with color maps of the medial (MC) and lateral condyle (LC) of the femur.

Results: The poll showed a positive dynamic VAS in 3 months among patients with OA stage II ($p<0.001$) and stage III ($p=0.058$), also there was a significant improvement in the Lequesne index among patients with OA II ($p<0.001$) and III ($p=0.0037$) stages. The significant dynamics of the WOMAC index was noted. However, patients with OA stage III, no significant changes were observed ($p=0.071$), unlike patients with OA stage II ($p<0.001$). Reliable differences in T2 values were obtained for the MC and LC of the femur in patients with OA stage II stage ($p=0.001$), there was no significant difference in the T2 values in the MC and LC in patients with OA stage III ($p=0.507$). In 3 months after therapy there was no significant difference in the T2 values for the MC and LC and among patients with OA stage II and stage III.

Conclusions: The study showed significant therapeutic efficacy of PRP among patients with OA stage II – a good decrease in pain syndrome and an increase the functional activity of the knee joint. T2 mapping techniques revealed more pronounced structural changes in the AC of the MC of the femur than in LC and more pronounced structural changes in the AC in OA stage III in comparison patients OA stage II. T2 mapping in early terms did not reveal correlations with clinical and functional data, which requires further study.

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IMPACT OF BISPHOSPHONATES IN AGE-RELATED MACULAR DEGENERATION: RETROSPECTIVE COHORT AND NESTED CASE-CONTROL STUDY

C. Garriga¹, M. Pazianas¹, S. Hawley¹, A. Delmestri¹, D. Prieto-Alhambra¹, C. Cooper², A. Judge³

¹University of Oxford/Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS)/Botnar Institute of Musculoskeletal Sciences, Oxford, ²University of Southampton/MRC Lifecourse Epidemiology Unit/Southampton General Hospital, Southampton, ³University of Bristol/Musculoskeletal Research Unit Translational Health Sciences/Bristol Medical School, Bristol, UK

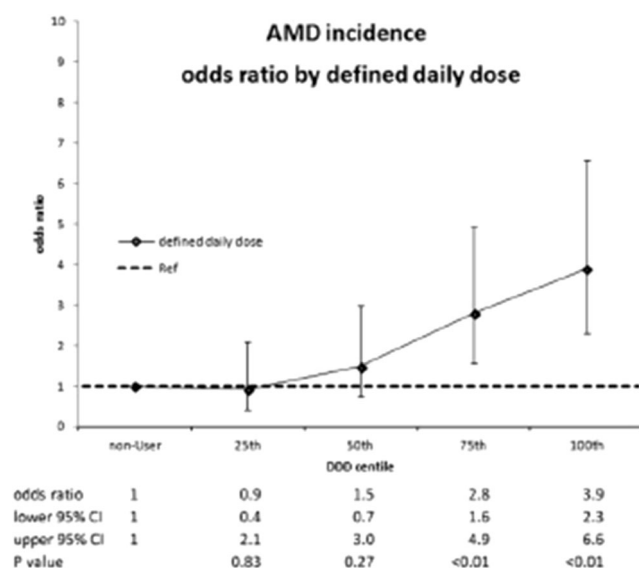
Objective: To determine if oral bisphosphonate (BP) use is associated with the incidence of age-related macular degeneration (AMD)

in a large “real-world” population-based cohort of incident hip fracture patients.

Methods: A cohort of 13,974 hip fracture patients (1999–2013) were used to conduct a: (a) propensity score matched cohort analysis and (b) nested case-control analysis. This a population-based study used electronic health records from UK primary care. Participants consisted of hip fracture patients aged ≥ 50 years without AMD diagnosis prior to hip fracture date or in the first year of follow-up. Prior BP-users and those who died, transferred out or with last data collected before hip fracture were excluded. Exposures was defined as incident BP use following hip fracture. BP use was further categorised according to defined daily dose in quartiles. Primary outcome was a diagnosis of AMD after the first year from index date. Propensity scores were used to match 1:1 BP-users to non-BP users. Covariates in the propensity score were index year, age, gender, BMI, smoking, alcohol drinking, region, drug confounders and comorbidities. Subhazard ratios and their 95% CIs were calculated including death as a competing risk. A nested 1:20 case-control analysis using conditional logistic regression provided risk estimates according to defined daily dose.

Results: Among 6208 matched patients and during 22,142 person-years of follow-up, 57 (1.8%) and 42 (1.4%) AMD cases occurred in BP-users and non-BP users, respectively. The survival analysis model did not provide significant evidence of a higher risk of AMD in BP-users (subhazard ratio: 1.6; CI: 0.9–2.7; $P=0.08$) although there was a significant increased risk among BP-users with high defined daily dose (top quartile) relative to non-BP users (odds ratio: 3.9, 2.3–6.6; $P<0.01$, respectively).

Conclusions: Overall, oral BP use was not associated with an increased risk of AMD in this cohort of hip fracture patients, although the risk increased significantly with higher defined daily dose.



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PREDICTORS OF OSTEOPOROSIS AND SARCOPENIA IN YOUNG EUGONADAL INDIANS WITH HIV INFECTION

D. Dutta¹, M. Sharma², R. Bansal³, A. Anand⁴

¹Department of Endocrinology, Venkateshwar Hospitals, ²Department of Rheumatology, Venkateshwar Hospitals, ³Department of Endocrinology, PGIMER and Dr RML Hospital, ⁴Antiretroviral Therapy Clinic PGIMER and Dr RML Hospital, New Delhi, India

Objective: This study aimed to determine occurrence and predictors of osteoporosis in premenopausal women and eugonadal men with HIV.

Methods: 220 men and 214 women with HIV were screened, of which 115 men (30–50 years of age) and 103 women (25–45 years of age), clinically stable, having >1-year follow-up, underwent hormonal and DXA analysis. 40 male and 75 female matched controls were evaluated.

Results: HIV males and females had significantly lower BMD and Z-scores at all sites. Osteoporosis was diagnosed in 64.35% males; commonest site being radius total (RT) (49.56%), followed by radius 33% (45.21%), radius ultradistal (RUD) (36.52%), lumbar spine (LS) (19.13%), neck of femur (NOF) (17.39%), total femur (TF) and greater trochanter (GT) (7.82% each). Osteoporosis was diagnosed in 34.95% HIV females, commonest site being RUD (24.27%), followed by radius 33% (17.48%), RT (15.53%), GT, NOF and LS (6.80% each). HIV males and females had significantly lower fat mass (FM), lean mass (LM), fat% (FP), bone mineral content (BMC), gynoid (G) fat, % skeletal muscle mass (PSMM) (sarcopenia), compared to controls. LM and FM was -15.65% and -11.54% lower in HIV. Sarcopenia was observed in 40% males and 17.5% females with HIV (controls none). HIV males with osteoporosis had higher HAART use, immune reconstitution inflammatory syndrome (IRIS), tuberculosis, lower FM, LM and sarcopenia. Logistic regression revealed PSMM, age and delta (Δ) CD4 count (change in CD4 count at 1 year of HAART, compared to pre-HAART) were best predictors of osteoporosis. Greater PSMM was associated with decreased osteoporosis, without adjusting for any variable (Model-1), adjusting for disease duration, tuberculosis and IRIS (Model-2), and adjusting for model-2 plus gonadotropins and sex steroids (Model-3). Greater Δ CD4 count and age were associated with increased osteoporosis after adjusting for models 1 and 3, and models 2 and 3 respectively. HIV females with osteoporosis had significantly higher use of HAART, lower LM, FM and FP. On logistic regression, LM followed by A/G ratio and BMI were best predictors of osteoporosis.

Conclusions: Osteoporosis and sarcopenia are major problems in young eugonadal men and women with HIV. Decreased skeletal mass, age, lower baseline CD4 count and rapid improvement in immune function were predictors of osteoporosis.

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CHANGES IN BMD AND TRABECULAR BONE SCORE IN POSTMENOPAUSAL WOMEN ON DENOSUMAB WITH OR WITHOUT RECENT BISPHOSPHONATE USE IN A CHINESE POPULATION

D. T. W. Lui¹, P. Ting², C. H. Y. Fong², M. Y. Yeung², V. W. K. Chau², C. H. N. Loong¹, J. K. Y. Lam¹, Y. C. Woo¹

¹Department of Medicine, Queen Mary Hospital, ²Department of Medicine, University of Hong Kong, Hong Kong, China

Objective: To compare changes in BMD and trabecular bone score (TBS) in women with postmenopausal osteoporosis (PMO) treated with denosumab with or without recent bisphosphonate (BP) exposure.

Methods: PMO women started on denosumab from 2012–2016 in an osteoporosis center were retrospectively reviewed. Those treated with BP prior to starting denosumab (BP+ group) were compared to those without recent BP exposure (BP- group). Patients previously treated with alternative anti-osteoporotic agents were excluded. All patients were under standardized follow-up protocol. BMD was measured with DXA before and 1 year after starting denosumab.

Results: 32 and 30 subjects in BP- group and BP+ group were identified respectively. Baseline characteristics (BMI, BMD, TBS and fracture history) did not differ significantly between groups except that patients in BP+ group were significantly older (76.4 $\pm$ 9.0 vs. 71.6 $\pm$ 8.4 years, $p=0.033$). The mean BP exposure was 4.4 $\pm$ 2.2 (range: 2–9) years in the BP group. Both groups had significant increase in BMD after denosumab treatment (6.39% in BP- group, 95%CI: 4.69–8.10, $p<0.001$; and 3.47%

in BP+ group, 95%CI: 1.40-5.54, $p=0.001$). The BMD gain was significantly lower in BP+ group ($p=0.029$), which remained statistically significant after adjustment for age ($p=0.014$) in multiple linear regression analysis. TBS did not significantly change after denosumab in both treatment groups.

Conclusions: Denosumab therapy does not result in as good BMD gain in patients with recent BP exposure compared with those without. Whether this translates into difference in fracture prevention efficacy in patients transitioning from BP to denosumab warrants further studies. The TBS findings concur with the recommendation that TBS should not be used for monitoring of response to antiresorptive therapies including denosumab.

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OUTCOME OF DRUG HOLIDAY IN OSTEOPOROSIS PATIENTS TREATED BY BISPHOSPHONATES

D. T. W. Lui¹, J. K. Y. Lam¹, C. H. N. Loong¹, Y. C. Woo¹

¹Department of Medicine, Queen Mary Hospital, Hong Kong, China

Objective: Patients on bisphosphonates (BPs) are commonly recommended to have drug holidays based on their fracture risk and the duration of treatment. However, the outcome of patients going through drug holiday, in particular in the Chinese, has been lacking. We therefore retrospectively reviewed the case notes and computer records of our patients to address the clinical outcomes and BMD change after drug holiday.

Methods: 72 subjects on drug holiday from BPs, based on clinical decisions, from 2010-2016 in our osteoporosis center were included in this analysis. Patients had DXA and X-ray thoracolumbar spine done before and after the drug holiday according to a predefined protocol. New fragility fracture was documented during clinic visits with regard to medical history and X-ray findings.

Results: Subjects had a mean age of 72.36 ± 11.36 . 93.1% were female and 62.5% had prevalent fragility fracture. The median follow up period after drug holiday was 33 (IQR: 17-55) months. 73.6%, 19.4% and 6.9% were on alendronate, risedronate and ibandronate, respectively. The duration of treatment before drug holiday was 60 (IRQ: 36-72) months. Baseline BMD and T-score was 0.797 ± 0.124 g/cm²; -1.63 ± 0.96 at spine and 0.574 ± 0.090 g/cm²; -2.0 ± 0.87 at neck of femur (NOF), respectively. There was a trend of BMD drop at spine but no statistically significant change at NOF in DXA reassessment (spine: -0.0131 , $N=30$, $p=0.062$; NOF: -0.00858 , $N=33$, $P=0.263$) taken at 19 (IQR: 13- 24) months. 23.6% patients were re-initiated with anti-osteoporosis agents at 19 (IQR 11-25) months due to BMD drop (87.5%) or new fracture (6.3%). 52.9% of them were changed to denosumab, while 41.2% and 5.9% were started on BPs and strontium respectively. Only 1 new fragility fracture (vertebral) developed and the time to fracture was 11 months. Those who still remained on drug holiday (76.4%) had a drug free period of 31 (IRQ: 16-50) months.

Conclusions: Taking drug holiday from BPs appeared safe in this Chinese cohort with appropriate case selection. However, a considerable proportion of patients needed to be restarted on treatment at around 19 months due to drop in BMD, a follow up DXA assessment within this period should be advocated.

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EVALUATION OF THE LOADS APPLIED ON THE HIP JOINTS IN WALKING WITH AND WITHOUT SCOTTISH RITE ORTHOSIS IN SUBJECTS WITH PERTHES DISEASE

M. Karimi¹

¹Shiraz University of Medical Sciences, Shiraz, Iran

Objective: Although the main aims of treatment in Legg-Calve Perthes disease are to increase the containment of femoral head within the

acetabulum and to decrease the loads applied to the hip joint, none of the treatment approaches were successful. There was no research evaluating the effect of using orthosis on joint reaction forces in subjects with Perthes disease. Therefore, the aim of this study was to evaluate the joint reaction forces in the subject with this disease while walking with and without orthosis.

Method: Two subjects with Perthes disease participated in this study. They were asked to walk with and without Scottish rite orthosis. Open SIMM software was used to extract the joint reaction forces in both conditions. The difference between kinetic and kinematic parameters in walking with and without orthosis for each subject was evaluated by two sample t-test.

Results: The results of this study showed that the ground reaction force applied on the leg increased follow the use of the orthosis. Moreover, use of orthosis influenced the kinematic of hip joint and pelvis.

Conclusion: Since joint reaction force is one of the main parameters influence hip joint deformation, use of orthosis may not influence the final deformation. As this was a pilot study, it is recommended to do a research with more number of subjects.

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TRANSIENT OSTEOPOROSIS OF THE KNEE: A FORGOTTEN ENTITY

A. Sobti¹, J. Sudhakar¹

¹Darlington Memorial Hospital, Trauma & Orthopaedics, Darlington, UK

Objective: Transient osteoporosis is an uncommon self-limiting disease mainly involving the weight-bearing joints of the lower limbs characterized by pain and limitation of function. There is confusion in literature concerning its etiology, pathogenesis and nomenclature. Although it is a known entity, it is under-recognized.

Methods: We report 5 cases of intra-articular transient osteoporosis of the knee, of which 1 case had osteoporosis migrating from the femur to the tibia. Usual presentation was insidious onset of pain with no history of trauma. Generally there is a delay between the onset of the symptoms and the appearance of objective findings on the usual radiographs rendering early diagnosis difficult. On physical examination, there was severe pain and swelling in the affected joint. On MRI scans there were low signal intensity on T1-weighted images and high signal intensity on T2- weighted images in the bone marrow of the affected joint, consistent with bone marrow edema. Regional migratory osteoporosis appeared on imaging as migrating bone marrow edema associated with osteoporosis from one area of the bone to another.

Results: This condition is usually self-limiting and symptoms tend to abate within a few months without sequelae. All patients had resolution of symptoms without any active intervention. Average time taken for resolution was 8 months.

Conclusion: The diagnosis must be made after careful consideration and by ruling out more common diseases. With its rare occurrence and un-specific clinical symptoms, transient osteoporosis may be overlooked or misdiagnosed commonly. Therefore there is a need for this report to refresh our memory of this condition.

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THE COMPARISON OF MUSCLE STIFFNESS BETWEEN PATIENTS WITH ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTED AND HEALTHY GROUP DURING RUNNING

M. Karimi¹, K. Sharifmoradui²

¹Shiraz University of Medical Sciences, Shiraz, ²Kashan University, Kashan, Iran

Objective: Anterior cruciate ligament (ACL) injury changes intensity and muscle activation pattern of lower limb, so it can alter the muscle

stiffness. The aim of this study was to evaluate muscles performance of the lower limb during running in individuals with anterior cruciate ligament reconstruction compared with healthy group.

Methods: Eight individuals with a reconstructed ACL, and 8 individuals with intact ACLs were participated in this study. A Vicon motion analysis system and two Kistler force plates were used to record the spatiotemporal variables, ground reaction forces and marker tracking during running. OpenSim was used to determine the muscles forces, length in both group of the subjects. Data were analyzed by Independent t-test in SPSS (version 22) software. The significance level was set at $p < 0.05$ for all analyses. Results: In ACL reconstruction group, stride length was significantly greater than that of healthy group. The muscle forces of adductor brevis ($P=0.02$), adductor longus ($P=0.01$), adductor magnus ($P=0.02$), biceps femoris (long head) ($P=0.00$), tibialis anterior ($P=0.03$), tibialis posterior ($P=0.05$) and vastus intermedius ($P=0.03$) showed significantly lower forces in ACLR group compared to healthy group.

Conclusion: In ACLR group, muscle forces was significantly lower than the healthy group.

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POTENTIAL EFFECTS OF HYDROGEN WATER OVER USUAL CONCENTRATION OF DISSOLVED HYDROGEN

R. A. Amir¹

¹Centre de Santé des Fagnes, Chimay, Belgium

Regulation of cellular redox balance is important for the maintenance of human body integrity. Many important diseases, such as ischemia, cancer, inflammation, neurological disorders, metabolic diseases and others, also ageing are known to be associated with increased reactive oxygen species (ROS) production. ⁽¹⁾ The different routes of molecular hydrogen (H_2) administration in animal model and human clinical studies are usually classified into three types: inhalation of H_2 gas, drinking H_2 dissolved water and injection of H_2 dissolved saline. The redox imbalance between nitric oxide and superoxide generated in the vascular endothelium is thought to play a significant role in the development of endothelial dysfunction. It is well known that H_2 neutralizes detrimental ROS, especially the hydroxyl radical. Endothelial dysfunction may cause accumulation of vascular damage and induces chronic inflammation, followed by other potential complications. Recently, it was demonstrated that H_2 has a therapeutic potential against chronic inflammatory diseases, including rheumatoid arthritis. ⁽²⁾ The concentration of exogenous H_2 in the body and its therapeutic efficacy have been previously studied and discussed in several studies. ^(3, 4) H_2 gas is generated endogenously in human intestines by commensal bacteria and a small amount of absorbed H_2 is detectable in exhaled air. These observations are indicative of safety of H_2 gas. More recent study has suggested that consumption of water containing over 3.5 mg of dissolved H_2 could improve vascular endothelial function. ⁽⁵⁾ It has been demonstrated that H_2 has the capability to act at the cellular level, and is qualified to cross the blood brain barrier and even to enter the mitochondria. Once in these ideal locations of cell, previous studies have shown that H_2 exerts antioxidant, anti-apoptotic, anti-inflammatory and cytoprotective properties that are beneficial to the cell. Many recent studies confirm more and more than H_2 may become in the future a novel therapeutic treatment or an adjuvant tool which may be useful when associated with other treatment or may have a protective effect on liver function of colorectal patients treated with mFolfox6 chemotherapy. Moreover, radiation may induces tissue injury at the cellular level. To protect healthy tissue surrounding tumor, H_2 may afford effective protection. ⁽⁶⁾

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KYPHOPLASTY VS. CONSERVATIVE TREATMENT: A CASE-CONTROL STUDY IN 110 POSTMENOPAUSAL WOMEN WITH OSTEOPOROTIC VERTEBRAL FRAGILITY FRACTURES – IS KYPHOPLASTY BETTER THAN CONSERVATIVE TREATMENT?

V. Pambianco¹, G. Autore¹, L. A. Nasto¹, G. Maccauro², E. Pola¹

¹Department of Orthopaedics and Traumatology - Spine Division - Catholic University of the Sacred Heart - "A. Gemelli" University Hospital, ²Department of Orthopaedics and Traumatology - Catholic University of the Sacred Heart - "A. Gemelli" University Hospital, Rome, Italy

Osteoporosis is a highly prevalent disease worldwide. Consequences of vertebral osteoporotic fractures include pain and progressive vertebral collapse resulting in spinal kyphosis, decreased quality of life, disability and mortality. Minimally invasive procedures represent an advance to the treatment of osteoporotic vertebral fragility fractures. Despite encouraging results reported by many authors, surgical intervention in an osteoporotic spine is fraught with difficulties. Advanced patients age and comorbidities are of great concern. We designed a retrospective case-control study on 110 postmenopausal women consecutively visited at our institution with diagnosis of vertebral fragility fractures. Study population was split in a surgical and a conservative cohort, according to the provided treatment. Kyphoplasty treated patients had lower back pain VAS scores at 1 month as compared with conservatively treated patients ($p < 0.05$). EQ5D validated questionnaire also showed a better quality of life at 1 month for surgically treated patients ($p < 0.05$). SF-12 scores showed greater improvements at 1 month and 3 months with statistically significant difference between the two groups just at 3 months ($p < 0.05$). At 12 months, scores from all scales were not statistically different between the two cohorts, although surgically treated patients showed better trends than conservatively treated patients in pain and quality of life. Kyphoplasty was able to restore >54.55% of the original segmental kyphosis, whereas patients in conservative cohort lost 6.67% of the original segmental kyphosis on average. Kyphoplasty is a modern minimal invasive surgery, allowing faster recovery than bracing treatment. It can avoid the deformity in kyphosis due to vertebral fragility fractures. In fact, the risk to develop a new vertebral fracture after the first one is very high.

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ONE YEAR OUTCOMES OF FRACTURE LIAISON SERVICE AT THE NATIONAL TAIWAN UNIVERSITY HEALTHCARE SYSTEM

R.-S. Yang¹, C.-H. Hong², K.-S. Tsai³, D.-C. Chan⁴

¹Department of Orthopedics, National Taiwan University Hospital, Taipei, ²Department of Geriatrics and Gerontology, National Taiwan University Hospital, Taipei, ³Superintendent Office, Far Eastern Polyclinic, Taipei, ⁴Superintendent Office, National Taiwan University Hospital Chu-Tung Branch, Hsin-Chu, Taiwan

Objective: To report one year outcomes for patients enrolled in the Fracture Liaison Service (FLS) at the National Taiwan University Hospital Healthcare System (NTUHS)

Methods: From Jan. 2014 to Jun. 2016, 600 patients with: 1) New hip fracture from orthopaedic wards; 2) Newly identified vertebral compression fractures from geriatric wards; 3) Clinical vertebral compression fractures from outpatient clinics were enrolled in the FLS at NTUHS. Patients were evaluated and managed following the 13 Best Practice Framework standards from the Capture the Fracture Campaign. After baseline assessments, FLS coordinators followed patients by phone at 4, 8, 12, 18, 24 months, then annually for 10 years. First year outcomes were reported here.

Results: For the entire cohort, mean age was 77.5 ± 10.0 with 72% women. At baseline, 98.7% completed evaluations including BMD within 8 weeks of enrollments, and 90.5% of participants who were reimbursable with osteoporosis medications from National Health Insurance were

treated. Participants were highly satisfied with the coordinators (87.0%) and the FLS program (85.0%). At one year, exercise rate increased from 57.8% to 69.9%, adequate protein intake rate increased from 78.7% to 91.2%, calcium intake increased from 53.8% to 80.6%, vitamin D intake increased from 51.0% to 75.9%, and fall rate in past year decreased from 59.8% to 25.0% (all $p < 0.001$). One year medication adherence rate was 92.0%, and one year mortality rate was 9.0%.

Conclusion: Enrollment in FLS was associated with high osteoporosis evaluation and treatment rate, as well as high satisfaction at baseline. At one year, improvements on exercise, adequate protein intake, calcium, vitamin D intake, and fall rate in past year were also observed. Overall medication adherence was high and mortality rate was acceptable.

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DISTAL RADIUS FRACTURES: AN EPIDEMIC PATHOLOGY WITH DIFFERENT THERAPEUTIC OPTIONS

B. García Martínez¹, J. V. Badiola Vargas²

¹Hospital Universitario Miguel Servet, Zaragoza, ²Hospital Royo Villanova, Zaragoza, Spain

Objectives: Distal radius fractures are the third osteoporotic fractures in our country due to their current incidence. The type patient is a woman over 60 years old who suffers an extraarticular fracture after a mild trauma. Although the choice of surgery vs. orthopedic treatment is clear in the literature, it is not in clinical practice. Our aim was to show the grade of agreement in the treatment of these fractures among the surgeons of our hospital.

Methods: We delivered a questionnaire to 20 surgeons from our hospital on ten patients with distal radius fractures. X-rays of fractures, before and after the reduction with a cast, were shown and different questions were asked about the treatment of them.

Results: We set up three groups of patients to show the results. Regarding the technique of treatment, in patients between 60-70 years old and in the group of >80 years old, the consensus among the surgeons was >75%. However, in the group of patients between 70-80 years old, a greater disparity of criteria was observed among surgeons. There were also differences in the period of immobilization within the same type of treatment, mainly in the use of external fixation. However, there were a high degree of agreement to start pharmacological treatment for osteoporosis after fracture. In case of first fracture, the most surgeons chose a treatment with calcium and vitamin D. If it was the second fracture, a more specific treatment was initiated, opting for teriparatide if it had already presented several osteoporotic fractures.

Conclusion: There are several options for distal radius fracture treatment. All of them have their advantages and disadvantages and probably that's the reason for lack of unified criteria of indication of the diverse types of treatment nowadays. Distal radius fracture is an emergency that has increased its frequency in our trauma services. It can be avoided? It is a difficult question to answer but certainly is necessary to try reduce its incidence. The treatment with teriparatide can help us without any doubt.

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JUVENILE RHEUMATOID ARTHRITIS AND TOTAL HIP ARTHROPLASTY

J. Badiola Vargas¹, B. García Martínez², J. Valle Puey³

¹Cirugía Ortopédica y Traumatología, Hospital Royo Villanova, Zaragoza, ²Cirugía Ortopédica y Traumatología, Hospital Miguel Servet, Zaragoza, ³Medicina Interna, Hospital Reina Sofía, Tudela, Spain

Objective: Total hip arthroplasty (THA) is indicated in patients with juvenile rheumatoid arthritis when there is marked functional impairment and / or severe disabling pain on a hip with advanced structural deterioration of the joint. Pain relief and a great improvement in joint function can be achieved in most patients.

Methods: We present two cases of patients with a diagnosis of Still's disease and a history of cemented THA presenting loosening of the prosthetic

components due to osteoporosis/osteopenia due to treatment with corticosteroids. After a thorough preoperative planning in both cases, extraction of the implants was carried out, reconstruction of the cup using an antiprolusion box over the allograft, and replacement of the femoral stem.

Results: In none of the surgeries there was incidents to emphasize. The postoperative period went smoothly. They are currently without pain and with an acceptable mobility of the joint. Radiologically there are no signs of osteolysis.

Conclusions: We consider THA a good therapeutic option in patients with inflammatory joint diseases that present great functional deterioration and severe pain. Skeletal immaturity is not an absolute contraindication for surgery in these patients. In the event that both the hip and the knee are involved, the THA should be performed first. The small size of the bones, the great deterioration of the existing joint, the osteoporosis that most of these patients present due to corticosteroid treatments and the associated soft tissue contractures make the surgical act in these patients technically demanding. The loosening of the components is the most frequent late complication in the THA. Because of that patients with inflammatory diseases tend to be operated on by THA at a younger age than a patient who does not suffer from this disease, a high percentage of cases will have to be reoperated, being the revision surgery of high complexity so careful THA templating is essential and the use of an individualized prosthesis is often necessary.

P207

DYNAMICS OF CELLULAR MARKERS ON PRE- AND POSTMENOPAUSAL WOMEN

D. Tinduh¹

¹Department of Physical Medicine and Rehabilitation Faculty of Medicine Universitas Airlangga, Dr. Soetomo Hospital, Surabaya, Indonesia

Objective: During life, women underwent the dynamic changes of bone cell activities. Estrogen affect the remodeling process inside the bone, which were changed related to the age. After skeletal maturation, coupling process of bone remodeling occurred in different characteristic. Our aim was to reveal the peak of bone remodeling activity (reflected by ratio of PINP/CTx) after skeletal maturation until postmenopausal period in healthy women.

Methods: Preliminary study. The subject were healthy women, 20-59 yo, no consumed foods and drugs which promote bone resorption regularly (> 3 times/week) in such number >3 months period. Observed data were sPTH, sIL-6, percentage of circulated cells as peripheral blood mononuclear cells/PBMC, measured by flow cytometry: adipocyte derived mesenchymal stem cell (ADMSC/CD34-CD105+CD49d+), marrow derived mesenchymal stem cell (MDMSC/CD34-CD105+CD49d-), active cell (CD117+/SCFR), mobilize cell (CD49d+/a2Integrin), homing cell (CD184+/CXCR4). Serum bone marker, measured by ECLIA were PINP and CTx.

Results: There were 54 women, classified on 4 groups: 25-33 yo (Group 1), 34-44 yo (Group 2), 45 yo until menopause (Group 3), menopause and 5 y after (Group 4). Serum PTH did not differ between groups. Serum IL-6 significantly higher on Group 4 compared to Group 1 ($p=0.002$) and Group 2 ($p=0.002$). Percentage of circulated ADMSC, CD49d+ and CD117+ cells were lowest on Group 4 compared to other groups significantly. Percentage of circulated MDMSC did not differ between groups. Percentage of circulated CD184+ cells was highest on Group 3 compared to other groups significantly. The highest serum CTx and PINP was on Group 4 compared to other groups significantly. Serum CTx on Group 1 was higher than Group 2 ($p=0.023$) and Group 3 ($p=0.023$). Ratio of PINP/CTx was higher in Group 3 compared to Group 1 ($p=0.016$).

Conclusion: Postmenopausal women underwent chronic inflammatory state, higher bone remodeling process and reduced circulated cells in peripheral blood. Group 3 showed the peak of circulated cells in peripheral blood flow and higher activity of osteoblast compared to osteoclast. The peak of coupling bone remodeling activity occurs after the bone achieve the peak bone mass before menopause in the women.

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COMPARISON OF THE EFFICACY OF Laterally Wedged Insoles and Bespoke Unloader Knee Orthoses in Treating Medial Compartment Knee Osteoarthritis

M. Maleki¹, M. Arazpour¹, M. Ahmadi Bani¹¹University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Objectives: Orthoses or laterally wedged insoles. The aim of this study was to identify and compare the effects of them on the gait parameters and pain in these patients.

Methods: Volunteer subjects with medial compartment knee OA (n=24, mean age 59.29±2.23 years) were randomly assigned to two separate groups and evaluated when wearing an unloader knee orthosis or insoles incorporating a 6° lateral wedge. Testing was performed at baseline and after six weeks of each orthosis use. A visual analog scale score was used to assess pain and gait analysis was utilized to determine gait parameters.

Results: Both orthoses improved all parameters compared to the baseline condition (p=0.000). However, no significant differences in pain (p=0.649), adduction moment (p=0.205), speed of walking (p=0.056) or step length (p=0.687) were demonstrated between them. The knee range of motion (p=0.000) were significantly different between the two interventions.

Conclusion: Both orthoses reduced knee pain. Maximum knee ROM was increased by both interventions although it was 3 degrees less when wearing the knee orthosis

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HOMOGENY OF LIVER AND KIDNEY MANIFESTS ON LIGAMENT-BONE IN ARTICULAR

J. Li¹, L. Sun¹, Y. Sui¹, W. Xie¹¹Liaoning University of Traditional Chinese Medicine, Shenyang, China

Chinese medicine has different understandings on viscera and their functions. Though the viscera theory is not fully demonstrated and explained with concrete modern scientific evidence, the 'Xiang' logic and philosophy in analyzing human body and the interrelation between organs and tissues may set a light in a new angle to deduce the interacting between cartilage and sinew in joints and furtherly illustrate mechanism of osteoarthritis development. The scientific conception of liver and kidney in Chinese medicine is analyzed and expended by 'xiang' logic, which enriches the theory of 'liver governs ligament' and 'kidney governs bone' and further elementary the systematically connection of 'liver-blood-ligament' and 'kidney-essence-marrow-bone-articular cartilage'. The homogeneity of liver and kidney, deep internal connection of viscera, manifests on the outward tissue 'ligament and bone' in articular. This pattern of systematic theory elementary will be fundamental for future study on 'holism of five-zang organs' manifests on outwards tissue, which may set the light on more theoretical and fundamental study in relative fields of traditional Chinese Medicine.

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THE EFFECT OF SPINAL ORTHOSIS ON DYNAMIC FOOT PRESSURE OF ELDERLY WITH HYPERKYPHOSIS

M. Ahmadi Bani¹¹Evin, Tehran, Iran

Objective: Osteoporosis in elderly people cause spinal hyperkyphosis. One of the most important treatments for hyperkyphosis is the using spinal

orthoses. There is a relation between spinal alignment and foot pressure. Therefore, the aim of this study was to determine the effect of semirigid spinal orthosis on dynamic foot pressure in elderly patients with hyperkyphosis.

Methods: Volunteer subjects (n=19) in range of 65-89 years old with spinal hyperkyphosis were participated in this study. Hyperkyphosis angle measured by flexible ruler before study and without orthosis. Static and dynamic foot pressure evaluated by Pedar with and without orthosis. Mean pressure in eight plantar foot region was measured. SPSS 18 software was used for statistical analysis.

Results: Data analysis demonstrated using spinal orthosis in static condition reduced forefoot pressure significantly (348.34 kPa to 370.61 with and without orthosis, respectively) and also decreased hindfoot pressure, although that was not statistically significant. In dynamic condition spinal orthosis only decreased first metatarsal pressure (p-value=0.017) and 2th to 5th fingers pressure (p-value=0.015) significantly.

Conclusion: Using spinal orthosis improved spinal alignment and changed foot pressure in static and dynamic conditions.

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LOW VITAMIN D LEVELS IN PATIENTS WITH HIV INFECTION

C. Capatina¹, A. Streinu Cerce², D. Manolache², O. Sandulescu², C. G. Barbu¹, C. Poiana¹¹Carol Davila UMPh, Dept. of Endocrinology, ²Carol Davila UMPh, Dept. of Infectious Diseases, Bucharest, Romania

Objective: Vitamin D (VD) deficiency is highly prevalent among HIV-infected patients and has been associated with a worse disease prognosis. Our aim was to determine the prevalence of hypovitaminosis D in a cohort of HIV-positive Romanian patients compared to healthy controls

Methods: Plasma samples for the determination of serum 25OHD concentration were collected from HIV-infected patients and healthy controls. 25OHD status was defined as: deficiency <20 ng/mL (severe deficiency <10 ng/mL), insufficiency 20-30 ng/mL, normal >30 ng/mL. Clinical and laboratory parameters were retrospectively extracted from patients' files (CD4+ cell count, CD4+ nadir, HBV/HCV co-infection, ART).

Results: We evaluated 118 HIV-positive patients, (72 males, 46 females, aged 36.9±12.2 years). 106 patients (98.14%) were on complex ART regimens. 9.3% had B/C hepatitis coinfection. We also 119 healthy controls matched by age, sex and menopausal status. The mean serum 25OHD concentration in the HIV-positive patients was significantly lower (19.36±11.34 ng/mL) compared to controls (23.74±8.32 ng/mL; p=0.001). Normal VD status was determined in only 15.96% of patients and 12.71% of controls. Severe VD deficiency was found in a higher percentage of HIV-positive patients (23.52%) compared to controls (4.2%, p=0.001). The serum 25OHD level in patients was not significantly correlated with gender, age, menopausal status in women, number of years of previous ART treatment or nadir CD 4 positive cell-count.

Conclusions: Low levels of 25OHD are present in a significantly higher percentage in HIV-positive patients compared to healthy controls. The serum 25OHD concentration was not correlated with any particularities of the treatment regimen or disease characteristics in our sample. Clinical guidelines related to the VD status in HIV-positive patients are needed.

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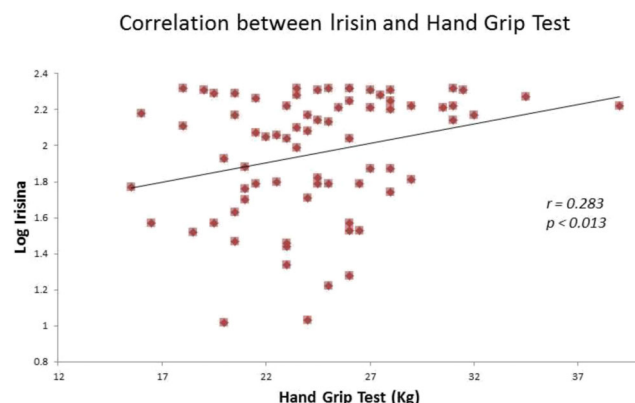
ASSOCIATION OF IRISIN SERUM CONCENTRATION AND MUSCLE STRENGTH IN NORMAL AND OVERWEIGHT YOUNG WOMEN

M. Martinez-Munoz¹, C. S. E. Camarillo Romero¹, S. Santillan Benitez², C. P. T. Correa-Padilla¹, M. Montenegro Morales¹, H. B. G. Huitron Bravo³, J. Garduño-García⁴¹CICMED UAEMex, ²UAEMex Chemistry School, ³UAEMex Medicine School, ⁴CICMED UAEMex - HGR 251 IMSS, Toluca, Mexico

Objective: Irisin was proposed as a protective exercise-induced myokine against diet-induced weight gain (1). Researchers have conducted their efforts to develop the link between exercise and irisin obtaining controversial results (2,3). The aim of the study was to associate muscle strength and serum irisin concentration in normal (NW) and overweight women (OW). **Methods:** Prospective cross-sectional study among 80 young, nonsmoking and healthy women was included, total sample was divided into normal weight (n=40) and overweight (n=40) according to BMI. Components of health related fitness, metabolic parameters, serum irisin and body composition were analyzed.

Results: Average age was 18.63 ± 0.63 years in NW and 18.78 ± 0.73 years in OW. Statistically significant differences were found in physical tests between NW and OW groups; one leg standing test hand grip strength vertical jump, modified push-up, fitness index and maximal oxygen uptake (VO2MÁX).). Nevertheless a statistically significance difference was not observed in irisin concentration (NW 108.51 ± 11 vs. OW $126.21.10$ ng/ml) ($p=0.251$). We found a positive correlation between irisin and hand grip strength (Figure 1).

Conclusion: According to our findings, hand grip strength could be linked with irisin concentration in overweight young women.



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DETERMINING ROLE OF JOINT ULTRASONOGRAPHY IN PATIENTS WITH GOUT STARTING TREATMENT WITH FEBUXOSTAT

M. Novella-Navarro¹, J. L. Cabrera-Alarcon², E. Calvo¹, T. Rodríguez-Araya¹, J. J. González¹, F. Aramburu¹, C. Marín¹, A. Gómez¹, P. Alcocer¹, I. Amil¹, M. Valero¹, S. Rodríguez-Rubio¹, P. García de la Peña¹

¹Department of Rheumatology, HM Hospital Madrid Norte Sanchinarro,

²Diagnostic Center of Molecular Disorders (CEDEM), Universidad Autonoma Madrid, Madrid, Spain

Objective: Gout is the most prevalent arthritis globally, it is due to monosodium urate crystals (MSU) deposit on tissues, mainly in joints and periarticular structures. Although the main clinical pattern in gout is monoarticular, many patients suffer from oligo/polyarticular crystalline deposits, even at the onset of the disease. Due to the information obtained through imaging tests such as ultrasonography (US), we know that the extent of MSU deposits are greater than we expected in many occasions, affecting clinically silent joints. Febuxostat is a potent inhibitor of xanthine oxidase that produces an intense and rapid reduction of MSU

crystals in patients with intense and/or extensive joint deposit. Musculoskeletal US is a key tool for the diagnosis and treatment of these patients, due to its accessibility and safety. It determines accurately the current extent of deposits and joint involvement in gout, which may condition therapeutic changes. Our aim was to evaluate the influence of articular US for clinical practice in Rheumatology when initiating treatment with febuxostat in patients with gout, determining the degree of crystalline deposit and articular ultrasonographic involvement, as well as the level of uricemia, at the time of initiation of treatment with febuxostat.

Methods: Observational cross-sectional study of 450 patients diagnosed with gout according to ACR criteria from 5 centers of a Spanish multihospital group, studied between December 2013 and May 2017. Of the total number of patients from our database, 129 patients, those treated with febuxostat (14 due to renal disease, adverse reaction or intolerance to allopurinol, and 115 due to the magnitude of joint involvement), were selected. US examination was performed both in the first consultation and in successive examinations, following the protocol proposed by Peiteado *et al.*, determining the number of joints with signs of gout (double contour, hyperechoic aggregates, hyperechoic areas) as well as acute inflammatory activity (Doppler signal). Other variables were taken into account (age, sex, hypertension, diabetes mellitus, dyslipidemia, chronic kidney disease, time of disease evolution and clinical pattern of joint involvement). Statistics: descriptive analysis of variables. Calculation of odds ratio (OR) from the coefficients provided by a binomial logistic model and corresponding confidence interval. (R Statistics version 3.3.2).

Results: 115 patients with febuxostat (112 men and 3 women), with a mean age of 57 ± 13 years and mean of disease evolution 14 ± 10 years. 59 patients had monoarticular clinical pattern, 46 oligoarticular and 10 polyarticular. Regarding to US involvement: we observed acute inflammatory activity by Doppler in 47 patients (40.86%), microcrystalline aggregates in 90 patients (78.26%) and double contour sign in 53 patients (42.08%). The mean uricemia at the time of the joint ultrasound examination was 7.4 ± 1.8 g/dl. Of the 94 patients with uric acid levels > 6 mg/dl, 72 presented extensive US involvement (76.59%), whereas of the 21 patients with levels < 6 mg/dl, US involvement was observed in 18 (85.71%). From the observed variables, none was a risk predictor for joint involvement in the binomial logistic regression model. Uricemia presented OR=0.83 CI (0.6-1.1).

Conclusion: Musculoskeletal US allows a rapid and non-invasive assessment of the extent and intensity of involvement and crystalline joint deposit in patients diagnosed with gout, providing more information than traditional physical examination. Ultrasound quantification of MSU deposits can significantly condition the intensity or type of uricemia-reducing treatment regardless of serum uric acid levels. In this study, patients with non-target uricemia did not present a greater joint affection evaluated by US, however, those with < 6 mg/dl, did present more affectionation than might be expected. US examination of joints allows a more precise individualization of the treatment in gout and should be incorporated in a regulated way to the periodic evaluation of these patients to optimize their prognosis.

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GROWTH HORMONE RECEPTOR ISOFORMS AND FRACTURE RISK IN ADULT-ONSET GROWTH HORMONE-DEFICIENT PATIENTS

S. Chiloiri¹, A. Giampietro¹, A. Bianchi¹, F. Angelini², C. Bima¹, A. Pontecorvi¹, A. Giustina³, L. De Marinis¹

¹Pituitary Unit, Section of Endocrinology, Department of Internal Medicine, Catholic University, School of Medicine, 'A. Gemelli' University Hospital, Rome, ²Laboratory of Vascular Biology and Genetics, Department of Medicine, Catholic University School of Medicine, Rome, ³Endocrinology, Vita-Salute San Raffaele University, Milan, Italy

Objective: Growth hormone deficiency is considered the most important factor determining skeletal fragility in hypopituitarism. Osteoblasts and chondrocytes express growth hormone receptor (GHR). Two GHR isoforms (GHRi) have been identified, differing for the presence/absence of a protein fragment encoded by exon 3 of GHR gene. Consequently, three genotypes were identified: carriers of both the full-length proteins (flfl-GHR), carriers of one full-length protein and one deleted protein (fld3-GHR) and carriers of both deleted proteins (d3d3-GHR). This polymorphism confers a higher sensitivity to GH but its effect on bone metabolism and skeletal fragility is unknown. We aimed to investigate the role of GHRi in predicting skeletal fragility in adult-onset GHD patients (AO-GHDpts).

Methods: A cross-sectional study investigated the association between d3-GHRi and prevalence of morphometric vertebral fractures (VFs) in AO-GHDpts.

Results: Ninety-three AO-GHDpts were enrolled. Forty-nine patients carried flfl-GHRi (52.7%), and 44 patients (47.3%) carried at least one allele of the d3-GHRi. Thirty-two VFs were documented. Fifty-seven patients underwent rhGH replacement therapy. IGF-I, rhGH treatment duration and rhGH mean weekly dose, gonadal status, glucocorticoid, testosterone or estroprogestin replacement therapy did not differ in fractured and non-fractured AO-GHDpts. Percentage of patients on rhGH was slightly higher in non-fractured vs. fractured patients. VF Prevalence was significantly higher in fl-carried comparing to d3-carried ($p < 0.0001$). We confirmed a lower prevalence of VFs in d3-carriers. Moreover, we compared the frequencies of VFs in patients treated and not treated with rh-GH for GHRi group. In d3-carriers, no VFs occurred in rhGH treated patients, whereas in fl-carriers, fracture frequency was superimposable in rh-GH treated and not-treated patients. Finally, we evaluated the prognostic role of GHRi on VFs separately in rhGH treated and not-treated AO-GHDpts: in rh-GH treated patients, d3 polymorphism correlated with a lower fracture prevalence (OR:0.37, 95%IC:0.24-0.55, $P < 0.0001$).

Conclusion: d3-GHRi may represent a protective factor for VFs, in GHD patients. As in GHD patients treated with rhGH, d3-GHRi may play an additional protective role with respect to treatment per se, GHR polymorphism could represent an additional tool for stratification the risk of VFs in AO-GHDpts.

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TO ASSESS THE CORRELATION BETWEEN VITAMIN D DEFICIENCY AND AUTOIMMUNE THYROID DISEASE

S. A. Bembey¹, H. Mahajan²

¹Sir Ganga Ram Hospital, ²Mahajan Imaging Pvt Ltd, New Delhi, India

Objective: To assess the incidence of low vitamin D levels in patients suffering from autoimmune thyroid disease.

Method: A retrospective study was done of 200 patients who had undergone testing for thyroid antibodies (Anti TPO and Anti Tg) and vitamin D levels in our department. Method used for both the tests was chemiluminescence on Liaison XL (Diasorin).

Normal Range: Thyroid antibodies: >30 uIU/ml. Vitamin D: < 20 ng/ml deficient; 21-29 ng/ml insufficient; >30 ng/ml sufficient.

Results: Out of the 200 patients screened a 77.5% incidence was found of patients suffering from autoimmune thyroid disease and having very low to low normal vitamin D levels with a CI of 95%.

Conclusion: Probably because both vitamin D and thyroid hormone bind to the similar steroid hormone receptors, and a different gene in the vitamin D receptor was shown to predispose people to autoimmune thyroid disease including Grave's and Hashimoto's thyroiditis, a large number of patients with raised thyroid antibodies would be having low-very low vitamin D levels and mandatory screening these patients for vitamin D seems necessary at the

initial screening schedule itself, with a regular supplementation follow up plan.

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FLOW-MEDIATED DILATION AS A MARKER OF ENDOTHELIAL DYSFUNCTION IN GOUT

E. Calvo Aranda¹

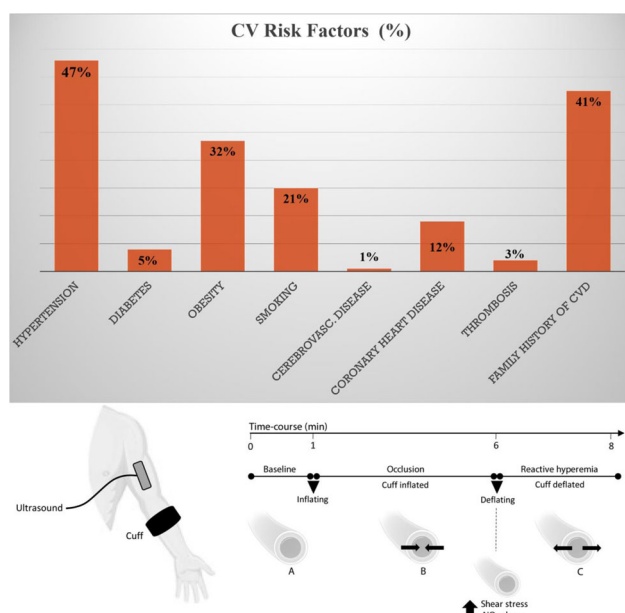
¹HM Sanchinarro University Hospital, Madrid, Spain

Objective: Several studies have shown the relationship between gout and increased cardiovascular risk and mortality. Hyperuricemia and crystal-induced synovitis are associated with endothelial dysfunction and patients with gout may be at increased risk of early atherosclerosis. Many reports have indicated that endothelial dysfunction plays a key role in affecting cardiovascular and renal function. The flow-mediated dilation (FMD) test is the most commonly used non-invasive assessment of vascular endothelial function and is associated with an increased risk of vascular events. There is a lack of studies with FMD assessment in patients with gout.

Methods: Prospective cohort study with collection of demographic and clinical data and cardiovascular treatments received. BMI, serum uric acid, ESR, high-sensitivity CRP [hsCRP], ferritin, cholesterol, triglycerides, vitamin D and homocysteine were measured. Patients were referred to Vascular Surgery Department for flow-mediated dilation assessment with high-resolution two-dimensional ultrasound imaging of the brachial artery. Endothelial dysfunction was defined as pathological values of FMD below 10 (severe if <5). All patients met the ACR classification criteria for gout.

Results: 150 patients, 97% men and 3% women. Average age: at time of study 56 (23-92); at diagnosis 47 years (15-79); at symptoms onset 45 years (15-77). 22.5% had tophi, 11.3% urate kidney stones, 42% gout family history, 41% cardiovascular disease family history. Hypertension 47.3%; diabetes mellitus 4.6%; dyslipidemia 56.7%; smokers 20.6%, quitters 37.6%; 75% overweight/obesity, mean BMI 28 (19-40). One patient had suffered stroke; 4 thrombosis; 17 ischemic heart disease (11 angina, 6 myocardial infarction). Analytical parameters: ESR 10 mm/h (1-68), hs-CRP 2.7 mg/dL (0.1-57.7); serum uric acid 6.9 mg/dL (2.4-11.8); ferritin 259 ng/ml (11-2000); cholesterol: 187 mg/dL (102-321), triglycerides 145 mg/dL (53-603); vitamin D 24.7 ng/mL (5.6-23.6; 29% <20); homocysteine 24.7 mmol/L (4-40; 32% >15 mmol/L). FMD was assessed in 147 patients with a mean value of -0.60 ± 0.52 . The 81% of subjects showed pathological values indicating endothelial dysfunction, severe in 52%. In the multivariate analysis, the only analytical determinant of endothelial dysfunction was the serum vitamin D concentration, which showed a negative correlation with FMD.

Conclusion: There is a high prevalence of traditional cardiovascular risk factors and cardiovascular diseases in our cohort. Most of our patients with gout have endothelial dysfunction measured by FMD, and that is severe in more than a half of them. Vitamin D deficiency is common and correlates with pathological values of FMD in gout. Cardiovascular risk should be periodically assessed in gout and we will continue studying the potential value of FMD as a marker of endothelial dysfunction in patients with this rheumatic disease.



P217 NOVEL APPARATUS PROVIDES COMPRESSION FORCES ON BONE RESULTING IN OSTEOBLASTIC ACTIVITY

J. Conviser¹, J. Conviser¹, S. Calcaterra¹

¹Ascend - Consultation in Health Care, Chicago, USA

Objective: Wolff's Law describes the relationship between bone geometry and mechanical influences on bone and suggests that when significant forces are applied to bone, the compression will stimulate an adaptive response. Exercise is recommended as a treatment option for those diagnosed with osteoporosis. However, traditional exercise has not been able to create the forces needed to stimulate bone growth in a safe and effective manner. A novel apparatus that allows for significant compressive force to the level required to have an effect on the osteoblastic function offers high force production with short duration, i.e., osteogenic loading (OL) was utilized. OL has been suggested as a non-pharmaceutical option to improve bone health. The purpose of this study was to examine if OL was 1) safe and 2) effective for individuals dealing with osteoporosis.

Methods: Fifteen women ranging in age from 56-84 years from three independent clinical locations with a diagnosis of osteoporosis were selected to participate in a one-year study using a new exercise device that allows the individual to create significant forces on the bone with four unique exercise movements. All three centers had the same equipment, settings and protocol. Subjects completed a minimum of 48 sessions once a week over the year, each session lasting approximately 15 min. DXA scans were conducted at the same testing location for both pre-and post-assessments. Subjects self-reported their body weight, weekly minutes of traditional exercise, diet and prescription medications.

Results: Of the 15 subjects, 10 individuals demonstrated a significant reduction (improvement in bone) in their mean DXA score, 3 had no significant change and 2 individuals showed a further degradation in their bone density. Within the 4 movements (chest press, leg press, abdominal crunch and vertical lift), forces generated were 2x - 10x body weight with no injuries reported with any subject.

Conclusion: These data suggest that a nonpharmacologic exercise solution is available to individuals diagnosed with osteoporosis. Further study is required with larger sample sizes and greater demographics. Additional research is needed to validate OL as a viable and safe strategy for bone reformation.

P218 PAGET DISEASE ASSOCIATED WITH PARTIAL OCULOMOTOR NERVE PALSY: A SIMPLE ASSOCIATION OR A COMPLICATION?

S. E. Oros¹, A. Goldstein², A. Dumitrascu², D. Alexandrescu², D. Grigorie³

¹Carol Davila University of Medicine and Pharmacy, ²C.I. Parhon National Institute of Endocrinology, ³Carol Davila University of Medicine and Pharmacy Bucharest, Bucharest, Romania

We present you the case of a 67 years old men, referred to our station for bowlegged left shank associating a sudden partial oculomotor nerve palsy. We examined a normal weight patient, with an obvious left lower leg deformation with a normal heart rate and blood pressure; normal shape and consistency of the thyroid, no exophthalmia, left palpebral ptosis and inferior and external deviation of the eye. Blood results pointed to normal alkaline phosphatase, calcemia and phosphatemia, normal TSH, PTH, suboptimal 25 OH vitamin D levels, slightly increased cross laps (0.82 ng/ml) with normal osteocalcin levels (23.4 ng/ml). The radiography of the left shank showed a iatagan shaped tibia; with thickening of the bone compact; demineralization and sclerosis of tibia in the diaphysis; increased vascular images in the frontal and parietal region in the skull radiography; and an 1.5 centimeters transparent lesion in the temporo-parietal region.

Bone scintigraphy showed intense metabolic reaction in the left tibia; moderate bilateral joints fixations. DXA of the spine BMD=1.046 g/cm²; T-score=-1.4 DS; Z-score=-0.9 DS; hip DXA BMD=0.877 g/cm²; T-score=-1.5 DS; Z-score=-0.3 DS. Contrast CT and MRI of the skull concluded -cystic process of the posterior fossa adjacent to the occipital bone- arachnoid cyst, the same result as the MRI performed before and offering no answer for the osteolytic lesion of the skull described in the radiography. Total and free PSA and ultrasound of the prostate were normal. The ophthalmologic exam confirmed nerve III partial paresis and slight reduction of the left visual field (left eye lid ptosis). We reviewed literature data and found no stated association between Paget disease and oculomotor nerve palsy, so we recommended treatment with ibandronic acid every 3 months (zoledronic acid was no treatment option for the moment), radiological follow up of the skull in 3 months and a checkup in 6 months.

P219 THE IMPACT OF BMI ON QUALITY OF LIFE AFTER LIGAMENOTPLASTY OF THE ANTERIOR CRUCIATE LIGAMENT OF KNEE

M. Milankov¹, M. Obradovic¹, M. Vranjes¹, M. Bjelobr¹

¹Department of Orthopaedic Surgery and Traumatology, Clinical Center Vojvodina, Medical Faculty, University of Novi Sad, Novi Sad, Serbia

Objective: Requirements which are set represent into young athletes cause injury of ligament and meniscal system of knee. In the last few years the number of reported cases of completed reconstruction of the anterior cruciate ligament of knee have doubled. Purpose of this study is to show if there are some significant difference in quality of life between persons with different values of BMI after anterior cruciate ligament reconstruction.

Methods: The study involved 510 patients who underwent reconstruction of the anterior cruciate ligament at the Department of Orthopaedic Surgery and Traumatology, Clinical Center of Vojvodina in Novi Sad in the period from March 2013 to December 2015. It is calculated BMI for each patient account to established formula and results were presented on based indices which are set by WHO. The life quality of these patients was determined by KOOS questionnaire.

Results: Injury of anterior cruciate ligament are basically more often in men population. In our study 413 patients were male and 97

patients were female. The age average of patients was 27 years old. The average value of BMI was 24.65 with the biggest part of normal nourished patients. It is determined low but significant difference in quality of life of patients with different values of BMI. If BMI is higher than total score of the KOOS questionnaire is lower, the words the quality of life is worse.

Conclusion: The life of persons with higher value of BMI ($> 24.9 \text{ kg/m}^2$) after anterior cruciate ligament reconstruction is not as good as life of persons with normal BMI ($18.5\text{--}24.9 \text{ kg/m}^2$).

P220

FACTORS ASSOCIATED WITH PATELLA INSTABILITY: A META-ANALYSIS AND SYSTEMATIC REVIEW

A. Cuttilan¹, A. Sayampanathan¹, A. Gupta¹

¹KK Women's and Children's Hospital, Singapore

Objective: Patellofemoral instability affects both athletes and non-athletes and can affect both the function and quality of life of an individual. There are factors which predispose individuals to patella instability. However, there has been no review to synthesise and consolidate the various factors which predispose individuals to patella instability.

Method: We searched MEDLINE, Scopus and Web of Science for a total of 648 articles. Eventually, we had 20 articles available for our systematic review based on our exclusion criteria. All data was analysed via Mantel-Haenszel statistics and random effect models where appropriate.

Results: The mean difference in sulcus angle between individuals with and without patella instability was 14.3° (95%CI= $13.2\text{--}15.5$, $I^2=86\%$, $p<0.0001$). Individuals with patella instability had a 2.18 mm smaller trochlear depth as compared to those without patellar instability (95%CI= $2.03\text{--}2.32$, $I^2=83\%$, $p<0.0001$). Individuals with patellar instability had a smaller lateral trochlear inclination of 7.01° as compared to individuals without patellar instability (95%CI= $6.18\text{--}7.83$, $I^2=0$, $p<0.0001$). The patella of individuals with patellar instability is tilted by 18.5° more as compared to those without instability (95%CI= $17.3\text{--}19.7$, $I^2=99\%$, $p=0.0003$). Individuals with patellar instability have a larger Insall-Salvati Index by 0.17 (95%CI= $0.15\text{--}0.19$, $I^2=0\%$, $p<0.0001$). Individuals with patellar instability have a higher Caton-Deschamps Index by 0.16 (95%CI= $0.13\text{--}0.18$, $I^2=0$, $p<0.0001$). The difference in tibial tuberosity trochlear groove (TTTG) distance between individuals with and without patellar instability is 5.46 mm (95%CI= $4.96\text{--}5.96$, $I^2=88\%$, $p<0.0001$).

Conclusions: A large variety of factors were associated with patella instability. They included a larger sulcus angle, a smaller trochlear depth, greater facet, decreased lateral trochlear inclination, a greater transepicondylar width, greater patella tilt, a larger Caton-Deschamps Index, a larger TTTG distance and an older age. Further studies should focus on biomechanical studies to assess why such factors predispose individuals to patella instability. Prospective studies should also be performed to provide higher quality data on the extent of risk these factors provide towards patella instability.

P221

INFECTION RATES USING SILVER COATING IN TUMORAL PROSTHETIC SURGERY

A. Aguilar¹, A. Peguero¹

¹Miguel Servet Hospital, Zaragoza, Spain

Objective: Megaprotheses are one of the most widely used treatments in oncological surgery, and one of its major complications is the high rate of infection. Several authors have reported the absence of side effects in silver-coated megaprotheses, showing concentrations of 56.4 ppb, and

no hepatic or renal effects were observed. Other studies show that the coating of the prosthesis emits enough silver to have antimicrobial effect.

Methods: 30 patients underwent implantation of silver-coated Mutars[®] arthroplasty due to neoplastic disease or periprosthetic fracture between 2004–2014. All surgeries were performed by the same group of specialized surgeons, implanting in all cases low-extremity megaprosthesis. Clinical and analytical monitoring was performed with a minimum of 4 years follow-up.

Results: During follow-up 3 infections (10% of patients) were detected, less than publications using non silver-coated prostheses. Surgery was needed in two cases, while the third was successfully treated with systemic antibiotics. The rest of the study group had a satisfactory functional recovery; without clinical or analytical signs of systemic effect of silver ions.

Conclusion: Silver coating in megaprotheses seems to decrease infection rate, allowing in some cases to control infection with less aggressive treatments.

P222

ANTIEPILEPTIC DRUGS ASSOCIATED REDUCTION IN BMD AND MICROARCHITECTURAL CHANGES IS ACCOMPANIED BY MODULATION OF RANKL AND WNT INHIBITORS IN NORMAL AND OVARECTOMISED RATS: TRANSLATIONAL SIGNIFICANCE

B. Parveen¹, A. Tiwary¹, D. Vohora¹

¹Jamia Hamdard, New Delhi, India

Objectives: Secondary osteoporosis is the major concern associated with long term intake of antiepileptic drugs (AEDs) (1). Women are the vulnerable targets owing to postmenopausal bone loss. We evaluated the effect of three AEDs on bone metabolism and on wnt inhibitors in normal and ovariectomised Wistar rats. The present results reported in Wistar rats on wnt inhibitors were confirmed in female epileptic patients by us recently (2).

Methods: Wistar rats were treated with AEDs (carbamazepine, 75 mg/kg; sodium valproate, 300 mg/kg; levetiracetam, 150 mg/kg) for 10 weeks following which microcomputed tomography analysis of BMD and microarchitecture of femoral epiphysis, proximal tibia and lumbar vertebrae was carried out. In addition, serum levels of vitamin D (25OHD), RANKL and wnt inhibitors (sclerostin and dickkopf-1) were measured.

Results: We found reduced BMD at femur epiphysis and lumbar vertebrae of animals treated with all three AEDs. This reduction was more pronounced in ovariectomised rats. AEDs treatment also resulted in microarchitectural changes in bone. These changes were accompanied by an increased serum RANKL and sclerostin. Increase in dickkopf-1 levels, however, was observed with only levetiracetam and decrease in 25OHD with carbamazepine only. Ovariectomy itself resulted in increased RANKL, sclerostin and DKK1 and reduced vitamin D. While sclerostin enhanced further upon AEDs treatment, serum DKK-1 levels showed a declining trend. Significant differences were discernible between normal and ovariectomised rats treated with AEDs.

Conclusions: We confirm adverse effects on bone following AEDs in female rats. Further, our results demonstrate for the first time that these effects are more pronounced in ovariectomised animals. Finally, our study confirmed that AED treatment displayed changes in the serum levels of wnt inhibitors and hence modulation of wnt inhibitors might be involved in their adverse effects on bone. The results have translational significance for postmenopausal epileptic women.

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P223

TREATMENT WITH TERIPARATIDE: IMPROVEMENT OF BMD IN GHD PATIENT

C. Bima¹, S. Gelli¹, S. Chiloire¹, A. Giampietro¹, A. Bianchi¹, M.- E. Braccaccia¹, S. Piacentini¹, M. Mormando¹, G. Grande¹, D. Milardi¹, A. Pontecorvi¹, L. De Marinis¹

¹Department of Endocrinology, Catholic University of the Sacred Heart, Rome, Italy

Teriparatide is the first anabolic agent shown to reduce the risk of fractures in patients with osteoporosis. We present a clinical case in order to report the effectiveness and safety of teriparatide in treatment naïve patients affected by osteoporosis. This patient was affected by growth hormone deficiency (GHD), diagnosed in June 2005, after neurosurgery for a prolactin-secreting pituitary adenoma. Patient was treated with rhGH from December 2007. Densitometry documented a severe osteoporosis without vertebral fractures. In April 2015 he started treatment with teriparatide, with excellent results. In fact, after 20 months of therapy, densitometry documented a state of osteopenia (T-score at lumbar spine of -1.5 SD; T-score at femur neck of -1.3 SD). This clinical case shows how teriparatide can be effective in the treatment of patients with osteoporosis at high risk of fracture.

P224

IN-HOSPITAL OSTEOPOROTIC HIP FRACTURE MORTALITY IN OLDER ADULTS IN ECUADOR

E. Lopez Gavilanez¹, K. Guerrero Franco², N. Bautista Litardo³, M. Navarro Chavez¹, M. Hernandez Bonilla⁵, C. Regalado Alvarado⁶, H. Abad Gualpa⁴, J. Palacio Riofrio⁴

¹Servicio Endocrinología Hospital Docente Policía Nacional Guayaquil #2, ²Servicio Medicina Interna Hospital Docente Policía Nacional #2, ³Servicio Endocrinología Hospital Clínica Kennedy Alborada, ⁴Servicio Endocrinología Omni Hospital, ⁵Servicio Endocrinología Hospital Docente Policía Nacional Guayaquil #2, ⁶Omni Hospital, Guayaquil, Ecuador

Objective: Fragility hip fracture are a major concern for public health because they are associated with high mortality especially in the older adults. Recent studies examining national trends of in-hospital hip fracture mortality in Ecuador have not been conducted. Our aim was to describe and interpret in-hospital hip fracture mortality trends in Ecuadorian men and women during the period 1997-2016, and to contrast these with trends in other populations.

Methods: We conducted a population-based temporal trend study in Ecuador from 1997-2016. Data the Ecuadorian Hospital Discharge year-book was used to determine the number of people of both sexes of 60 or more years, hospitalized with hip fracture (ICD-10 codes: S72.0, S72.1, S72.2). Crude and age-adjusted mortality rates was calculated. We standardize mortality rates by age by direct method with the world population (WHO). Trends in age-standardized mortality rates were estimated by joinpoint regression analysis. The trends were expressed as annual percent change (APC) and average annual percent of change (AAPC). Data analysis was performed using the Joinpoint Regression[®] program, Version 4.5.0.1.

Results: There were 240 deaths due to proximal femur fractures (120 females, 120 males). Mortality in men showed a statistically significant increase during the study period. The estimated APC was 2.5% (CI 95% 0.3 to 4.7; $p < 0.05$) and the average AAPC 2.5% (CI 95% 0.3 to 4.7; $p < 0.05$), without any identified joinpoint. In women, mortality had a statistically significant increase between 1997-2016, with the estimated APC being 8.6% (CI 95% 5.2 to 12; $p < 0.05$), without any identified joinpoint; and the AAPC 8.6 (CI 95% 5.2 to 12; $p < 0.05$).

Conclusion: During the study period, in-hospital hip fracture mortality in Ecuador showed a statistically significant increase in both

sexes. The observed trends were not similar to those of other countries and require further analysis to determine all the factors that have an effect on them.

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AXILLARY NERVE LESIONS AFTER OSTEOPOROTIC PROXIMAL HUMERUS FRACTURES: WHAT SHOULD CHANGE IN OUR ADVICE TO THE PATIENT ACCORDING TO THE ELECTROPHYSIOLOGICAL FINDINGS

L. Pena¹, E. López-Anglada¹, J. Pena¹, J. Paz¹, A. Braña¹

¹Hospital Universitario Central de Asturias, Oviedo, Spain

Axillary nerve injuries after proximal humerus fractures are thought to be rare. In most studies, the frequency of injury is usually determined using clinical examinations, but results from electrophysiological studies reveal higher rates than expected, in fact. Very few studies have investigated this topic. Our aim was to find a relation between the different kind of proximal humerus fractures and the severity of the nerve injury, so as to provide a right piece of advice to the patient according to the prognosis of the lesion.

This was a prospective observational study of 96 consecutive patients who suffered a proximal humerus fracture. We performed a clinical and electrophysiological examination at a minimum follow-up time of 12 months. Electrophysiological examinations comprised electromyography and electroneurography. The main outcome was the frequency and severity of axillary nerve lesions. Inclusion criteria were to present a proximal humerus fracture in a patient elder than 18-year-old, who accepted to make the electrophysiological studies. Exclusion criteria were to suffer a disease that affects the electromyography (diabetes mellitus, myopathy, polyneuropathy, motoneuron disease, hypo- or hyperthyroidism), anticoagulant treatments (acenocumarol) and dementia.

Finally, 33 patients were monitored for an average of 14 months. Normal EMG or low axonotmesis occurred in 17 patients, (axillary neuropathy without muscular denervation) axonotmesis with incomplete reinnervation occurred in 7, and complete reinnervation (muscular denervation) occurred in 6. The latter group was classified as having a temporary axillary nerve lesion.

In conclusion, the 18% rate of permanent axillary nerve lesions in our study is higher than expected based on the clinical examination. Electrophysiological assessment is therefore more appropriate to detect axillary nerve injuries. A repeated pattern appears on the results of the electrophysiological examinations were we can see (1) neuroapraxia without muscular denervation in displaced fractures with a metaphyseal trace, and in those non-displaced fractures but associated to a gleno-humeral dislocation, (2) there is a very low risk of axillary nerve injury in non-displaced fractures, (3) and we notice a muscular denervation injury in those 3 or 4 fragment fractures that are displaced or impacted.

P226

DIAGNOSIS NECK PAIN MYOTONIC SYNDROMES

A. N. Filipovich¹

¹Research Center of Medical Assessment and Rehabilitation, Minsk, Belarus

The dynamic monitoring of 195 patients with myotonic and myofacial syndromes of neck pain was done against the control group of 45 people. An extended neurological examination was carried out which included roentgenometry of cervical and vertebrocranial areas of spinal column, electromyography of 7-9 relevant muscles, finding of the “key” muscle and the overall

computer aided assessment of osteomuscular, cardiorespiratory and oxygen transport system disorders. Clinical and electromyographic criteria for diagnosis of myotonic and myofascial syndromes of neck pain were identified based on the occurrence rates. The role of major system disorders in pathogenesis of neurological manifests of neck pain was studied. New therapeutic approaches to stopping pain and myotonic syndromes were developed; the effectiveness of early rehabilitation measures was demonstrated. The prevailing myotonic syndromes were identified which were the musculus obliquus capitis inferior syndrome (in 68, or 39.4% patients); suprascapular area syndrome (33% of patients); musculus scalenus anterior and musculus scalenus medius syndromes (18.9%); musculus pectoralis minor syndrome (9.7%). Hypodynamia caused system disorders were noted in 78.3% patients including excessive body mass and fat content; reduced blood circulation rate and heartbeat volume and the pronounced decrease of PWC170. The most informative spondylographic findings were reduced thickness of posterior areas of intervertebral disks from C1 to C7 (52.3 to 77.9% of patients), cervical lordosis impression (76.4%) and uncovertebral arthroses (58.2%). The most seriously affected ("key") muscles in neck pain patients were found. Diagnosis and treatment strategies for neck pain patients were developed.

P227

REHABILITATION FOR PATIENTS WITH LOW BACK PAIN

A. N. Filipovich¹

¹Research Center of Medical Assessment and Rehabilitation, Minsk, Belarus

Objectives: Examination of 78 patients with myotonic (MT) syndrome of lumbar osteochondrosis.

Methods: Patients went through the clinical estimation of neurologic status, manual testing of muscles, CT and MRI of back bone lumbar department, interferential and needle electromyography of the most damaged muscular groups, dosed loading veloergometry, revasography of feet, and shins.

Results: It was established for the first time, that among MT-syndrome patients 54 (69.2%) an associated damage of two or more muscles prevailed. The most damaged ("key") muscles appeared to be gastrocnemius muscle (43; 55.1%), gluteus medius (42; 53.82%), quadriceps femoris (36; 46.2%), rectus abdominis and external oblique (32; 41.1%), peroneal muscle (29; 37.2%), piriform muscle (29; 37.2%), lumbar quadratus muscle (28; 35.9%), gluteus maximus (19; 24.3%), gluteus minimus (16; 20.5%), adductor (14; 17.9%) and abductor (9; 11.5%) thigh muscles. Medical-rehabilitation complex on damaged extremity was approbated in 27 patients with MT syndrome. The complex included oral reception of katadolon (100 mg 3 times a day for 10 days), tractions on Fintrac-471 table (with force from 3 to 55 kg, a course of 8-10 sessions) and also acupuncture with use acupuncture points of general action with vascular autonomic nervous system orientation (G14, MJ6, E36, RP6, TR5, V40) and locally-segmented points on the most damaged muscular groups (AT60, VB30 with deep introduction to piriform muscle; VB 34, VB41, F3).

Conclusion: After treatment damaged extremity pain has completely disappeared in 19 patients.

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PATIENTS WITH LOW BACK PAIN ACUPUNCTURE TREATMENT

A. N. Filipovich¹

¹Research Center of Medical Assessment and Rehabilitation, Minsk, Belarus

Objectives: 78 patients with myotonic (MT) syndromes of lumbar osteochondrosis surveyed in dynamics for the purpose of their early diagnostics, studying of frequency, search of the most interested muscles with revealing of a "key" muscle for applying differentiated acupuncture.

Methods: The complex of methods including dynamics of the neurologic status, manual testing of muscles, CT, MRI, electromyography of 5-6 muscular groups, reovasography of feet was used.

Results: Most clinically pronounced were the following syndromes: transverse muscle (23; 29.4%), oblique muscle (32; 41.1%) abdominal muscles, stomach, lumbar quadratus muscles (28; 35.9%), big (19; 24.3%), large (42; 53.8%) and small muscle (16; 20.5%), gluteus, piriform (29; 37.2%), and also adductor (17; 21.8%), abductor (19; 24.3%), quadriceps femoris (41; 52.6%) muscles, gastrocnemius (43; 55.1%) and peroneal (29; 37.2%). In 54 (69.2%) patients prevailed associated (two and more) syndromes. Acupuncture points of general action (GJ4, MJ6, E36, RP6, TR5, V40) and local muscular points were used to stop pain muscular spasm, taking into account the revealed MT-syndromes. Katadolon was additionally prescribed for stable pain syndrome (100 mg/d, 10 days) for powerful analgesic, muscle relaxing effects, deleting of "painful memory", preventing of pain chronification. Complex therapy appeared to be effective in 75 (96.2%) patients.

Conclusion: Timely diagnostics of associated MT-syndromes of lumbar osteochondrosis allows to validate adequate therapy methods.

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EFFICACY OF PM&R IN INFLAMMATORY GONARTHRITIS AND EVALUATION WITH 99TC-MDP BONE SCINTIGRAPHY

M. Gencbay Bicer¹, N. Kocamaz¹, S. Oncel²

¹Bakirkoy Dr. Sadi Konuk Training and Research Hospital, Istanbul,

²Dokuz Eylul University Faculty of Medicine, Izmir, Turkey

Objectives: 99Tc-MDP bone scintigraphy used in inflammatory rheumatic disease accompanied with synovitis is a very sensitive and definitive test in osteoarthritis which is the most common rheumatic disease, acute synovitis attacks are characteristic features. We wanted to evaluate the efficacy of the nonthermal physical medicine and rehabilitation (PM&R) program and the position of scintigraphy in synovitis of inflammatory osteoarthritis.

Methods: Nonthermal PM&R in 20 patients with synovitis of inflammatory osteoarthritis which was diagnosed clinically and radiologically was applied. Inflammatory rheumatic diseases, peripheral vascular diseases, active infection, malignancy, fracture and subluxation, who are involved in sports actively and those patients whose mean age 56±1.5. As PM&R program, diadynamic current, cold pack, pulsed shortwave diathermy therapy and an exercise program were applied. When patients were evaluated before, at the end, and after a 3-week interval of the therapy, by using all parameters, 3 phase scintigraphy was applied.

Result: It was found that nonthermal PM&R therapy was efficient in inflammation.

Conclusion: In spite of this clinical inflammation in gonarthrosis did not show any significant finding both before and after the therapy.

P230

PREVALENCE OF VERTEBRAL FRACTURES SECONDARY TO CORTICOSTEROIDS IN EGYPTIAN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS

H. M. El-Hadary¹

¹Cairo University, Cairo, Egypt

Statement of the Problem: Patients with SLE are at risk of generalized osteoporosis. The etiology of bone loss in SLE is supposed to be multifactorial, including traditional osteoporosis risk factors,

inflammation, metabolic factors, hormonal factors, serologic factors, and medication-induced adverse effects. Glucocorticoids (GCs) still, remain the first-choice treatment option for SLE. GCs have an inhibitory effect on the bone turnover and may induce osteoporosis, delay healing of fractures, inhibit bone growth, and cause osteonecrosis via reduction of osteoblast activity. Vertebral fractures, the hallmark of osteoporotic fractures, is one item of the (SLEDAI) for SLE. The prevalence of vertebral fractures in SLE ranges between 20% and 21.4%, including premenopausal women, although the associated risk factors remain unclear. Peripheral fractures are often easy to diagnose whereas vertebral compression fractures can be clinically silent or be recognized as ordinary back pain by the patient and therefore overlooked. Vertebral compression fractures are common but seldom diagnosed in patients with SLE regardless of treatment with GCs or not. Recent studies have shown that vertebral compression fractures are common in SLE patients in spite of normal BMD indicating alternative mechanisms to the origin of compression fractures. It also points to the necessity of radiological examination in finding compressions of the spine.

Method: Descriptive epidemiology cross-sectional analytical study that include 100 Egyptian patients with SLE and 50 normal individuals of matched age and sex as a control group. **Conclusion:** Vertebral deformities scored according to Kleerekoper method (Kleerekoper et al., 1984) were found in 24 (24%) patients these results nearly match those of Almeheh et al. (2010) who studied 150 SLE patients. There was a higher prevalence of vertebral deformities 29% percent of the patients in Almeheh et al. 2010 study had at least one prevalent, radiological, vertebral compression. 88% percent of fractures were asymptomatic.

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BMD AND DXA BODY COMPOSITION IN MARATHON RUNNERS

S. Tomková¹, Z. Lörinczová¹, K. Hricová¹, P. Vaňuga²

¹Faculty of Medicine Pavol Jozef Šafárik University in Košice, Department of Internal Medicine, Hospital Košice-Šaca a.s., Košice-Šaca, ²National Institute of Endocrinology and Diabetology, Lubochňa, Slovakia

Objective: DXA is rapidly becoming more accessible and popular as a technique to monitor body composition, especially in athletic populations. DXA provides information on three compartments of body composition, according to the terminology "fat mass", "lean mass" or the "fat free soft tissue" and "bone mineral content". The aim of the study was to evaluate BMD and DXA body composition in runners during Košice Peace Marathon in 2016.

Methods: 40 athletes were examined by total body densitometry. Three compartments of body composition, containing "fat mass", "lean mass" or the "fat free soft tissue" and "bone density" in total were investigated. Control group contained 40 healthy young men. Measurement of BMD and body composition was made on the device DXA densitometer Hologic Explorer. Results were evaluated by nonparametric tests such as Mann-Whitney test.

Results: The results of BMD were normal in runners and control group. Statistically significant relation ($p=0.0067$) was found between endurance running distance and fat mass in athletes. There is statistically significant difference of BMI between runners and control group.

Conclusion: There was confirmed statistically significant relation between endurance running distance and body composition. DXA Body composition can be helpful in long term training plan in athletes. DXA densitometry is widely used to measure bone density. Also bone density ensures athletes because this sport is connected with higher risk of osteopenia and osteoporosis. DXA densitometry offers us also a possibility to measure body composition and by now is used as a reference method.

P232

VITAMIN D AND AUTOIMMUNE DISEASE

H. M. Al Attia¹

¹Universal Hospital, Abu Dhabi, United Arab Emirates

Objective: The association between hypovitaminosis D and autoimmune diseases has been demonstrated by epidemiological studies suggesting higher prevalence of vitamin deficiency among autoimmune patients compared to the general population. This issue has not been studied in this area before. We conducted this work by reviewing the records of 25 (OH)D of patients with and without autoimmune disease.

Methods: Only adult patients without history of vitamin D supplementation were included. All underwent assay for 25(OH)D.

Results: The cohort comprised of 77 patients (group G1) without evidence of connective tissue disease (CTD) (based on history, clinical and laboratory relevance) and other 59 with CTD (G2). Both groups were dominated by females and by Individuals from Arabs states. 63 diagnoses were made in the 59 patients with CTD and shown in Table 1.

Table 1

Diagnosis	Number (%)
RA	27 (43%)
SLE	14 (22%)
Autoimmune thyroid disease (Hashimoto's disease)	7 (11%)
Scleroderma	3 (4.5%)
Myositis	2 (3%)
Aniphospholipid syndrome	2 (3%)
Chronic juvenile arthritis	2 (3%)
Sicca syndrome	2 (3%)
Polymyalgia rheumatica	1 (1.5%)
Undifferentiated connective tissue disease	1 (1.5%)
Raynaud's phenomenon	1 (1.5%)

Their age was comparable (41.5 ± 12.8 vs. 43.7 ± 12.4) in the two groups respectively, $P=0.32$. The mean of 25(OH)D was lower in G1 (19.3 ± 7.28 vs. 24.5 ± 8.17 ng/ml in G2), $P=0.0001$. 71(92%) and 48 (81.5%) showed hypovitaminosis D (25(OH)D <30 ng/ml) in the 2 groups respectively, $P=0.070$. Yet, the mean level of 25(OH)D was significantly lower in G1 (18.0 ± 5.77 , 95%CI of 16.67-19.25) vs. 21.5 ± 5.2 ng/ml, 95%CI of 19.88-23.05) in G2, $P=0.001$. 6/71 (5%) and 3/48 (6%) in G1 & G2 expressed deficient levels of vitamin D (25 (OH) D <10 ng/ml), $P=1.000$. The mean of total calcium (t ca) and ionized calcium (i ca), and the frequency of secondary hyperparathyroidism (SHPTH) were not different in both groups ($P=NS$). **Conclusions:** The association between hypovitaminosis D and autoimmune disease could not demonstrated in this group of patients thus this was in contrast with previous reports indicating the contrary. Nonetheless, before concluding further on the issue we need to consider larger number of patients in future studies.

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BONE DENSITY IN MORQUIO SYNDROME (MPS)

H. M. Al Attia¹

¹Universal Hospital, Abu Dhabi, United Arab Emirates

Introduction: Mucopolysaccharidosis IV (MPS IV; Morquio disease) is an autosomal recessive lysosomal storage disorder caused by an enzyme defect. Number of patients with this disorder have a wide spectrum of clinical manifestations including growth impairment and progressive

chondrodysplasia frequently resulting in limited to no ambulation. It is well documented that impaired or lack of ambulation corresponds with low BMD in populations with physical disabilities such as cerebral palsy, spina bifida and muscular dystrophy.

Patient: A 30 year old male and the second among 10 siblings born to contiguous parents. He was wheelchair-bound since early childhood.

Clinical and radiological features:

- Short stature (98 cm) & weight (30.9 kg)
- Multiple skeletal deformities including bell chest, dysplastic epiphysis, long fingers, hypotonia, valgus deformity, rocker bottom feet, platyspondyly and aortic valve insufficiency.
- No corneal opacity, normal cognition
- 25(OH) D: 12.9 ng/ml, PTH: 50 pg/ml (N 15-65), LH: 1.2(N1-13), FSH: 1.6 (1-10), T: 19.66

Further investigation:

DXA scan (z-score): Spine: -4.3, R hip: -5.1, L hip: -4.6.

Skin fibroblast: Positive for N-acetylgalactosamine 6 sulfatase enzyme deficiency.

25(OH) D: 12.9 ng/ml(N>30), PTH: 50 pg/ml (N 15-65). No evidence of hypogonadism. Renal and liver function were within normal values.

Discussion: There is an increased risk of poor bone mineralization in patients with mucopolysaccharidoses including Morquio syndrome. It is related to several factors including malnutrition, a particularly small frame, an abnormal gait, and reduction of physical activities or lack of ambulation as in this patient. Noteworthy, the bone growth and mineralization have been reported to be affected by glycosaminoglycans accumulation in animal models of MPS (1,2). Our patient here exhibited low bone density in the three sites tested had other contributory factors for the osteoporosis. He already lacked ambulation, was of low body weight and height and of low vitamin D level as well.

Conclusion: Attention should be given by the clinicians to the BMD status in patients with Morquio syndrome.

References:

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2. Turner AS et al. *Calcif Tissue Int* 1995

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RARE GENETIC DISEASE AND LOW BONE MINERAL DISEASE: HEREDITARY MULTIPLE OSTEOCHONDROMAS AND OSTEOPOROSIS

H. M. Al Attia¹

¹Universal Hospital, Abu Dhabi, United Arab Emirates

Introduction: The disorder hereditary multiple osteochondromas (HMO), previously called hereditary multiple exostoses (HME), is characterized by growths of multiple which is cartilage-capped bone tumors that grow outward from the metaphyses of long bones. It is manifested by a reduction in skeletal growth, bony deformity, restricted joint motion, shortened stature, premature osteoarthritis, and compression of peripheral nerves. The risk for malignant degeneration to osteochondrosarcoma increases with age, although the lifetime risk of malignant degeneration is low (~1%). The diagnosis of HMO is based on clinical and/or radiographic findings of multiple exostosis in one or more members of a family. The two genes in which pathogenic variants are known to cause HMO are EXT1 and EXT2. A combination of sequence analysis and deletion analysis of the entire coding regions of both EXT1 and EXT2 detects pathogenic variants in 70-95% of affected individuals (1).

Case report: 36 year old Indian clerk with deformities in the form of bilateral swellings and pain in the limbs. His deceased mother had similar deformities. But other 3 siblings were not affected. His height was 163 cm, weight 61 kg and BMI 22. CBC, ESR, urea and creatinine, LFT, serum iron, B12, LH, FSH, RF, CCP were within normal values. 25(OH)D was 23 ng/ml (N>30), serum Ca

8.9 mg/dl (N 8.4-10.5), ionized Ca 1.133 mmol/L (N 1.16-1.32) and PTH of 69.64 pg/ml (N 15-65). TFT were within normal values yet TPO Abs titre was elevated (227.9) (N<35) indicating Hashimoto thyroiditis. Serum osteocalcin was low (6.02 ng/ml, N 9-42) but β -CTX was within normal values (190 pg/ml). The DXA scan (z-score) showed osteoporotic values in both femurs (-4.1 in L and -3.1 in R) and osteopenic score of -1.7 in the spine. The radiology profile showed osteochondromas of the upper and lower limbs and spinal scoliosis along with limbs deformities. He was treated with bisphosphonate and vitamin D supplementation.

Conclusion: A previous work revealed a novel heterozygous acceptor splice site mutation of EXT1 results in hereditary multiple exostosis that is associated with low bone mass, indicating a possible additional role for EXT1 in bone biology and in regulating BMD (2). We assume this patient with evidently strong FH of HMO would fit within the above conclusion. Nonetheless, he also had hypovitaminosis D and mild secondary hyperparathyroidism which might contribute further for the low BMD. Therefore at the diagnosis of this rare skeletal disorder in future cases, efforts should also be directed towards the status of BMD.

References:

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2. Lemos MC et al. *J Clin Endocrinol Metab* 2005

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ASSOCIATION BETWEEN LIPID PROFILE AND LUMBAR SPINE BMD AND TRABECULAR BONE SCORE IN IRANIAN ELDERLY: BUSHEHR ELDERLY HEALTH PROGRAM

N. Panahi¹, A. Ostovar¹, A. Ghasem-Zadeh², G. Shafiee³, R. Heshmat³, N. Mehrdad⁴, B. Larjani⁵, I. Nabipour⁶

¹Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran,

²Departments of Medicine and Endocrinology, University of Melbourne, Australia, Melbourne, Australia, ³Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, ⁴Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, ⁵Endocrinology & Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, ⁶The Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, Iran

Objective: Some studies, not all, have shown association between cardiovascular disease and osteoporosis, however, the shared root cause of these two diseases of the elderly remains unknown due to so many confounders. The aim of this study was to evaluate the association between lipid profile and areal BMD (aBMD) and trabecular bone score (TBS) of lumbar spine in Iranian elderly.

Methods: Study subjects were 1260 women and 1166 men, aged above 60 years, participating in the second stage of Bushehr Elderly Health programme, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran. Lumbar spine aBMD was measured using DXA (Discovery WI, Hologic, USA) and TBS was calculated using TBS iNsightTM software (Medimaps group). The associations between lipid profiles and aBMD and TBS of lumbar spine were examined using multivariable linear regression analysis stratified by sex and adjusted for age, and BMI. Standardized coefficients are presented. Results: In men after adjusting for age and BMI, we found negative correlations between aBMD and TBS of lumbar spine with total cholesterol (TC) (β = -0.083, p=0.003 and β = -0.067, p=0.020, respectively). The correlations had similar trends for high density lipoprotein cholesterol (HDL) (β = -0.080, p=0.004 and β = -0.065, p=0.025, respectively) and low density lipoprotein cholesterol (LDL) levels (β = -0.086, p=0.002 and

$\beta=-0.063$, $p=0.027$, respectively). However, neither lumbar spine BMD nor TBS was statistically significantly correlated with TC, HDL, or LDL in women.

Serum triglycerides were not correlated with TBS in men or women, but a positive and statistically significant correlation was observed between TG and BMD in women ($\beta=0.097$, $p<0.001$). The correlation between TG and BMD, however, was not statistically significant after adjustment for age and BMI in men.

Conclusion: This study found inverse correlation between lipid profile and both BMD and TBS mainly in men. Lower TBS values was observed in men with higher lipid levels which is associated with increased risk for fragility fracture in older men. However, this study found no association between serum lipid profiles and BMD or TBS in older women. The mechanisms of these associations are not clear, and specified studies are needed to clarify the relationships.

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THE ANABOLIC EFFECT OF PICOLINIC ACID ON WNT SIGNALLING PATHWAY IN VITRO

A. A. Al Saedi¹, L. S. Singh¹, S. P. Phu¹, G. D. Duque¹

¹University of Melbourne and Australian Institute for Musculoskeletal Science (AIMSS), Victoria, Australia

Objective: Wnt signalling proteins are small secreted proteins that are active in embryonic development, and tissue homeostasis. Wnt proteins bind to receptors on the cell surface, initiating a signalling cascade that leads to β -catenin activation of gene transcription. Our team has reported that Picolinic acid (AP), an end product of the tryptophan degradation pathway, has an osteogenic effect on human mesenchymal stem cells (hMSCs). However, the mechanisms of action explaining this osteogenic effect remain unknown. In this study, we explored a potential role of the Wnt-signalling pathway in the anabolic response to Picolinic acid by hMSCs.

Methods: hMSCs were cultured in osteogenic induction media in the presence of an osteogenic dose of PA (100 mM) or vehicle. Alkaline phosphatase activity was measured every 3 h within 48 h. Cells were also incubated with PA $\pm$ IWP3, an inhibitor of Wnt secretion, in different conditions. Protein was collected for western blotting. In addition, RT-PCR of osteogenic genes was performed.

Results: hMSCs treated with an anabolic dose of PA showed significantly higher ALP production. PA had reverted the inhibitory effect of IWP3. Wnt production (Wntb7 and 10) increased when cells incubated with PA.

Conclusion: Our results suggest that the anabolic effect of PA on hMSCs enhance the Wnt/ β -catenin pathway. PA reverted the effect of IWP3. In summary, we demonstrated a direct effect of PA on the Wnt/ β -catenin pathway, which could partially explain the osteogenic effect of PA on hMSCs.

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A NEW FLOW CYTOMETRY METHOD TO QUANTIFY LAMIN A EXPRESSION IN CIRCULATING OSTEOPROGENITOR (COP) CELLS: A NEW BIOMARKER FOR FRAILTY, OSTEOPOROSIS AND SARCOPENIA

A. A. Al Saedi¹, G. D. Duque¹, L. S. Singh¹, S. P. Phu¹, P. G. Gunawardene², P. S. Suriyaarachch²

¹University of Melbourne and Australian Institute for Musculoskeletal Science (AIMSS), Victoria, Australia, ²Sydney Medical School Nepean, University of Sydney, Penrith, NSW, Sydney, Australia

Objective: Circulating osteoprogenitor (COP) cells are considered a surrogate of the stem cell population in muscle and bone. Low levels of COP cells are associated with frailty and disability (Gunawardene et al. *J Gerontol A Biol Sci Med Sci*. 2015). Lamin A, a protein of the inner nuclear

membrane, plays vital role in stem cell survival, replication, and differentiation. Lamin A deficiency affects osteoblast differentiation and muscle mass and has been associated with osteosarcopenia (Tong et al, *Mech Ageing Dev*. 2011). Therefore, we hypothesized that quantification of lamin A in stem cells could be used as a more robust biomarker for musculoskeletal diseases, and also as a predictor of frailty and disability in older persons. However, a non-invasive method to quantify lamin A expression in stem cells was still required. Considering that COP cells are a non-invasive source of stem cells, in this study, we aimed to develop and validate a flow-cytometric protocol to quantify lamin A expression in COP cells.

Methods: A random sample of community-dwelling individuals aged 65 and older enrolled in the Nepean Osteoporosis and Frailty (NOF) Study (mean age 82.8; N=77; 70% female; 27 fit, 23 pre-frail and 27 frail). COP cells were identified by flow cytometry using selective gating of CD45/OCN+ cells. Lamin A was quantified in COP cells using percentage of lamin A/C+ COP cells and also mean fluorescence intensity (MFI) for lamin A in COP cells. Logistic regression models estimated the relationship between the percentage of lamin A-expressing COP cells and prevalent disability and frailty.

Results: Percentage of lamin A-expressing COP cells is decreased with age. Low lamin A expression in COP cells is also associated with disability. Both Barthel (activities of daily living) and OARS (instrumental activities of daily living) scales decreased with lamin A values ($p<0.004$, $p<0.01$ respectively). Lamin A MFI also decreases with age ($p<0.001$), in addition, low MFI values were associated with a significantly higher score in the frailty index (Rockwood) ($p<0.03$). Moreover, lower percentage of COP cells expressing lamin A was associated with two fold greater odds of being frail than being fit (odds ratio OR=2.06, 95%CI=0.98-4.3).

Conclusion: In this study we demonstrated the feasibility of a new non-invasive diagnostic method to quantify of lamin A expression in COP cells. Low levels of expression of lamin A were associated with the presence of disability and frailty. Although longitudinal studies are still required, this diagnostic method offers a valid a reliable tool to diagnose osteosarcopenia and to predict frailty and disability in osteosarcopenic patients.

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EFFECTS OF EXTRACTED OIL FROM HINOKI CYPRESS ON DIFFERENTIATION AND APOPTOSIS IN OSTEOCLASTS

E.-H. Kim¹, H.-A. Seo², H.-Y. Jung³, H.-R. Suh⁴

¹Chief of Endocrine Department, Department of Internal Medicine, Daegu Fatima Hospital, Daegu, South Korea, ²Endocrine /fatima hospital /, Daegu, South Korea, ³Endocrine /Kyung Hee university, Seoul, South Korea, ⁴internal medicine/ Bogwang hospital, Daegu, South Korea

Phytoncides, which are volatile substances emitted from plants for protection against plant pathogens and insects, are known to have insecticidal, antimicrobial activities. Some studies have shown that phytoncides have anti-inflammatory effects in mammalian cells. LPS-induced increases of TNF α , NF κ B, and oxidative stress were attenuated by phytoncide-like compounds in macrophage cells, RAW264.7. To investigate the effects of phytoncide, we used extracted oil from tree. The essential oil from freshly cut needles of Hinoki cypress (*Chamaecyparis obtusa*) was obtained by steam distillation using a manufactured apparatus with a condenser. To explore the effect of phytoncide on osteoclast differentiation, we used bone marrow-derived macrophage and RAW 264.7 cells. Expression of osteoclast-specific genes and effects on cell signaling pathways associated with cell differentiation were analyzed by RT-PCR and Western blotting. Phytoncide significantly inhibited RANKL-induced TRAP-positive multinucleated cell formation in bone marrow-derived macrophages and RAW 264.7 cell cultures in a dose-dependent manner. The suppression of ERK, AKT, and p38 mitogen-activated protein kinases engaged by RANK were observed in Western blotting after phytoncide treatment in RAW 264.7 cells. Furthermore, phytoncide suppressed Bcl-2 and stimulated Bax protein expression in RAW 264.7 cells. Phytoncide significantly stimulated apoptosis

in RANKL-induced RAW 264.7 cells in a dose-dependent manner. These data indicated that phytoncide may have suppressive effects on osteoclasts through reduced differentiation and enhanced apoptosis in osteoclasts.

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HYPERCALCITONINEMIA AS ISOLATED ENDOCRINE MANIFESTATION OF PSEUDOHYPOPARATHYROIDISM TYPE 1A AND 1B

M. P. Yavropoulou¹, G. Trovas², E. Avramidis², F. M. Elli³, G. Mantovani³, J. G. John¹

¹Aristotle University of Thessaloniki, Department of Internal Medicine, AHEPA University Hospital, Thessaloniki, Greece, ²University of Athens, Laboratory for the Research of Musculoskeletal System, Athens, Greece, ³University of Milan, Department of Clinical Sciences and Community Health, Fondazione IRCCS Ospedale Maggiore Policlinico, Milan, Italy

Pseudohypoparathyroidism (PHP) is a heterogeneous group of rare endocrine disorders characterized by normal renal function and resistance to the action of PTH. There are 5 variants of PHP, among which type 1A (PHP-1A), is the most common one that include developmental and skeletal defects, collectively termed Albright hereditary osteodystrophy (AHO).

Case presentation: We present 2 cases, a 54 and a 33 year old male, diagnosed with PHP, where the only endocrine manifestation was high levels of serum calcitonin at baseline (114 pg/ml and 203 pg/ml, respectively (NR:<10 pg/ml)) and after pentagastrin infusion (530 pg/ml, and 1020 pg/ml, respectively with peak value at 5 min after infusion). AHO phenotype was present in only one case (the 54 year old male). We performed GNAS molecular analysis (methylation status and copy number analysis by MS-MLPA) in genomic DNA samples for both patients. The analysis revealed a novel missense variant c.131T>G p.(Leu44Pro) affecting GNAS exon 1, in the patient with the clinical diagnosis of PHP 1A. According to predictive in silico analysis, this variant is supposed to encode for an altered protein, and it is likely responsible for the clinical phenotype presented by the patient. The genomic DNA analysis of the second patient revealed the presence of the recurrent 3-kb deletion affecting the imprinting control region (ICR) localized in the STX16 region associated with the loss of methylation at the GNAS A/B differentially methylated region (DMR), consistent with the diagnosis of an autosomal dominant form of PHP 1B.

Conclusion: Hypercalcitoninemia is rarely seen in PHP type 1A that is also characterized by other endocrine manifestations and AHO phenotype, but has not been described before in other variants such as PHP1B.

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INCREASED MORTALITY IN OLDER HOME-DWELLING MEN WITH HIGH SERUM PERIOSTIN LEVELS: THE PROSPECTIVE STRAMBO STUDY

P. Szulc¹, J.-C. Rousseau¹, R. Chapurlat¹

¹INSERM UMR 1033, University of Lyon, Hospices Civils de Lyon, Lyon, France

Objective: Elevated tissular periostin expression and its high serum levels are associated with a higher risk of relapse and death in cancer patients. Our aim was to study the link of serum periostin with mortality in older men.

Methods: In cohort of 815 home-dwelling men aged 60-87 followed up prospectively for 8 years, periostin was measured at baseline using ELISA (USCN).

Results: All-cause mortality (n=168) increased across the periostin quartiles (lowest: 16%, 17%, 19%, highest: 30%, p<0.005). After adjustment for potential confounders, higher serum periostin was associated with higher mortality (HR=1.30 per SD, 95%CI: 1.13–1.50, p<0.001). All-cause mortality was higher in the highest

periostin quartile vs. three lower quartiles jointly (HR=1.79, 95%CI: 1.29–2.48, p<0.001). In the adjusted model, cancer mortality (n=69) increased with periostin levels (HR=1.44 per SD, 95%CI: 1.16–1.79, p<0.001) and was higher in the highest quartile vs. three lower quartiles jointly (HR=2.31, 95%CI: 1.41–3.78, p<0.001). In the multivariable model, cardiovascular mortality (n=55) was higher in the highest quartile vs. three lower quartiles combined: HR=1.93, 95%CI: 1.07–3.48, p<0.05. The mortality for other causes analyzed jointly (n=44) was not associated with periostin levels in the multivariable models (HR=1.22 per SD, 95%CI: 0.91–1.65, p=0.19). After exclusion of 106 men with prevalent neoplasms and 29 men who died during the first 2 years of the follow-up, all-cause and cancer mortality remained higher in the highest periostin quartile vs. three quartiles combined (25 vs. 15%, p<0.005 and 10 vs. 5%, p<0.05, respectively). These trends persisted in the fully adjusted model for all-cause mortality (HR=1.80, 95%CI: 1.21–2.65, p<0.005) and for cancer mortality (HR=2.12, 95%CI: 1.10–4.03, p<0.05).

Conclusion: In older home-dwelling men, high serum periostin levels are associated with higher mortality, mainly cancer mortality, after adjustment for confounders.

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PREVALENCE OF DYSMOBILITY SYNDROME IN COMMUNITY DWELLING ELDERLY IN IRAN: BUSHEHR ELDERLY HEALTH PROGRAMME

N. Moradi¹, A. Ostovar¹, G. Shafiee², F. Sharifi³, N. Mehrdad³, I. Nabipour⁴, R. Heshmat², E. Taheri¹, B. Larijani⁵

¹Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴The Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, ⁵Endocrinology & Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objectives: Various factors contribute to osteoporotic fractures in the elderly. It is an ongoing effort to incorporate these factors into a single measure that facilitates screening the population to identify the individuals at higher risks. “Dysmobility syndrome” (DS) incorporates risk factors such as osteoporosis, sarcopenia, history of falls and obesity into a single measure. We sought to determine the prevalence of DS in the elderly using the data collected through Bushehr Elderly Health programme (BEH) cohort study.

Methods: Out of 2772 elderly aged ≥60 that participated in the second stage of the BEH, a population-based prospective cohort study which is being conducted in Bushehr, Iran, 2188 participant met the criteria for analysis. DS was defined as having 3 or more of the following 6 items based on the criteria proposed by Binkley and colleagues: low appendicular lean mass ratio, low grip strength, slow gait speed, high fat mass ratio, osteoporosis, and falls in the previous year. Body composition was measured using DXA (Discovery WI, Hologic, USA) and grip strength was measured using a digital dynamometer. Speed was calculated using a digital chronometer for a distance of 4.75 m. Data analyses were performed using Stata Statistical Software (Release 13. College Station, TX: StataCorp LP). **Results:** The overall prevalence of DS was 69.8% (95%CI=67.8-71.7%). The frequency of DS was higher among women compared with men, 914 (81.2%) and 613 (57.7%), respectively, (P<0.001). The prevalence of DS was also higher among older age groups (χ² for Trend=84.648, p<0.001). More than 90% of the women older than 75 years old and men older than 80 years old had DS.

Conclusion: DS is prevalent in community dwelling older adults of Iran with a higher prevalence among women and older age groups.

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THE SOCIO-ECONOMIC INEQUALITY OF DYSMOBILITY SYNDROME AMONG COMMUNITY RESIDING ELDERLY IN IRAN: BUSHEHR ELDERLY HEALTH (BEH) PROGRAMME

N. Moradi¹, A. Ostovar¹, G. Shafiee², F. Sharifi³, N. Mehrdad³, I. Nabipour⁴, B. Larijani⁵

¹Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran,

²Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴The Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, ⁵Endocrinology & Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objectives: To measure socio-economic inequality of dysmobility syndrome in the elderly residing in Bushehr, Iran.

Methods: Out of 2772 elderly aged ≥ 60 that participated in the second stage of BEH, a population-based prospective cohort study which is being conducted in Bushehr, Iran, 2188 participants were included in this analysis. Dysmobility syndrome was defined as having 3 or more of the following 6 items based on Binkley et al. criteria: low appendicular lean mass ratio, low grip strength, slow gait speed, high fat mass ratio, osteoporosis, and falls in the previous year. Body composition and grip strength were measured using DXA (Discovery WI, Hologic, USA) and digital dynamometer, respectively. Speed was measured using a digital chronometer for a distance of 4.75 m. Existence of each of twenty household assets was asked from the participants to construct an asset index using principal component analysis method. The association of dysmobility syndrome and quintiles of the asset index was investigated using Pearson's chi-squared test. Multivariable logistic regression analysis was used to evaluate the association of DS and quintiles of asset index adjusted for age and sex. Concentration index was calculated as the indicator of inequality of DS among the participants and was decomposed to its contributing factors using convenient regression method. Data analyses were performed using Stata Statistical Software (Release 13. College Station, TX: StataCorp LP.)

Results: The prevalence of DS was 81.2% (914) and 57.8% (613) among women and men, respectively ($\chi^2=142.4$, $P<0.001$). An inverse association was observed between the quintiles of asset index and the prevalence of DS ($\chi^2=64.3$, $p<0.001$). The adjusted odds ratio of DS for the quintile 1 and 2 of the asset index were 1.54 (95%CI=1.11-2.15) and 1.42 (95%CI=1.04-1.95), respectively, compared with quintile 5. The concentration index was -0.066 (95%CI=-0.081, -0.050). The largest contribution to the measured inequality belonged to age (32%), sex (24%), household socio-economic status (21%), and education level (18%).

Conclusion: These findings suggest existence of socio-economic inequality of dysmobility syndrome among elderly people residing in Bushehr, Iran.

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SEGMENTAL CERVICAL VERTEBRAL CURVATURE AND CLINICAL OUTCOMES FOLLOWING CONSERVATIVE INTERVENTIONS FOR CERVICAL RADICULOPATHY

S. Agarwal¹, T. Allison²

¹Nopany Institute of Healthcare Studies, Kolkata, India, ²Curtin University, Perth, Australia

Objectives:

- To document the radiographic levels of involvement in a cervical spine cohort.
- To document the radiological segmental curvature at baseline and after 3 months in a spondylotic cervical radiculopathy cohort, conservatively managed.
- To determine the association between baseline assessments of radiological measures of cervical spine curvature with pain and disability measurements at baseline, and at a one year follow-up in a cervical radiculopathy cohort treated conservatively.

Methods: A cohort of 109 cervical radiculopathy patients were assessed for segmental radiological curvature measurements using the Posterior Tangent Method at baseline and repeated at 3 months. Pain measured by the 101 Numerical Pain rating Scale for neck and arm pain respectively and disability using the Neck Pain and Disability Scale (English and Hindi) were measured at baseline, 3 months and at a one year follow-up.

Results: The highest prevalence of involvement was at the C5-6 level (69%) followed by C6-7 (16%) and C4-5 (14%). The C6-7 level was mostly a single level involvement (58.7%) and less frequently two levels (9%). At 3 months, the mean radiographic segmental curvature values suggest a trend for increase in curvature values. Nonparametric rank analysis (Wilcoxon) was able to detect statistical difference ($p<0.001$) observed at C2-3 ($z=-5.25$), C3-4 ($z=-4.30$), C4-5 ($z=-5.27$), C6-7 ($z=-3.42$) and C2-7 ($z=-5.53$) but not at C5-6 ($z=-1.50$, $p=0.13$) or the symptomatic levels ($z=-1.66$, $p=0.096$). At baseline, significant correlations (Spearman rank correlation coefficient) existed between baseline curvature total ($r=-0.31$) as well as at the symptomatic level ($r=-0.22$) with baseline arm pain ($p<0.01$). At 12 months, radiological segmental curvature values had significant correlation at some levels with arm pain; r values at C4-5=-0.33, C5-6=-0.23, C6-7=-0.25 and at all levels with disability outcome scores; r values at C2-3=-0.44, C3-4=-0.34, C4-5=-0.33, C5-6=-0.47, C6-7=-0.37, C2-7=-0.59, Symptomatic level=-0.42.

Conclusion: All segmental curvature values were lower in the present study than those reported previously for patients with acute and chronic neck pain. There was a negative correlation between cervical segmental kyphosis and arm pain at baseline and with both arm pain and disability scores at 12 months, signifying an important association between the development of segmental kyphosis and the level of pain and disability.

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REMOVAL OF AN ADRENAL HORMONE ADENOMA IN A PATIENT WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND MULTIPLE AUTOMATIC FRACTURES

G. Spiliotis¹

¹Rheumatological Department of General Hospital Asklepieio Boulas, Ilioupolis, Greece

Systemic lupus erythematosus is a standard autoimmune disease characterized by the production of antibodies against cellular core. The use of corticosteroids is effective in various manifestations of Lupus. We will present a 45 -year -old woman suffering from the disease for five years and received hydroxychloroquine, prednisolone and azathioprine. The patient received bisphosphonates and after three years had an automatic right-sided double fracture of pubic bone. The patient was put up in teriparatide and after one year she showed a 5th metatarsal fracture left. Then she took denosumab and after one year she showed a 6th rib fracture right. Computed tomography of chest and upper abdomen were performed, where it was found an adrenal adenoma. Cortisol levels in the blood and urine, were elevated. After surgery it was found that adenoma produced cortisol. Since then, there was not another automatic fracture.

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ONLINE BOTS COULD HELP IN PREVENTION AND TREATMENT OF OSTEOPOROSIS

V. Krylov¹¹Sechenov University, Moscow, Russia

Introduction: It is too much easier and cheaper to prevent a decrease a bone density and fractures, than in the future to treat osteoporosis and its complications.

Methods: We used an online system for patient education based on the video lessons to convey the necessary information on good nutrition, necessary to do exercises and the need for exposure to the sun. Also we added individual online doctors management.

Results: Watching the short movies, the patients formed the habits of good nutrition during the first month already, which includes a diet with restriction of fat, digestible carbohydrates and daily consumption of low-fat dairy products, slow carbohydrates, protein and fiber. Were also presented recommendations for compliance with the physical activity, as well as vitamin D consumption. Also we added individual online doctors management, which include everyday motivation and chatting with doctors 24 h a day. We examined data from a survey of 520 patients registered in the online system www.rightdiet.ru and 50 patients control group who were given the same recommendations on the appointment and 67 patients with online management. Surprisingly, the consumption of milk and dairy products increased by 2.6 times, compared with patients in the control group and 3.4 in management group. The exposure to the sun was observed 15-30 min daily, compared with the control group 5 min. Regular physical activity were the main group of 260 min per week, in control group 80 min and 380 min in management group.

Conclusions: Very important how we can make delivery of the material. We live in a world of high technologies and lack of time. Often the patient has no opportunity to go to the doctor for an appointment, and during reception it is not always possible to discuss all aspects, and even if it was possible, some information is forgotten by patients. Everyday management group has better results because of increasing motivation and reminders. So, we would like to use online bots for everyday motivation and answer a simply questions to improve the quality and duration of life of more our patients.

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BODY IMAGE, SELF-ESTEEM AND QUALITY OF LIFE IN PATIENTS WITH PRIMARY MALIGNANT BONE TUMORS

L. A. Holzer¹, N. Huyer², J. Friesenbichler², A. Leithner²¹AUVA Trauma Center Klagenfurt and Medical University of Graz, Klagenfurt, ²Medical University of Graz, Graz, Austria

Objective: Patients with primary malignant bone tumors are facing different challenges in their everyday lives due to improved treatment and prolonged survival. This raises the question whether and to what extent their quality of life, body image and self-esteem is affected by their disease. The aim of this retrospective study was to analyze the quality of life, body image and self-esteem of patients with primary malignant bone tumors compared to a healthy control group.

Methods: A total of 56 patients (39 male, 17 female; average age 33.8 [±14.29] years) who were treated with either osteosarcoma or Ewing-Sarcoma at the authors' institution between Jan 1989 and May 2015 were included into the study (mean follow-up: 9.1 [±6.6] years). The control group consisted of 58 (average age 24.4 [±3.1] years, 31 male, 27 female) healthy medical students. Standardized questionnaires were used to assess quality of life

(SF-36), body image (MBSRQ) and self-esteem (RSE-scale). Student t-tests were used for statistical analysis.

Results: Quality of life (SF-36) (in physical categories) and body image (MBSRQ) was significantly lower in patients with primary malignant bone tumors compared to healthy cohort ($p < 0.001$). Self-esteem was not affected in patients and did not show any difference compared to control group (23.96 vs. 24.00).

Conclusion: Physical categories of quality of life and body image sensation of patients with primary malignant bone tumors are worse compared healthy controls. However, self-esteem does not seem to be affected by the condition and its management.

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ADVANCED PRACTICE PHYSIOTHERAPY SERVICES: QUALITATIVE STUDY OF PATIENT EXPERIENCES

O. Fennelly¹, C. Blake², O. Fitz Gerald³, R. Breen⁴, A. Caffrey⁵, K. Smart⁶, L. Fletcher⁶, S. Corcoran⁶, S. Casserly Feeney⁷, E. Ni Shé⁸, C. Cunningham¹

¹School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin, ²School of Public Health, Physiotherapy and Sports Science, University College Dublin, ³Department of Rheumatology, St. Vincents' University Hospital, Dublin, ⁴Health Service Executive, Dublin, Ireland, ⁵Bone and Joint Clinic, St. Vincent's University Hospital, Dublin, ⁶Physiotherapy Department, University Hospital Waterford, Waterford, ⁷Royal College of Physicians, Dublin, ⁸School of Nursing, Midwifery and Health Systems, University College Dublin, Dublin, Ireland

Objective: Advanced practice physiotherapists (APPs) triage the care of patients with musculoskeletal (MSK) disorders to reduce wait times for specialist MSK services in a cost-effective manner. This study aimed to explore patient experiences of APP services.

Methods: Participants (n=9) attended specialist MSK services at one rural and one urban University Hospital in Ireland. Semistructured interviews utilised a topic guide informed by existing literature and stakeholder consultation. Interview data were transcribed verbatim and analysed utilising a thematic analysis by two independent reviewers¹.

Results: Participants had a mean age of 61±15.2 and six were female. They presented with MSK disorders of the knee (n=3), hand (n=2), low back (n=2) and hip (n=2).

Patient experience: Patients reported largely positive experiences with APP services and all expressed being content seeing a physiotherapist. Confidence in specialist services: Clinician profession did not matter to patients, as long as they were in the 'specialist' service. APPs were reportedly 'knowledgeable', 'confident' and 'professional', allowing patients to trust their clinical decision. *"They're really a door way to a doctor if you need it and they will know whether you need it or not"*. Rule out a serious pathology: As well as gaining new information and options, patients reported the most important outcome was being reassured. *"She told me there was nothing seriously wrong which is good like there's nothing am that needs operation - I did not know that before"*. Access to MSK services: Some patients reported surprise at their wait time for a specialist MSK appointment. *"It may have been a couple of months, but I thought it would be almost a year"*. They see this as one of the advantages of APP services as they are *"not waiting whatever long to see a consultant directly"*.

Conclusion: Patients perceived the MSK APP pathway as beneficial due to shorter wait times, access to specialist opinions and receiving information on their condition. This supports the introduction of APPs in specialist MSK services, with reduced burden on consultant doctors and satisfied patients.

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EARLY PERIPROSTHETIC FRACTURES IMPACT EMOTIONAL BUT NOT FUNCTIONAL OUTCOMES AFTER PRIMARY TOTAL KNEE ARTHROPLASTYS. R. Saifuddin¹, J. B. T. Lim², J. S. B. Koh², T. S. Howe², S. J. Yeo², A. K. Mitra², N. N. Lo²¹St. George's University of London, London, UK, ²Department of Orthopaedic Surgery Singapore General Hospital, Singapore

Objective: Little is known about the absolute impact of postoperative periprosthetic fractures (PPFs) alone on post total knee arthroplasty (TKA) outcomes, as many past studies do not adjust for confounding comorbidities. We hypothesize that early PPFs have no significant effect on 2-year outcomes. Our study aims to evaluate the effect of early PPFs on outcomes 2 years post-TKA.

Methods: We reviewed prospectively collected data on all TKA patients recorded in a tertiary hospital TKA registry. 19 patients who had sustained early PPFs (defined as those occurring within a year post-TKA) were identified and matched for gender, age, BMI, Charlson Comorbidity Index, surgeon and, pre-operative patient reported outcome measures (PROMs) to a control group of 38 patients. Pre-operative and postoperative SF-36 Scores, Oxford Knee Scores and Knee Society Scores were evaluated for both study and control groups. Improvements of 2-year postoperative PROMs over the baseline were analysed between PPFs and controls using a t-test. As a subanalysis, we compared the frequency of femoral notching in both the study and control group using a chi-squared test.

Results: We found no significant difference in 2-year outcomes of physical function, pain and, general, physical, social and mental health between patients who experienced early PPFs and those who did not. However, early PPFs were associated with lower emotional role functioning, with early PPF patients being more likely to report negative feelings of anxiety and depression ($p=0.013$). As our sub-finding, we also observed a significant association between notching and early PPFs with 66.7% of our study group having femoral notching compared to 10.5% in our control group ($p<0.01$). Majority of early PPFs occurred within 3 months post-surgery.

Conclusion: Although early PPFs have no discernible impact on physical and social outcomes of TKAs 2 years postoperatively, there is a significant negative impact on the patient's emotional health. Rehabilitative measures in managing a patient's emotional wellbeing after experiencing early PPFs postoperatively should be improved. Additionally, as most early PPFs occur within the first three months post-TKA, activity modification and fall precautions should be reinforced during this period.

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THE EFFECT OF KNEE ORTHOSES ON GAIT PARAMETERS IN MEDIAL KNEE COMPARTMENT OSTEOARTHRITIS: A LITERATURE REVIEWM. Maleki¹, M. Arazpour¹, M. Ahmadi Bani¹¹University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Objectives: To review the previous research regarding the biomechanical effects of knee valgus braces on walking in medial compartment knee osteoarthritis patients.

Methods: According to the population intervention comparison outcome measure methods and based on selected keywords, 12 studies were chosen according to (met) the inclusion criteria.

Results: The results indicated that treatment with knee braces was effective in decreasing pain, improving function, ameliorating improvement in range of motion, and increasing speed of walking and step length in conjunction with a reduction in the adduction moment applied to the knee.

Conclusion: Osteoarthritis knee braces may be considered for improvement of walking and treatment of medial compartment knee osteoarthritis.

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HOW TO ASSESS COMORBIDITY OF THE PATIENTS SUFFERING FROM HIP FRACTURE ASSOCIATED WITH OSTEOPOROSIS AND SUBSEQUENT HIP REPLACEMENTI. Golovach¹, I. Zazirnyi², I. Semeniv²¹Feofania Clinical Hospital, Rheumatology Department, ²Feofania Clinical Hospital, Orthopaedic Department, Kyiv, Ukraine

Objective: Devoted to the establishment of comorbidity of patients with an osteoporotic hip fracture who subsequently underwent hip replacement.

Methods: Retrospective analysis was applied to the research of 60 cases of osteoporotic hip fractures; the patients' average age was 77.9 ± 9.2 years. The presence of osteoporosis, the mechanism of injury, the history of fractures, and related diseases were evaluated. Fragility fractures were confirmed by DXA. Out 37 patients participating in the research 32 were diagnosed with osteoporosis, other 5 patients were with III degree osteopenic syndrome. The study of comorbidity in patients with femoral neck fractures was conducted to determine the effects of concomitant diseases on the onset and progression of osteoporosis, participation in the injury, and the choice of treatment method - unipolar bipolar or total hip joint endoprosthesis.

Results: At the time of hospitalization, only 19 patients received antiosteoporotic therapy; all patients took calcium supplements in combination with vitamin D, but this treatment was mainly of courseal character; 14 patients - bisphosphonates (alendronate and zoledronate); and 5 patients - strontium ranelate. All patients had a high comorbidity index: the Charleston' comorbidity index was 8.66 ± 1.92 points, CIRS comorbidity index 12.4 ± 4.8 points. The disturbances of cardiovascular system accounted for the largest share of comorbidity structure, first of all coronary heart disease, arterial hypertension, heart rhythm disturbance, leading to congestive heart failure, and vascular disease of the central nervous system as well. The older were the patients, the higher was comorbidity indexes accompanied by worse concomitant diseases and increased risk of complications. Severity of comorbidity and comorbidity index values significantly influenced the choice of surgical treatment for hip fracture.

Conclusion: Femoral neck fractures in older persons remain one of the most common and complicated for the treatment of skeletal damage. Patients over the age of 50 with a trauma of the proximal femur have high comorbidity, primarily cardiovascular disease, and over the age of 80 are significant cognitive impairments. With age, comorbidity indices increase, and the course of accompanying diseases worsens, and the risk of complications increases. The significance of concomitant pathology and the magnitude of the comorbidity indices significantly influenced the choice of the method of surgical treatment for the fracture of the femoral neck.

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EFFECT OF METHYLPREDNISOLONE PULSE THERAPY ON BIOCHEMICAL MARKERS OF BONE TURNOVER: DIRECT AND REMOTE DATAI. Golovach¹, D. Vershynina², E. Lazorenko¹, T. Chipko¹¹Feofania Clinical Hospital, Rheumatology Department, Kyiv, ²National Medical University, Radiology Department, Ivano-Frankivsk, Ukraine

Objective: To study the effect of high dose 6-methylprednisolone pulse therapy (MPPT) on seric bone alkaline phosphatase (sBAP), urinary

deoxypyridinoline (uDpyr), bone Gla-protein (BGP), urinary CrossLaps and 25OH vitamin D level in patients with systemic connective tissue diseases and systemic vasculitis.

Methods: During 2006–2016, we observed 67 patients with systemic connective tissue diseases and systemic vasculitis who underwent high-dose therapy with methylprednisolone (pulse therapy). Among them were 32 patients with systemic lupus erythematosus, 16 with dermatomyositis, 11 with granulomatosis with polyangiitis, 2 with eosinophilic granulomatosis with polyangiitis, 3 with nodular polyangiitis, and 4 with mixed connective tissue diseases. There were 21 men and 46 women. The average age of the patients was 44.8 ± 8.7 years. Patients received pulse therapy with methylprednisolone intravenously at a dose of 1000 mg for three consecutive days. Biochemical markers of bone metabolism evaluation were performed after the initiation of the high-dose therapy, namely 3 d and 28 d after the MPPT.

Results: We observed a significant increase in the bone resorption markers 3 d after the MPPT. Thus, there was a 3.1 times increase in the level of sBAP and 1.7 times increase in the level of uDpyr. At the same time, the level of BGP decreased by half and the level of urinary CrossLaps decreased by 3.5 times. The concentration of 25OH vitamin D did not change. Bone resorption markers returned to normal after 28 d and bone formation markers continued to show low rates. High-dose glucocorticoid therapy did not affect the 25OH vitamin D concentration. Fluctuations of biochemical markers of bone turnover with the use of MPPT were episodic and restored by the 28th day.

Conclusion: These data suggest that high doses of glucocorticoids administered for a short period are able to induce an increase of bone resorption and a decrease of bone formation; moreover, bone turnover returns to basal levels when the treatment is stopped.

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ASSESSING THE QUALITY OF LIFE IN PATIENTS WITH OSTEOPOROSIS FOLLOWING ISOKINETIC TRAINING

I. L. Irsay¹, C. V. Ciortea¹, U. R. Ungur¹, B. M. Borda¹

¹University of Medicine and Pharmacy, Cluj-Napoca, Romania

Objective: Osteoporosis influences the quality of life in all its aspects: chronic pain, decreased physical functioning, mental isolation, diminishing access to certain facilities, lowering the income and more. One of the most effective ways of decreasing complications of osteoporosis and therefore improving the quality of life is exercise therapy. The main hypothesis in this study was that using isokinetic training techniques can improve the quality of life in patients with osteoporosis.

Methods: We included 30 patients with primary osteoporosis in the study. The study was conducted on 10 days of treatment with the tests being performed on day 1 and day 10. Isokinetic training was fixed, daily, for 10 d, bilaterally, including repetitions of flexion and extension of the knee at 150, 180, 240 grd/s, each of 10 repetitions with 20-s pauses. Patients were evaluated in day 1 and 10 of treatment. For the quality of life assessment we used the QUALEFFO-41 questionnaire.

Results: Wilcoxon test was used for dependent samples (pairs) for repeated measurements of the same categorical variable. The threshold for the tests was taken $\alpha=0.05$. Analysis of results on each item may indicate that we had significant changes before and after treatment on all items. The most significant changes were recorded for Item A Pain, and the least modified were Questions in Item D related to Mobility, and E, Leisure, Social Activities. Overall analysis of the QUALEFFO-41 questionnaire after treatment shows a significant change ($p<0.001$).

Conclusion: Isokinetic training can be used to improve the quality of life in patients with osteoporosis.

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EFFECT OF MINERAL BONE DENSITY AND OSTEOPOROTIC FRACTURE ON PHYSICAL FUNCTIONING IN POSTMENOPAUSAL WOMEN

K. Filipovic¹, M. Stanic², J. Zvekc-Svorcan¹, N. Nenadov³, M. Vuksanovic⁴, S. Subin-Teodosijevic⁵

¹University of Novi Sad, Faculty of Medicine Novi Sad, Special Hospital for Rheumatic Diseases Novi Sad, Novi Sad, ²University of Novi Sad, Faculty of Medicine, Novi Sad, ³University of Novi Sad, Faculty of Medicine Novi Sad, Home "Veternik", Veternik, ⁴University of Belgrade, Faculty of Medicine Belgrade, "Zvezdara" University Medical Center, Endocrinology, Diabetes and Metabolic Disorders, Belgrade, ⁵General Hospital "Djordje Joanovic", Zrenjanin, Serbia

Objective: To observe effect of BMD and low-trauma fractures on physical functioning in postmenopausal women.

Methods: Prospective cross-section study encompassed 190 postmenopausal women aged 50 or more, being referred to special hospital for rheumatic diseases in Novi Sad for DXA. Study was approved by the ethical board of Special hospital for rheumatic diseases in Novi Sad, and all subjects had signed the informed consent form. All subjects had the DXA scan done at the L spine, the hip, and the femoral neck; values were obtained as absolute numbers (g/cm²) and as T-score. All subjects were asked whether they had previous low-trauma fractures and were given a questionnaire to fill regarding their life quality (QUALEFFO-41, validated for Serbian population). Effects of BMD and presence of low-trauma fracture were observed regarding level of physical functioning. Statistical processing and data analysis were done using SPSS v.20 software.

Results: Average age of subjects was 67.30 ± 7.651 years, average age at the menopausal onset was 47.9 years and 46.31% subjects had previous low-trauma fractures. There is a statistically significant negative correlation between physical functioning and T-score of the femoral neck ($r=-0.683$, $p<0.001$), T-score at the hip ($r=-0.526$, $p<0.001$), and T-score of the spine ($r=-0.177$, $p<0.05$). Statistically significant difference also exists ($t=3.11$, $p<0.05$) between subjects with and without bone fractures, having in mind the level of physical functioning. Group with fractures has lower level of physical functioning (30.5 vs. 25.2). There is no statistically significant correlation between the physical functioning and the number of vertebral fractures ($r=0.471$, $p>0.05$), or nonvertebral ones ($r=0.143$, $p>0.05$).

Conclusion: Poorer life quality due to physical functioning is proven for patients with lower BMD and those with low-trauma fractures, regardless of number of fractures. Other parameters of life quality should also be observed, and most of all osteoporosis must be timely diagnosed and treated in order to prevent repercussions in quality of life.

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INFLUENCE OF BMD AND OSTEOPOROTIC FRACTURES ON THE QUALITY OF SOCIAL AND MENTAL FUNCTIONING IN POSTMENOPAUSAL WOMEN

J. Zvekc-Svorcan¹, M. Miklos², K. Filipovic¹, T. Jankovic¹, J. Aleksic³, R. Krasnik⁴, S. Subin-Teodosijevic⁵

¹University of Novi Sad, Faculty of Medicine Novi Sad, Special Hospital for Rheumatic Diseases Novi Sad, Novi Sad, ²University of Novi Sad, Faculty of Medicine Novi Sad, Novi Sad, ³Center for Preventing and Treating Osteoporosis, Railway Healthcare Institute, Belgrade, ⁴University of Novi Sad, Faculty of Medicine Novi Sad, Institute of Child and Youth Health Care of Vojvodina, Novi Sad, ⁵General Hospital "Djordje Joanovic", Zrenjanin, Serbia

Objective: To examine BMD and small trauma fractures in relation to the quality of social and mental functioning of postmenopausal women.

Methods: This prospective cross-sectional study involved 210 postmenopausal women aged ≥ 50 years, who were referred for DXA scan in the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia, between February 24 and April 3, 2017. BMI was measured in all patients, and was expressed in both absolute values (g/cm^2) and in terms of T-score. In addition, all participants completed the informed consent and the quality of life questionnaire QUALEFFO-41 Serbian version. Analyses included social (7 items) and mental (9 items) functioning, along with their relationship with the T-score and experienced fractures. The study was approved by the Ethics Committee of the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia. Pearson correlation coefficient and t-test were also employed, while instrument reliability was assessed via Cronbach's α coefficient.

Results: The average age of the sample was 67.01 ± 7.49 years, while 41.9% of the participants reported prior small trauma fractures. Statistically significant negative correlation was noted between social functioning and the T-scores pertaining to the femur neck ($r = -0.438$; $p < 0.001$), hip ($r = -0.412$; $p < 0.001$) and spine ($r = -0.226$; $p < 0.001$), as well as between mental functioning and the T-scores for the femur neck ($r = -0.424$; $p < 0.001$), hip ($r = -0.454$; $p < 0.001$) and spine ($r = -0.319$; $p < 0.001$). In addition, statistically significant differences were noted between subsamples formed based on presence/absence of small trauma fracture when it comes to social functioning ($t = 2.17$; $p < 0.05$). The mean values pertaining to these two groups indicate that small trauma fractures reduce quality of life (49.6 vs. 44.3), while having no effect on mental functioning ($t = 0.92$; $p > 0.05$).

Conclusion: Postmenopausal women with lower bone density have reduced quality of life in terms of social and mental functioning, while social functioning is compromised in those with history of small trauma fractures.

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VALUE OF FOREARM BMD IN SCREENING OSTEOPOROSIS IN FEMALE PATIENTS WITH RHEUMATOID ARTHRITIS

W. Yu¹, Z. Zhuoli¹

¹First hospital of Peking University, Beijing, China

Objective: To compare the forearm BMD between lumbar spine and left hip BMD by DXA and explore the diagnostic value of the forearm BMD in rheumatoid arthritis (RA) patients.

Methods: In the study, 200 postmenopausal female patients with established RA underwent DXA of the lumbar, left hip and nonsuperiority forearm DXA at the same time. We compared BMD at different sites, and the diagnostic cutoff value and risk factors of abnormal axial BMD by forearm BMD was explored. Sensitivity and specificity were calculated to determine the correlation between cases of osteoporosis detected by the axial DXA scan and forearm. Multiple linear regression was used to find the risk factors of forearm BMD.

Results: (1) The mean age of the 200 postmenopausal female patients was 55.9 ± 13.8 years. Based on their axial DXA data and fracture history, 170 (85.0%) patients had abnormal BMD (T-score < -1.0). (2) Compared with abnormal axial BMD group, forearm BMD in normal axial group was significantly decreased [$0.33 \pm 0.13 \text{ g}/\text{cm}^2$ vs. $0.44 \pm 0.06 \text{ g}/\text{cm}^2$, $t = 4.29$, $P < 0.01$]. (3) Forearm BMD was significantly lower in patients whose disease duration was > 1 year and positive anti-CCP antibody group. (4) Forearm BMD was positively correlated with axial BMD, both at lumbar and left hip, respectively. (5) The sensitivity and specificity for identifying osteoporosis in lumbar were 70.2% and 77.4%, respectively, when the T-score threshold of forearm was defined as -2.65 ; however, the sensitivity and the specificity for identifying osteoporosis at left hip were 74.1% and 70.6% when T-score threshold of forearm was defined as -2.5 . (6) Multiple regression analysis showed that higher age, long disease duration and positive anti-CCP antibody are risk factors of forearm BMD in RA patients.

Conclusion: Our study has confirmed that DXA measurement performed of forearm BMD is capable of screening osteoporosis defined by axial BMD in female RA patients. Forearm BMD is lower in patients who had higher age, longer disease duration and positive anti-CCP antibody.

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EARLY OSTEOARTHRITIS: HOW TO DEFINE, DIAGNOSE, AND MANAGE – A SYSTEMATIC REVIEW

A. De Sire¹, F. Gimigliano², A. Moretti³, A. Migliore⁴, M. L. Brandi⁵, P. Piscitelli⁶, G. Iolascon³

¹Department of Medical and Surgical Specialties and Dentistry, University of Campania "Luigi Vanvitelli", Naples, ²Department of Mental and Physical Health and Preventive Medicine, University of Campania "Luigi Vanvitelli", Naples, ³Department of Medical and Surgical Specialties and Dentistry, University of Campania "Luigi Vanvitelli", Naples, ⁴Fatebenefratelli St. Peter's Hospital, Rome, ⁵Department of Surgery and Translational Medicine, University of Florence, Florence, ⁶Southern Italy Hospital Institute, IOS/Coleman Ltd, Naples, Italy

Objective: Osteoarthritis (OA) is the major cause of joint pain and impaired mobility resulting in a marked reduction of quality of life (QoL) [1]. It would be of crucial importance to have a clear definition of early OA (EOA) in order to adopt proper preventive measures that might result in better long-term quality of life of affected patients and reduce or delay the need of joint replacement interventions, with the related implications in terms of economic impact on healthcare services. Aim of this systematic review (SR) was to define the "state of the art" on definition, diagnosis, and management of EOA.

Methods: We carried out an updated systematic review on both PubMed and Embase databases searching for all the studies and researches published in literature – up to 31 December 2015 – which were addressing the issues of EOA definition, diagnosis, and management. The systematic review has been carried out following the 5 steps summarized by Khan and colleagues in 2003 [2].

Results: Our SR found 211 and 447 (published from 1973–2015) articles, when searching on PubMed and Embase database, respectively. Among the 132 papers that met our inclusion criteria, only 1 article explicitly addressed the issue of EOA definition [3], but it was only an expert opinion, while all the other researches were focused on diagnosis or management of EOA.

EOA has been defined with regards to the younger age of osteoarthritis onset and radiological damage (grade I-II of the Kellgren-Lawrence classification).

Conclusion: Until now, EOA has been defined with regards to the age of the patient and the precocity of radiologically measureable damages. A more clear classification of EOA (especially hip and knee EOA), based on characteristics and symptoms of affected patients, should be delivered by scientific community in order to better identify subjects who might benefit from innovative therapeutic approaches.

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P257

QUALITY OF LIFE AND TOTAL KNEE ARTHROPLASTY: GOOD PRE-OPERATIVE SF-36 PHYSICAL SCORES ARE CORRELATED WITH POORER ABSOLUTE IMPROVEMENTS IN SCORES BUT HIGHER SATISFACTION AFTER SURGERY

B. Teo¹, A. K. Mitra¹, M. A. Png², N. N. Lo¹, B. Lee³, J. Koh¹, S. J. Yeo¹, K. C. Tan⁴, T. S. Howe¹

¹Department of Orthopaedic Surgery, Singapore General Hospital, ²Department of Diagnostic Radiology, Singapore General Hospital, ³Orthopaedic Associates, Mount Elizabeth Medical Centre, ⁴Dept of Plastic, Reconstructive & Aesthetic Surgery, Singapore General Hospital, Singapore

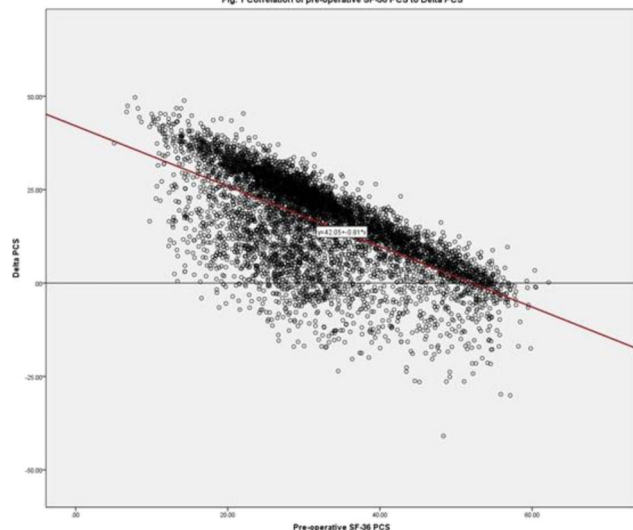
Objective: A recent publication¹ challenged the cost-effectiveness of total knee arthroplasty (TKA) in patients with less severe symptoms. We correlated the preoperative disability (measured by SF-36 physical component summary (PCS) to its delta score (2-year endpoint minus baseline score)) and patient satisfaction after TKA.

Methods: Prospectively collected registry data for 6881 patients undergoing unilateral TKA in a tertiary institution from Jan 2010 to Dec 2014 were reviewed. SF-36 PCS was compiled from the domain scores taken preoperatively and at 2-year follow-up. Patient satisfaction was scored using a 6-level Likert scale. A preoperative PCS cutoff was determined using a receiver operating characteristic curve (ROC) to predict for no improvement after surgery (defined as not meeting the minimal clinically important difference of 10).

Results: The patients were aged 67.0 ± 7.7 years, predominantly female (76.5%), of Chinese ethnicity (94.3%), with BMI of 27.7 ± 4.6 kg/m². At 2-year follow-up, the mean SF-36 PCS improved from 32.2 ± 10.1 to 48.2 ± 9.5 ($p < 0.001$). Preoperative SF-36 PCS correlated negatively with the delta PCS (Spearman coefficient = -0.66; $p < 0.001$) (Fig. 1). The preoperative SF-36 PCS cutoff value was determined to be 42.1 at maximal Youden index associated with area under the ROC curve of 0.79 (95%CI 0.78-0.80) with a positive predictive value of 84.8% and a negative predictive value of 80.3%. Despite having significantly lower improvement (delta PCS) ($p < 0.001$), patients with preoperative SF-36 PCS ≥ 42.1 had significantly higher 2-year SF-36 PCS ($p < 0.001$) and higher satisfaction ($p = 0.01$).

Conclusions: Higher preoperative physical scores portend lower potential for improvement after TKA. However, overall satisfaction correlates more with absolute scores than interval improvements. Functional assessment, pre-operative counselling and modification of expectations are vital before TKA surgery.

Fig. 1 Correlation of pre-operative SF-36 PCS to Delta PCS



Reference: 1. Ferket BS et al. BMJ 2017;356:j1131

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BONE STATUS OF PATIENTS TREATED WITH ANTI-AROMATASE IN ALGERIA: RESULT OF FOLLOW-UP AT 1 YEAR

M. Djennane¹, N. Debiene¹, S. Sakhr¹, C. Sedkaoui¹

¹Department of Medicine, Tizi ouzou, Algeria

Objective: Breast cancer is the most common cancer in women leading to significant morbidity and mortality. It is the first cancer in Algeria and the

leading cause of death in women. Hormonal treatments have contributed to the prolongation of life expectancy in hormone receptor-positive patients. Recent studies have reported a higher incidence of hospitalizations of women with breast cancer for any type of fracture compared to the general population. This risk is even higher when the patient is on antiaromatases.

Methods: It is a prospective, longitudinal, descriptive study whose main objective is to describe the initial bone status and after one year of follow-up in patients starting an anti-aromatase.

Clinical, biological, radiological and densitometric evaluations were performed in all patients. The initial assessment involved 292 patients and 250 patients were reassessed at 1 year.

Results: The average age of the patients is 56.8 ± 7.3 years. In the initial evaluation, 21.6% of patients had a T-score < -2 in the lumbar spine and 9.5% of patients had a T-score < -2 in the femoral neck. 6 patients have at least one vertebral fracture. Univariate analysis has shown that the risk of vertebral fracture is associated with lumbar (RR=1.33 95%CI 0.23-2.45) and femoral neck (RR=2.39 95%CI 1.46-3.27). The average vitamin D level: 15.2 ± 3.5 ng/l (6-29). At one year, patients without osteoporosis had a bone loss of about 1.5% at the spine and 1.2% at the femoral neck. Four patients presented with new vertebral fractures. In treated osteoporotic patients, BMD remained stable (0.3% loss). Half of the patients still have vitamin D insufficiency. Two patients presented with a new vertebral fracture.

Conclusion: The risk of fracture should be assessed in any person receiving anti-aromatase therapy. Screening, prevention and treatment of iatrogenic complications of these treatments should not be neglected in the long-term management of these patients.

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ROLE OF TRABECULAR BONE SCORE IN PREDICTING FRACTURE RISK IN OSTEOPENIC WOMEN: CASE-CONTROL SURVEY

M. Djennane¹, G. Chabane², F. Bouzar², A. Tibiche¹, G. Chabane²

¹Department of Medicine, ²University Hospital Center, Tizi ouzou, Algeria

Objective: Osteoporosis (OP) poses a major public health problem in the world. It is characterized by low bone mass associated with alterations in bone microarchitecture that increases bone fragility and increased risk. The trabecular bone score (TBS) is a bone texture index derived from a bone densitometry image (BMD) of the lumbar spine. It is correlated with parameters of microbone architecture and gives information complementary to BMD. Clinical studies show that GER is lower in postmenopausal women with a fracture compared to those without fracture, and this regardless of the BMD results and the main risk factors clinics.

Methods: This is a retrospective case-control study conducted at the unit level of bone osteodensitometry in the University Hospital center of Tizi-ouzou (Algeria) concerned menopausal women between 50-80 years old. The patients are all osteopenic ($-2.5 \leq \text{T-score} \leq -1.0$) at the level of the lumbar spine. Patients were classified according to the presence or absence of vertebral fracture (VF) and age. For each patient with VF (case), cases-controls were adapted according to age. Eligible cases should have a low energy VF confirmed by standard radiography. The exclusion criteria were the presence of a disease or drug intake that could interfere with bone metabolism, patients with lumbar spinal pathology of inflammatory or degenerative origin or with a history of surgery at the lumbar spine. For each patient, the following clinical parameters were noted: age, weight, height, BMI and X-ray calculation: standard radiographic VF scan, lumbar BMD, and TBS in the same region used for BMD using TBS iNsight V 1.0 (Med-imaps). All patients who consented to the study.

Results: Of the 174 women recruited, 62 patients with VF (cases) and 122 without VF (controls). There was no difference between cases and controls compared at age (65.5 vs. 64.3 years, $p = 0.26$). Women with VF had

a higher BMI higher than those without VF (25.9 vs. 23.8, $p < 0.001$). BMD as well as TBS were lowest in the group with VF (-1.89 vs. -1.62, $p = 0.001$) and (0.87 vs. 1.20, $p < 0.001$). Comparing TBS and BMD, it appears that each decrease of a standard deviation (DS) in the BMD was associated with an odds ratio (OR=1.78, 1.13-2.23) of fracture vertebral area and area under the AUC curve=0.54 (0.46-0.64). With each decrease of a DS of the TBS was associated with a OR=2.42; 1.64-3.73) of VF with AUC=0.82 (0.76-0.87). The difference between TBS and BMD AUCs was statistically significant ($P < 0.001$). Comparing the TBS plus the BMD vs. the BMD alone according to a logistic regression model, it appears that the AUC of the TBS + BMD=0.69 (0.61-0.77) vs. the AUC of the BMD alone (AUC=0.54 (0.46-0.64) with OR=2.72 (1.85-3.59). A determination of the diagnostic cutoff value of TBS by the Youden index corresponding to the value of the TBS with the best sensitivity (82.1%) and specificity (71%), it is 0.531 and the threshold value of the corresponding TBS is 1.138.

Conclusion: The results obtained do not make it possible to make the direct link between a low TBS and the fracture risk nevertheless, the TBS is a practical clinical tool not insignificant in determining this risk in postmenopausal osteopenic women.

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THE EFFECT OF MONTHLY ORAL IBANDRONATE (IBN) ON BMD GAINS IN THE MOVEST STUDY: ADDITIONAL TREAT-TO-TARGET ANALYSIS

M. Ito¹, H. Hagino², Y. Asao³, J. Hashimoto³, K. Katsumata³, K. Endo³, M. Yamamoto³, R. Matsumoto⁴, T. Nakamura⁵

¹Center for Diversity and Inclusion, Nagasaki University, Nagasaki, ²School of Health Science & Rehabilitation Division, Tottori University Faculty of Medicine, Tottori, ³Chugai Pharmaceutical Co. Ltd., Tokyo, ⁴Taisho Pharmaceutical Co. Ltd., Tokyo, ⁵Touto Sangenjaya Rehabilitation Hospital, Tokyo, Japan

Objective: We previously reported the efficacy of monthly oral IBN 100mg in the randomized double-blind MOVEST study vs. monthly IV IBN 1mg. This post hoc analysis presents data on BMD gains with respect to achieving the BMD T-score target.

Methods: Ambulatory Japanese patients (pts) aged ≥ 55 years with primary osteoporosis were randomized to receive monthly oral IBN 100mg + monthly IV placebo, or monthly IV IBN 1mg + monthly oral placebo. The primary endpoint was noninferiority of oral vs. IV IBN with respect to BMD gains at the lumbar spine (LS) after 12 months. In the per protocol set, changes in the proportion of pts with LS, total hip (TH), and femoral neck BMD T-scores in four categories (≤ -3.0 , > -3.0 and ≤ -2.5 , > -2.5 and ≤ -2.0 , and > -2.0) were examined at baseline (BL), 4, 6, and 12 months.

Results: The proportion of pts with LS BMD T-score at BL was 59.6%, 25.1%, 11.5%, and 3.8% with oral IBN, and 59.8%, 26.5%, 10.1%, and 3.7% with IV IBN, respectively. Values at 12 months were 35.0%, 37.9%, 18.6%, and 8.5% for oral IBN, and 39.8%, 33.9%, 18.8%, and 7.5% for IV IBN. The proportion of pts with LS BMD T-score > -2.5 increased by 11.8% and 12.5% in the oral and IV groups, respectively. Findings were consistent at the proximal femur: the proportion of pts with TH BMD T-score at BL was 23.2%, 22.1%, 24.9%, and 29.8% with oral IBN, and 27.0%, 25.9%, 17.5%, and 29.6% with IV IBN. Values at 12 months were 19.4%, 18.3%, 24.0%, and 38.3% for oral IBN, and 22.0%, 20.4%, 22.0%, and 35.5% for IV IBN. The proportion of pts with TH BMD T-score > -2.5 increased by 7.6% and 10.4% with oral and IV IBN, respectively.

Conclusions: Both oral and IV IBN increased the proportion of pts with BMD T-score > -2.5 at the LS and proximal femur. The proportion of pts achieving this score increased with treatment duration. These data suggest that treatment adherence is important for effective management of osteoporosis and that oral and IV IBN produce early BMD gains.

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ACUTE SPINAL CORD INJURY FOLLOWING CEMENT LEAKAGE FROM RUPTURED BALLOON OF VESSELPLASTY

S. W. Wu¹

¹Taipei Veterans General Hospital, Taipei, Taiwan

Vesselplasty is a novel technique for treatment of vertebral osteoporotic compression fractures. It characterizes a PET balloon which acts as a not only a expander but also a bone cement container. Although there were reports about balloon rupture during coronary angioplasty or kyphoplasty, no reports regarding balloon rupture during Vesselplasty was found. We report a case suffered from balloon rupture during Vesselplasty complicated with neurological compromise. Vesselplasty was first performed in 2004 by Darwono. It uses a polyethylene terephthalate (PET) balloon container (Vessel-X, A-Spine Holding Group Corporation) to restore the height of the vertebral body. [1] The balloon acts as both a vertebral body expander and a bone cement container. Because of the porous structure, it also allows cement interdigitation into cancellous bone to increase the stability. Theoretically, this technique would prevent cement leakage that might cause neural compression or venous embolism. There was no searchable reports on PubMed regarding neurological complications caused by cement leakage with the use of Vesselplasty. We report a case with T6 compression fracture who received Vesselplasty treatment suffered from cement leakage and paraplegia.

Case report: A 77-year-old female presented herself with middle back pain since a fall one month ago. The pain was aggravated by standing and walking, and relieved by rest. Physical examination showed middle back knocking pain. There was no neurological deficit. Plain X-rays showed T6 and T11 compression fracture. MRI study was arranged which showed T6 vertebral body recent compression fracture and T11 vertebral body old compression fracture without spinal canal compromise. BMD study over lumbar spine showed T-score -2.02, which indicated osteopenia. We arranged admission for her for Vesselplasty treatment. Vesselplasty was performed through bilateral pedicle tracts. However, cement leakage after balloon rupture was found intra-operatively. Fluoroscopy was checked and spinal canal compromise was found. Emergent open laminectomy was performed. A cement block was removed. Fluoroscopy was checked again and no visible cement in the spinal canal was noticed. However, paraplegia was found postoperatively. Megadose steroid was prescribed. Rehabilitation was conducted and physical therapy was initiated. Paralytic ileus with abdominal pain, nausea, poor appetite was also found.

Discussion: There are many reports of balloon ruptures during cardiovascular procedures. Intraaortic balloon (IAB) ruptures was reported with the incidence of 2.4% (382 insertions over 75 months).[2-4] However, there were no complications as a consequence of IAB rupture. [2] Jahollari reported a case of IAB rupture and entrapment in the right femoral artery which was solved by surgical extraction under local anesthesia. [5] Schrader, R reported a case of rupture and fragmentation of a PET-balloon catheter during percutaneous transluminal coronary angioplasty of a calcified LAD-obstruction. The balloon ruptured when the insufflation pressure increased to 12atm.[6] Emergent operation for fragments removal was done to prevent a large myocardial infarction. [6-8] Rothschild, R also reported 3 cases of coronary angioplasty balloon rupture complicated by coronary artery dissection. [9] Kussmaul, W G 3rd demonstrated a circumferential tear of a ruptured angioplasty balloon. The fluoroscopic appearance of impending balloon rupture is also demonstrated. [10] It is also reported that liquid embolic materials such as lipiodol or a 33% NBCA-Lipiodol mixture should not be performed with 3 kinds of balloon catheter owing to the likelihood of causing rupture of the

balloons.[11] In kyphoplasty, there was also some reports about balloon ruptures during the procedure. Balloon rupture was observed during 5 vertebrae among 137 kyphoplasties. [12] 1 balloon rupture was found in 22 kyphoplasty using in multiple myeloma patients with spinal compression fractures. [13, 14] Despite of the ruptured balloons during kyphoplasty, ruptured balloons were easily withdrawn without clinical consequences. [15–17] Despite of the many reports mentioned above, there were few reports describing balloon ruptures during Vesselplasty procedure. Due to the basic difference of clinical scenario, the materials contained in the balloon during Vesselplasty were different from other procedures using balloons. In the balloons used in IABP, balloons were inflated and deflated with air. In balloon angioplasty, contrast media such as lipiodol was used and contained in the balloons. In contrast, during Vesselplasty, PMMA was contained and act as a spacer. The major difference between PMMA and air or contrast media is the heat generated during polymerization. Whether the heat generated from PMMA during polymerization would increase the possibility of balloon rupture or not need further investigation. Viscosity is another concern. During injection, the viscosity of PMMA is greater than water or contrast media. If the injection is done too quickly, it will elevate the pressure inside the inserter and cause the system to fail, including the possibility of breaking the delivery system. [18] On the other hand, the rough surface of the cancellous bone in vertebral body may also enhance the possibility of balloon rupture, comparing to the balloons used in IABP or angioplasty. Krishnan reported a series of patients receiving Vesselplasty. According to his report, Vesselplasty balloon rupture rate was as high as 33%, and the rate would be decreased to 8% if preceding kyphoplasty balloon was combined. [19] Most of the ruptures resulted in intravertebral cement spill, despite 2 cases with asymptomatic extravertebral cement leakage. No neurological complications was reported in the series. As to our knowledge, this case is the first report of neurological complication caused by Vesselplasty balloon rupture during cement injection. In this case, neurological complication may be caused not only by leaked cement block compression, but also thermal damage from the heat generated during cement polymerization. Despite of emergent decompression by laminectomy and removing cement block, the injury caused by compression and thermal damage may be irreversible. Some technical pitfalls, such as gentle delivery of the balloon, proper positioning of the balloon inside the vertebral body, and slowly injection of PMMA, should be emphasized.[18] Besides, more detailed explanation to the patients before the procedures should be taken during clinical practice in the future.

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CIRCULATING LEVELS OF IL-17A CORRELATE WITH THE DISEASE SEVERITY IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM

G. Guabello¹, E. Dozio², E. Passeri³, E. Vianello², C. Aresta³, S. Palmieri², C. Eller-Vainicher⁵, M. Corsi Romanelli⁶, S. Corbetta³.

¹Rheumatology Unit, IRCCS Istituto Ortopedico Galeazzi, Milan, Italy

²Department of Biomedical Sciences for Health, University of Milan, Milan, Italy, ³Endocrinology Service, IRCCS Istituto Ortopedico Galeazzi, Milan, Italy, ⁵Endocrine Unit, IRCCS Fondazione Cà Granda Ospedale Maggiore Policlinico, Milan, Italy, ⁶SMEL, Department of

Biomedical Sciences for Health, University of Milan, IRCCS Policlinico San Donato, San Donato Milanese (MI), Italy

Objective: Th17 lymphocytes and the released cytokine IL-17A have been shown to be involved in bone remodeling. Th17 lymphocytes are activated by PTH, while IL-17 disrupts PTHrP/LRP-6 interaction inhibiting Wnt signaling and promoting bone loss.

Elevated PTH levels in patients affected with primary hyperparathyroidism (PHPT) are associated with higher polymorphonucleates-derived IL-17A mRNA levels than healthy controls. The study investigated circulating IL-17A levels in 54 postmenopausal females with PHPT (64.0±11.8 years, mean±SD) compared with those in 20 age-matched normocalcemic and euparathyroid osteoporotic women. Subjects with autoimmune diseases, included Hashimoto's thyroiditis, kidney diseases, cancers, haematologic diseases, and active smokers were excluded.

Results: Mean plasma IL-17A levels in postmenopausal female PHPT patients were similar to those detected in osteoporotic controls (14.5±10.6 vs. 17.8±11.0 pg/ml; P=0.30) and did not correlate with circulating PTH levels. Nonetheless, IL-17A levels inversely correlated with ionized calcium levels (r=-0.262, P=0.05) and with urine calcium excretion levels (r=-0.324, P=0.036). Moreover, plasma IL-17A levels positively correlated with BMD(r=0.448, P=0.003; r=0.439, P=0.005) and T-scores (r=0.328, P=0.018; r=0.473, P=0.02) at total and neck femur levels, respectively. Compared with PHPT patients with IL-17A in the lower quartile (<8.1 pg/ml), hyperparathyroid patients with IL-17A in the upper quartile (>21 pg/ml) showed a significantly less reduced mean BMD at lumbar spine (0.776±0.16 vs. 0.916±0.15 g/cm², P=0.05), total femur (0.645±0.08 vs. 0.832±0.09 g/cm², P=0.0001) and femur neck (0.526±0.09 vs. 0.701±0.08 g/cm², P=0.0002); the two groups did not differ for age and BMI.

Conclusions: In postmenopausal women with primary hyperparathyroidism, circulating IL-17A levels were similar to those detected in women with postmenopausal osteoporosis, while, at variance with what reported in postmenopausal osteoporosis, they inversely correlated with the severity of the disease.

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TRABECULAR BONE SCORE OF CHILDREN AND ADOLESCENTS 4 TO 19 YEARS OLD IN MEXICO CITY

M. A. Guagnelli¹, R. Ambrosi¹, D. Lopez-Gonzalez¹, R. Winzenrieth², L. Del Rio³, P. Clark¹

¹Unidad de Epidemiología Clínica, Hospital Infantil de México Federico Gómez, Mexico City, Mexico, ²Medimaps SASU, Merignac, France,

³CETIR Medical Centre, Barcelona, Spain

Objectives: Trabecular bone score (TBS) is a texture-based tool analyzing DXA images in order to assess bone microarchitecture in the lumbar region. In pediatric population, definition of normative values has remained elusive due to the disparities of results in normal population, probably linked to uncontrolled factors which impact bone microarchitecture and the nonlinear behavior of bone growth. Our objective was to evaluate TBS in healthy Mexican children and adolescents using chronological age or bone age taking into account skeletal maturation and puberty onset as confounding variables.

Methods: DXA acquisitions from 269 boys and 296 girls aged 5-20 years were included. Bone age was evaluated according to Greulich and Pyle method. Pseudovolumetric BMD (3D BMD) was calculated based on cylindrical model proposed by Kroeger et al. (Bone Mineral, 1992). TBS assessment was evaluated using a custom version of TBS (Med-Imaps SASU, France) that includes a soft tissue correction for pediatric subjects. Loess method for local regression was used to show the means of the population on different ages using SPSS v23. The LMS statistical method proposed by Cole and Green (Stat Med, 1992) was used to construct aBMD, vBMD and TBS age-related curves using LMSchartmaker 2.0.

Results: When chronological age was used, girls' curve showed decreasing phase delineating a "U" shape similar to previous reports. However,

when evaluated with bone age, both graphs show constant TBS until 9 years in girls and 12 years in boys, both in accordance to the age of puberty, the onset of which is different between genders, a well known phenomenon.

Conclusions: Bone age, better related to puberty onset than chronological age, may be more useful to interpret TBS and may allow to have normative data for children. This preliminary data need to be reproduced by other groups in healthy children and adolescents as well as in groups with different pathologies affecting this population.

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MULTI-SITE OPPORTUNISTIC DIAGNOSIS OF VERTEBRAL FRAGILITY FRACTURES IN COMPUTED TOMOGRAPHY SCANS

J. Staal¹, R. Hyatt², M. K. Javadi³, E. Russell³, T. O'Neill⁴, K. Poole⁵, D. Chappell⁵, R. Rajak⁶, E. Kariki¹

¹Optasia Medical, Cheadle Hulme, ²East Lancashire Hospitals NHS Trust, Blackburn, ³Nuffield Department of Orthopaedics, Oxford, ⁴Salford Royal NHS Foundation Trust, Salford, ⁵Cambridge University Hospitals NHS Foundation Trust, Cambridge, ⁶Croydon Health Services NHS Trust, Croydon, UK

Objective: Vertebral fragility fractures (VFFs) are an early manifestation of osteoporosis. VFFs may triple the risk of future hip fracture yet VFF patients are often underrepresented in Fracture Liaison Services (FLSs). We assessed the rate of VFFs in computed tomography (CT) scans of the thorax, abdomen and pelvis and reviewed whether they had been previously reported. We also investigated whether the identified VFF patients had been referred to an FLS.

Methods: We retrospectively audited pseudonymised CT scans of patients 50 years and older, containing the spine, and performed over a 12-month period at 5 NHS hospitals in the UK (Cambridge, Croydon, East Lancashire, Oxford and Salford). We used the Optasia Medical ASPIRE™ service, a commercial case-finding service combining machine learning with radiologist over-read (EK). VFFs were classified using the Genant-SQ method and only moderate and severe VFFs were included. We compared our findings with the original radiology reports.

Results: We collected 47,889 scans (50.1% ♀) and used a sample of 1638 scans for analysis. Of these, 237 patients (53.4% ♀) had VFFs (14.5%±1.7%, 95%CI). VFF prevalence between sites was not significantly different. Four sites (Ca., Cr., E.L., Ox.) checked the original radiology reports and FLS referral. The median reporting rate was 67.7% (IQR 55.7%, 74.5%) and the median FLS referral was 13.3% (IQR 10.8%, 22.0%).

Conclusions: On average, 1 in 7 patients had at least one moderate VFF with a median of 13.3% being seen by the FLS. Whilst men are underrepresented in FLSs, nearly as many men as women were found to have VFFs. Opportunistic diagnosis of VFF can greatly increase the number of patients referred to FLSs, potentially protecting the patients' quality of life and decreasing the economic burden of osteoporosis.

References: 1. J. Bone Min Res 2014;29:392; 2. Osteoporos Int 2013;24:393

Disclosures: JS is employed by Optasia Medical. EK is contracted by Optasia Medical.

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STUDY OF ACTION OF DOXYCYCLINE ON DIFFERENT MODELS OF OSTEOPENIA: EXPERIMENTAL STUDY

J. P. Mardegan Issa¹, F. A. T. De Figueiredo¹, R. C. Shimano¹, D. L. Pitoli¹

¹University of São Paulo, Ribeirão Preto, Brazil

Objective: Doxycycline is a drug used as an antibiotic (100 mg/d dosage) and as an inhibitor of matrix metalloproteinases - MMPs (20 mg twice daily). This medicine is a calcium chelator and therefore interferes with bone remodeling. In the present study, the authors aimed to induce osteopenia with the association of classical techniques to check the potential of the drug doxycycline and its interaction in the osteopenia.

Methods: Sixty-three Wistar rats obtained from the USP, campus Ribeirão Preto, were divided into 9 groups with n=7 each, being: control group with doxycycline 10 mg/kg/d (C10), control with doxycycline 30 mg/kg/d (OVX10), ovariectomized with doxycycline 30 mg/kg/d (OVX30) and ovariectomized with water (OVX), sedentarism group 10 mg/kg/d (C30) and control (C30), ccline 10 mg/kg/d (Se10), sedentarism 30 mg/kg/day (Se30) and water (Se). All groups had their induction models to osteopenia for 90 d. Subsequently, the groups receiving the drug were submitted to daily doses (10 mg/kg/d and 30 mg/kg/d) for 60 d. The left femur samples were assigned to bone densitometry, right femur samples were subjected to light microscopy, right tibia samples for chemical quantification of calcium, magnesium, zinc and phosphorus, and total serum samples were submitted to quantification of calcium and total cholesterol. The weight of the rats was calculated on a precision scale at the animal house. The left femur was dried at 37°C on dried oven and then weighed on a precision scale, and the length of these femur bones were measured using a digital caliper to measure the bones along its long axis. Statistical analysis was used for linear general model, multivariate analysis and the tartrate resistant acid phosphatase (TRAP) analyses were submitted to normality test and then to nonparametric test with Kurskal Wallis with analysis of variance, having differences a Dunn post-test was performed to specify the differences both with significance of p≤0.05.

Results: Statistically significant differences were found between Se vs. Se10 and Se30 for BMC (bone mineral content), quantification of magnesium and quantification of bone trabeculation by Masson trichrome in the distal portion, OVX vs. OVX10 for bone densitometry and calcium in serum, OVX vs. OVX10 and OVX30 for quantification of bone trabeculation by Masson trichrome in the proximal and distal portion and Se vs. Se30 and OVX vs. OVX30 for TRAP immunostaining, all results with p≤0.05.

Conclusion: Using this experimental model, doxycycline played a key role in the blood transport of calcium chelate (data evidenced by the higher presence of calcium in the serum of the OVX30 group) and contributed positively to bone from rats affected by osteopenia induced by bilateral ovariectomy and sedentary lifestyle, supporting data of bone densitometry, quantification of bone trabeculae of the distal femur (microarchitecture), qualitative analysis by TRAP immunostaining and quantification of Mg in the bone.

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RECONSTRUCTION IN ONE PACIENT OF TWO CAVUS VARUS FEET SECONDARY TO A HEREDITARY MOTOR SENSORY NEUROPATHY

A. M. Gómez Blasco¹, M. Lizcano Palomares¹, M. Sanz Saínz¹, V. García Calvo¹, R. Cardona Malfey¹, C. Martín Hernández¹

¹Hospital Universitario Miguel Servet, Zaragoza, Spain

Objective: When we face a cavus foot, we must think of a neurological cause, Charcot-Marie-Tooth (CMT) disease is the most common hereditary neuropathy and its manifestations are progressive. One of the main ones is the cavus foot with valgus of the forefoot (forefoot cavus) due to the imbalance of the musculature, although it can associate other deformities. The aim is to present a diagnosed

case of CMT and to expose the surgical treatment performed on the patient.

Method: We present the case of a 41-year-old patient diagnosed with inherited motor sensory polyneuropathy type CMT 1A, referred to traumatology due to progressive weakness and deformity in both feet. The exploration showed gait in steppage, irreducible deformities in both feet in Equus varus, greater in the right foot, generalized muscular weakness, sensory deficits and abolition of reflexes. After its study by means of radiographs and CT, corrective intervention of the right foot was planned, performing fasciotomy of the plantar aponeurosis, calcaneus valgus translation osteotomy, wedge osteotomy of the metatarsals by Jones technique and interphalangeal arthrodesis of the 1st finger. After 6 months, the left foot was surgically operated.

Results: The clinical and radiological evolution was satisfactory, after completing one month of immobilization in each foot and finally the plantigrade support of both feet and an improvement in the patient's gait were achieved.

Conclusion: The CMT disease presents progressive and changing deformities, it must be taken into account in the face of the therapeutic approach. When the evolution of the disease is short, the deformity will be reducible. If the evolution is long, the deformities can become fixed.

When we face an irreducible deformity of the foot of long evolution but without arthropathy, our objective should be to achieve a plantigrade support, for this the osteotomies act on the deformity and improving the biomechanics. Arthrodesis should be considered in the final stages and with joint involvement.

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ULTRA-LOW DOSE ANTI-INTERLEUKIN1 IN CHRONIC GOUT: A SAFE AND SUCCESSFUL COMBINATION THERAPY WITH LOW DOSE COLCHICINE AND URATE LOWERING AGENTS

M. Capassoni¹, F. Galluccio¹, M. Matucci Cerinic¹

¹University of Florence AOU Careggi Rheumatology, Firenze, Italy

Objective: Evaluate the efficacy of low dose anti-IL1 inhibitors administered by sublingual route in gout arthritis with remitting course that cannot be completely controlled with standard therapy regimens.

Methods: Inclusion criteria was diagnosis of chronic gouty arthritis with remitting course (acute flares in patients with chronic gout and no intercritical period), high levels of CRP and the need of chronic assumptions of NSAIDs or steroids, with flare at suspension. 20 patients were selected that fulfilled the criteria (Patients intolerant to the study drug, with poor compliance to therapies or to diet, with hyperuricemia or end stage renal disease were excluded from the study). The study consist of two consecutive parts. An observational part where patients are treated for 6 months with 0.5-1 mg/d of colchicine and 300 mg/d of allopurinol. They performed visits at baseline, 3 and 6 months and we collected data about blood tests, VAS score, number of flares, compliance to therapy and adverse events. An experimental part where we added GUNA anti-IL1® (an infinitesimal dilution of anakinra that has a concentration of 10 fg/mL) 20 drops administered SL. Again patients performed visits at baseline (which coincides with the last visit of the observational phase), 3 and 6 months and we collected the same kind of data.

Results: At 6 months after introduction of GUNA anti-IL1 all patients, except 1, experienced no flares of disease, levels of CRP became negative and VAS pain scale was significantly reduced (CRP level $p<0.0001$; VAS $p<0.0001$). NSAIDs and steroid consumption was significantly reduced. No adverse events happened.

Conclusion: Ultra-low dose of anti-IL1 agents added to standard therapy is an effective and safe way to achieve disease remission

CONTRASTO									
colchicina 0.5-1 mg/giorno + allopurinolo titolando									
Variable	Media	Dev std	Quartile inferiore	Mediana	Quartile superiore	Minimo	Massimo		
PCR_0	0.82	0.15	0.70	0.80	0.84	0.59	1.12		
PCR_3	0.88	0.23	0.71	0.77	1.03	0.65	1.40		
PCR_6	0.84	0.12	0.71	0.84	0.93	0.67	1.05		
VAS_0	5.40	1.27	4.50	5.00	6.00	3.00	8.00		
VAS_3	5.90	1.25	5.00	6.00	7.00	4.00	8.00		
VAS_6	5.95	1.19	5.00	6.00	7.00	3.00	8.00		
d_pcr_3	0.06	0.21	-0.04	0.01	0.11	-0.23	0.76		
d_vas_3	0.02	0.13	-0.07	-0.03	0.05	-0.09	0.36		
d_vas_6	0.50	1.05	0.00	0.00	1.00	-1.00	3.00		
d_vas_6	0.55	0.76	0.00	0.50	1.00	-1.00	2.00		

TRT+Trattamento									
Variable	Media	Dev std	Quartile inferiore	Mediana	Quartile superiore	Minimo	Massimo		
PCR_0	0.84	0.12	0.71	0.84	0.93	0.67	1.05		
PCR_3	0.72	0.11	0.65	0.70	0.81	0.55	0.90		
PCR_6	0.53	0.12	0.50	0.50	0.50	0.50	1.03		
VAS_0	5.95	1.19	5.00	6.00	7.00	3.00	8.00		
VAS_3	4.25	1.07	3.50	4.00	5.00	2.00	6.00		
VAS_6	1.80	1.58	1.00	2.00	2.00	0.00	7.00		
d_pcr_3	-0.10	0.07	-0.16	-0.10	-0.05	-0.24	0.02		
d_pcr_6	-0.30	0.15	-0.39	-0.33	-0.21	-0.55	0.05		
d_vas_3	-1.70	0.86	-2.00	-2.00	-1.00	-4.00	0.00		
d_vas_6	-4.15	1.46	-5.00	-5.00	-3.00	-6.00	0.00		

Test wilcoxon signed rank test	
Differenza	P-value
PCR3-PCR0	0.001
PCR6-PCR0	<0.0001
VAS3-VAS0	<0.0001
VAS6-VAS0	<0.0001

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A CLINICAL TRIAL COMPARING FUNCTIONAL OUTCOMES IN MEDIAL COMPARTMENT OA KNEE PATIENTS TREATED WITH A PNEUMATIC UNLOADING BRACE AND RESISTED HIP AND KNEE EXERCISES

S. Agarwal¹, A. Sharma¹

¹Nopany Institute of Healthcare Studies, Kolkata, India

Objectives: To compare clinical and functional outcomes in medial compartment OA knee patients treated with either pneumatic unloading brace along with specific set of hip and knee strengthening exercise or the same set of exercises alone.

Methods: 26 participants were randomly allocated in two groups, A (n=11) and B (n=15). Group A wore pneumatic unloading brace for duration 3 h/d for 12 weeks and performed exercises to strengthen the knee and hip muscles for 12 weeks. Group B performed the same exercises as Group A for 12 weeks. Variables measured and corresponding outcome measures were:

1. Pain: Visual Analog Scale
2. Disability: WOMAC Index
3. Quality of Life: Short Form 36. Subscales- Physical function (PF), Role limitation of Physical function (RP), Body pain (BP), General health (GH), Vitality (VT), Social function (SF), Role limitation of emotional function (RE), Mental health (MH)
4. Mobility: Timed Up and Go test (TUG)
5. Lower extremity strength, balance and disability (5 TRCR): Repeated chair rise (5 times)

Results: Post intervention comparisons of mean values of VAS, WOMAC, 5 TRCR and SF-36 were better for Group A as compared to Group B whilst the TUG test score mean value was less for the former. However statistically significant differences ($p<0.05$) between the measures were achieved only for VAS scores and six out of the eight SF-36 subscales tested: PF, RP, BP, GH, VT and MH.

Conclusion: The results of this study conclude that in medial compartment knee OA, pneumatic unloading brace and hip and knee strengthening exercises are both effective in reducing pain and disability and improving quality of life, mobility, lower limb strength and balance. Although statistically significant differences were not achieved between

the groups, this may be attributed to the limited sample size causing a type 2 error.

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BARIATRIC SURGERY LEADS TO DECLINES OF FEMORAL BONE DENSITY, BUT NOT SPINE BONE DENSITY, AFTER SIX MONTHS

O. Matos¹, D. L. Kendler², E. Ruthes¹, A. D. Lass¹, W. Ripka¹, J. C. Bassan¹

¹Federal University of Technology - Paraná, Curitiba, Brazil, ²University of British Columbia, Vancouver, Canada

Objectives: Bariatric surgery is increasingly utilized for the treatment of morbid obesity¹. The main objective of the study was to verify if some of

the variables showed direct or inversely proportional influence on BMD at hip and lumbar spine.

Methods: Consenting patients underwent anthropomorphic measurements, body composition and BMD at baseline and after six months using Hologic Discovery A.

Discussion: We enrolled nine women (mean age 41.1±10.3) in a long-term prospective study of the effects of bariatric surgery on body composition and BMD. Here we report the initial six-month data. Mean weight loss was 25.6% (104.5 to 77.7 kg); percent body fat declined 37.6% (48.6 to 30.3 kg) and total hip bone density declined 18.2% (1.096 to 0.894 g/cm²), all significant. Lumbar spine bone density declined less than hip over the six-month follow-up with declines of 2.84% (1.042-1.013 g/cm²). Appendicular lean mass declined 5.7% (7.8-7.3 kg/m²), but did not present before and after surgery indices classified as sarcopenia.

Table 1. Comparison of mean and median value, standard deviation, interquartile deviation and *P*-value between pre- and post-data of body composition and BMD

Variables	Pre	Post	Median Difference (pre - post)	<i>P</i> *				
Mean±SD	Median	IQ	Mean±SD	Median	IQ			
Body fat (%)	46.4±3.5	45.50	6.45	38.8±5.2	37.60	9.20	7.9	0.008
Body fat (kg)	48.6±8.3	45.27	8.92	30.3±6.7	27.51	9.26	17.8	0.000
Weight(kg)	104.5±12.8	104.20	20.00	77.7±9.4	78.70	11.55	25.5	0.008
BMDf (g/cm ²)	1.096±0.113	1.082	0.210	1.096±0.107	0.920	0.120	0.162	0.008
BMDs (g/cm ²)	1.042±0.149	1.112	0.230	1.042±0.144	1.015	0.200	0.097	0.260
Visceral adiposity	42.6±3.5	43.40	6.30	3.5±7.00	32.70	12.55	10.70	0.008
BMI (kg/m ²)	41.4±4.1	39.90	5.65	31.1±3.2	30.00	5.25	9.90	0.008
Lean mass (kg)	53.9±6.2	53.92	11.43	45.8±5.9	42.96	9.11	10.96	0.008
Append lean mass (kg/m ²)	7.8±0.9	7.84	0.95	7.3±0.8	7.41	1.39	0.39	0.017

Conclusions: We report early six-month declines in hip bone density greater than spine bone density in patients after gastric bypass surgery. The relation of decreases in appendicular lean mass and femoral neck bone density may be consequence of soft tissue-bone interactions at weight-bearing sites. Our data may also indicate a more significant artefact in DXA measurements at hip as compared to spine, related to changes in body thickness.

Reference: 1. Fried M et al. *Obes Surg* 2014;24:42

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DETERIORATION IN CORTICAL AND TRABECULAR MICROSTRUCTURE AND MATRIX MINERAL DENSITY PRODUCE BONE FRAGILITY IN PATIENTS WITH CHRONIC KIDNEY DISEASE

A. Ghasem-Zadeh¹, R. Jaipurwala¹, P. Mount², X. Wang¹, L. Churilov², S. Iuliano¹, R. Zebaze¹, C. Chiang¹, E. Seeman³

¹Departments of Medicine and Endocrinology, Austin Health, University of Melbourne, ²Departments of Nephrology, Royal Melbourne Hospital, University of Melbourne, ³Departments of Medicine and Endocrinology, Austin Health, University of Melbourne, Australian Catholic University, Melbourne, Australia

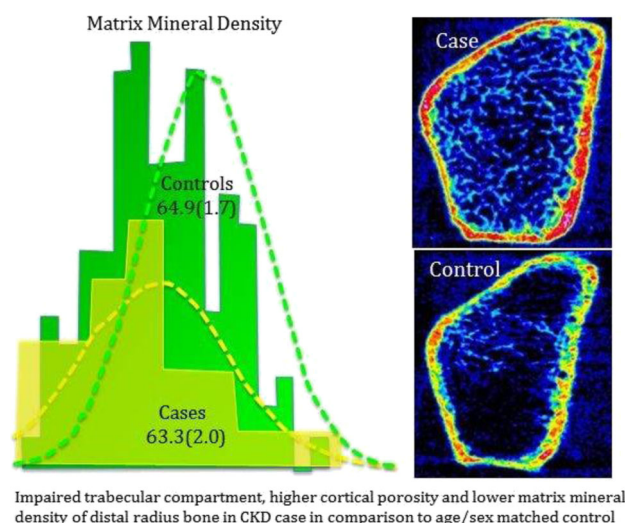
Introduction: Identifying patients with chronic kidney disease (CKD) at risk for fractures is an unmet need. Areal BMD (aBMD) measurement lacks sensitivity as most persons having fractures have osteopenia or normal aBMD. Remodeling markers are not helpful because their renal

clearance is impaired. However, high porosity is a consistent finding in CRF in animal models of renal disease. Loss of bending strength is a 7th power function of porosity so a small increase in porosity with modest bone loss disproportionately increases fracture risk. Unbalanced trabecular remodeling erodes trabeculae but high trabecular density is reported in some animal models, perhaps due to errors in segmenting cortical from trabecular bone using threshold based image analyses.

Methods: One hundred and one (52 male) subjects with CKD (79 transplants, 22 dialysis) and 188 healthy age-sex matched controls (76 males) had measurements of bone microarchitecture using HR-pQCT. Distal radius image of 31 cases women (59 years, 22-81) were analysed by StrAx 1.0 software for cortical porosity and matrix mineral density and compared with 112 sex and age-matched controls (57 years, 26-79).

Results: Compared to controls, women with CKD had 1.2, 1.34, 1.38, and 1.17, SD higher distal radial total, compact cortex, outer and inner transitional zone porosity, respectively, and 1.8 SD lower trabecular number and 1.6 SD greater separation and 0.95 SD lower matrix mineral density. Limited data in men showed 1.1 and 1.3 SD lower total vBMD and trabecular number, respectively and 1.2 SD higher trabecular separation (all *p*<0.001).

Conclusions: Patients with renal disease have severe deficits in mineralized bone matrix volume due to high porosity and reduced matrix mineral density which may compromise material stiffness. Studies are needed to determine whether these measurements identify patients who come to sustain fractures and whether treatments can be targeted to these abnormalities.



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THE ASSOCIATION BETWEEN MENISCAL BODY EXTRUSION AND THE DEVELOPMENT/ENLARGEMENT OF BONE MARROW LESIONS ON KNEE MRI IN OVERWEIGHT AND OBESE WOMEN

F. Zhang¹, M. Bierma-Zeinstra², H. G. Oei³, A. Turkiewicz⁴, M. Englund⁴, J. Runhaar³

¹Orthopaedic Department, Affiliated Hospital of Xuzhou Medical University, Xuzhou, China, ²Department of General Practice, Erasmus Medical Center, Rotterdam, ³Department of Radiology & Nuclear Medicine, Erasmus Medical Center, Rotterdam, The Netherlands, ⁴Department of Orthopaedics, Lund University, Lund, Sweden

Objective: To determine the association between meniscal body extrusion and bone marrow lesion (BML) development/enlargement in overweight and obese women at high risk of knee osteoarthritis (OA).

Methods: We used baseline and 30 months follow-up data of the PROOF study, Netherlands, comprising overweight or obese women aged 50–60 years, free of clinical knee OA. All subjects (n=395) completed a questionnaire on knee complaints and physical activity, underwent physical examination, radiography, and repeated 1.5 Tesla MRI of both knees. Using the midcoronal MRI slice, one observer measured tibial plateau width and meniscal body extrusion of both menisci in both knees. BMLs and meniscal damage were read using the semiquantitative MOAKS scoring system by another observer. The association between BML development and meniscal extrusion was primarily analyzed with a random-effects logistic regression model adjusted for age, body weight, body height, physical activity, meniscus damage, knee alignment, and tibia width. In addition, we used a fixed-effect regression model for evaluation of knee-specific factors.

Results: In our primary model, there was about 24% increased risk of BML incidence/enlargement per 1 mm extrusion (95%CI 0.99, 1.57) for medial compartments and 69% risk increase (95%CI 1.27, 2.25) for the lateral compartments. Results from the fixed-effects regression model were similar, strengthening the validity of the findings.

Conclusions: Meniscal body extrusion is an important factor influencing BML development/enlargement, and thus a potential treatment target in early knee OA.

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THE EFFECT OF INTRA-ARTICULAR TRANEXAMIC ACID INJECTION ON UNICOMPARTMENTAL KNEE ARTHROPLASTY PATIENTS' BLOOD LOSS VOLUME IN PERIOPERATIVE PERIOD

F. Zhang¹

¹Orthopaedic Department, Affiliated Hospital of Xuzhou Medical University, Xuzhou, China

Objective: To investigate the effect of intraoperative intra-articular tranexamic acid (TXA) injection on unicompartmental knee arthroplasty (UKA) patients' blood loss in perioperative period.

Methods: Randomise 20 UKA patients into treatment group and control group with 10 in each group. In treatment group, 50 ml normal saline with 1.5g TXA was injected intra-articularly after fascial layer was closed by sutures but before tourniquet was discharged. And in control group, the same volume of normal saline was injected. After injection, drainage tubes were clipped and tourniquets were discharged. Drainage tubes in both groups were pulled out after 48 h. Observe and record total blood loss volume, postoperative drainage volume, hidden blood loss volume, blood transfusion rate, postoperative hemoglobin value, activated partial thromboplastin time (APTT), prothrombin time (PT), prothrombin time-international normalized ratio (PT-INR), postoperative deep venous thrombosis (DVT), pulmonary embolism (PE) rate and incisional complication rate.

Results: Total blood loss volume 577.3 ± 286.2 ml, total drainage volume 232.0 ± 146.0 ml, hidden blood loss volume 345.3 ± 94.5 ml in treatment group were all lower than control group, and with statistical significant difference ($p < 0.05$). In neither group, complications and untoward effects such as lower limb deep venous thrombosis, pulmonary embolism or infection of incisional wound happened.

Conclusion: Intra-articular tranexamic acid injection could remarkably reduce postoperative total blood loss volume, overt and hidden blood loss volume for UKA patients without increasing related postoperative complications. The recovery of knee functions was satisfying.

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THE EFFECT OF USING LOWER LIMB ORTHOSES ON BONE MINERAL CONTENT IN SUBJECTS WITH SPINAL CORD INJURY

M. Ahmadi Bani¹

¹University of Social Welfare and Rehabilitation sciences, Tehran, Iran

Objective: Spinal cord injury (SCI) is an adverse effect of spinal cord damage that results in loss of standing and walking. Osteoporosis is common after SCI. pathologic fracture in lower extremity is a consequence of decrease in bone mineral content (BMC). Lower limb orthoses enable patients to stand and walk. The aim of this study is to evaluate the effect of using standing and walking orthoses on lower limb BMC in subjects with SCI.

Methods: A review was performed to identify the effect of standing and walking by lower limb orthoses by paraplegic subjects on lower limb bone mineral. A database search of Medline, ISI Web of Knowledge, Scopus and Google Scholar performed for title and abstract review.

Results: Although most of literatures reported BMD unchanged in lumbar spine but emphasized on BMD reduction in lower limb especially in proximal of femur and distal of tibia between 10 to 70%. Some literatures demonstrated using orthoses by passive mechanical loading have significant effect on BMD at lower limb extremity specially the proximal femur. Some other documents confirmed Using Knee ankle foot orthosis (KAFO) did not influence on BMD.

Conclusion: The present review suggests a positive orthotic effect of lower limb orthoses on lower limb BMD but there are controversial documents. Further investigation in this field is needed in the future.

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NEW ASPECTS IN IMMUNODIAGNOSTICS OF OSTEOARTHRITIS

O. Emelyanova¹, O. Rusanova¹, I. Gontar¹, I. Zborovskaya¹¹Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy", Volgograd, Russia

Objective: In osteoarthritis (OA) there is a change in biosynthesis of various collagen types. Involvement of cutaneous collagen type I, cartilaginous collagen type II, vascular collagen type III into the autoimmune process may induce production of corresponding antibodies. Our aim was to study the regularities of antibody (Ab) response to collagen type I, II and III in patients with OA, using immobilized granulated antigen agents (IGAA) with magnetic properties.

Methods: Thirty healthy individuals and 121 patients with OA were observed. Ab to collagen type I, II, III were determined by indirect immunoenzymatic method using IGAA. The obtained agents were in the shape of granules 10–100 mcm in size.

Results: In healthy individuals the Ab level to type I collagen was 0.026 ± 0.0031 , to type II 0.0303 ± 0.0028 , to type III 0.0228 ± 0.0033 . The level of Ab to all collagen types grew upon an increase in affected joints. In the group of patients with mono- and oligoarthritis the level of Ab to collagen type I, II, III significantly exceeded the level of antibody response to these types in donors ($t_I=5.18$, $t_{II}=4.26$, $t_{III}=4.77$, $p<0.001$). An enhanced antibody response to these collagen types was noted in patients with quickly progressing course of the disease, and especially in case secondary synovitis developed. The highest Ab titers to collagen type II were noted in patients with OA stage 2 and 3 and multiple joint lesions, which correlates with the extent of osseointerarticular destruction. A considerable increase in collagen type I and II is noted in patients with quickly progressing disease and in the presence of secondary synovitis.

Conclusion: Inclusion of highly sensitive tissue-specific antigen agents based on collagen type I, II, III in immunoenzymatic assay permits an advancement of diagnostic methods and makes it possible to reveal the regularities of antibody response to collagen type I, II, III in patients with OA.

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ROLE OF INFLAMMATORY CYTOKINES IN DISEASE SEVERITY OF RHEUMATOID ARTHRITIS

A. Aggarwal¹, A. Sharma², A. Bhatnagar¹¹Department of Biochemistry, Panjab University Chandigarh,²Department of Internal Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Objectives: An array of cytokines is involved in the disease severity of systemic autoimmune diseases such as rheumatoid arthritis (RA). Study of cytokine balance in RA may persuade both the diagnostic process and therapeutic approaches. Our aim was to assess the levels IL-18, TNF- α in serum samples and IFN- γ , IL-8, and IL-4 positive NK and NKT cells of peripheral blood of RA patients and their correlation with disease activity score.

Methods: This retrospective study included 70 newly diagnosed RA patients (49 females, 21 males) and matched 100 healthy controls. Disease activity score was calculated using standard DAS-28. Levels of IL-18 and TNF- α in serum samples were quantified using ELISA while intracellular expression of IFN- γ , IL-4, and IL-8 in NK and NKT cells were determined by multicolor flow cytometry. Differences between the means were compared and levels were correlated with DAS-28 using suitable tests.

Results: Mean age of patients and healthy controls were 35.2 and 33.8 years, respectively. The average DAS-28 score of the patients

was 5.21. Level of IL-18 was found to be 3.04 fold higher while 5.9 fold higher expressions were recorded for TNF- α in patients as compared to healthy controls. Moreover, IFN- γ + NK, IFN- γ + NKT, IL-8+ NK, and IL-8+ NKT cells were also raised in RA patients (67.3 ± 14.6 , 63.3 ± 20.7 , 62.2 ± 16.8 , and 72.6 ± 14.2). However, IL-4+ NK and IL-4+ NKT cells were markedly ($p<0.001$) diminished (2.27 ± 2.50 and 2.35 ± 3.68) in patients. IL-18, TNF- α , IFN- γ , and IL-8 were positively correlated while IL-4 was inversely correlated with DAS-28.

Conclusions: The balance of Th1 and Th2 cytokines were poised towards Th1 in RA. Anti-cytokine agents may serve as potential therapeutic agent in RA treatment. The work is in progress to investigate these cytokines as biomarkers of disease severity.

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ASSESSMENT OF FRACTURE RISK FOR PATIENTS ON AROMATASE INHIBITORS

E. C. Cefai¹, D. B. Balzan¹, R. A. Attard¹, A. B. Borg¹, C. M. Mercieca¹¹Department of Rheumatology, Mater Dei Hospital, Msida, Malta

Objectives: Aromatase inhibitors (AI) have now become the standard of care in the management of postmenopausal hormone receptor positive breast cancer. One of the main side effects is accelerated bone loss and consequent increased risk of fragility fracture. Fracture risk maybe easily overlooked unless a specific assessment is carried out. Our aim was to assess whether screening for fracture risk was done by the oncologists in a secondary care setting. The latest ESCEO guidelines were used as standard of care.

Results: The mean age was 65 years (SD 9.8). 36% were on anastrozole, 26% on exemestane and 38% on letrozole. Age at menopause was documented in only 1 patient. 14% had osteopenia/osteoporosis at baseline prior to starting AI treatment. Of these 10% were on calcium/vitamin D supplementation. Out of the 80 patients only 11% had a follow-up DXA scan after starting the AI. Calcium and vitamin D levels were checked in 41% and 6% respectively.

After initiation of AI 10 patients were given antiresorptive therapy (8 patients received zoledronic acid, 2 patients strontium ranelate). Rheumatology input was requested for only 3 patients. Documentation of risk factors for fragility fractures such as BMI, smoking and alcohol status was absent in the majority of cases.

Conclusion: The majority of patients treated with aromatase inhibitors did not have a proper fracture risk assessment. This cannot be underestimated since it can potentially lead to serious complications for breast cancer patients. Rheumatologists need to liaise with oncologists to establish care pathways to ensure that all patients on aromatase inhibitors are screened and treated to reduce fracture risk. This audit highlights the need to develop a clear care pathway to guide oncologists in prescribing AI.

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CHRONIC PAIN IN ELDERLY DUE TO OSTEOPOROSIS OSTEOARTHRITIS OR MUSCLE IMBALANCES

M. A. Farago¹, S. Pop¹, F. Cioara¹¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: Because the extent of medical research and diffusion of information in medical world and general population related to osteoporosis, the chronic musculoskeletal pain in elderly is mostly attributed to osteoporosis. We attempted to diagnose the chronic musculoskeletal pain in elderly.

Methods: An observational study on 112 young old outpatients (60–69 years) (proper age for retirement and most often still independent persons) who were referred to rehabilitation department with diagnosis of

osteoporosis (based on DXA results) and common complaints of musculoskeletal pain and dysfunction. For diagnostic purpose a complex general physical exam including musculoskeletal evaluation, pain scale, and imaging study if necessary were performed. Comorbidities and the level of daily activity were taken into account. The final diagnosis tried to clarify the source of pain: osteoporosis, osteoarthritis or posture and muscle imbalances

Results: Study group characteristics: mostly women (n=100, 89.28%), from urban area, medium to highly educated (13.9 years of formal education), 29 (25.89%) still professional active, no history of fragility fractures, 18 (16.07%) smokers, drink occasionally, 4 (3.57%) with medication connected with osteoporosis risk intake, 64 (57.14%) over-weighted and obese, mostly cardiovascular and digestive comorbidities, with a medium to high level of pain (6.7 on 1-10 VAS), all having back pain and 35 (31.25%) other joints pain. 103 patients (91.96%) had postural changes with consequent muscle imbalances, 72 (69.9%) out of them being with Janda slayer syndrome (indicating long-standing muscle imbalance). Symptomatic lower limbs osteoarthritis was present in 26 patients (22.32%), pronated feet in 66 patients (58.92%).

Conclusions: 1. Even if osteoporosis or osteopenia was present in all subjects, we connected the musculoskeletal pain to postural changes and secondary to muscle and myofascial imbalances mostly. Osteoarthritis of the spine and lower limbs is the second cause of back pain in our study group. Suspicion of osteoporotic pain remains in 3 patients (2.67%) (due to local spine pain to percussion without relevant X-Ray changes). 2. The diagnosis of musculoskeletal pain in still active elderly should be reconsidered and better investigated.

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RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY OF THE EFFECT OF A CHITOSAN OLIGOMER ASSOCIATED WITH VITAMIN D3 ON A BONE REMODELING MARKER IN POSTMENOPAUSAL WOMEN WITH VITAMIN D DEFICIENCY

F. A. Allaert¹

¹Health Claim Evaluation and Cen Nutriment, Dijon, France

Objectives: To evaluate vs. placebo, the effect of a chitosan oligomer associated with vitamin D3 on a biomarker of the bone turnover, the osteocalcin.

Methods: Study design was a randomized, double-blind, placebo-controlled study on two parallel groups. Main criterion: evolution of serum osteocalcin level between D0 and 3 months (3M). Osteocalcin is recognized by the EFSA (European Food Safety Agency) as a valuable study criterion for the substantiation of health claim dedicated to physiological maintenance of optimal bone density (1). Secondary endpoint: evolution of serum vitamin D (25OHD) between day 0 and 3M. Inclusion criteria: women who have been in menopause for >3 years and who have vitamin D deficiency (<30 ng/ml).

Results: 33 women aged 61.6±5.3 years and menopausal since 12.5±6.9 years were included in the study. Serum osteocalcin and 25 OHD levels were 48.5±14.9 µg/L and 24.7±4.7 ng/mL. 16 were randomized in the placebo group and 17 in the vitamin D3 group. During 3 months, osteocalcin remained stable in the vitamin D3 group (p: 0.5207) and increased significantly in the placebo group (p: 0.0448), the evolution being statistically different between the groups: -0.7±4.4 µg/L 95%CI: [- 3; 1.6] vs. 2.7±5.2 µg/L 95%CI: [0.1; 5.4]; (p: 0.0475). 25OHD also remained stable in the vitamin D3 group (p: 0.4481) but it decreased significantly in the placebo group (p-value: 0.0345) but without the difference between groups reaching the statistical threshold because of the width of the standard deviations: -1.5±7.7 ng/ml 95%CI: [-5.6; 2.6] vs. -3.8±6.2 95%CI: [-6.9; -0.6] (p: 0.3567).

Conclusion: Compared to a placebo, a three month intake of a chitosan oligomer associated with vitamin D3 for 3 months stabilizes osteocalcin, a validated marker of bone remodeling, and thus may contribute to the prevention of the postmenopausal osteoporosis.

Reference: 1) EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA); Scientific Opinion on the substantiation of health claims related to maintenance of bones. EFSA J 2009;7: 1228.

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WHEN A HIP FRACTURE REVEALS A CELIAC DISEASE: A CASE REPORT

C. Bejarano Lasunción¹, L. Rodríguez Chacón¹, A. M. Gómez Blasco¹
¹Orthopaedic Surgery and Traumatology Department, Miguel Servet University Hospital, Zaragoza, Spain

Objective: We report a case of a undiagnosed celiac disease presenting as a hip fracture due to a severe vitamin D deficiency.

Methods: The case is about a 18-year-old male patient who had a left subcapital hip fracture (type 3 according to the Garden classification: complete fracture with partial displacement) due to a minimal traumatism while playing football. There was not any previous medical history. The patient was treated with closed reduction and internal fixation with two lag screws. We also performed a bone densitometry revealing an important BMD loss (Z-score -3.0) and the metabolism study showed a severe vitamin D deficiency (27.1 nmol/L) and high levels of antitransglutaminase IgA antibodies (2502.40 U/mL – normal reference: 0.00-20.00 U/mL). The digestive biopsy confirmed the diagnose: celiac disease, treated with a gluten free diet and calcium and vitamin D supplementation.

Results: After more than one year of follow-up, there have been no complications (osteosynthesis failure, avascular necrosis or nonunion) the patient is free of pain, with full hip mobility and the serum vitamin D levels have normalized.

Conclusions: In young patients presenting nontraumatic fractures, vitamin D deficiency should be kept in mind and proper diagnostic work-up should be performed to identify the underlying cause of osteomalacia, such as the celiac disease.

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OVERVIEW OF THE ADVANTAGES OF MOLECULAR HYDROGEN FOR MEDICAL APPLICATIONS

R. A. Amir¹

¹Centre de Santé des Fagnes, Chimay, Belgium

It has been clearly demonstrated that molecular hydrogen (H₂) has different and many advantages exhibiting marked effects for various medical applications: it is mild enough neither to disturb metabolic redox reactions nor to affect signalling by reactive oxygen species (ROS). It should have, up to now, no or little adverse effects. H₂ can be monitored with an H₂-specific electrode or by gas chromatography. H₂ rapidly diffuse into tissues and cells to exhibit efficient effects.

Thus, it could be used for preventive and therapeutic applications by different methods: inhaling H₂ gas, drinking H₂-dissolved water, injecting H₂-dissolved saline, taking an H₂ bath or dropping H₂-saline onto the eyes. Recent publications revealed that, in addition to the direct neutralization of highly reactive oxidants, H₂ indirectly reduces oxidative stress by regulating the expression of various genes. H₂ appears to also reduce a powerful oxidant, peroxynitrite (ONOO⁻). This would mean that H₂ has the potential to protect our DNA/RNA and proteins from damage linked to oxidative stress. It seems that it does this while not perturbing cellular homeostasis. H₂ appears to stimulate the production of endogenous antioxidants via the Nrf2 pathway, meaning it upregulates the body's own antioxidant system. This results in the production of more protective

enzymes such as glutathione, catalase, and superoxide dismutase. These antioxidants are powerful and aid in the reduction of excessive ROS and oxidative-stress within the body, which have been linked to nearly all human diseases. Moreover H_2 can regulate inflammatory cytokines, hormones and proteins. Research shows, that H_2 has the potential to exhibits these effects: anti-inflammatory effects, selective antioxidant, anti-allergic effects, anti-cellular death, anti-aging, reduces aches and pains, protective to skin, cardioprotective, decreases muscle fatigue, reduces lactate levels, may contribute to induce anti-diabetic effects, improves cognitive function and cytotoxic protection and can have a neuroprotective effect, a radiation protection effect and can be considered as cytoprotective agent. In addition to growing evidence obtained by model animal experiments, extensive clinical examinations were performed or are under way, particularly to improve the knowledge of cellular action and the impact of effect of hydrogen water over usual concentration of dissolved hydrogen.

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DEVELOPMENT OF A NOVEL OSTEOCLAST INHIBITOR TARGETING INTEGRIN $\alpha_V\beta_3$ -OSTEOPONTIN INTERACTION

P. Doori¹, L. Soo Young¹

¹Department of Life Science and the Research Center for Cellular Homeostasis, Ewha Womans University, Seoul, South Korea

Objective: Small molecule-inhibition targeting protein-protein interaction (PPI) is now recognized as an emerging and challenging area in drug design.

Methods: We developed a novel interactive drug discovery methodology known as Protein Chip technology (ProteoChip) as a cutting-edge PPI assay system applicable for unique PPI-targeting therapeutics integrated with computer-aided drug design (CADD).

Results: Here, we describe a novel small molecular PPI inhibitor, IPS-02001, which blocks integrin $\alpha_V\beta_3$ -osteopontin interface a novel PPI inhibitor identified by the interactive methodology of both ProteoChip- and CADD-based PPI assay. IPS-02001 (6,7-Dichloro-2,3,5,8-tetrahydroxy-1,4-naphthoquinone) was screened from different compound libraries (InterBioScreen, Commercial libraries) using an *in silico* structure-based molecular docking simulation method and a protein chip-based protein-protein interaction assay system. Additionally, integrin $\alpha_V\beta_3$, an adhesion receptor expressed in osteoclasts (OCs), was implicated in the regulation of OC function via regulation of the cytoskeletal organization of OCs. IPS-02001 blocked OC maturation from murine bone marrow-derived macrophages, as well as the resorptive function of OCs. Moreover, treatment with IPS-02001 impaired downstream signaling of integrin $\alpha_V\beta_3$ linked to Pyk2, c-Src, PLC γ 2, and Vav3 and disrupted the actin cytoskeleton in mature OCs. Furthermore, IPS-02001 blocked RANKL-induced bone destruction by reducing the number of OCs and protected against ovariectomy-induced bone loss in mice.

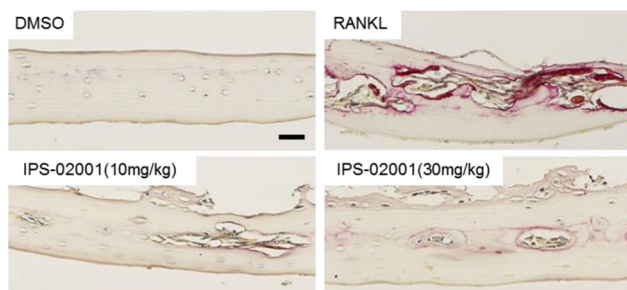


Figure 1. IPS-02001 suppresses RANKL-induced OC formation and bone destruction. Inhibition of RANKL-induced (2 mg/kg body weight) bone destruction after injecting IPS-02001 (10 mg and 30 mg/kg body weight). TRAP staining was performed on histological sections of calvaria bone. Scale bar indicates 200 μ m.

Conclusion: IPS-02001 may represent a promising new class of antiresorptive drugs for treatment of bone diseases associated with increased OC function.

Reference: Park D et al. Biomaterials. 2016;98:131

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EVOLUTION OF OSTEOPOROSIS IN PATIENTS WITH GOUT ASSOCIATED NEPHROLITHIASIS

L. Rotaru¹, L. Groppa¹, E. Russu¹, L. Chislari¹, V. Cazac¹

¹IP SMPU "Nicolae Testemițanu", Department of Internal Medicine, Discipline of Rheumatology and Nephrology, Chisinau, Moldova

Objective: There are numerous risk factors in the development and relapse of gout-associated nephrolithiasis, osteoporosis being one of particular importance. The increase of renal calcium and uric acid excretion is one of the important factors in the development and relapse of nephrolithiasis. In these patients, the BMD is lower, and there is a greater risk of osteoporosis related fractures. Our aim was to determine the risk factors of osteoporosis, and the relationship between osteoporosis and calcium excretion in patients with gout associated nephrolithiasis.

Methods: 100 patients (60 men and 40 women) with gout-associated nephrolithiasis have been included in the study. The subjects have been examined using questionnaires, serum and urine uric acid levels, serum and urine calcium levels, as well as instrumental methods of investigation (joint X-ray, DXA).

Results: Following the study, the prevalence of osteoporosis in the two study groups has proven that in 28 women (70%), the risk of developing the disease increases with onset of menopause, while in 24 (40%) men, the risk increases with the onset of metabolic syndrome and age. The decrease in BMD has been recorded more frequently in patients with nephrolithiasis at the age of 50 and older ($p=0.037$). With age, in patients with nephrolithiasis, an increasing daily excretion of calcium has been registered. The latter is characteristic both for patients without ($p=0.021$), and with risk factors for osteoporosis ($p=0.035$).

Conclusions: In patients with gout associated nephrolithiasis, the risk of osteoporosis is increased both in men and in women. The following risk factors have been determined ($p<0.05$): obesity, low vitamin D levels, age and menopause.

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POLYPHENOL CONTENT AND ANTIOXIDANT CAPACITY IN HERBAL REMEDIES WITH ANTI-OSTEOPOROTIC EFFECT

A. Pallag¹, F. Cioara¹, N. R. Suciu¹, T. Jurca¹, F. Marc¹

¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: Osteoporosis is a public health problem affecting a very large number of people. Phytotherapy in osteoporosis focuses on the use of herbal remedies with estrogenic properties and plants to help provide more calcium to the bones or help the body to produce the principles that help calcium absorption. In our previous studies we noticed that the most known and used plants in Romania with anti-osteoporotic effect are: *Achillea millefolium* (milfoil), *Equisetum arvense* (horsentail) and *Urtica dioica* (stinging nettle).

Methods: In this study we investigated some alcoholic extracts obtained from vegetal sources used by anti-osteoporotic action: *Achillea millefolium* (milfoil), *Equisetum arvense* (horsentail) and *Urtica dioica* (stinging nettle). We followed the level of antioxidant compounds and the

antioxidant capacity in the alcoholic extracts. The antioxidant compounds level was evaluated by using Folin-Ciocalteu method, for determination of total phenolic contents and a colorimetric method to evaluate the content of total flavonoids. Antioxidant capacity of the extracts was evaluated by using DPPH method (radical scavenging activity of plant extracts against stable 2,2-diphenyl-2-picryl-hydrazyl-hydrate), FRAP method (ferric reducing antioxidant power) and CUPRAC assay (Cupric ions (Cu²⁺) reducing power).

Results: Our results show that the studied medicinal plants possesses high levels of antioxidant substances and high antioxidant power. The amounts of total polyphenols is 73.94 mgGAE/100DW in case of *Achillea millefolium* (milfoil), 82.63 mgGAE/100DW in case of *Equisetum arvense* (horsentail) and 68.72 mgGAE/100DW in case of *Urtica dioica* (stinging nettle). The amounts of total flavonoids is 65.18 mgQE/100DW in case of *Achillea millefolium* (milfoil), 67.23 mgQE/100DW in case of *Equisetum arvense* (horsentail) and 57.16 mgQE/100DW in case of *Urtica dioica* (stinging nettle). Considering our extracts antioxidant capacity, the FRAP method shown 82.60 μ mol Trolox equivalent/gDW (TE) in case of milfoil, 84.16 μ mol Trolox equivalent/gDW (TE) in case of horsentail and 58.10 μ mol Trolox equivalent/gDW (TE) in case of stinging nettle. DPPH method shown 68.40% in case of milfoil, 77.30% in case of horsentail and 72.10% in case of stinging nettle. CUPRAC assay shown 71.40 μ mol Trolox equivalent/gDW (TE) in case of milfoil, 69.20 μ mol Trolox equivalent/gDW (TE) in case of horsentail and 67.83 μ mol Trolox equivalent/gDW (TE) in case of stinging nettle. Conclusions: The results showed that the extracts of *Achillea millefolium* (milfoil), *Equisetum arvense* (horsentail) and *Urtica dioica* (stinging nettle) are rich sources of phenolic compounds, flavonoids and phenolic acids, with antioxidant capacity and reducing power, which can contribute to improve the anti-osteoporotic effect of this herbal remedies. Phytotherapy in osteoporosis treatment is important due to the absence of secondary effects and because it can be used simultaneously with drug therapy.

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PERCEIVED LEVELS OF PAIN AND THEIR IMPACT ON EVERYDAY QUALITY OF LIFE IN PATIENTS WITH KNEE OSTEOARTHRITIS FOLLOWING DIFFERENT CONSERVATIVE TREATMENT OPTIONS

A. Bitzidis¹, M. Kyrou¹, N. Samaras¹, A. Koundoudis¹

¹Orthopaedic Department, Mpodosakeio General Hospital Ptolemaida, Ptolemaida, Greece

Objective: To evaluate the perceived levels of pain and their impact on everyday quality of life in patients with knee Osteoarthritis (OA) following different conservative treatment options.

Methods: From January 2016 until January 2017, we studied a cohort of 60 patients (11 males) with a mean age of 68.7 years (59-82) who have been diagnosed previously with primary knee OA according to the ACR criteria. [1] The patients were divided in 3 equal and similar groups regarding their characteristics of age, sex, weight and the OA Kellgren-Lawrence x-ray staging. Group 1 included 20 patients who followed the same treatment option with glucosamine sulphate 1.5 g OD. Group 2 contained patients who had an intra-articular injection with high molecular weight hyaluronic acid with chondroitin and in group 3 all patients had an intra-articular injection with a platelet rich plasma (PRP) preparation. Informed consent was obtained from all participating patients. We evaluated the visual analogue scale (VAS) for pain before and at 3 months since the application of the conservative treatment options. [2] In the same time the patients were asked to complete voluntarily and anonymously the SF-36 health survey, assessing their everyday quality of life. [3]

For the statistical analysis the t-test has been used and statistical importance was set at $p < 0.05$. Decimal values were not taken into account.

Results: The VAS score for all 60 patients before treatment had a mean value of 78 with $p < 0.01$. These values were within the higher values of descriptive term of moderate pain. Group 1 had a mean VAS score of 46 at 3 months of treatment and group 2 had a mean value of 32. Group 3 had a VAS mean score of 28. Regarding the patients' everyday quality of life, the mean SF-36 score before treatment was 46 with $p < 0.04$. Group 1 at 3 months had a score of 61, group 2 had a mean score of 75 and group 3 had a score of 78.

Conclusion: All patients had a moderate to severe chronic pain due to knee OA which affected their everyday activities and their quality of life. After the application of the 3 conservative treatment options, an important improvement has been obtained with more prominent for those who had an intra-articular injection with a PRP preparation.

References:

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A STUDY OF C-REACTIVE PROTEIN (HIGH SENSITIVITY AND METALLOPROTEINASE-DEPENDENT) AND ITS RELATION WITH SONOGRAPHIC SYNOVITIS IN PATIENTS WITH KNEE OSTEOARTHRITIS

R. Ahmed¹, M. Hassan², M. El Sergany¹, N. Soliman³, A. M. Helal²

¹Physical Medicine, Rheumatology and Rehabilitation Department, Faculty of Medicine, Tanta University, Tanta, ²Physical Medicine, Rheumatology and Rehabilitation Department, Faculty of Medicine, Alexandria University, Alexandria, ³Biochemistry Department, Faculty of Medicine, Tanta University, Tanta, Egypt

Objective: To determine the association between serum high sensitivity-C reactive protein (hs CRP), matrix metalloproteinase (MMP)-dependent degradation of CRP (CRPM) and sonographic synovitis in knee OA patients.

Methods: This case-control study was performed on Forty patients fulfilling the ACR classification criteria for primary knee OA from those attending the outpatient clinic of Rheumatology and Rehabilitation Department at Tanta University Hospitals. Subjects were informed about the nature of the study and an informed consent was taken. A control group of forty matching healthy subjects was enrolled in this study. The following data were obtained from all subjects: personal data, medical history for the present condition, BMI, complete clinical examination, functional assessment using the WOMAC index. Laboratory investigations included: hsCRP and CRPM. Ultrasonographic assessment using linear multifrequency transducer for assessment of joint inflammation grey scale synovitis and power Doppler signal.

Results: This study included two groups: forty patients and forty control subjects. In the patient group, there were 37 females and 3 males, the mean age was 51.5 ± 9.2 , 50% were housewives and the mean BMI was 32.7 ± 6.2 . In the patient group, there were 35 females and 5 males, the mean age was 46.6 ± 5.3 , 30% were housewives and the mean BMI was 32.8 ± 4.5 . The WOMAC questionnaire scores ranged between (5-112) and the median was 57. Sonographically, 29 patients had GS synovitis. Only 5 patients had a positive Doppler signal. There was a statistical significant difference between both groups as regards the serum levels of both the hs CRP and the CRPM. While there was no statistical significant correlation between hs CRP, CRPM and any of the above mentioned ultrasound parameters.

Conclusion: This study revealed a statistical significant difference between patient and control groups as regards the serum levels of both the hs CRP and the CRPM, while there was no association between sonographic synovitis and hs CRP nor CRPM.

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BONE DENSITY IN RHEUMATOID ARTHRITIS PATIENTS OF ARABIC ETHNICITY: DATA FROM RHEUMATOID ARTHRITIS REGISTRY IN QATARF. A. Alam¹, S. E. Al-Emadi¹¹Hamad Medical Corporation, Doha, Qatar

Objective: Rheumatoid arthritis (RA) is chronic inflammatory disease. Bone loss and fracture has been observed in this chronic disease. Multiple factors can contribute to bone loss in RA for example steroid use, immobility and chronic inflammatory stat. Data was taken from RA registry in Qatar and only patients of Arabic ethnicity were included in this study from period of June 2013 to November 2015. Our aim was to describe pattern of bone loss (osteoporosis and osteopenia) in RA patients of Arabic ethnicity, living in Qatar.

Methods: Rheumatoid arthritis patients of Arabic ethnicity, who underwent DXA scan for estimation of BMD, were included in this observational study. Patients were categorized based on T-score at L1-L4 vertebrae, femoral neck and total femur into osteoporosis and osteopenia. (T<-2.5 at any of the above site were categorized as osteoporosis and between -1 and -2.5 as osteopenia).

Results: Total of 152 patients fulfilled the inclusion criteria; 87.5% female, 47.4% Qatari national, 71.1% were rheumatoid factor positive, 76.3% anti-CCP positive and 40.8% had erosive disease. Mean age of the patients was 53.7; 61.8% of patients were above the age of 50. Decrease bone density was observed in 50.6% of the patients. Osteoporosis was present in 13.8% (2% younger than 50, 11.8% older than 50) and osteopenia in 36.8% (9.8% younger than 50, 27% older than 50). Around 30.9% patients were receiving medication for prevention of fracture (21.1% alendronate, 9.8% zoledronic acid). Concomitant steroid was used in 32.9% of patients. Ten patients (6.6%) had fragility fracture. Steroid use was significantly associated with osteoporosis, osteopenia and fracture.

Conclusion: Our observational study showed that half of our RA patients are having decrease bone density measured by DXA scan pointing towards the importance of regular assessment of bone health and early intervention in all RA patients irrespective of their ethnic background.

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INVESTIGATING MALNUTRITION AMONG CANCER PATIENTS RECEIVING CHEMOTHERAPY IN A TERTIARY CARE HOSPITAL OF PAKISTAND. R. Fatima¹, M. R. Zaidi²¹SKMC & RC, ²Wecare Medical Centre, Lahore, Pakistan

Objective: Cancer patients often suffer from malnutrition which raises the risk of infections. Being immunocompromised, there is a marked reduction on quality of life (QoL) and health outcome. Malnutrition also enhances the incidence of postoperative complications such as delayed wound healing, wound dehiscence, morbidities and mortalities. Our aim was to investigate malnutrition among cancer patients and to assess the nutritional status of patients receiving chemotherapy.

Methods: The study was conducted in Sir Ganga Ram Hospital, Lahore. Simple screening tool (short screening sheet) for malnutrition was used. Nutritional assessment of 80 patients receiving chemotherapy was done by assessing BMI, mid upper arm circumference MUAC, triceps skin-fold thickness TST, serum albumin, Total lymphocytes count. Nitrogen balance and intake of macronutrients were also analysed.

Result: According to full nutritional assessment, 42 patients (52.5%) out of 80 were found malnourished. Short screening sheet identified 51 patients as malnourished who were receiving chemotherapy. The SSM had a specificity of 0.88 and sensitivity of 0.72. 62% of the patients exhibited negative nitrogen balance.

Conclusion: Nutrition is the most neglected area of clinical care. Early nutritional support and counselling is essential in order to improve patients quality of life. Mass media should be involved so that adequate

attention can be given to nutritional issues arising in diagnostic and therapeutic procedures

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THE EFFECTS OF A 10-WEEK OTAGO EXERCISE PROGRAMME ON LOWER EXTREMITY STRENGTH, BALANCE AND FEAR OF FALLING IN A SAMPLE OF GREEK COMMUNITY-DWELLING ELDERLY PEOPLE: A PILOT STUDYM. Tsekoura¹, E. Billis¹, S. Varoucha¹, S. Ntaountaki², E. Tsepi¹, C. Matzaroglou¹¹Department of Physiotherapy, School of Health and Welfare, Technological Educational Institute of Western Greece, ²Department of Physiotherapy Department, School of Health and Welfare, Technological Educational Institute of Western Greece, Aigio, Greece

Objective: The purpose of this study was to explore the effects of the Otago exercise program (OEP) on lower extremity strength, balance and fear of falling (FoF) among Greek healthy individuals 65 years old and over.

Methods: Fifteen elderly people (13 women, 2 men, range 65-82, mean 71, 53±5.83 years) from an Open Care Center for Elderly in the city of Patras, Greece agreed to participate in the study. They enrolled in a group-based OEP, run twice a week for 10 weeks, under the supervision of two specialized in this area physiotherapists. The OEP is an evidence-based progressive exercise programme designed for the elderly (developed, evaluated, and disseminated in New Zealand), comprising of three domains; muscle strengthening, balance training, and walking. The measures completed pre and post intervention included knee muscle strength, as measured isokinetically (Biodex dynamometer), balance capacity as measured with the Berg Balance Scale and Falls Efficacy Scale-International (FES-I), walking capability measured with the timed-up and go (TUG) test, and function measured with a sit-to-stand test. Ethical approval was given by the Ethics Committee of the School of Health and Welfare of the Technological Educational Institute (TEI) of Western Greece. The study was conducted from January to March 2017.

Results: Exercisers showed significant improvement in measures of balance and FoF at the completion of the programme. Participation in the OEP resulted in statistically significant differences in TUG scores (p<0.00), FES-I score (p=0.03), Berg Balance scale (p=0.009) and sit to stand test (p=0.01). Lower extremity strength was improved but no statistically significant changes were noted in knee flexion and extension muscle strength, with the exception of left knee flexion strength (p=0.001).

Conclusions: Findings suggest that an organized twice-weekly, 10-week exercise programme can improve balance outcomes and FoF amongst elderly community-dwelling people. Since therapeutic exercise is a low-cost effective option, elderly population, should be encouraged to participate in community-based group exercise programs to maintain overall health and wellness and prevent future falls. Future studies should be conducted in a larger sample size and compare OEP against other recognized exercise programmes in order to further determine their benefits.

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SARCOPENIA AND QUALITY OF LIFE QUESTIONNAIRE (SARQOL®): GREEK CROSS CULTURAL ADAPTATIONM. Tsekoura¹, E. Billis¹, J. Gliatis², E. Tsepi¹, C. Matzaroglou¹, G. K. Sakkas³, C. Beaudart⁴, O. Bruyere⁴, E. Panagiotopoulos⁵¹Department of Physiotherapy, School of Health and Welfare, Technological Educational Institute of Western Greece, Aigio, Greece, ²Department of Orthopaedic Surgery, University Hospital of Patras, Rio, Greece, ³Faculty of Sport and Health Sciences, University of St Mark & St John, Plymouth, UK, ⁴Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium, ⁵Department of Spinal Cord Injuries, University Hospital of Patras, Rio, Greece

Objective: To translate and validate into the Greek language and setting the Sarcopenia and Quality of Life Questionnaire (SarQoL[®]).

Methods: The questionnaire was translated through a forward and backward translation procedure by 2 bilingual translators. For the validation procedure, participants over 60 years old, both sarcopenic and nonsarcopenic participated in the study. Subjects were recruited from two sites (University Hospital for sarcopenic and Physiotherapy laboratory for the nonsarcopenic ones). Subjects were requested to complete 3 questionnaires; the Greek SarQoL (SarQoL^{GR}) as developed in its final Greek version, and 2 generic ones already adapted into Greek, the SF-36 questionnaire and the EuroQoL 5-dimension (EQ-5D). Test-retest reliability was verified after a two-week interval using the intraclass correlation coefficient (ICC). At last, floor and ceiling effects were also tested. Ethical approval was given by the Ethical Committee of the School of Health and Welfare of the Technological Educational Institute (TEI) of Western Greece.

Results: 176 subjects (136 female, 40 male) with a median age of 71.19 (SD=7.95) participated in the study, 50 (28.4%) of which (36 women and 14 men) were diagnosed sarcopenic based on the algorithm developed by the European Working Group on Sarcopenia in Older People. The SarQoL^{GR} was found understandable, applicable and practical in administration, as all participants filled it without encountering any problems. SarQoL^{GR} mean score for sarcopenic subjects was 52.12±11.04 (range: 24.74–71.81) compared to 68.23±14.1 (range: 24.83–94.81) for nonsarcopenic ones ($p=0.001$). Neither a floor nor a ceiling effect was observed. The SarQoL^{GR} questionnaire data showed good correlation with some domains of SF-36 and the EQ-5D. Cronbach's α was 0.96, indicating a high level of internal consistency for the SarQoL^{GR}. An excellent agreement between test-retest of the SarQoL^{GR} was also yielded (ICC=0.96, 95%CI 0.95–0.97). For individual domains, the lowest ICC was found for domain of Fears (ICC=0.64, 95%CI 0.54–0.72).

Conclusions: SarQoL^{GR} is now available. Its psychometric properties indicate that it is a comprehensible, applicable, valid, consistent and reliable measurement tool for sarcopenic populations and can thus, be used across Greek populations and settings.

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STRAIN COUNTER STRAIN TECHNIQUE VS. KINESIOTAPE IN TREATING PATIENTS WITH MYOFASCIAL NECK PAIN SYNDROME

D. R. Abdelfattah¹, P. Katabei¹, P. Nasef¹

¹Faculty of Physical Therapy, Cairo University, Cairo, Egypt

Objective: To compare the effects of strain counter strain technique and kinesiotope on myofascial neck pain syndrome. Myofascial pain syndrome is one of the most common complaints in clinical practice. Strain Counter Strain technique is noninvasive therapeutic modality for treatment of soft tissue disorders. Kinesiotape is now widely used in management of musculoskeletal injuries.

Methods: Forty five patients with myofascial neck pain syndrome assigned randomly into: strain counter strain technique group (n=15), kinesiotope group (n=15) and control group (n=15). The strain counter strain technique was applied for two weeks (3 sessions/ week, 20 min per session). kinesiotope was applied for upper trapezius muscle for two weeks (3 d on and 1 d off). Pressure algometry, visual analogue scale and neck disability index were used to evaluate participants before and after the corresponding interventions. ANOVA was used to determine differences between groups for all measured parameters. Paired t-test was used to compare between the pre- and post-treatment values within groups.

Results: For the 45 study participants (33 women and 12 men; mean age=44.1±7 years) statistical analysis revealed that Subjects in strain counter strain technique and kinesiotope groups experienced significant increase in pressure pain threshold, decrease in neck disability scale and

pain level than those in the control group in favor of strain counter strain technique group ($p>0.05$).

Conclusions: The results suggest that treatment with strain counter strain technique and kinesiotope were effective however strain counter strain technique was more effective for management of myofascial neck pain syndrome.

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ANALYSIS OF SERUM LEVELS OF OPG AT 24 AND 48 HOURS IN PATIENTS WITH ACUTE CORONARY SYNDROME AND INFLAMMATORY JOINT DISEASE

V. Popova¹, Z. Vazhev², J. Peshev³, M. Geneva- Popova⁴, D. Paskaleva⁵, M. Ivanova⁴, K. Kraev⁴, J. Peeva⁶, Y. Ronchev⁷, A. Batalov⁴, M. Jelyazkova⁸, L. Peychev⁹

¹Medical University Plovdiv, Medical Faculty, Department of Rheumatology, ²Medical University Plovdiv, Medical Faculty, Department of Cardiac and Vascular Surgery, University Hospital "St. Georgi" EAD, Clinic of Cardiac Surgery, ³Medical University Plovdiv, Medical Faculty, Department of General and Clinical Pathology, ⁴Medical University Plovdiv, Medical Faculty, Department of Rheumatology, ⁵Department of Nursing Care, Medical University Plovdiv, ⁶Medical University of Plovdiv, Faculty of Public Health, ⁷Medical University Plovdiv, Medical Faculty, Department of Central Clinical Laboratory, ⁸Medical University Plovdiv, Faculty of Medicine, Department of Propedeutics of Internal Diseases University Hospital "Kastella" EOOD, Clinic of Rheumatology, ⁹Medical University Plovdiv, Faculty of Pharmacology, Plovdiv, Bulgaria

Objective: To investigate serum OPG levels at 24 and 48 h, study of CIMT and evaluation of early cardiovascular risk with GRACE score scale.

Methods: The study included 95 patients with ACS, of whom 46 with and 49 without IJD, mean age 69.59±7.22. Of these 46 patients with IJD, 23 were diagnosed with rheumatoid arthritis (RA) and 23 with psoriatic arthritis (PsA) with an average age of 68.74±7 and 49 patients without IJD (mean age 70.39±7.40). Control group of patients without IJD and ACS. Kits in the serum levels sOPG-sandwich ELISA, Detection range: 1-900 pg/mL. Sonographic study on the presence of carotid plaques at patient arrival - "Aloka Q7" ultrasound machine.

Results: It can be seen that there is a statistically significant difference between OPG, 24 h, $p<0.001$; OPG at 48 h, $p<0.001$. The OPG level at 24 h is highest in the IJD group (207.71 ng/ml), and the difference between this group and the group without IJD (99.30 ng/ml) is significant, $p<0.001$. The serum OPG level at 48 h again showed the highest value in the IJD group (143.36 ng/ml) with a significant difference with the group without IJD (69.38 ng/ml), $p=0.002$. On the other hand, there was no significant difference between the IJD group and the control (109.53 ng/ml), $p=0.513$. The lowest was in the non-IJD group (69.38 ng/ml), but the difference with the control group did not reach statistical significance, $p=0.060$.

Conclusion: The serum level of OPG/24h could be a predictive serum marker for early mortality and higher CVD risk in IJD.

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LP4, A LACTOFERRIN-DERIVED SMALL PEPTIDE REVERSES OSTEOPENIA VIA BMP2-OPG DEPENDENT PATHWAY

S. Pal¹, M. Sayeed¹, A. Kumar¹, M. K. Harioudh¹, K. Mitra¹, J. K. Ghosh¹, N. Chattopadhyay¹

¹Central Drug Research Institute, Lucknow, India

Objective: Lactoferrin has been reported to have potent mitogenic and anti-apoptotic actions on osteoblasts. We here report identification of a small peptide fragment of lactoferrin having osteo-anabolic effect.

Methods: Skeletally mature Sprague Dawley rats were used for femur osteotomy model and ovariectomy-induced osteopenia. Rat calvarial osteoblast cultures were used to assess osteoblast differentiation. μ CT, bone strength tester and ELISA kits were used for various measurements.

Results: We designed 3 small peptide fragments of lactoferrin and measured their effect on osteoblast differentiation. Out of three, one fragment, LP4 showed strongest osteogenic differentiation and the effect was significantly higher than lactoferrin. LP4 significantly enhanced BMP2, Runx2 and OPG expression and increased mineralization of bone marrow stromal cells. Noggin (an endogenous BMP2 inhibitor) completely blocked the effect of LP4 on osteoblast differentiation and OPG expression. This data suggests that LP4 mediates its effect via BMP2. We then assessed the skeletal effects of LP4. First, we determined the effective dose in a rat femur osteotomy model and found that LP4 had significant bone regenerative effect at 6 μ g/kg dose ($p<0.01$). Further, we treated skeletally mature osteopenic rats with LP4 for 90 d and significant bone restorative effect of LP4 was observed at 6 μ g/kg dose. LP4 significantly enhanced serum PINP ($p<0.05$), and partially suppressed serum CTX-1 ($p<0.05$). LP4 completely restored trabecular mineral apposition rate and bone formation rate up to the level of sham. We found that after 90 d, LP4 treatment serum OPG level was higher ($p<0.05$) compared to vehicle treated animals.

Conclusion: A small fragment of lactoferrin showed significant osteogenic activity likely via the induction of BMP2. LP4 also suppressed osteoclastic activation likely via the BMP2-OPG dependent mechanism. We conclude that LP4 could be a potential therapeutic agent for bone anabolic therapy.

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USE OF GLUCOCORTICOID IS AN INHIBITORY FACTOR FOR THE EFFECTS OF DENOSUMAB IN THE TREATMENT OF OSTEOPOROSIS

T. Koike¹, H. Yoshimura¹, K. Orita¹

¹Search Institute for Bone and Arthritis Disease (SINBAD), Shirahama Foundation for Health and Welfare, Shirahama, Japan

Objectives: Treat-To-Target (T2T) strategy is beginning to be regarded as a reliable strategy in osteoporosis treatment. To reach the target within the time, medicines with the ability to sufficiently increase BMD at a fast speed should be needed. Denosumab (DMAb) improves BMD rapidly and might be one of candidate drugs for T2T practice. It is very important to know inhibitory factors that attenuate the effect of DMAb in the treatment of osteoporosis. The aim of this study was to identify risk factors for inadequate response to the treatment of osteoporosis by DMAb.

Methods: Sixty-six patients treated with DMAb were observed retrospectively for one year. The mean age was 74 years old, women were 91% and 36 patients with rheumatoid arthritis (RA) were included. We measured BMDs at lumbar and hip by DXA (Hologic Discovery) at baseline and one year later. We evaluated the effects of age, BMI, use of glucocorticoid (GC), previous treatment for osteoporosis, BMD at baseline, bone metabolic markers (BAP; bone alkaline phosphatase, uNTx; urinary N-telopeptide) and the previous vertebral fractures for the response to DMAb. We defined the cases who could not gain the increase of BMD over 2% at the lumbar vertebrae and 4% at the hip as inadequate responders by taking the measurement error into account.

Results: Dose of GC was significantly higher in non-responder at non-RA trochanter and RA lumbar BMD ($p=0.028$, 0.006). BAP was higher in non-responder at RA lumbar BMD ($p=0.007$). Urinary NTX was significantly low in non-responder at non-RA lumbar and RA trochanter BMD ($p=0.026$, 0.048). Previous treatment for osteoporosis was significantly frequent in nonresponder at non-RA lumbar, total hip and trochanter BMD ($p=0.026$, 0.022 , 0.003). Multivariate logistic analysis including

age, BMI, dose of GC, BMD at baseline, BAP, uNTX as confounders revealed that dose of GC was the significant risk factors for no-response at lumbar BMD (OR0.634, 95%CI 0.433-0.93, $p=0.02$).

Conclusions: Patients receiving GC might not gain an adequate response to the treatment by DMAb for osteoporosis. Reducing dose of GC or alternative treatment regimen might be necessary.

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PASSIVE STATIC STRETCHING OF KNEE FLEXORS MUSCLES FOR JUMPING IMPROVEMENT

D. Sun¹, G. Fekete¹

¹Eötvös Loránd University, Szombathely, Hungary

Objective: To explore the biomechanical variations of vertical jump performance in middle school students with high sports level before and after passive static stretching (PSS) of knee flexors muscles and to further discuss how PSS influences vertical jump performance in order to provide a more effective warmup routine and theoretical basis for PE teachers and coaches.

Methods: 15 male middle school students, without any injury histories on lower limbs within 3 months, participated in this study. Subjects with markers on the lower limbs performed vertical jump performance before and immediately after PSS of knee flexors muscles, respectively. Vicon motion capture system was used to collect the kinematic data of lower limb and AMTI force platform simultaneously recorded the ground reaction force during vertical jump. SPSS 17.0 was used to calculate the differences between the vertical jump before and after PSS in terms of kinematic and kinetic data.

Results: The kinetic data showed that the peak value of ground reaction force before PSS was higher than the one after PSS when take-off. The flight time was significantly longer after PSS. Some significant differences had also been found in the kinematic data. In sagittal plane, the angles of greatest flexion for each joint (hip, knee, and ankle) after PSS were greater compared with these before PSS when take-off (hip: $p<0.05$; knee: $p<0.01$; ankle: $p<0.05$).

Conclusion: These results showed that the increased range of motion (ROM) of hip, knee, and ankle because of PSS could boost the explosive extension of lower limb during take-off, which can potentially improve vertical jump performance, although the peak value of ground reaction force for the vertical jump after PSS was lower. Therefore, the PSS applied only on knee flexors muscles may have an acute effect on enhancing the vertical jump performance for middle school students with high sports level and should be added to warm-up exercises in middle school sports class and sports training.

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SEVERE OSTEOPOROSIS IN A POSTMENOPAUSAL WOMAN WITH CONCURRENT TUBERCULOUS MENINGITIS

O.-S. Enache¹, S. Martin¹, M. Cotea¹, I. Bojoga¹, A. Sirbu¹, S. Fica¹

¹Elias Hospital, Bucharest, Romania

Objective: Osteoporosis is a common metabolic bone disease that lowers life quality and increases mortality of patients who suffer from osteoporotic fractures. Active tuberculosis can be a risk factor for osteoporosis. We present the case of a 49 years old woman (5 years postmenopause) recently diagnosed with tuberculous meningitis and severe osteoporosis. **Methods:** The patient had a history of lumbago, but no previous fractures. A lumbar spine MRI in November 2016 showed discal protrusions, but no vertebral fractures. In December 2016 patient presented with vomiting, severe headache and stiff neck. Lumbar puncture revealed tuberculous (TB) meningitis and anti TB drugs (HRZE 7/7) were initiated. She received associated glucocorticoid therapy (equivalent doses of prednisone: 30 mg/d 3 weeks, 15 mg/d 2 weeks, 5 mg/d 1 week). Due to aggravating lumbago, repeated MRI in March 2017 revealed L1 and L2 vertebral

fractures and in September 2017 thoraco-lumbar spine MRI uncovered T8-L5 vertebral fractures. She was referred to our clinic for diagnosis and management. Lumbar spine and left hip DXA showed severe osteoporosis (L1-L4 T-score=-4.8SD, Z-score=-4.4SD, neck hip T-score=-2.6SD, Z-score=-1.6SD). FRAX score: major osteoporotic fracture probability=7.8% and hip fracture probability=2.6%. Laboratory findings reveal a mild leukopenia (3820/ μ L), medium high ESR (35mm/1h), ACTH=8.45 pg/ml, 8 am plasma cortisol=35.8 μ g/dl, PTH=28.33 pg/ml, low 25-hydroxyvitamin D=18.4 ng/ml, calcemia=9.9 mg/dl, phosphatemia=4.3 mg/dl, alkaline phosphatase=94 U/L, osteocalcin=2.7 ng/ml and β -CrossLaps=0.91ng/ml, TSH=1.85 μ IU/ml, FT4=1.07 ng/dl. **Results:** Considering the severity and rapid progression of osteoporosis, treatment with teriparatide (prefilled pen with 28 doses of 20 μ g/80 μ l, sc daily) was started, as well as supplementation with 1 g calcium and 2000 IU of vitamin D3 daily.

Conclusion: Patients with unusually severe osteoporosis should be carefully evaluated for modifiable causes of osteoporosis and quickly receive proper treatment. In this case (menopause at the age of 44, glucocorticoid therapy for <3 months, no identifiable risk factors), tuberculosis might be the aggravating factor for osteoporosis.

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NEW CIRCULATING BIOMARKERS OF ENDOCRINE BONE FUNCTION IN PATIENTS WITH ACROMEGALY AND CUSHING'S DISEASE

T. Tsoriev¹, A. Iljin¹, L. Nikankina¹, L. Rozhinskaya¹, G. Melnichenko¹, Z. Belaya¹

¹The National Research Centre for Endocrinology, Moscow, Russia

Objective: Bone tissue is a nonclassical endocrine organ, which produces at least two hormones: fibroblast growth factor 23 (FGF-23) and decarboxylated osteocalcin (OC). Our aim was to evaluate the serum levels of biomarkers related to endocrine function of bone in patients with Cushing's disease (CD) and acromegaly.

Methods: Fasting serum samples were taken between 8-10 a.m. from patients with CD, acromegaly and age-, sex- and BMI-matched healthy volunteers and stored at -40° C. Commercially available kits for enzyme-linked immunosorbent assay (ELISA) were used to determine the serum levels of FGF-23, cofactor (coreceptor) Klotho, propeptide of type 1 procollagen N-terminal (PINP). IGF-1 was measured by the immunochemiluminescence assay, late-night salivary cortisol (LNSC), osteocalcin and C-terminal telopeptide of type 1 collagen (CTX) was evaluated using the electrochemiluminescence method. No-parametric tests (the Kruskal-Wallis test and the Mann-Whitney test) were used to assess the differences between the groups of patients.

Results: The study includes 78 patients, (37.6 years old, 95%CI 34.75-40.46): 29 patients with CD (group 1), 22 with acromegaly (group 2), and 27 healthy individuals (group 3), matched by sex, age and BMI (p=0.432, 0.373 and 0.725 between groups, respectively). LNSC in patients with CD and IGF-1 in patients with acromegaly were significantly higher compared to the control group (p=0.004 and p<0.001, respectively). In patients with acromegaly, a statistically significant increase in FGF-23 (1.13 (0.78;1.49) pmol/l vs. 0.78 (0.54;1.09)) pmol/l and phosphorus (1.38 (1.24;1.52) mmol/l vs. 1.16 (1.12;1.29)) mmol/l (p=0.01 and p<0.001, respectively) was observed along with statistically significant increased levels of all tested bone remodeling markers. FGF-23 levels correlates with IGF-1 p=0.483; p<0.001. In patients with CD, bone formation markers were suppressed (PINP 28.5 (18.0-44.0) ng/ml in CD vs. 56.50 (39.5-65.5) ng/ml in a control group p<0.001; osteocalcin 8.53 (5.4-12.41) ng/ml in CD vs. 22.45 (17.36-26.31) ng/ml in a control group), but differences in the levels of other biomarkers could not be identified. Klotho levels were not changed in all three groups of subjects.

Conclusion: Acromegaly leads to hyperphosphatemia and an increase in FGF-23, which is most likely due to the development of resistance to FGF-23, and the intensification of bone remodeling. With CD, another

bone hormone, osteocalcin, is suppressed along with the suppression of PINP.

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THE USEFULNES OF TRABECULAR BONE SCORE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

T. Yalochkina¹, N. Sasonova², T. Chernova², N. Tarbaeva², T. Tsoriev², L. Rozhinskaya², Z. Belaya²

¹City Polyclinic No. 219 Moscow City Health Department, ²The National Research Centre for Endocrinology, Moscow, Russia

Objective: To estimate the trabecular bone score (TBS) for evaluation of fracture probability in order to make decisions about starting osteoporosis treatment in patients with type 2 diabetes mellitus (T2DM).

Methods: We obtained BMD and TBS using DXA (iDXA, Lunar) in patients with T2DM (with and without a history of osteoporotic fractures) vs. the control group. Before and after TBS measurements, we assessed the 10-year probability of fracture using the Fracture Risk Assessment Tool (FRAX).

Results: we enrolled 48 patients with T2DM, including 17 with a history of low-traumatic fracture, 31 patients without fractures and 29 subjects of a control group. BMD was higher in patients with T2DM compared to the control group at L1-L4 (mean T-score 0.44, 95%CI -3.2 – 4.9 vs. mean T-score 0.33, 95%CI -2.9 – 3.0 in a control group p=0.052) and total hip (mean T-score 0.51, 95%CI -2.1 – 3.0 vs. mean T-score -0.03, 95%CI -1.4 – 1.2 in a control group p=0.025). The TBS and 10-year probability of fracture (FRAX) was not different in patients with T2DM vs. the control group before the TBS was entered as an additional risk factor. However, when the TBS was entered as an additional risk factor, the 10-year probability of fracture became higher in patients with T2DM (10-year probability of fracture in T2DM- 8.68, 95%CI 0.3-25.0 vs. 6.68, 95%CI 0.4-15.0 in control group, p=0.04). Among patients with diabetes with and without fractures the FRAX score was higher in subjects with fractures, but no difference was found in regards to BMD or TBS. Entering BMD and TBS values into the FRAX tool in subjects with diabetes and fractures decreased the FRAX score. However, patients with low-traumatic fractures should be treated for osteoporosis without a BMD, TBS or FRAX assessment.

Conclusion: TBS improves the results of FRAX assessment in patients with T2DM and should be entered while evaluating FRAX in patients with T2DM. However, additional research is needed to develop a more sensitive tool to evaluate fracture risk in patients with T2DM.

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AN EPIDEMIOLOGICAL STUDY OF HIGH-RISK FRACTURE IN COMMUNITY-DWELLING PEOPLE: ASSOCIATION WITH RISK OF OSTEOARTHRITIS AND FRAILTY

I. Chem¹, F.-P. Chen²

¹Kaohsiung Medical University, Kaohsiung City, ²Keelung Chang Gung Memorial Hospital, Keelung City, Taiwan

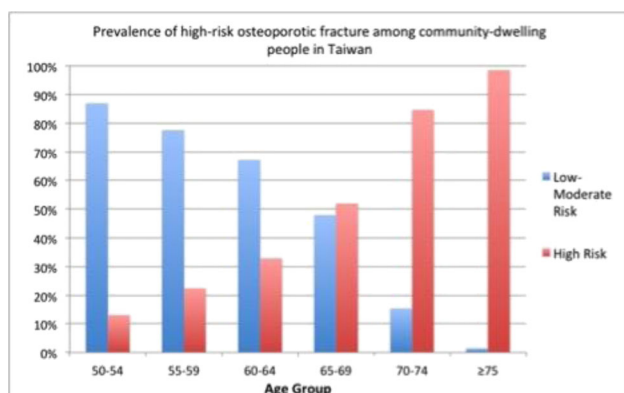
Objective: To assess the risk of osteoporotic fracture among community-dwelling people in Taiwan according to the Fracture Risk Assessment (FRAX) model and the association with the risk of osteoarthritis and frailty.

Methods: From January to December 2017, 3565 people aged 50 years and over (70.3% women and 29.7% men) were enrolled in various public health educational activities. A total of 64 of these public health educational activities were held across Taiwan during 2017. In this cross sectional study, data collection included FRAX (excluding BMD), heel ultrasound bone densitometry, clinical criteria for knee osteoarthritis (from the ACR), frailty index (components: weight loss, inability to rise from a chair, and poor energy (using the Study of Osteoporotic Fractures (SOF)

index)), and the Physical Health Questionnaire (PHQ-2). High risk of osteoporotic fracture was defined as a 10-year probability of hip fracture $\geq 3\%$, major osteoporotic fracture $\geq 20\%$, or heel ultrasound T-score ≤ -2.5 .

Results: 2301 people (65.3%: 1641 women, 658 men) were noted to have high risk of osteoporotic fracture. Stratified by age group, 68.0% of Taiwanese aged 55 years and older, 81.0% aged 65 years and older, and 98.6% aged 75 years and older are at high risk (Figure 1). Aside from increased age and female gender, knee osteoarthritis risk, frailty, depression, and fall were all also significantly associated with high risk of osteoporotic fracture.

Conclusion: With a significantly high prevalence of increased risk of osteoporotic fracture in the Taiwanese population, intensified efforts aimed at identifying and treating these high-risk fracture populations are needed. Additional expanded efforts to include those with risk of osteoarthritis, frailty, depression, and fall are also imperative so as to prevent fracture.



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DIFFERENCES IN SELF-PERCEIVED DISABILITY BETWEEN WOMEN AND MEN WITH CHRONIC LOW BACK PAIN

A. L. Knezevic¹, D. Vajagic¹, J. Mulaj¹, T. Vlajic¹, N. Levic¹, T. Davidovic¹, V. Jurisic¹, S. Visekruna¹

¹Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia

Objective: Chronic low back pain (CLBP) often limits functionality of patients. Differences between self-perceived disability between men and women with CLBP pain remain unclear. The objective of this research was to compare gender differences in self-perceived functionality.

Methods: This prospective study was conducted in the period from 2016-2017 at Medical Rehabilitation Clinic, Clinical Centre of Vojvodina. It included an overall of 119 patients, referred to the clinic for multimodal therapy of CLBP. Demographic data and present pain intensity on numerical rating scale (NRS) were collected at the moment of examination. In order to determine the level of perceived disability, Oswestry Disability Index (ODI) was used.

Results: There were more female patients in our sample (62 females (52.1%) vs. 57 males (47.9%)). Mean age was 52.56 $\pm$ 13.22 years (range 23-81 years), with no statistically significant differences in age between male and female patients (54.19 $\pm$ 11.65 vs. 50.79 $\pm$ 14.64 years, $t=1.396$, $p=0.166$). Mean reported present pain intensity at the moment of examination was 5.76 $\pm$ 2.29 on NRS. However, women reported significantly higher pain intensities than men (6.29 $\pm$ 2.33 vs. 5.18 $\pm$ 2.12, $t=2.722$, $p=0.007$). The mean score of ODI was 37.91 $\pm$ 15.55, with women

reporting significantly higher perceived disability (40.72 $\pm$ 17.71 vs. 38.84 $\pm$ 13.67, $t=2.091$, $p=0.039$).

Conclusion: Women with CLBP perceive significantly higher pain intensity and higher level of disability compared to men.

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SELF-PERCEIVED LEVEL OF DISABILITY AND PAIN INTENSITY IN CHRONIC LOW BACK, CERVICAL PAIN AND OSTEOARTHRITIS OF THE HIP, KNEE OR ANKLE

A. L. Knezevic¹, M. Jeremic-Knezevic¹, S. Tomasevic-Todorovic¹, K. Boskovic¹, J. Ivacic², S. Kevic³, D. Simic¹, J. Boban¹

¹Faculty of Medicine, University of Novi Sad, Novi Sad, ²General Hospital Senta, Senta, ³Medical Rehabilitation Clinic, Clinical Centre of Vojvodina, Novi Sad, Serbia

Objective: To test differences between various painful conditions in self-perceived level of disability and pain intensity, reported by patients.

Methods: This prospective study was conducted in the period from March 2016 till November 2016 in 274 patients, referred to clinic for multimodal therapy due to chronic pain conditions, divided in 4 groups: 130 with low back pain – I group, 25 with cervical pain – II group, 32 with hip, knee or ankle osteoarthritis – III group, and 87 patients who had both low back pain and cervical pain – IV group. Demographic data about patients were gathered. They filled out Oswestry disability index (ODI) and reported their present pain intensity.

Results: Majority of subjects were women (167 (60.9%)); mean age of the sample was 53.37 $\pm$ 12.85 years (range 18-81). There was significant difference in ODI scores between four groups of patients (36.45 $\pm$ 14.82 vs. 22.64 $\pm$ 15.44 vs. 24.88 $\pm$ 18.80 vs. 37.30 $\pm$ 17.53 respectively, $F=9.593$, $p<0.001$). Post hoc analysis showed that I and IV group scored significantly higher disability levels on ODI, compared to groups II and III. Pain intensity was also significantly different among tested groups (5.55 $\pm$ 2.19 vs. 4.88 $\pm$ 2.33 vs. 4.59 $\pm$ 2.37 vs. 6.22 $\pm$ 2.29 respectively, $F=5.167$, $p=0.002$). Post hoc analysis showed significantly higher pain intensities in groups I and IV, compared to groups II and III.

Conclusion: Patients with low back pain report higher pain intensities and perceive higher level of disability compared to patients with osteoarthritis of the hip, knee or ankle, and patients with cervical pain.

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GENDER DIFFERENCES IN PAIN INTENSITY AND NEUROPATHIC PAIN SYMPTOMS IN SUBJECTS WITH KNEE OSTEOARTHRITIS

J. Ivacic¹, A. L. Knezevic², M. Jeremic-Knezevic², S. Tomasevic-Todorovic², K. Boskovic²

¹General Hospital Senta, Senta, ²Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia

Objective: To test gender differences with knee osteoarthritis in perceived pain intensity and presence of neuropathic pain symptoms.

Methods: This prospective study was conducted in the period 2016-2017, on an overall of 200 patients, referred for physical therapy due to knee osteoarthritis. Demographic data about patients were gathered. Neuropathic component of the pain was tested using Douleur Neuropathique questionnaire with 4 questions (DN4). Patients were divided into two groups according to the results of this instrument (first group with DN4 scores <4 and the second with DN4 ≥ 4). All subjects reported their present pain intensity using numerical rating scale. All subjects had diagnosis of chronic pain defined as a pain lasting for at least 3 months.

Results: Majority of subjects were women (152 (76.0%)), mean age of the sample was 65.59 $\pm$ 12.33 years. 107 subjects scored ≥ 4 on DN4 (53.5%). Average pain intensity was 6.65 $\pm$ 2.14. There was no significant gender difference in frequency of subjects who scored DN4 ≥ 4 (54.6% vs.

50.0%, $\chi^2=0.311$, $p=0.621$). Although women perceived higher pain intensity, this difference did not reach statistical significance (6.80 ± 2.14 vs. 6.17 ± 2.10 , $t=1.807$, $p=0.072$).

Conclusion: There were no gender differences in pain intensity and neuropathic pain symptoms in patients with chronic pain due to knee osteoarthritis.

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THE QUALITY OF LIFE IN PATIENTS WITH OSTEOPOROSIS AND TOTAL HIP ARTHROPLASTY

V. M. Ciorte¹, I. M. Borda¹, R. A. Ungur¹, I. Onac¹, L. Irsay¹

¹Department of Medical Science, Medical Rehabilitation of "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca, Cluj-Napoca, Romania

Objective: Osteoporosis plays an important role in the rehabilitation of patients with hip endoprostheses, it is the most frequent cause of fractures in the elderly population and also, a defining element of ankylosing spondylitis and rheumatoid polyarthritis, being involved in potential intraoperative complications (iatrogenic fractures or acetabular protrusions), as well as postoperative complications (early prosthesis loss). The aim of the study is to demonstrate that the presence of osteoporosis delays the postoperative rehabilitation of patients with hip endoprostheses, which is why it is important to maintain increased BMD values immediately after the implant of the prosthesis, in order to avoid its subsequent loss, particularly after uncemented arthroplasty.

Method: The study was performed at the Clinical Rehabilitation Hospital Cluj-Napoca, in the period March 2008 - December 2009, in 66 patients aged between 44-84 years, with uni- and bilateral total cemented and uncemented hip prostheses. A standard study protocol was elaborated which included the information and enrollment of patients, the determination of the BMD of the spine and hips by DXA. The patients followed a recovery program with four weeks before surgery (lot I) and 12 weeks after surgery for hip arthroplasty (lot I and II). The patients were clinically evaluated using two scales: SF-36 and the QUALEFFO-41.

Results: The two scores were significantly correlated ($p<0.005$) with the diagnosis made based on DXA examination: normal BMD, osteopenia or osteoporosis; score values being higher as BMD was lower.

Conclusions: The quality of life of patients with hip arthroplasty is poorer in the case of decreased BMD compared to normal values (presence of osteopenia or osteoporosis).

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SEVERE POSTPARTUM SPINAL OSTEOPOROSIS WITH MULTIPLE COMPRESSION VERTEBRAL FRACTURES: A CASE PRESENTATION

A. Bitzidis¹, D. Zagoudinos¹, M. Kyrou¹, N. Samaras¹, A. Koundoudis¹

¹Orthopaedic Department, Mpodosakeio General Hospital Ptolemaida, Ptolemaida, Greece

Objective: To present a rare case of severe postpartum spinal osteoporosis with multiple vertebral compression fractures.

Methods: A 42 year old secundipara presented complaining of debilitating low back pain for the last month with no history of recent trauma. She was 3 months postphysiologic delivery exclusively breastfeeding her baby. Her pain started at the last month of gestation progressively worsening and was attributed to the expected musculoskeletal changes given her pregnancy. In regards with her relevant past medical history she had an uneventful first pregnancy 17 years ago, breastfeeding for 18 months. No other pathologic condition was noted. On examination she had a noted kyphosis on standing position and could walk only for a few meters. Her

pain intensity according to the visual analogue scale was severe giving a score of 86 (0-100). [1] She had tenderness over the low thoracic (T) and lumbar (L) spine with no neurological deficit. X-rays showed compression fractures of the T12, L2 and L3 vertebrae. A lumbar and left hip bone scan with DXA showed a Z-score of -3.2 and -2.5, respectively. [2] The endocrine and metabolic workup was within normal rates. She was advised to stop breastfeeding and apply a spine orthosis. She commenced anabolic anti-osteoporotic treatment with teriparatide and calcium with vitamin D supplementation. She was symptoms free at 4 months of therapy and at 1 year she had a lumbar Z-score of -2.3 and a left hip of -1.9. New X-rays done showed no new fractures. She voluntarily stopped her anti-osteoporotic treatment at that time and started regular exercise.

Conclusion: Osteoporosis associated with pregnancy and lactation is a less commonly known condition and it is often overlooked. We should recognize the potential risk of postpartum Osteoporosis and carefully differentiate back pain after delivery in order to prevent osteoporotic fractures.

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THE LIMITATIONS OF USING SIMPLE DEFINITIONS OF GLUCOCORTICOID EXPOSURE ON THE PREDICTION OF FRACTURE RISK

D. E. Robinson¹, T. P. van Staa², E. M. Dennison³, C. Cooper³, W. G. Dixon⁴

¹Arthritis Research UK Centre for Epidemiology, School of Biological Sciences Faculty of Biology, Medicine and Health, University of Manchester, Manchester, ²Health eResearch Centre, Farr Institute for Health Informatics Research, University of Manchester, Manchester, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ⁴Arthritis Research UK Centre for Epidemiology, School of Biological Sciences Faculty of Biology, Medicine and Health, University of Manchester, Manchester, UK

Objective: To evaluate the effects of different definitions of glucocorticoid (GC) exposure on the magnitude and pattern of fracture risk using the same dataset.

Methods: Data from patients with rheumatoid arthritis (RA) were extracted from the Clinical Practice Research Datalink, a primary care database with electronic health records in the UK. Patients exposed to oral GCs were matched to up to two unexposed patients by age, gender and location. The first osteoporotic fracture (locations: vertebral, hip, forearm, humerus, pelvis or rib) was identified with adjusted and unadjusted cox proportional hazard ratios (HR) and 95%CI produced for fracture risk following GC therapy using different models of risk attribution. These models included current daily dose (categories 0.1-4.9, 5-9.9, 10-14.9, 15-19.9, 20-24.9, 25+ mg prednisolone equivalent dose (PEQ)/day), cumulative dose (categories 0.1-0.9, 1-2.4, 2.4-4.9, 5-7.4, 7.5-10, >10 g PEQ) and times since discontinuation of GCs (categories current use, 1 day-1 month, 1-3 months, 3-6 months, 6 months-1 year, >1 year ago). Unexposed was the comparator for all models.

Results: There were 16,507 patients included of which 8357 contributed time to the exposed category. Approximately 70% of all patients were female and patients were followed for four years on average. Exposed patients were older, with higher BMI and more comorbidities. There were three key results. 1. Risk of fracture increases with current daily dose 1.44 (1.17, 1.77) for 5 to 9.9 mg PEQ to 3.02 (1.77, 5.15) for 15 to 19.9 mg PEQ. 2. Risk of fracture increases with cumulative dose, from 1.22 (1.03, 1.44) (0.1 to 0.9 g) to 1.83 (1.35, 2.48) (7.5 to 10 g), however the individual effects of dose and duration in this model were unclear. 3. Risk of fracture increased during the first month after discontinuation of GCs from HR (95%CI) 1.43 (1.21, 1.68) for current users to 1.66 (1.27,

2.16) before decreasing to non-significant levels 1.11 (0.79, 1.57) for those exposed between 1 and 3 months prior.

Conclusion: GC exposure was associated with excess fracture risk, but effect size differed according to definition of exposure, highlighting the need to incorporate multiple exposure dimensions in assessments of fracture risk in patients with RA using oral GCs.

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COMPARING CLINICAL AND ECONOMIC OUTCOMES OF DENOSUMAB AND TERIPARATIDE MEDICATIONS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

A. H. E. Elsalawy¹

¹Alnoor Specialist Hospital, Inpatient Medical Care Department, Makkah, Saudi Arabia

Objectives: Although therapeutic options for osteoporosis have expanded greatly over the past few decades, no single agent is able to restore skeletal integrity in most patients with advanced disease. Biologics are substantially more expensive than their conventional counterparts but it is unclear whether extra costs deliver better health outcomes. We compare clinical and economic outcomes between teriparatide daily subcutaneous administration (Monthly costs 505 \$) and denosumab six monthly subcutaneous administration (monthly costs 43 \$) among postmenopausal women with osteoporosis.

Methods: From a 50% random sample of patients followed in osteoporosis clinic at Alnoor Specialist hospital, we selected women newly diagnosed with osteoporosis between 1 January 2014 till 1 July 2016 and who initiated teriparatide or denosumab after the diagnosis. We followed them up until one of these events: switching osteoporosis treatment, death, or the end of study period – end of December 2016. Clinical outcomes included hip fracture, vertebral fracture, fracture of radius, ulna or carpal bones, other upper limb fractures, other lower limb fractures and any fracture. Economic outcomes included medical costs, pharmacy costs, and total costs associated with osteoporosis. Using conventional propensity score, high-dimensional propensity score and instrumental variable analysis, we constructed Cox proportional hazards models to evaluate the risk of fracture and two-part models to compare costs.

Results: Teriparatide users had higher risk of fracture and higher costs, compared with similar denosumab users. The hazard ratios of fracture for teriparatide relative to denosumab ranged from 1.37-2.12, depending on methods. There was no difference in the risk of hip fracture between treatment groups. Total annual costs related to osteoporosis were higher for teriparatide users.

Conclusions: Teriparatide is more expensive yet less effective than treatment with denosumab in postmenopausal osteoporosis with no difference of hip fracture prevention between treatment groups.

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MANAGEMENT OF PEDIATRIC AXIS FRACTURES: AN INSTITUTIONAL EXPERIENCE

P. Singh¹, D. Sawarkar¹, A. Kumar¹, S. Verma¹, D. Agarwal¹, S. Chandra¹, S. Kale¹

¹All India Institute of Medical Sciences, New Delhi, India

Objectives: Cervical spine injury (CSI) in paediatric age group are rare and unique as compare to adult age group. Our objective is to elucidate the mechanism of injury and the surgical treatment outcome of axis vertebra fractures in paediatric population.

Methods: 33 paediatric patients with C2 fracture who were admitted and underwent surgical management in a single trauma centre from January 2009 to June 2017 were retrospectively analysed. Medical records, radiographic findings, course in the hospital, neurological findings before and after the surgical treatment were reviewed. Mode of injury, type of fractures, age wise distribution, types of treatment given and outcome were

analysed. Patient up to 18 years of age were included in the study. Patients were divided into three groups (5-9 years, 10-14 years, 15-18 years). In 0-4 years group there was no patient. Patient with only subluxation without fracture were excluded from the study. 5 patients whose radiographic data were not available were excluded in surgical outcome analysis. Special attention was given to the surgical approach and the outcome.

Results: Out of a total of 33 patients, 16 had fall from height, 15 had road traffic accident (RTA) and 1 had electric shock and 1 was due to neck scarf caught in machine. Over all 30 were male and 3 were female. 18 patients were in the 15-18 years group, 10 in the 10-14 years group and 5 in the 5-9 years group. There were 24 odontoid type II fractures, 2 odontoid type III fractures and 7 Hangman fractures. 28 patients were analysed for surgical outcome. 5 were excluded due to non-availability of radiological data in our data base. One patient expired in the same admission. No other patient had neurological deterioration post operatively. One patient had surgical site infection. One patient expired after 1 year of discharge.

Conclusion: We have demonstrated that surgical management is a viable option in the management of C2 fracture with a favourable outcome. Fall from height is found to be a common cause of injury in the younger paediatric age group even more than road traffic accident. Congested urban dwelling, type of building, lack of playground and the habit of playing in the rooftop may be a contributing factor which needs further study. Coming out with an awareness campaign will go a long way in preventing precious loss of life and limbs in this tender age group.

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THE EFFECT OF ESTROGEN THERAPY ON BONE DENSITY: A THIGH BONE SHAFT PERIPROSTHETIC FRACTURE IN A PATIENT WITH GONADAL DYSGENESIS – CLINICAL CASE PRESENTATION

A. Holub¹, J. Marante Fuertes², A. Pérez Alcántara³

¹Primary Care Center La Granja, Jerez de la Frontera, ²University of Cádiz, General Hospital in Jerez de la Frontera, ³General Hospital in Jerez de la Frontera, Cádiz, Spain

Objectives: Turner syndrome (TS) is a congenital disease caused by partial or complete loss of one sex chromosome, which occurs in 1:2500 female live births. One of the major comorbidities in TS is bone fragility. The mechanisms underlying bone impairment in affected patients are not clear, but estrogen deficiency and X-chromosomal abnormalities represent important risk factors. The aim of our work is to present of the most frequent comorbidities of TS treated with estrogen therapy that is a bone fracture with the peculiarity of being periprosthetic, in that case. We also put a special emphasis on the treatment and prevention of this kind of fractures.

Methods: 29- year old female diagnosed with TS and medical history of lumbar and thoracic spine surgery and bilateral femoral shaft fracture 5 years ago treated with plate osteosynthesis suffers a fatal fall in her bathroom and arrives at the emergency room with inability to walk and severe pain in her left lower limb. Clinical Findings: Examination: unilateral thigh pain exacerbated by activity, with motion of her left lower limb limited. Glasgow Coma Score 15. Normotensive. No head, thoracic or abdominal injury. No neurovascular deficit in the lower limb were found. Results: Radiological examination revealed: left displaced femoral shaft fracture just right above the proximal extremity of the plate that stabilized the previous femoral fracture of the patient. Diagnosis: Displaced femoral shaft peri- implant fracture in the left limb. Therapy and Progression: We proceed to the fracture fixation: as a first step challenge was the extraction of the metal plate uses in previous the surgical treatment requiring the high speed surgical motor system to remove the screws. During the surgery physiological saline solution was required in high amount for irrigation. As a second step we used antegrade intramedullary nailing.

Conclusions: Patients with TS have increased fracture risk and decreased bone density. Bone fragility is recognized as one of the major

comorbidities in TS so that it is crucial to prevent fractures in those patients. It is frequent to find periprosthetic and peri-implant fractures in those patient and the goals of treatment include surgical stabilization, implant replacement, or both to restore function. Strategies to prevent osteoporosis and fractures should be considered in TS subjects, just during pediatric age however supplementation of vitamin D and active lifestyle, including weight bearing and regular physical activity, could confer benefit in maintaining bone health in TS.

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BUROSUMAB, AN ANTI-FGF23 MONOCLONAL ANTIBODY, FOR X-LINKED HYPOPHOSPHATEMIA (XLH): ANALYSIS BY AGE FROM TWO PHASE 2 PEDIATRIC TRIALS

R. Padidela¹, T. O. Carpenter², E. Imel³, A. A. Portale⁴, A. Linglart⁵, W. Högl⁶, A. Boot⁷, W. Van't Hoff⁸, G. S. Gottesman⁹, M. Mao¹⁰, A. Skrinar¹⁰, J. San Martin¹⁰, M. P. Whyte⁹

¹Royal Manchester Children's Hospital, Manchester, UK, ²Yale School of Medicine, New Haven, USA, ³Indiana University School of Medicine, Indianapolis, USA, ⁴University of California, San Francisco, San Francisco, USA, ⁵Hôpital Bicêtre, Le Kremlin-Bicêtre, France, ⁶Birmingham Children's Hospital, Birmingham, UK, ⁷University of Groningen, Groningen, The Netherlands, ⁸Great Ormond Street Hospital, London, UK, ⁹Shriners Hospitals for Children, St Louis, USA, ¹⁰Ultragenyx Pharmaceutical Inc., Novato, USA

Objective: We evaluated efficacy and safety of burosumab, a fully human monoclonal antibody against fibroblast growth factor 23, in children with XLH of different age groups in two Phase 2 trials.

Methods: In study CL201 (NCT02163577), 52 children with XLH (5-12 years old [yrs], Tanner ≤ 2 at baseline) were randomized 1:1 to receive subcutaneous (SC) burosumab every two (Q2W) or four (Q4W) weeks for 64 weeks. Doses were titrated up to a maximum of 2 mg/kg to achieve serum phosphorus levels within 1.1-1.6 mmol/dL. In study CL205, 13 children with XLH, 1-4 yrs, received SC burosumab 0.8 mg/kg Q2W, or increased to 1.2 mg/kg if serum phosphorus remained low. A key efficacy endpoint for both studies was change in rickets severity assessed radiographically by blinded readers using the Thacher Rickets Severity Score (RSS) and Radiographic Global Impression of Change (RGI-C).

Results: Results are reported by baseline age: 1-4 yrs (Study CL205: n=13), 5-7 yrs (CL201: Q2W n=6, Q4W n=7), 8-9 yrs (CL201: Q2W n=12, Q4W n=12), and 10-12 yrs (CL201: Q2W n=8, Q4W n=7). Mean burosumab dose at week 40 in CL201 and CL205 was ~1mg Q2W. Dose for Q2W or Q4W did not differ substantially by age. Regardless of dosing regimen, mean increases in serum phosphorus (range +0.1 to +0.4 mmol/dL) and 1,25(OH)2D (range +28.9 to +109.7 pmol/L) occurred in all age groups by week 40. Serum alkaline phosphatase (ALP) decreased across all age groups. At week 40, Total RSS was reduced across all age groups; rickets as assessed by RGI-C improved. A subject in each study experienced a serious adverse event (AE): hospitalization for fever/muscle pain that resolved within a day in CL201 and a dental abscess in CL205. Other AEs were generally mild to moderate in severity. No clinically meaningful changes in serum calcium or PTH levels occurred. No subjects discontinued therapy or developed hyperphosphatemia.

Conclusions: Treatment response was consistent across age groups. Burosumab was associated with increases in serum phosphorus, decreases in ALP, and improvements in rickets in children 1-12 yrs with XLH.

Table 1. Bone Efficacy Assessments from UX023-201 and UX023-205 by Age Group at Week 40

Age at Baseline (Study)	1-<5 years (CL205)	5-<8 years (CL201)	8-<10 years (CL201)	10-12 years (CL201)
Regimen (n)	Q2W (13)	Q2W (6) Q4W (7)	Q2W (12) Q4W (12)	Q2W (8) Q4W (7)
Serum ALP				
Baseline	549 ± 54	446 ± 23	462 ± 24	466 ± 27
Week 40	335 ± 24	384 ± 29	391 ± 18	412 ± 27
Change	-213 ± 14 ^a	-63 ± 23 ^b	-70 ± 20 ^c	-54 ± 19 ^b
Total RSS				
Baseline	2.9 ± 0.4	1.2 ± 0.2	1.9 ± 0.3	2.2 ± 0.2
Week 40	1.2 ± 0.1	0.9 ± 0.1	1.0 ± 0.1	0.8 ± 0.1
Change	-1.7 ± 0.1 ^a	-0.4 ± 0.1 ^a	-0.9 ± 0.1 ^a	-1.4 ± 0.1 ^a
RGI-C	+2.3 ± 0.1 ^a	+1.5 ± 0.2 ^a	+1.5 ± 0.1 ^a	+1.7 ± 0.1 ^a

^ap<0.0001; ^bp<0.05; ^cp<0.01; P-value is based on change from baseline and not a comparison between age groups. Baseline and Week 40 values are reported as mean ± SE. Change refers to least squares mean ± SE change from baseline. ALP, Alkaline Phosphatase (U/L); Q2W, Every 2 Weeks; Q4W, Every 4 Weeks; RSS, Rickets Severity Score; RGI-C, Radiographic Global Impression of Change.

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P309

BONE RELATED PLASMA MICRORNA EXPRESSIONS IN PATIENTS WITH CUSHING'S DISEASE

T. Grebennikova¹, Z. Belaya¹, A. Nikitin², A. Solodovnikov³, L. Rozhinskaya¹, G. Melnichenko¹, I. Dedov¹

¹The National Research Centre for Endocrinology, Moscow, ²Federal Research and Clinical Center FMBA of Russia, Moscow, ³Ural State Medical Academy, Ekaterinburg, Russia

Objective: MicroRNA (miR) are a class of small non-coding RNA that regulate gene expression and bone tissue homeostasis. They are considered a new class of endocrine regulators with promising potential as biomarkers. Our aim was to evaluate circulating miR signatures in patients with glucocorticoid-induced osteoporosis due to Cushing's disease (CD).

Methods: This was a case-control study of 24 patients with active CD and 18 healthy control subjects matched by age, sex and BMI. The fasting blood samples were collected in the morning; centrifuged twice for 15 min at a temperature of +5°C at 3000 rpm for 20 min. Plasma samples were frozen and stored at -80°C. Twenty-eight miRs which were previously reported to be involved into bone remodeling regulation (hsa-miR-22-3p; hsa-miR-27a-3p; hsa-let-7g-5p; hsa-miR-96-5p; hsa-miR-320a; hsa-miR-10b-5p; hsa-miR-550a-5p; hsa-miR-100-5p; hsa-miR-21-5p; hsa-miR-328-3p; hsa-miR-26a-5p; hsa-miR-34a-5p; hsa-miR-155-5p; hsa-miR-191-5p; hsa-miR-203a-5p; hsa-miR-211-5p; hsa-miR-125b-5p; hsa-miR-199a-5p; hsa-miR-148a-3p; hsa-miR-550b-2-5p; hsa-miR-133a-5p; hsa-miR-9-5p; hsa-miR-21-3p; hsa-miR-27a-5p; hsa-miR-135a-5p; hsa-miR-188-3p; hsa-miR-31-5p; hsa-miR-122-5p) were quantified in plasma by qPCR, compared between groups and correlated with established bone remodeling markers. Twenty-four hours urine free cortisol (24hUFC) was measured by an immunochemiluminescence assay on a Vitros ECi (60-413 nmol/24h).

Results: We enrolled 24 patients with CD and 18 healthy control subjects who were matched by age (35 (95%CI 29-42) vs. 35 (30-39)) $p=0.722$, sex $p=0.371$ and BMI $p=0.07$. Patients with CD had 24hUFC -1305 (870-1740) nmol/24h. We found a significant difference in the expression of miRs in patients with CD vs. healthy control subjects in plasma: miR-22-3p $p=0.03$; $q=0.038$; miR-27a-3p $p=0.005$; $q=0.038$; let-7g-5p $p=0.005$; $q=0.038$; miR-96-5p $p=0.05$; $q=0.038$; miR-320a $p=0.009$; $q=0.05$; miR-10b-5p $p=0.015$; $q=0.061$; miR550a-5p $p=0.013$; $q=0.061$; miR-100-5p $p=0.024$; $q=0.085$; miR-21-5p $p=0.033$; $q=0.091$; miR-328-3p $p=0.031$; $q=0.091$; miR-26a-5p $p=0.044$; $q=0.113$ were upregulated. The difference found in plasma samples did not correlate with the changes in miR expression of bone tissue samples. However, significant negative correlations were found between reported miRs and serum osteocalcin levels.

Conclusions: The differences in miR expressions, which previously had been reported as regulators of osteogenic differentiation, indicate that miR may be promising biomarkers, but their role in circulation should be further investigated

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P310

DIFFERENTIAL RESPONSE OF BONE AND KIDNEY TO ACEI IN DB/DB MICE: A POTENTIAL EFFECT OF CAPTOPRIL ON ACCELERATING BONE LOSS

Y. Zhang¹, N. Chen¹, M.-C. He¹, N.-N. Sha¹, Q. Shi¹, Y.-J. Wang¹

¹Spine Disease Research Institute, Longhua Hospital, Shanghai University of Traditional Chinese Medicine, Shanghai, China

The components of renin-angiotensin system (RAS) are expressed in the kidney and bone. Kidney disease and bone injury are common complications associated with diabetes. This study aimed to investigate the effects of an angiotensin-converting enzyme inhibitor, captopril, on the kidney and bone of db/db mice. The db/db mice were orally administered by gavage with captopril for 8 weeks with db/+ mice as the non-diabetic control. Serum and urine biochemistries were determined by standard colorimetric methods or ELISA. Histological measurements were performed on the kidney by periodic acid-Schiff staining and on the tibial proximal metaphysis by safranin O and Masson-trichrome staining. Trabecular bone mass and bone quality were analyzed by microcomputed tomography. Quantitative polymerase chain reaction and immunoblotting were applied for molecular analysis on mRNA and protein expression. Captopril significantly improved albuminuria and glomerulosclerosis in db/db mice, and these effects might be attributed to the downregulation of angiotensin II expression and the expression of its downstream profibrotic factors in the kidney, like connective tissue growth factor and vascular endothelial growth factor. Urinary excretion of calcium and phosphorus markedly increased in db/db mice in response to captopril. Treatment with captopril induced a decrease in BMD and deterioration of trabecular bone at proximal metaphysis of tibia in db/db mice, as shown in the histological and reconstructed 3-dimensional images. Even though captopril effectively reversed the diabetes-induced changes in calcium-binding protein 28-k and vitamin D receptor expression in the kidney as well as the expression of RAS components and bradykinin receptor-2 in bone tissue, treatment with captopril increased the osteoclast-covered bone surface, reduced the osteoblast-covered bone surface, downregulated the expression of type 1 collagen and transcription factor runt-related transcription factor 2 (markers for osteoblastic functions), and upregulated the expression of carbonic anhydrase II (marker for bone resorption). Captopril exerted therapeutic effects on renal injuries associated with type 2 diabetes but worsened the deteriorations of trabecular bone in db/db mice; the latter of which was at least in part due to the stimulation of osteoclastogenesis and the suppression of osteogenesis by captopril.

P311

SURGICAL OUTCOME OF ATYPICAL SUBTROCHANTERIC AND FEMORAL FRACTURE RELATED TO BISPHOSPHONATES USE IN OSTEOPOROTIC PATIENTS WITH OR WITHOUT TERIPARATIDE TREATMENT

L. Tungyi¹, S. Chunyi¹, F. Tsaisheng¹, Y. Wenling², C. Lihuei²

¹Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, Keelung branch, Keelung, ²Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, Linkou branch, Taoyuan, Taiwan

Objectives: Atypical subtrochanteric fracture and femoral fracture have been considered to be rare complications related to long-term bisphosphonates use. A reduced bone turnover rate may lead to delayed bone healing. Limited data have revealed that teriparatide treatment may reverse the effect of bisphosphonates and be effective in bone healing.

Methods: We reviewed patients with atypical subtrochanteric and femoral fracture related to bisphosphonates use between January 2008 and December 2014. Thirteen female patients were enrolled. Radiographic findings were compatible with the characteristics of atypical fracture. Surgical intervention was performed for all, and teriparatide use was advised postoperatively. Outcome measures included perioperative results, and clinical and radiographic outcome.

Results: Of the 13 female patients enrolled, 10 had subtrochanteric and 6 had proximal femoral fracture; 3 had bilateral fractures. The mean age of the patients at surgery was 70.15 ± 6.36 years. Most fractures (68.8%) presented prodromal thigh pain. All patients were treated with an intramedullary fixation system without severe complications. The patients were divided into 2 groups based on whether they had received treatment with teriparatide or not. The mean time to bone union was 4.4 months in the teriparatide-treated group, and 6.2 months in the non-teriparatide-treated group ($p=0.116$). Six patients (75%) in the teriparatide-treated group and 4 (50%) in the non-teriparatide-treated group ($p=0.3$) achieved bone union within 6 months. The means of the modified Harris Hip Score and Numerical Rating Scale were significantly better in the teriparatide-treated group at postoperative 6 months. Seven patients had the same ability to walk at the 1-year follow-up as they did before the atypical fracture.

Conclusions: Teriparatide treatment in patients with atypical fracture may help in fracture healing, hip function recovery, and pain relief in this reduced bone turnover patient group.

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EFFICACY OF MODIFIED ROBERT JONES BANDAGE ON REDUCING INVISIBLE BLOOD LOSS AFTER TOTAL KNEE ARTHROPLASTY: A RANDOMIZED CONTROLLED TRIAL

A. Pornrattanamaneewong¹, D. R. Ruangsomboon¹, A. Chareancholvanich¹, A. Narkbunnam¹, A. Wilairatana²

¹Mahidol University, Department of Orthopaedics Surgery, Siriraj Hospital, ²Chulalongkorn University, Department of Orthopaedics Surgery, Chulalongkorn Hospital, Bangkok, Thailand

Objective: To compare the efficacy and safety of modified Robert Jones bandage (MRJB) and non-compressive dressing (NCD) on reducing invisible blood loss (IBL) after total knee arthroplasty (TKA).

Methods: Eighty patients who underwent unilateral TKA were randomly assigned into two groups; MRJB and NCD groups. Pre- and post-operative hematocrit levels, amount of drained blood and transfused blood were measured and calculated into IBL. Pain score, amount of morphine usage, range of motion (ROM) at discharge, blood transfusion rate and complications were also recorded and compared between both groups.

Results: There was no significant difference in the mean IBL between MRJB (221.2±233.3 ml) and NCD groups (158.5±186.7 ml) ($p=0.219$). Postoperative pain score at rest and during ambulation, amount of morphine usage, ROM at discharge, blood transfusion rate and complications were also similar between two groups.

Conclusions: This study cannot determine the benefit of MRJB over NCD. The use of MRJB may not be necessary after primary TKA.



P313

THE COSTS OF FEMORAL NECK FRACTURE PATIENTS TREATED WITH INTERNAL FIXATION IN MAKKAH SAUDI ARABIA: LOCAL EXPERIENCE FROM ALNOOR SPECIALIST HOSPITAL

S. F. Z. Zidan¹, A. H. E. Elsalawy²

¹Alnoor Specialist Hospital Holly Makkah, Orthopedic Department,

²Alnoor Specialist Hospital, Inpatient Medical Care Department, Makkah, Saudi Arabia

Objective: The study rationale was to provide a detailed overview of the costs for femoral neck fracture treatment with internal fixation in Makkah. Mean total costs per patient at 2-years follow-up were SR 80,000. Costs were higher for older, less healthy patients. Results are comparable to internationally published costs. The aim of this study was to provide a detailed overview of the cost and healthcare consumption of patients treated for a hip fracture with internal fixation. A secondary aim was to compare costs of patients who received treatment of osteoporosis to prevent second fragility fracture.

Methods: The study was performed among 600 patients, concerning femoral neck fracture treated with internal fixation. Patient characteristics and healthcare consumption were collected. Total follow-up was 2 years. Costs included hospital costs during primary stay and follow-up, and costs related to rehabilitation and changes in living situation. Costs were compared between nonrevision surgery patients, implant removal patients, and revision arthroplasty patients.

Results: A total of 600 patients were included (mean age 65 years). Mean total costs per patient at 2-years follow-up were SR 80,000. The main contributing costs were related to the primary surgery, admission days,

physical therapy, and revision surgeries, the cost nearly SR 100,000 in case of second fracture.

Conclusions: The main determinant was the costs of admission to a rehabilitation center/nursing home. Costs were specifically high in elderly with co morbidity, who were less independent pre-fracture, and have a longer admission to the hospital and/or a nursing home. Costs were also higher in revision surgery patients. The 2-years follow-up costs in our study were comparable to published costs in other societies.

P314

OSTEOPOROSIS AND ATHEROSCLEROSIS

L. L. Lagvilava¹, L. K. Kilasonia², N. D. Dolidze³, T. S. Shaburishvili¹, M. K. Kopaliani¹, T. R. Rukhadze¹

¹"Tbilisi Heart and Vascular Clinic" Ltd, ²Tbilisi State University,

³National Institute of Endocrinology, Tbilisi, Georgia

Objectives: Rising statistics of extraskeletal calcifications and osteoporosis lead to a profound research in order to link molecular correlations between aortic calcifications and osteoporosis. Growing number of investigations have revealed cross-expressions of regulatory proteins controlling bone resorption and atherosclerotic plaque formation. The aim of our study was to assess frequency of osteoporosis in patients with atherosclerosis.

Method: 8000 patients – 4800 women and 3200 men, age range 43-75 years. Coronary atherosclerosis diagnosis and its progression was studied from 2015-2017. Diagnostic sequence consist of echocardiography, coronarography and lipid profile parameters.

Results: In 80% (6400) of patients with confirmed diagnoses of atherosclerosis, osteoporotic changes have found, the numbers are much higher than general occurrence of osteoporosis in Georgian population ($p<0.01$). 2780 patients received antiosteoporotic treatment 43% started denosumab 60 mg subcutaneous injection once in 6months, 57% bisphosphonates: PO and IV infusions, respectively.

Conclusion: 1. The distribution and spread of osteoporosis among research group has not shown any differences in age and gender. 2. Denosumab showed 76% efficacy for the treatment of osteoporosis. 3. Group treated with denosumab has showed not only increase BMD numbers, but also positive outcomes on those in contrast to group treated with bisphosphonates. 4. Denosumab influence on the progression or regression of atherosclerosis in under discussion.

P315

TWO-YEAR RESULTS OF A TWO-DAY EDUCATIONAL PROGRAM ABOUT OA PARQVE II (PROJECT ARTHRITIS RECOVERING QUALITY OF LIFE BY EDUCATION) IMPROVES FUNCTION, STRENGTH AND QUALITY OF LIFE IN RESPECT TO USUAL CARE

M. U. R. Rezende¹, N. L. B. Brito², M. I. H. Hissadomi², A. F. P. Pailo², R. F. Frucchi², T. P. Pasqualin², F. E. S. Farias², C. A. S. Silva², C. H. C. Cernigoy², O. F. S. Santana², M. M. M. Marins², O. P. C. Camargo²

¹Orthopaedics and Traumatology Department, University of Sao Paulo General Hospital, ²Orthopaedics and Traumatology Department, University of Sao Paulo General Hospital, Sao Paulo, Brazil

Objective: Education is considered by most guidelines as one of the core treatment aspects of knee osteoarthritis (KOA). The aim of this study was to compare the results of standard care with and without a two-day educational program.

Methods: Prospective randomized clinical trial with 192 patients with grades II and III K&L KOA allocated to two groups: control (usual care) and intervention (usual care and 2 days of lectures, two

month apart, about OA with a multiprofessional group). Visual analogue scale (VAS), WOMAC, Lequesne, SF-36 questionnaires (physical, PCS, and mental, MCS, components) and measures such as BMI, body fat percentage (BFP), Timed-up-and-go (TUG) and Five Times Sit-To-Stand Test (FTSST) were taken at baseline, six, 12 and 24 months.

Results: Groups were similar at baseline in all parameters ($p>0.05$) but lean weight ($p=0.048$) and TUG ($p=0.01$), where the control group had higher lean mass and performed TUG in a shorter period of time. The follow-up results suggest different behavior of the groups throughout the evaluation moments for almost all the parameters. Both groups improved WOMAC pain, stiffness, function and total scores throughout the study period ($p<0.001$) but the intervention group improved more in WOMAC pain, function and total ($p=0.001$, $p<0.001$, and $p<0.001$, respectively). VAS and PCS scores also varied between groups ($p<0.001$ and $p=0.004$, respectively) favoring the intervention group with the exception of the two-year VAS evaluation where the results favored the control group ($p=0.008$). Both groups improved Lequesne ($p<0.001$) and the MCS ($p=0.018$) similarly ($p=0.099$ and $p=0.783$, respectively), with the Lequesne scores being higher in all moments of evaluation in the control group ($p=0.030$). BMI did not differ in the study ($p>0.005$), BFP diminished between one and two-year evaluations in both groups ($p=0.034$) and lean weight remained higher in all time points in the control group ($p=0.027$). Both groups improved TUG and FTSST ($p<0.001$) but with differences between groups ($p=0.012$ e $p=0.037$, respectively) favoring the intervention group.

Conclusions: In relation to usual care, this two-day educational program improved pain, function, physical quality of life as well as objective measures of strength such as TUG and FTSST. This program did not lead to clinically relevant changes in BMI.

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THE MODIFIED ROBERT JONES BANDAGE DOES NOT IMPROVE PERFORMANCE OR FUNCTIONAL OUTCOME AFTER TOTAL KNEE ARTHROPLASTY: A RANDOMIZED CONTROLLED TRIAL

D. R. Ruangsomboon¹, A. Pornrattanamaneewong¹, A. Narkbunnam¹, A. Wilairatana², A. Chareancholvanich¹

¹Mahidol University, Department of Orthopaedics Surgery, Siriraj Hospital, ²Chulalongkorn University, Department of Orthopaedics Surgery, Chulalongkorn Hospital, Bangkok, Thailand

Objective: To compare timed up-and-go test scores (TUG) and Oxford knee score (OKS) between cases using the modified Robert Jones bandage (MRJB) and those using a noncompressive dressing (NCD) after TKA.

Methods: A total of 70 patients undergoing unilateral primary TKA were randomly assigned to one of two groups of 35 patients each according to type of postoperative dressing. Group 1 had an MRJB applied for 24 h while Group 2 received an NCD. At 6 weeks after surgery, TUG and OKS were measured and scores were compared between the groups. Postoperative drained blood loss, pain score, degree of knee swelling, range of motion and complications were also recorded and compared as secondary outcomes.

Results: There were no significant differences in the mean TUG scores (MRJB, 16.5 ± 7.5 s vs. NCD, 17.6 ± 11.4 s, $p=0.769$) or mean OKS (MRJB, 34.8 ± 5.6 points vs. NCD, 35.3 ± 5.8 points, $p=0.722$). Postoperative drained blood loss, pain score, degree of knee swelling, range of motion and complications were also similar between the group using the MRJB and that using an NCD.

Conclusion: The use of the MRJB does not improve either performance or functional outcome after primary unilateral TKA.

Table 1. Outcomes of interest

Outcomes	MRJB group (mean $\pm$ SD) (n=35)	NCD group (mean $\pm$ SD) (n=35)	P-value
Drained blood volume (mL)			
within 0-24 h	204.9 $\pm$ 160.5	206.0 $\pm$ 108.9	0.972
within 24-48 h	108.7 $\pm$ 99.5	118.3 $\pm$ 93.2	0.544*
within 0-48 h	313.6 $\pm$ 232.9	324.3 $\pm$ 166.6	0.826
VAS of postoperative first day (points)			
At rest	1.5 $\pm$ 1.9	1.5 $\pm$ 2.0	0.883*
During ambulation	1.5 $\pm$ 2.3	2.0 $\pm$ 2.5	0.369*
VAS of postoperative second day (points)			
At rest	1.5 $\pm$ 2.0	1.5 $\pm$ 2.3	0.812*
During ambulation	1.7 $\pm$ 2.3	1.3 $\pm$ 2.0	0.506*
Knee circumference (mm)			
Preoperative	374.1 $\pm$ 43.5	375.1 $\pm$ 20.7	0.903
Change in first day	15.0 $\pm$ 17.0	16.4 $\pm$ 14.5	0.609*
Change in second day	7.3 $\pm$ 13.8	-0.5 $\pm$ 20.0	0.031*
Overall change	22.3 $\pm$ 21.6	15.9 $\pm$ 22.5	0.228
Thigh circumference (mm)			
Preoperative	416.3 $\pm$ 51.3	407.1 $\pm$ 35.7	0.525*
The change in first day	16.4 $\pm$ 21.2	21.9 $\pm$ 16.4	0.174*
The change in second day	6.7 $\pm$ 13.3	6.9 $\pm$ 12.8	0.572*
Overall change	23.1 $\pm$ 21.0	28.8 $\pm$ 18.5	0.231
ROM (degree)			
At discharge	84.9 $\pm$ 10.0	85.3 $\pm$ 10.4	0.640*
At 2 weeks	93.7 $\pm$ 10.1	94.4 $\pm$ 9.2	0.578*
At 6 weeks	105.6 $\pm$ 12.0	106.3 $\pm$ 10.9	0.753*
OKS at 6 weeks (points)	34.8 $\pm$ 5.6	35.3 $\pm$ 5.8	0.722
TUG at 6 weeks (s)	16.5 $\pm$ 7.5	17.6 $\pm$ 11.4	0.769*

Abbreviations=MRJB, modified Robert Jones bandage; NCD, non-compressive dressing; VAS, visual analogue pain score; ROM, range of motion; OKS, Oxford knee score; TUG, timed up-and-go test

* Mann-Whitney U test used when data were not normally distributed.

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CORRELATIONS BETWEEN VITAMIN D SERUM CONCENTRATION, IMMUNOLOGICAL MARKERS AND FACTORS REGULATING THE ACTIVITY OF B CELLS IN THE GROUP OF PATIENTS WITH PRIMARY SJÖGREN'S SYNDROME AND PATIENTS WITH SYMPTOMS OF DRYNESS WITHOUT AUTOIMMUNE DISEASE CONFIRMATION

M. Maślińska¹, K. Kostyra-Grabczak¹, J. Dmowska-Chalaba¹, M. Mańczak², B. Kwiatkowska¹

¹National Institute of Geriatrics, Rheumatology and Rehabilitation, Early Arthritis Clinic, ²National Institute of Geriatrics, Rheumatology and Rehabilitation, Department of Gerontology, Public Health and Didactics, Warsaw, Poland

Objectives: Vitamin D plays role not only in the bone development, but also in many immunological processes. Our aims were to assess the 25(OH)D3 serum concentration in patients with the primary Sjogren's syndrome (pSS) and with symptoms of dryness without pSS confirmation – and the effect of its lowering on certain clinical parameters in pSS patients.

Methods: Group I; n=66 pSS patients: 57 female (86%), 8 men (14%), mean age 50.5 (± 15.3); - group II - patients with symptoms of dryness; n=32 F 29 (91%), M 3 (9%) mean age 53.8 (± 12.5). Groups did not differ between themselves in terms of sex and age. 25(OH)D levels were determined (30–80 ng/ml normal range), the immunological profile: anti-SS-A, anti-SS-B antibodies, anti-nuclear antibodies, rheumatoid factor and cytokines such as B cell activating factor, a proliferation-inducing ligand, Fms-related tyrosine kinase 3 ligand (FLT3) were assessed. Salivary gland biopsies with the focus score (FS) assessment, dry eye examinations (Schirmer test and ocular staining score) were performed. Statistics: U Mann-Whitney test (continuous variables), Spearman correlation coefficient (correlations between quantitative variables) statistical significance set at $p < 0.05$.

Results: Majority of both groups patients displayed 25(OH)D deficiency (< 30 ng/ml) 73% vs. 91%, respectively. Only in group II the deficiency correlated with older age ($\rho = -0.442$). Significant correlations between 25(OH)D and FLT3L concentration were observed: positive in group I ($\rho = 0.354$), negative ($\rho = -0.375$) in group II. In group I 25(OH)D level and FS positively correlated. There were no significant correlations of 25(OH)D level with eye dryness symptoms or other assessed variables.

Conclusions: Results may suggest that the low 25(OH)D serum level in pSS group depends mainly on the immunological process and not on the older age, as usually observed in the general population. The positive correlation between FLT3 and 25(OH)D in pSS may be explained by the fact, that FLT3L is produced by epithelial cells. Its higher concentration indicates slighter damage and, indirectly, a lower immunological disease activity – thus possibly a higher 25(OH)D concentration as well. Surprisingly, higher 25(OH)D concentration was associated with higher FS, which needs a further assessment.

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OSTEOPOROSIS KNOWLEDGE AND HEALTH BELIEFS ABOUT NUTRITION AND PHYSICAL ACTIVITY AMONG WOMEN IN VLORA CITY, ALBANIA: A CROSS-SECTIONAL STUDY

F. K. Kamberi¹, R. L. Lalo², V. N. Ndreu³, E. S. Sinaj³

¹Research Center for Public Health, Faculty of Public Health, University of Vlore ‘Ismail Qemali’, Vlore, ²Department of Health Care, Faculty of Public Health, University of Vlore ‘Ismail Qemali’, Vlore, ³Faculty of Technical Medical Sciences, University of Medicine, Tirana, Albania

Objective: To assess osteoporosis knowledge and health beliefs about nutrition and physical activity among 86 women randomly selected in Vlora, Albania.

Methods: The study was conducted during April-May 2016. The anonymous, self-administered questionnaire Osteoporosis Health Belief Scale (OHBS) was used for the data collection. Except section with demographic data, the questionnaire included the sections on the importance of consumption of calcium-rich food products and the section of the role of physical activity in preventing osteoporosis. For the questions, we've used a typical five-point Likert rating scale. Values of $p \leq 0.05$ were considered statistically significant.

Results: The mean age of women 44.55, SD ± 14.93 , range [20–84]. Most of the evaluation variables regarding women's knowledge and beliefs about the role of nutrition in preventing osteoporosis appear in the 3 and 4 point of Linkert scale, respectively I do not know and agree. 39.54% of women agree that calcium rich- foods are expensive. There was a low level of self-efficacy since 36% of women are totally agree that the use of calcium rich-foods sacrifices the eating of other foods that they like. About a half of women responded that the consumption of calcium rich-foods prevent problems related to osteoporosis. 30% of women in the study don't know that the regular exercise reduces chances of bone fractures. It was evidenced statistical correlation between beliefs about calcium consumption and regular exercise, $p < 0.05$. Lower disease severity was confirmed.

Conclusion: Women's health beliefs on osteoporosis, calcium consumption and physical activity affect their perceived self-efficacy and severity to the disease. Design and implementation of educational interventions for prevention of osteoporosis with focus on nutrition, physical activity and self-management of the disease are essential.

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ASSOCIATION BETWEEN DECLINE IN MUSCLE HEALTH AND BONE HEALTH IN OLDER INDIVIDUALS FROM THE SARCOPHAGE COHORT

M. Locquet¹, C. Beaudart¹, J.-Y. Reginster¹, M. Hajaoui¹, O. Bruyère¹

¹Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objectives: The dynamic relationship between bone and muscle health is not fully understood. Our aim was to explore the relationship between bone and muscle wasting over one year, in older individuals.

Methods: The SarcoPhAge project aims to identify the consequences of a progressive deterioration in muscle mass, muscle weakness and/or physical performance. Measurements of BMD of the spine, hip and femoral neck are performed at regular intervals. Bone microarchitecture is assessed by ultrasonography. A 1-year clinically relevant decline in bone and muscle parameters was evidenced, sex-specifically, using the Edwards-Nunnally Index. It consists of calculating reliability scores to bring the pre-test scores closer to the mean and, then, a confidence interval is developed for this adjusted pre-test score. Confidence intervals are used when calculating the change from pre-test to post-test, so greater actual change in scores is necessary to show clinical significance. Furthermore, according to the literature, a clinically relevant decline in physical performance corresponds to a loss of one unit, in one year, in the results of the SPPB test. The results were adjusted for covariates potentially impacting muscle and bone health: age, sex, BMI, number of comorbidities, nutritional and cognitive status.

Results: Among the 232 participants (75.5 ± 5.4 years), we observed a significant association between a clinically relevant decline in muscle mass and a decrease in BMD at the three sites (adjusted OR=2.35 [1.03–5.40] for the spine, 2.67 [1.18–6.04] for the hip and 2.25 [1.01–4.99] for the femoral neck) as well as a significant association between muscle mass loss and deterioration of the skeletal microarchitecture (OR=4.19 [2.14 to 8.18]). A clinically relevant decline in muscle strength was significantly associated with a decrease in spine BMD (OR=2.96 [1.19–7.37]) and hip BMD (adjusted OR=2.64 [1.10–6.37]) but not with the evolution of bone microarchitecture. The decline in performance was not associated with the decline of bone parameters.

Conclusion: Our results suggest that decrease in muscle mass and muscle strength is associated with a decrease in bone mass whereas only muscle mass but not muscle strength changes correlates with a deterioration of bone microarchitecture.

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BARIATRIC SURGERY AND 3 YEAR CHANGES IN BMD; NOVEL MECHANISMS OF BONE LOSS AND COMPARISON OF FOUR DIFFERENT WEIGHT LOSS MODALITIES

M. M. Brzozowska¹, T. Tran², D. Bliuc², J. Jorgensen³, M. Talbot⁴, J. A. Eisman⁵, C. P. White⁶, P. A. Baldock⁷, J. R. Center⁸

¹Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Sutherland and St George Hospital, Sutherland and St George Clinical School, University of New South Wales, ²Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, ³St George Private Hospital, ⁴St George Private Hospital, Faculty of Medicine, University of New South Wales, ⁵Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Department of Endocrinology, St Vincent's Hospital, St Vincent's Clinical School, University of New South Wales, School of Medicine, University of

Notre Dame, ⁶Department of Endocrinology and Diabetes, Prince of Wales Hospital, Clinical Chemistry, South Eastern Area Laboratory Services Pathology, Faculty of Medicine, University of New South Wales, ⁷Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Faculty of Medicine, University of New South Wales, School of Medicine, University of Notre Dame, ⁸Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Department of Endocrinology, St Vincent's Hospital, Faculty of Medicine, University of New South Wales, NSW, Australia

Bariatric surgery is the most effective intervention for obesity, but little is known about its long term skeletal effects. Some bariatric procedures result in changes in gut-derived, pro-satiety hormones Peptide YY, GLP1 and adiponectin that also affect bone homeostasis. We evaluated the impact of four weight loss interventions, diet (n=13), gastric banding (GB) (n=11), gastric sleeve (GS) (n=21) and Roux-en-Y gastric bypass (RYGB) (n=7), on BMD over 36 months. DXA scans were performed at 0, 12, 24 and 36 months along with QCT scans of LS at 0, 12, 24 months, calciotropic indices, gut hormones and adipokines.

All groups had significant but differing weight loss during the first 12 months. Despite weight stability between 12–36 months and supplemented calcium and vitamin D, the weight loss modalities resulted in different skeletal responses. RYGB and GS patients experienced continuous total hip BMD loss over 3 years, reaching -14% (95%CI -17%, -12%) for RYGB and -9% (-10%, -7%) for GS, significantly different from diet after adjustment for weight loss. The RYGB procedure affected multiple skeletal sites causing lumbar spine BMD loss during the 1st postoperative year and, over 36 months, forearm BMD loss. No BMD loss was noted for GB and diet groups at any time point. Similar to DXA, RYGB subjects had significantly greater rate of bone loss at LS measured by QCT than the diet group. Consistent with bone loss, bone turnover markers (urine uNTx and serum osteocalcin) remained elevated, relative to baseline, up to 3 years post GS and RYGB.

RYGB and GS groups exhibited long term exaggerated postprandial PYY (150–200%, $P<0.001$ for RYGB and approximately 50%, $P<0.01$ for GS) and adiponectin responses (50%–100%, $P<0.001$ for RYGB and 30%–60%, $P<0.001$ for GS) up to 3 years post bariatric surgery. These were inversely associated with TH BMD loss.

The RYGB procedure had a generalised, clinically significant, negative impact on the skeleton. Despite weight stability, RYGB and GS procedures, but not GB and diet, resulted in ongoing TH BMD loss. The rise in postprandial PYY and adiponectin after some bariatric procedures may mediate these skeletal changes.

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COMPARISON OF MUSCULOSKELETAL FUNCTION BETWEEN FALLER'S PRE-FRAIL OLDER WOMEN WITH AND WITHOUT VESTIBULAR DYSFUNCTION

A. S. Wojciechowski¹, A. R. S. Gomes², J. Melo Filho¹, S. Biesek³, A. B. Ferreira⁴, G. A. Tormes⁴, I. Riceto⁴, J. S. Malisky⁵, B. S. Zeigelboim⁶

¹Federal University of Parana, Physical Education, ²Federal University of Parana, Prevention and Rehabilitation in Physiotherapy Department, Physical Education, ³Federal University of Parana, Physical Education, Centro Universitário Autônomo do Brasil (UNIBRASIL), ⁴Federal University of Parana, Physiotherapy, ⁵Tuiuti University of Parana, Communication Disorders, ⁶Tuiuti University of Parana, Communication Disorders, Curitiba, Brazil

Objective: To compare the musculoskeletal function between faller's pre-frail older women with and without vestibular dysfunction.

Methods: Cross-sectional study included 15 pre-frail older women (72.93±3.5 years old; BMI: 29.94±4.57 kg/m²), classified as pre-frail by the Fried's phenotype (1 or 2 criteria). Participants were categorized as fallers if they had at least one fall in the past 12 months. Vestibular function was assessed using a vectoelectronystagmography (VENG) to

determine vestibular dysfunction (VD). The musculoskeletal function was evaluated through 5-times sit-to-stand test (strength and power of lower limbs); timed up and go (TUG) single and cognitive dual task in habitual speed; and active range of motion (ROM) of the hip, knee, and ankle joint using a goniometer. The Mann-Whitney U test was used to compare groups (with and without VD) ($p<0.05$).

Results: The sample was composed by 53.3% (n=8) older women with VD and 46.7% (n=7) without VD. The most part of the participants had only one fall during the last year (60%, n=9); 13.3% (n=2) had two falls and 26.7% (n=4) three or more falls. The participants without VD showed lower strength and power of lower limbs (15.82±5.35s vs. 10.31±1.99s, $p=0.002$); inferior ROM of plantar flexion (18.19±6.89° vs. 29.04±6.81°, $p=0.009$) and a higher risk of falls detected in cognitive dual task TUG (16.37±4.09s vs. 12.24±2.75s, $p=0.04$) when compared to participants with VD.

Conclusions: The 5-times sit-to-stand test and TUG cognitive dual task scores indicated risk of falls in pre frail older women without VD. The falls in pre frail older women without VD might be explained by means of a poor musculoskeletal function. On the other hand fallers pre frail older women with VD showed adequate strength and power of lower limbs but risk of falls when cognitive dual task TUG was carried out suggesting neural mechanism involved.

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ROLE OF ALENDRONATE/TERIPARATIDE IN STEROID-INDUCED OSTEOPOROSIS IN DEVELOPING COUNTRIES

A. Qadir¹

¹Dow University of Health Sciences, Karachi, Pakistan

Objectives: Bisphosphonate therapy is the standard of care for the prevention and treatment of steroid-induced osteoporosis. Studies of anabolic therapy in patients who are taking long-term steroids and are at high risk for fracture are lacking.

Methods: This is double-blinded randomized controlled trial that was conducted in Civil Hospital Karachi from January 2015 to June 2017. In this study comparison of alendronate with teriparatide in 214 women and men with osteoporosis (ages, 22–65 years) who had received glucocorticoids for at least 3 months (prednisone equivalent, 5 mg daily or more). A total of 107 patients received 20 µg of teriparatide once daily, and 107 received 10 mg of alendronate once daily. The primary result was the change in BMD at the lumbar region. Secondary outcomes included changes in BMD at the total hip and in markers of bone turnover, the time to changes in BMD, the incidence of fractures, and safety.

Results: Conclusively, the mean (±SE) BMD at the lumbar spine had increased more in the teriparatide group than in the alendronate group (3.2 ±0.5% vs. 6.9±0.6%, $P<0.001$). A significant difference between the groups was reached by 6 months ($P<0.001$). At 12 months, BMD at the total hip had increased more in the teriparatide group. Fewer new vertebral fractures occurred in the teriparatide group than in the alendronate group (6.0% vs. 0.4%, $P=0.004$); the incidence of nonvertebral fractures was similar in the two groups (3.5% vs. 5.4%, $P=0.36$). Significantly more patients in the teriparatide group had at least one elevated measure of serum calcium.

Conclusions: Patients with osteoporosis who were at high risk for fracture, BMD increased more in patients receiving teriparatide than in those receiving alendronate.

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AUDIT OF BOAST GUIDELINES CONCERNING FRACTURE LIAISON SERVICES AT A DISTRICT GENERAL HOSPITAL (DGH)

Y. Zhang¹, R. Ross¹, R. S. Swaminathan¹

¹Tameside General Hospital, Ashton-Under-Lyne, UK

Objectives: Fragility fractures (Ff), caused by underlying osteoporosis, are a leading cause of mortality and morbidity in the UK (UK),

resulting in a great financial burden on the National Health Service (NHS). These injuries are often progressive, highlighting the importance of secondary prevention. Fracture liaison services (FLS) are effective at reducing the risk of subsequent fragility fractures in the elderly. The British Orthopaedic Association Standards for Trauma (BOAST) outline guidance for FLS organisation and implementation.

Methods: This audit focused on measures applicable in a fracture clinic setting. Over 4 weeks, patients aged over 50 presenting to fracture clinic with fragility fracture were tracked for the following outcomes: GP awareness, patient education or any other action.

Results: From 31 patients included, only 3% of GPs had been informed. No patient had been given any information on osteoporosis or fragility fractures. Only 1 patient's letter made reference to concerns regarding balance to be addressed by the GP but no other initiated intervention had been documented.

Conclusion: There is definite room to improve the secondary prevention of FF at this DGH. The fracture clinic setting is normally busy and frantic, but it is an ideal opportunity for simple measures to be implemented, or at least as a feeder into a formal FLS. Currently this service is lacking, and is in discussion to be implemented. Until then, GP awareness and patient education should be a minimum, which will look to be addressed before re-audit.

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LOSS OF BONE MASS OR A CASE OF MISDIAGNOSING? CASE REPORT

M. Sousa da Silva¹, J. Lindolfo Cunha Borges²

¹Centro de Pesquisa Clínica do Brasil, ²Universidade Católica de Brasília, Brasília, Brazil

Objective: To illustrate that a DXA intriguing result can be explained by bone physiology knowledge.

Methods: Case Report: A 78-year-old woman, 159 cm tall, 59 kg weight, presented at our DXA service for a follow-up exam. Baseline DXA: T-scores of -2.1 at the lumbar spine, -2.6 at the total femur and -3.2 at radius 33%. Two years follow up DXA showed 23% increase BMD at lumbar spine, 4% increase at total hip, but 15% loss at nondominant forearm. What could explain hip and spine bone gain with forearm bone loss? The answer is teriparatide (TPT) use for the past two years.

Results: The presented case illustrates how, at predominantly cortical sites, TPT promotes neocortical bone reabsorption, resulting in increased bone porosity and augments periosteal bone sedimentation, therefore leading to a gain in cortical thickness and bone diameter.[1–3] As a result, cortical bone gets an inner endocortical porosity and a thicker cortical surface, therefore a bone with less BMD.

Conclusion: Even though DXA is the golden-standard tool for osteoporosis diagnosis and follow-up, some bone strength features, such as bone geometry, are not reflected. Physician's understanding of bone physiology and its clinical implications, however, can overcome this limitation. Referred physicians must be aware of DXA limitations and monitor osteoporosis improvement with a complete analysis of the exam and clinical features.

References:

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P325

THE CONTENT OF THE STRUCTURAL ELEMENTS IN THE FEMORAL BONE IN PATIENTS WHO UNDERWENT TOTAL HIP REPLACEMENT

M. Dąbrowski¹, A. Ziola-Frankowska², L. Kubaszewski³, P. Rogala³, M. Frankowski⁴

¹Department of Spondyloorthopaedics and Biomechanics of the Spine, Wiktor Dega Orthopaedic and Rehabilitation Clinical Hospital, Poznań University of Medical Sciences, ²Department of Analytical Chemistry, Faculty of Chemistry, Adam Mickiewicz University in Poznań, ³Department of Spondyloorthopaedics and Biomechanics of the Spine, W. Dega University Hospital, Poznań University of Medical Sciences, ⁴Department of Water and Soil Analysis, Faculty of Chemistry, Adam Mickiewicz University in Poznań, Poznań, Poland

Methods: The study was included 86 patients undergoing total hip replacement for osteoarthritis. Determine the content of elements Ca, Mg, P, Na in the proximal femur bone tissue (cancellous and cortical bone) was using ICP-AES analytical techniques. The interdependencies among these elements and their correlations depended on factors including age and gender. From the anamnesis of preoperative patients were not diagnosed or treated for osteoporosis. The relationships between the individual parameters examined were determined using the Spearman test and calculating the correlation coefficients.

Results: In women, a significant decrease in the content of elements in cortical bones with age has been demonstrated in the group between 51-60 years - which confirms the results of the Spearman coefficient. In other age groups 61-70, the coefficient would be close to zero, and above 70 years of age it was negative, but not statistically significant and ranged from -0.44 for Ca to -0.22 for Mg. In men, a significant decrease in the content of Ca and P in cortical bone with age in the age groups 61-70 years and over 70 years (Ca-0.71 and P-0.76, respectively) was demonstrated (Table 1).

Table 1. Spearman correlation coefficients for content of Ca, P, Mg and Na in the femoral neck and age in each age group.

Femoral neck	Women			Men		
	51-60 (n=12)	61-70 (n=19)	>70 (n=19)	51-60 (n=19)	61-70 (n=11)	>70 (n=9)
Ca	-0.59*	-0.02	-0.44	0.02	-0.56*	-0.71*
P	-0.65*	-0.01	-0.38	0.07	-0.53*	-0.76*
Mg	-0.63*	0.02	-0.22	-0.14	-0.28	-0.66*
Na	-0.69*	-0.18	-0.27	-0.25	-0.09	-0.59*

* statistically significant

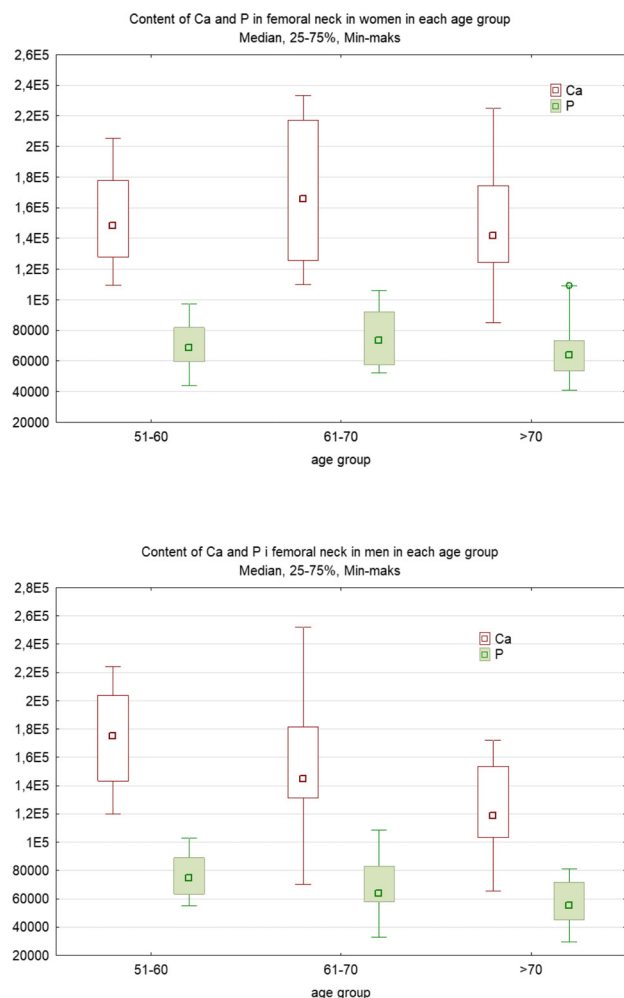
In cancellous bones a significant low decrease in the content of elements in cortical bones with age has been demonstrated in the group between 61-70 in women, but not statistically significant (Ca-0.32 and P-0.2 respectively). However, in cancellous bones in men, negative but not significant correlation coefficients were shown in the group over 70 years of age (Table 2).

Table 2. Spearman correlation coefficients for content of Ca, P, Mg and Na in the femoral head and age in each age group

Femoral head	Women			Men		
	51-60 (n=12)	61-70 (n=19)	>70 (n=19)	51-60 (n=19)	61-70 (n=11)	>70 (n=9)
Ca	0.00	-0.32	0.14	0.11	0.12	-0.26
P	0.01	-0.20	0.09	0.07	0.13	-0.23
Mg	-0.03	-0.11	0.02	0.10	-0.07	-0.33
Na	0.44	-0.32	0.03	-0.03	-0.18	-0.47

* statistically significant

Figure 1. Comparison of median of Ca and P content (in mg / kg) in the femoral neck in age groups in women and men.



Conclusion: The intensive reduction of the structural elements in patients with osteoarthritis measured quantitatively by means of coupled plasma emission spectrometry is more pronounced in compact bone and occurs in women before the age of 60. In men it begins in 7th and increases in the 8th decade of life.

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THE RELATION OF VITAMIN D LEVEL ON MUSCLE MASS AND STRENGTH IN TAIWANESE OSTEOPOROSIS WOMEN

J. S. Hwang¹, J. F. Chen¹

¹Department of Internal Medicine, Chang Gung Memorial Hospital, Chang Gung University, Taipei, Taiwan

Objectives: To evaluate the vitamin D level on muscle mass and strength in postmenopausal osteoporosis women in Taiwan.

Methods: Osteoporosis is a progressive systemic bone disease characterized by low bone mass and microarchitecture deterioration of bone tissue, leading to increased bone fragility and susceptibility to fractures, and sarcopenia is age-related decline of skeletal muscle plus low muscle strength and physical performance. Those ultimately leads to subsequent physical disability and increased fall among

older adults. It is recognized as a major public health problem in many countries, as well as in Taiwan. Vitamin D increases serum calcium by promoting intestinal calcium absorption and plays a role in bone formation and resorption and also as regulatory role on metabolic pathways implicated in muscle functions, some studies has demonstrated that poor vitamin D status is associated with worse muscle functions and postural instability, leading to an increased risk of falls, which may lead to fractures. This single center, cross-sectional, observational study analyzed the vitamin D level in Taiwanese postmenopausal osteoporotic patients on muscle mass and strength at osteoporosis clinic. A single, non-fasting blood sample to assess 25(OH)D and biochemical tests were performed in the study visit. Vitamin D inadequacy was defined as serum 25(OH)D level <30 ng/mL. Muscle mass was measured by Bioelectrical impedance analysis (BIA) to derive appendicular skeletal muscle mass index (kg/m²), muscle strength was measured by hand grip strength (kg) with a dynamometer and a timed 5-meter walk was used to determine gait speed (m/sec).

Results: A total of 30 patients were enrolled at Chang Gung Memorial Hospital. Overall, the average age was 71.3±8.9 years, mean serum 25(OH) D level was 27.2±8.4 ng/mL, mean appendicular skeletal muscle mass index, handgrip strength and gait speed were 6.8±0.7 kg/m², 15.2±0.7 kg and 1.1±0.2 m/s. A relationship was present between serum 25OHD and appendicular skeletal muscle mass index (r=0.27; P=0.004), gait speed (r=0.47; P<0.001). In contrast, no relationship was observed between circulating 25OHD concentrations and handgrip strength.

Conclusions: Approximately 63% of subjects were 25OHD inadequacy (≤30 ng/ml). The results of this study have shown the correlation between serum 25OHD and appendicular skeletal muscle mass index and handgrip strength, thus vitamin D is important among osteoporosis women. Recommendations and education for postmenopausal women with osteoporosis to receive adequate vitamin D supplementation should be reinforced.

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EFFECTS OF VIRTUAL DANCE EXERCISE ON SKELETAL MUSCLE MASS IN COMMUNITY-DWELLING OLDER WOMEN

A. R. S. Gomes¹, L. H. Gallo², E. V. Rodrigues³, J. Melo Filho⁴, J. B. Silva⁵, M. O. Harris-Love⁶

¹Federal University of Parana, Prevention and Rehabilitation in Physiotherapy Department, Physical Education, ²Physical Education, Federal University of Parana, ³Physical Education, Massage Department at Federal Institute of Parana, ⁴Federal University of Parana, Physical Education, ⁵Federal University of Parana, Physiotherapy, Curitiba, Brazil, ⁶The George Washington University, Department of Exercise and Nutritional Sciences, Milken Institute School of Public Health, Washington, USA

Objective: To analyze the effects of virtual dance exercise on muscle mass of community older women.

Methods: Forty-two healthy, moderately active older women participated in this study and selected assignment to either a control group (CG; n=20; 70.3±5.6 years; BMI 28.2±4.7 kg/m²) or training group (TG; n=22; 69.3±3.7 years; BMI 27.1±3.6 kg/m²). CG participants maintained their lifestyle and TG participants performed virtual dance group training, using the Dance Central game for Xbox 360® and Kinect, 3 times/week, 40 min in duration, for 12 weeks. Calf circumference (CC) was assessed using a tape measure. Medial gastrocnemius (MG) architecture was evaluated at 20%, 30% and 40% of the distance between medial tibia condyle and medial malleolus with B-mode ultrasound (Logiq Book-XP, General Electric®) using a linear-array probe (50 mm, 4 cm of depth, 11 MHz). Image J software was used to analyze muscle thickness (i.e., mean distance between deep and superficial aponeuroses), pennation angle (i.e., angle from insertion of muscle fiber fascicles to the deep aponeurosis) and

fascicle length (i.e., measured between the superior and deep aponeuroses). Factorial ANOVA was adopted for the within and between groups analysis, and Cohen's d equation for effect size ($p < 0.05$).

Results: TG participants increased CC (1.68%, $p = 0.01$) compared to pre training and also to CG participants ($p = 0.03$; $d = 0.71$). TG participants showed greater (8.65%) muscle thickness at the 40% portion ($p = 0.01$; $d = 0.30$) compared to pre training. In addition, increased muscle thickness at the 20% portion was greater (3.78%) than the minimal detectable change in TG participants. Conclusion: The virtual dance exercise intervention enhanced MG muscle mass. Post-intervention changes in muscle mass were detected using an accessible clinical tool, calf circumference measurement. The observed increases in calf size were consistent with the ultrasound measures of muscle thickness.

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THE LEVEL OF ADHERENCE TO CALCIUM IN RELATION TO THE DURATION OF THE OSTEOPENIA IN POSTMENOPAUSAL WOMEN

M. Maksimovic-Simovic¹, B. Erdeljan¹

¹Special Hospital for Rheumatic Diseases Novi Sad, Novi Sad, Serbia

Objective: To show the level of adherence to calcium in relation to the duration of the osteopenia in postmenopausal women.

Methods: The prospective analysis is performed from 20 November to 20 December 2015 at the Special Hospital for Rheumatic Diseases Novi Sad, Serbia. The study involved 80 postmenopausal women who were diagnosed with reduced BMD by DXA and all respondents filled in the same questionnaire. Morisky scale was used to analyze adherence to calcium in relation to the duration of the osteopenia. According to this scale, low adherence is defined when total score is > 2 , medium when score is 1–2, and high < 1 . The central tendency measures, ANOVA test and t -test were used for statistical analysis.

Results: The average age of participants was 65.52 ± 8.29 years. 32.5% had osteopenia (duration $M 3.54 \pm 2.42$ years). Most patients showed a low level of adherence to calcium (91.7%). Medium adherence had 8.3% of the patients and none of the patients had high adherence to calcium. Looking at the duration of the osteopenia, there is statistically significant difference in relation to the medium and low adherence to calcium (T -test = 2.53, $p < 0.05$). Namely, those patients who had a low adherence to calcium had a longer time of the disease duration (duration $M = 4.7 \pm 2.25$ years) than those with a medium adherence to calcium (duration 1.83 ± 1.94 years).

Conclusion: There is a critically low adherence to calcium in all observed patients. Inadequate calcium intake may cause complications in patients with reduced BMD. Duration of the disease is definitely one of the reasons of low adherence.

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IMPROVEMENT OF FRACTURE HEALING WITH TERIPARATIDE IN CHALLENGING PSEUDOARTHROSIS: AGAIN A SUCCESSFUL CASE INSTEAD OF HIS OUT-OF-INDICATION STATUS

I. Sancho¹, J. Mondragón², M. Menéndez²

¹Servicio de Cirugía Ortopédica y Traumatología. Hospital Reina Sofia Tudela, Tudela, ²Complejo Hospitalario de Navarra, Pamplona, Spain

Objective: Pseudoarthrosis is defined as a non healing fracture 9 months after trauma. Management of this condition is often challenging and sometimes medical and surgical therapies have to be used. Pseudoarthrosis is not an approved indication of the osteoanabolic agent teriparatide. We would report an optimal result achieved in terms of bone healing using this molecule.

Methods: We present the case of a 61 year old Caucasian man who suffered a spontaneous fracture of the distal tibia. Metabolic blood studies showed a hypovitaminosis D. Related metabolic disorders were studied and discarded.

An orthopedic (conservative) treatment was performed consisting on the applying of an inguino-pedic cast and non weight bearing. A normalization of blood vitamin D parameters was achieved after prescription of appropriate supplements. However, after 7 months no signs of proper union were seen and surgical treatment proposed. A locking compression plate was implanted to fix the fracture and bone allograft used to reassure bone union. The immediate postoperative period went uneventful and the patient was indicated again non-weight bearing immobilization. After 4 months, on radiographic examination, the fracture remained unchanged. Two months later the patient continued to experience pain and bone healing findings did not be clear on plain radiographs. At that point Teriparatide was prescribed at the dose of 20 $\mu\text{g/d}$ once therapy contraindications were discarded.

Results: At six months of treatment the fracture healed and the patient reported a progressive subsidence of symptoms. At 2-years follow-up the patient was pain free, the functional status excellent and the radiology evidenced complete bone healing.

Conclusion: The question of giving a medical treatment in the purpose of accelerating fracture healing is an increasing concern. Currently, the efficacy of teriparatide in treating osteoporosis has been widely accepted, yet using teriparatide to enhance fracture healing is still debated. A conceivable positive effect of teriparatide on fracture healing is well-studied on animals, however further human studies are needed.

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INTERACTION BETWEEN BONE BIOMARKERS AND DIETARY CARBOHYDRATE INTAKE AMONG LRP5 GENOTYPE (RS556442): THE NUTRIGENOMICS STUDY

L. Khorraminezhad¹, S. Moradi², E. Aghaei¹, Z. Maghbooli³, K. Mirzaei¹

¹Department of Community Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences (TUMS), Tehran, ²School of Nutritional Sciences and Dietetics, Esfahan University of Medical Sciences, Esfahan, ³Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Recent studies showed an important role of genetic differences and serum level of biomarkers of bone formation (osteocalcin) and bone resorption (β -CTX). Low density lipoprotein receptor related protein 5 (LRP5) was found as one of the most important genes in bone metabolism by WNT signaling pathway. As we know, osteoporosis and dietary intake are closely related with many contradictions. This nutrigenomics study examined to interaction between LRP5 genotypes and dietary intake of carbohydrate, with regards to serum level of bone biomarkers.

Methods: In this cross-sectional study, 265 postmenopausal women were enrolled; the mean age was 57.92 years (SD: 6.17). Bone density measurements were assessed by DXA. Dietary data were collected through the validated food frequency questionnaire for Iranian. Genotyping for LRP5 gene SNP (rs556442) was performed by the PCR-RFLP method. Statistical analyses were performed by using Nutritionist4 and SPSS software.

Results: The frequency of GG, AG and AA genotypes were 13.43%, 56.12% and 30.43% respectively. The results showed that there was no significant relationship between subjects with AA, AG, GG genotypes and serum level of osteocalcin and β -CTX ($P > 0.05$), also BMD in each region ($P > 0.05$). By using multinomial regression, there has been just a significant correlation between β -CrossLaps and hip BMD, T-score and Z-score ($P < 0.0001$, $P < 0.0001$ and $P = 0.001$) and lumbar BMD, T-score and Z-score ($P = 0.004$, $P = 0.002$ and $P = 0.06$). We found no significant association between dietary carbohydrate intake and bone turnover markers ($P > 0.05$). By using Independent-samples T-test, we found a significant relationship between β -CTX and dietary carbohydrate intake only in participants with AA genotype ($P = 0.07$). After categorization based on osteocalcin and β -CTX tertiles, our univariate analyses showed interaction between serum level of β -CTX and dietary carbohydrate intake related to LRP5 genotypes ($P = 0.088$, $\beta = 0.38$).

Conclusion: We found a direct marginal significant association between high dietary carbohydrate intake and serum levels of β -CTX, just among

postmenopausal women who were AA genotype of LRP5 gene (rs556442).

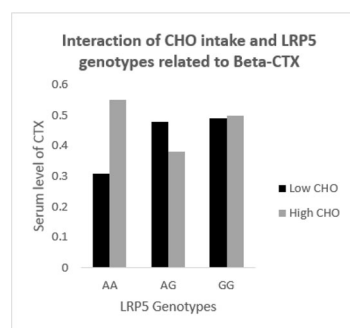


Figure 1. Interaction between the amount of CHO dietary intake and LRP5 genotypes Beta-CTX (rs556442).

* $P < 0.05$ $P_{\text{interaction}} = 0.088$

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THE FIRST EVALUATION OF THE FRACTURE LIAISON SERVICE IMPLEMENTATION IN MOSCOW CITY CLINICAL HOSPITAL N13

D. Rizina¹, L. Farba¹, G. Runova², V. Fadeyev²

¹City Hospital No. 13, ²Sechenov University, Moscow, Russia

Objectives: Globally, the most effective model of re-fractures preventing in patients with osteoporosis is a Fracture liaison service (FLS). FLS main objectives are identification of patients, assessment of re-fractures risks, diagnosis and initiation of osteoporosis therapy. Our aim was to assess the possibility of implementation and effectiveness of the FLS in the Moscow City Clinical Hospital N13, as well as identifying risk factors of osteoporosis such as vitamin D deficiency and low calcium intake with food.

Methods: For the period from October 2016 to July 2017 FLS included 85 patients (84 women), whose average age was 73 years (39-95), undergoing low-energy fractures and undergoing treatment in the City Clinical Hospital N13. Among them, fracture of the proximal femur had 32 persons (37.7%), fracture of upper limb 29 (34.1%), vertebral fractures 7 (8.2%), and other sites 17 (20%). All patients were evaluated individual fracture risk using FRAX, examined levels of vitamin D, calcium. The questionnaire was developed to clarify the amount of calcium in the patients diet.

Results: The vast majority of patients had deficiency of vitamin D with an average level of 25(OH)D of 17.1 ng/ml, with a minimum level in the group older than 75 years is equal to 13.0 ng/ml (3-51.9). The average consumption level of calcium in the products was 650 mg (237-2261), with the lowest consumption in the group aged 75 years, equal to 390 mg (237-1409) per day. All patients had been prescribed calcium and vitamin D supplements, and in 94% of cases, pathogenetic anti-osteoporotic therapy: denosumab 34%, alendronic acid 26%, zoledronic acid 22%, ibandronic acid 6% and teriparatide in 6% of cases.

Conclusions: The results of this work identified a significant deficiency of vitamin D and low intake of calcium-rich food among the patients, especially in the age group older than 75 years. The FLS implementation in Moscow City Hospital No 13 has led to a significant improvement in the quality of patient care.

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RADIAL EXTRACORPOREAL SHOCKWAVE THERAPY IN THE TREATMENT OF GLUTEUS MEDIUS CALCIFIC TENDINOPATHY

C. Gjerakaroska Savevska¹, E. Nikolikj Dimitrova¹, V. Koevska¹, B. Mitrevska¹, M. Gocevska¹, B. Kalcovska Ivanovska¹, M. Manoleva¹

¹Institute for Physical and Rehabilitation Medicine, Medical Faculty, Ss Cyril and Methodius University, Skopje, Macedonia,

Introduction: Calcific tendinopathy of the gluteus medius causes pain in the lateral aspect of the hip. Radial extracorporeal shock wave therapy

(RESWT) has been suggested as an alternative treatment for calcific tendinopathy. We demonstrate the effectiveness of RESWT regarding gluteus medius calcific tendinopathy.

Method: We describe the case of a 59-year-old woman with a four months history of a clicking sensation in the right lateral hip area while walking, moderate pain worsened with activity and decreased range of motion in the right hip. This pain was resistant to analgesics. Her medical history included postmenopausal osteoporosis. On physical examination: deep palpation over the right greater trochanter caused pain, flexion in the hip was 90°, extension 10°, external rotation 30° and abduction 35°, the motions were painful. The score on the Numeric Rating Scale for Pain (NRSP) was 5 (moderate pain). Plain radiography of the right hip revealed a calcific rounded masses above the greater trochanter. There were no other contributory findings and no laboratory abnormalities. Physical modalities failed to improve the pain and the range of motion in the hip, therefore RESWT was suggested as an alternative treatment. In the region of pain around the great trochanter, 2000 shockwaves were applied with a pressure of 2.5 Bar and a frequency of 10 Hz, for each session. The patient received a total of four sessions, each a week apart.

Results: After the fourth RESWT flexion in the hip was 110°, extension 10°, external rotation 40°, abduction 40° and the NRSP score was 0 (no pain). At 3-month follow-up, the calcification was completely resolved.

Conclusion: RESWT led to a good clinical outcome as well as complete resolution of the radiographic findings. RESWT is a safe, alternative treatment for gluteus medius calcific tendinopathy and can exclude the possibility of invasive treatment.

P333

THE RELATIONSHIP BETWEEN THE DIETARY INFLAMMATORY INDEX AND PREVALENCE OF RADIOGRAPHIC SYMPTOMATIC OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

N. Veronese¹, N. Shivappa², B. Stubbs³, J. Hebert⁴, S. Maggi¹

¹National Council Research, Padova, Italy, ²The Cancer Prevention and Control Program., Columbia, USA, ³King's College, London, UK, ⁴University of South Carolina, Columbia, USA

Objective: To investigate whether higher dietary inflammatory index (DII[®]) scores were associated with higher prevalence of radiographic symptomatic knee osteoarthritis in a large cohort of North American people from the Osteoarthritis Initiative database.

Methods: 4 A total of 4358 community-dwelling participants (2527 females; mean age 61.2 years) from the Osteoarthritis Initiative were identified. DII scores were calculated using the validated Block Brief 2000 Food-Frequency Questionnaire and DII[®] scores were categorized into quartiles. Knee radiographic symptomatic osteoarthritis was diagnosed clinically and radiologically. The strength of association between DII (expressed as quartiles) and knee osteoarthritis was investigated through a logistic regression analysis, which adjusted for potential confounders, and results were reported as odds ratios (ORs) with 95% CIs.

Results: Participants with a higher DII score, indicating a more pro-inflammatory diet, had a significantly higher prevalence of radiographic symptomatic knee osteoarthritis compared to those with lower DII score (Quartile 4: 35.4% vs. Quartile 1: 24.0%; $p < 0.0001$). Using a logistic regression analysis, adjusting for 11 potential confounders, participants with the highest DII score (Quartile 4) had a significantly higher probability of experiencing radiographic symptomatic knee osteoarthritis (OR: 1.40; 95%CI: 1.14 to 1.72; $p = 0.002$) compared to participants with the lowest DII score (Quartile 1).

Conclusions: Higher DII values are associated with higher prevalence of radiographic symptomatic knee osteoarthritis.

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ASSOCIATION BETWEEN MEDITERRANEAN DIET AND MAGNETIC RESONANCE PARAMETERS FOR KNEE OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

N. Veronese¹, L. La Tegola², G. Crepaldi¹, S. Maggi¹, G. Guglielmi²
¹National Council Research, Padova, ²University of Foggia, Foggia, Italy

Objective: The Mediterranean diet appears to be beneficial for osteoarthritis (OA), but the few data available are limited to X-ray and clinical findings. The aim of this study was to investigate if adherence to the Mediterranean diet was associated with a better morphology of the knee's cartilage of the knee, assessed with MRI, in a large cohort from North America.

Methods: In this cross-sectional study, 783 participants (59.8% females; mean age: 62.3 years) with an MRI assessment from the Osteoarthritis Initiative were finally included. Adherence to the Mediterranean diet was evaluated through a validated Mediterranean diet score (aMED). A coronal 3D FLASH with Water Excitation MR sequence of the right knees was used. The strength of the association between aMED (as increase in one standard deviation) and knee MRI parameters was investigated through an adjusted linear regression analysis, reported as standardized betas with 95% CIs.

Results: Using a linear regression analysis, adjusted for 10 potential confounders, each increase in one SD in the aMED corresponded to a significant increase in volume of cartilage at central medial femur ($\beta=0.12$; 95%CI: 0.09 to 0.15), mean cartilage thickness of central medial femur ($\beta=0.13$; 95%CI: 0.01 to 0.17), mean cartilage thickness at central medial tibial-femoral compartment ($\beta=0.12$; 95%CI: 0.09 to 0.15), and in cartilage volume at medial tibial-femoral compartment ($\beta=0.09$; 95%CI: 0.06 to 0.12).

Conclusions: higher adherence to a Mediterranean diet is associated with a significant better morphology of the knee's cartilage, also after adjusting for potential confounding factors.

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VITAMIN D INTAKE AND MAGNETIC RESONANCE PARAMETERS FOR KNEE OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

N. Veronese¹, L. La Tegola², G. Crepaldi¹, S. Maggi¹, G. Guglielmi²
¹National Council Research, Padova, ²University of Foggia, Foggia, Italy

Objective: Vitamin D is known to play a crucial role in the osteoarthritis (OA) pathogenesis, but the few data available are limited to X-rays and clinical findings. The aim of this study was to investigate if a higher intake of vitamin D was associated with a better architecture of the knee's cartilage of the knee, assessed with MRI, in a large cohort from North America.

Methods: 783 participants (59.8% females; mean age: 62.3 years) with an MRI assessment from the Osteoarthritis Initiative were included. Vitamin D dietary intake was calculated as the sum of food and oral supplementation. A coronal 3D FLASH with Water Excitation MR sequence of the right knees was used. The strength of the association between dietary vitamin D intake and knee MRI parameters was investigated through an adjusted linear regression analysis, reported as standardized betas with 95% CIs.

Results: Using a linear regression analysis, adjusted for 10 potential confounders, higher vitamin D intake (reported as increase in one standard deviation=250 IU) corresponded to significant higher values of mean cartilage thickness and volume of cartilage at medial tibia, volume of cartilage and mean cartilage thickness at central lateral femur, volume of cartilage and mean cartilage thickness at central medial femur, and volume of cartilage and mean cartilage thickness at central medial tibial-femoral compartment.

Conclusions: Higher vitamin D intake is associated with a significant a better architecture of the cartilage knees, also independently taking in account from several potential confounders.

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DIETARY MAGNESIUM AND INCIDENT FRAILTY IN OLDER PEOPLE AT RISK FOR KNEE OSTEOARTHRITIS: AN EIGHT-YEAR LONGITUDINAL STUDY

N. Veronese¹, B. Stubbs², M. G. Caruso³, S. Maggi¹
¹National Council Research, Padova, Italy, ²King's College, London, UK, ³IRCCS De Bellis, Castellana Grotte, Italy

Objective: Inadequate magnesium (Mg) intake is associated with lower physical performance, but the relationship with frailty in older people is unclear. Therefore, we aimed to investigate whether higher dietary Mg intake is associated with a lower risk of frailty in a large cohort of North American individuals.

Methods: Details regarding Mg intake were recorded through a food-frequency questionnaire (FFQ) and categorized as more/equal than RDA (Recommended Dietary Allowance) vs. lower. Frailty was defined using the Study of Osteoporotic Fracture index. Multivariable Cox's regression analyses, calculating hazard ratios (HRs) with 95% CIs, were undertaken by sex.

Results: 4421 individuals at high risk or having knee osteoarthritis without frailty at baseline (mean age: 61.3, females=58.0%) were followed for 8 years. After adjusting for 11 potential baseline confounders, reaching the RDA for Mg lowered risk of frailty among men (total n=1857, HR=0.51; 95%CI: 0.26-0.93), whilst no significant associations were found in women (total n=2564). Each 100 mg of dietary Mg intake at baseline corresponded to a 22% reduction in men (HR=0.78; 95%CI: 0.62-0.97; p=0.03), but not in women (HR=1.05; 95%CI: 0.89-1.23).

Conclusions: Higher dietary Mg intake appears to reduce the risk of frailty in men, but not in women.

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ESTIMATION OF 10-YEAR FRACTURE RISK WITH AND WITHOUT BMD IN RHEUMATOID ARTHRITIS PATIENTS

J. Alam¹, M. Choudhury¹, S. Haq¹, N. Islam¹, S. Ahmed¹, S. Shahin¹, M. Ali¹, T. Mahmood¹, R. Rabbani²
¹BSM Medical University, ²Dhaka University, Dhaka, Bangladesh

Objective: To find out any discrepancy in fracture risk estimates with and without BMD in rheumatoid arthritis (RA) patients.

Methods: This study was carried out at the Department of Rheumatology, BSM Medical University, Dhaka in 2015. Total 65 consecutive patients of RA fulfilling ACR/EULAR criteria aged 40-90 year were recruited. Ten-year fracture risk of these patients were evaluated by FRAX score with and without BMD and differences were observed.

Results: FRAX score without BMD revealed that major fracture risk was low in 58 (89.2%) patients, moderate in 7 (10.8%) patients but re-estimation of with BMD revealed that 55 (84.6%) patients remained in low risk group, 8 (12.3%) patients in moderate risk group and 2 (3.1%) patients went to high risk group. In case of hip fracture risk without BMD, risk was low in 58 (89.2%) patients, high in 7 (10.8%) patients but with BMD 50 (76.9%) patients remained in low risk group but risk of 15 (23.1%) patients became high. Almost all high risk patients (93.3%) patients were ≥ 55 years of age. Increasing age, female sex, disease duration and use of steroid was positively correlated with increased FRAX score where as high BMI and high BMD was associated with low FRAX score. But in multivariate analysis it was found that only relation with age was at statistically significant level.

Conclusion: Significant numbers of patients of rheumatoid arthritis have high risk of fracture especially hip fracture. The mean of FRAX score increased in both major and hip osteoporotic fracture risk after adding BMD. More than half of the patients above 55 years or more had high risk of fracture. So, BMD should be done in patient aged >55.

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PREVIOUS BISPHOSPHONATE TREATMENT INFLUENCE THE TRABECULAR BONE SCORE (TBS) ON THE TREATMENT RESPONSE TO TERIPARATIDE

T. Kodama¹, T. Sasaki²

¹JCHO Saitama Medical Center, Saitama, ²Tokyo Metropolitan Ohkubo Hospital, Tokyo, Japan

Objective: The previous antiresorptive treatment may influence the response to teriparatide. The objective of this study is to determine the effect of prior bisphosphonate exposure on TBS change after teriparatide (1-34 PTH) treatment.

Methods: This is a nonrandomized prospective study. 70 postmenopausal female patients completed the 24 months treatment with teriparatide. Over all changes in TBS were measured. TBS were measured every 6 months in lumbar spine (L2-L4). Patients who had compression fracture of lumbar spine (L2-L4) or severe deformity were excluded from this study. Patients were divided in two groups. Prior bisphosphonate group had >1 year exposure to bisphosphonate (n=30). Bisphosphonate naïve group had no previous bisphosphonate exposure (n=25). Patients with less than a year of bisphosphonate exposure were excluded from this study (n=15). The response to teriparatide was compared using change rates of TBS from the baseline. PINP was measured before teriparatide treatment and correlation between TBS change was evaluated.

Result: The overall change rate of TBS from baseline was 1.5%. The patient demographic showed no significant change between two groups. The change in TBS was 0.4% and 3.0% (p<0.05) at 24 months, in the prior bisphosphonate group and bisphosphonate naïve group, respectively. PINP value before teriparatide treatment had significant relation with TBS change.

Conclusion: We¹⁾ have reported that prior bisphosphonate exposure inhibit the increase of BMD both in spine and femoral neck compare to bisphosphonate naïve group. Prior bisphosphonate exposure also inhibited the increase of TBS. To maximize the effect of teriparatide on TBS, and to make better quality bone, we should not use bisphosphonate prior to teriparatide. Prior treatment with bisphosphonate prevented increases in TBS. We should consider using teriparatide first, if the osteoporosis is severe and patient is at risk from fracture.

Reference: 1) Kodama T et al. The effect of bisphosphonate on the treatment response to teriparatide in Japanese Population. WCO-IOF-ESCEO Florence 2017.

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COMPARISON BETWEEN TREATING ESTABLISHED OSTEOPOROSIS BY TERIPARATIDE ACID INJECTION ALONE AND BY COMBINED TREATMENT OF TERIPARATIDE ACID INJECTION AND DENOSUMAB INJECTION

N. Neji¹, A. Ali¹, H. Elazaly¹

¹King Faisal Medical Complex, Taif, Saudi Arabia

Objectives: Compare the results of the treatment of elderly patients with established osteoporosis either with Teriparatide alone or in combination with denosumab.

Methods: A prospective study for 28 months (from August 2015 to December 2017) in King Faisal Medical Complex in Taif which is a referral hospital serving a population of about 2 million citizens. 78 patients included in the study, were suffering from established osteoporosis (BMD <-3.5) and most of them had one or more fragility fracture. These patients were stratified into two groups; the first group (52 patients) received treatment with teriparatide daily injection only, while the second group (26 patients) received combined treatment with teriparatide daily injection and denosumab injection every 6 months. All patients received daily calcium and vitamin D supplements. Patients who were not compliant to the treatment for any reason were removed from the study. BMD was measured at the beginning of the treatment and at the end of each year.

Results: For every patient three BMD values were recorded; at the beginning of the treatment, after one year and the end of the second year. The mean changes in BMD for the first group were +1.93 and +1.45 for the first and second year respectively. While the mean changes in BMD for the second group were +2.05 and +1.61 for the first and second year, respectively. Patient of both groups had significant increase in the BMD with both treatment modalities. However, there was slight increase in BMD for the patients of the second group over the first one.

Conclusion: All patients on both groups had statistically significant improvement in BMD measures after the first and second year of treatment. However, slight improvement was found in the patients of the second group. Hence combining denosumab injection with teriparatide failed to show significant improvement over patients receiving teriparatide injection alone.

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MATERNAL AWARENESS FOR VITAMIN D SUPPLEMENTATION IN BREASTFED INFANTS - ROMANI POPULATION

A. Lungu¹, I. Cucos¹, D. Opris-Belinski², S. Prizlopan³, F. Berghes²

¹Sf. Maria Hospital, Bucharest, ²Carol Davila University of Medicine Bucharest, Bucharest, ³CMI Ileanda, Ileanda, Romania

Objective: To evaluate maternal awareness for vitamin D supplementation in breastfeeding infants in Romani population.

Methods: Romani population is largely distributed in CEE countries, but they migrated in western countries, too. Unfortunately, they are among the less educated and less wealthier persons in Europe. An interview was conducted among family doctors from an area with about 10 000 persons of Romani populations. The interview was structured [1] including data about past (10 years ago) and present maternal awareness for vitamin D supplementation. The level of agreement among doctors was considered very high (100-75%), high (75-50%), moderate low (50-25%) and very low (25-0%).

Results: Romani population are perceived as being very attentive with their infants being especially interested by any possible consequences of diet in normal walking (very high agreement). Vitamin supplementation is considered essential (very high agreement), its role is considered being related to a proper development of limbs (very high agreement) and not necessary related to bone health (moderate low agreement). Mothers prefer mixed vitamin supplementation instead only Vitamin D (high agreement). Other data collected refers to vitamin D type preference, milk formulas preference, incentives for vitamin D supplementation or role for vitamin D in other possible pathology [2, 3].

Conclusion: Vitamin D is easily adopted by Romani mothers - high level of adherence to this supplementation is the norm. It is considered affordable with a preference for certain formulations. Romani populations seems to be no different from other

EU populations in terms of maternal awareness for vitamin D supplementation.

References:

1. Hifinger M et al. *Ann Rheum Dis* 2017;76:126
2. Groseanu L et al. *Eur J Rheumatol* 2016;3:50
3. Berghea F, et al. *Ann Rheum Dis* 2014;73:1148

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ROMANI ELDERLY BELIEFS ON VITAMIN D ROLE IN NORMAL AGING

I. Cucos¹, F. Berghea², S. Prizlopan³, A. Lungu¹, R. Ionescu²

¹Sf. Maria Hospital, Bucharest, ²Carol Davila University of Medicine Bucharest, Bucharest, ³CMI Ileanda, Ileanda, Romania

Objective: To evaluate how is vitamin D supplementation perceived in aged persons from Romani ethnic group.

Methods: Romani ethnic group is originating from India but today is largely spread in European Countries, too. Unfortunately, they are frequently marginalized in the societies they live and this creates an educational gap between them and the rest of population. Although Romani breastfeeding mothers seem to be aware of the vitamin D role in child development, little is known about what the elderly believe regarding their need of vitamin D. An interview was conducted among family doctors from an area with about 10.000 persons of Romani populations. The interview was structured including data about past and present attitudes and perceptions regarding vitamin D need in aged persons. The level of agreement among doctors was considered very high (100-75%), high (75-50%), moderate low (50-25%) and very low (25-0%).

Results: Romani elderly are perceived as being poorly informed about osteoporosis and other vitamin D related illness (very high agreement). No relation between a proper muscle health and vitamin D is generally recognized (very high agreement). A combination of vitamins is considered necessary in almost all aged person (very high agreement) with no interest for vitamin D (high agreement). Other data collected refers to moment the Romani elderly persons open discussion about vitamin supplementation, marketing preferences, source of funds for vitamin supplementation, adherence and acceptability of osteoporosis treatment.

Conclusion: Vitamin D has a modest place in Romani elderly therapeutic universe. From this point of view a large knowledge gap exists between them and other segments of EU population. Stronger education efforts need to be developed to close this gap.

References:

1. Hifinger M et al. *Ann Rheum Dis* 2017;76:126
2. Groseanu L et al. *Eur J Rheumatol* 2016;3:50

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IMPROVEMENT OF PAIN DIMENSIONS AND DISABILITY SCORE IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN WITH ANTIOSTEOPOROTIC THERAPY

M. I. Majumder¹, M. Harun², S. Anwaruzzaman³, T. Ahmed⁴

¹Comilla Medical College, ²Chattagram International Dental College, Chittagong, ³Comilla Medical College, Comilla, Bangladesh, ⁴Professor of Medicine, Comilla Medical College, Comilla, Bangladesh

Osteoporosis (OP) is associated with physical limitation, impairment of general wellbeing, mood and chronic pain with a variety of negative outcomes including disability and poor quality of life. OP patients need assessment of pain in regards of severity and dimensions. Aim of this study was involving that issue done in Comilla Medical College, Comilla, Bangladesh with inclusion of 117 postmenopausal osteoporotic patients. Among those 87 were postmenopausal OP before initiating treatment (Group-A) and 30

postmenopausal OP were on antiosteoporotic treatment with yearly intravenous zoledronic acid with calcium and vitamin D supplement for 2 years (Group-B). All patients were evaluated by McGill pain scale in short form and visual analog scale (VAS) for dimension of pain and intensity. Graded chronic pain scale for disability score. In 2 Groups A and B, mean age were (61.29±9.93 vs. 61.73±7.83 in years), height (147.90±6.98 vs. 150.26±6.42 in cm), weight (50.43±10.90 vs. 51.60±9.77 in kg) and time of sufferings (42.04±37.34 vs. 42.43±28.08 in months) were statistically not significant (p value=0.05). Lumbar and femoral BMD in T-score of Group-A vs. Group-B (-3.35±0.98 vs. -3.49±1.23) and (-2.65±1.07 vs. -2.72±1.04) were significantly different (p value=0.001 & 0.002). In both group severity of pain(7.05±1.95 vs. 6.06±1.87), pain intensity (64.60±19.31 vs. 55.88±20.10) and disability score (65.58±19.31 vs. 55.88±20.10) were significantly different statistically (p value=0.017, 0.011 and 0.020) indicating improvement with antiosteoporotic therapy. The dimension of pain in both group was purely sensory (8.91±3.12 vs. 7.06±3.64) but some were affective (3.41±3.72 vs. 2.1±1.7). So sensory pain dimension were significantly (p value=0.008) better or improved in treated osteoporotic patient belonging Group-B than affective pain (p value=0.06). Our study shown improvement of pain in all dimensions, the severity, intensity, sensory as well as affective pain and disability score with the antiosteoporotic therapy.

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BMD IN WOMEN WITH SYSTEMIC SCLEROSIS

S. Monov¹, D. Monova², M. Stambolova³, R. Shumnalieva¹

¹Medical University - Sofia, Department of Internal Medicine, Clinic of Rheumatology, ²Medical University - Sofia, Medical Institute, Department of Internal Medicine, ³Medical Institute - Ministry of Interior, Sofia, Bulgaria

Objectives: Systemic sclerosis (SSc) is a multisystem autoimmune disease, characterized by diffuse fibrosis, degenerative changes, and vascular abnormalities in the skin, joints, and internal organs. The effect of systemic sclerosis on bone density is not well understood. The aim of this study is to evaluate the BMD and occurrence of fracture and fracture-related mortality in women with SSc.

Methods: Demographics, disease manifestations of SSc, biological inflammatory parameters, functional disability, scleroderma health assessment questionnaire, immunological status, BMD (lumbar spine and femoral neck), risk factors for low BMD, fractures, and fracture-related mortality were collected in patients with SSc. BMD was measured by using a DXA in lumbar spine and femoral neck. Fisher's Exact and Student's t-tests were used to evaluate differences between women with and without low BMD. Logistic regression was used for multivariate analysis.

Results: 48 consecutive unselected SSc women were approached. The mean age of women was 48.32±15.56 years, the mean disease duration was 10.12±4.78 years, Twenty-nine women (60.42%) had low BMD, of those 11 (37.93%) had osteoporosis, mean BMD in lumbar spine was -2.86±0.38 and in femoral neck was -2.22±0.26. 23 (47.92%) women with SSc were postmenopausal. In correlation analysis and in multiple regression models, there were correlations between BMD and longer duration of SSc (p<0.01), family history of osteoporosis (p<0.05), age (p<0.01), menopause (p<0.01), low BMI (p<0.02), presence of internal organ involvement (p<0.05), malabsorption syndrome (p<0.05), joint involvement (severe joint pain and erosive arthropathy) (p<0.05), and immunological status (positivity of anti-DNA topoisomerase I antibodies) (p<0.05). 4 women (4/29) with low BMD had a fracture, compared to 2 without low BMD. Fracture-related mortality did not occur in any patients.

Conclusions: Our data suggest that women with SSc are at risk of low BMD and fracture, especially when other risk factors for osteoporosis are

present. A number of clinically relevant factors (longer duration of SSc, presence of internal organ involvement, joint involvement, immunological status) are associated with low BMD.

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BMD ADJUSTMENT IN KIDNEY-TRANSPLANT RECIPIENT CHILDREN

R. Ambrosi¹, M. A. Guagnelli¹, A. M. Hernandez², M. Medeiros², P. Clark¹

¹Unidad de Epidemiología Clínica, Hospital Infantil de México Federico Gómez, ²Laboratorio de Investigación en Nefrología y Metabolismo Mineral Óseo, Mexico City, Mexico

Objectives: Chronic kidney disease in children causes multiple bone alterations, particularly renal osteodystrophy, which affects both bone quality and size, in turn causing short stature, bone deformities and brittleness. Once they get a transplant, this process starts to revert, and although mineral alterations improve, short stature often requires growth hormone supplementation but bone fragility requires evaluations in order to revert the disease's effects. DXA is a valuable tool for its measurement in children affected with chronic diseases but it requires adjustment for their proper evaluation since it is size-dependent. Our objective was to evaluate height adjusted age (according to 50th percentile in CDC growth charts) and bone age (according to Greulich and Pyle charts) correlation to BMD in kidney transplant recipient children.

Methods: DXA measurements were made for 31 (16 girls) pediatric kidney transplant recipients. Lumbar and total body less head (TBLH) BMD were obtained. Within the same measurement, non-dominant hand image was obtained to evaluate bone age. BMD for chronological age was obtained directly, height adjusted age and bone age were calculated and the results graphed into a scatterplot, R square values were obtained.

Results: Coefficient of determination of lumbar and TBLH were higher both for bone age and height adjusted age than for chronological age. Height adjusted age shows the best r squared in both boys and girls with values up to 0.76 in girls for TBLH and 0.68 for girls in lumbar region.

Conclusions: Height adjusted age seems to show a better correlation with BMD in children recipient of kidney transplant. Follow up of these patients is in progress to evaluate long term evolution of BMD, response to transplant and long term fracture risk

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EXERCISE TO IMPROVE FUNCTIONAL OUTCOMES IN PERSONS WITH OSTEOPOROSIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

A. Varahrami Vigeh¹, I. B. Rodrigues², J. C. Macdermid¹, D. Bryant³, T. Birmingham¹

¹University of Western Ontario, London, ²MacMaster University, Hamilton, ³London, Canada

Objective: Osteoporosis affects many aspects of daily life. The aim of this systematic review was to assess the effects of exercise interventions on functional outcomes in persons with osteoporosis, in comparison with controls.

Methods: Four databases were searched and yielded 1587 citations. Two reviewers independently determined study eligibility, rated risk of bias, appraised methodological quality of studies, and resolved discordance by consensus.

Results: A total of 28 studies examining 2113 participants met inclusion criteria; 25 studies were suitable for meta-analyses. Four categories of exercise were identified using the ProFaNE taxonomy. After removing studies with high risk of bias and sorting them into

intervention subtypes, we were able to sufficiently reduce the heterogeneity. The standardized mean difference favored multicomponent exercise for mobility (-0.56 , 95%CI $[-0.81, -0.32]$, $p=0.06$, $I^2=51\%$); balance (0.50 , 95%CI $[0.27, 0.74]$, $p=0.28$, $I^2=21\%$); and self-reported measures of functioning (-0.69 , 95%CI $[-1.04, -0.34]$, $p=0.02$, $I^2=61\%$). Trials were judged at low or unclear risk of selection bias, indicating inadequate reporting and at high risk of performance bias due to lack of participant blinding. The mean methodological quality rating of the studies was 63.5% indicating moderate quality.

Conclusions: A multicomponent exercise program of high-speed training combined with simulated functional tasks is promising to enhance functional outcomes. Due to substantial clinical heterogeneity of the target groups and specific demands of exercise modes, it is unclear which exercise program is optimal.

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USEFULNESS OF VERTEBROPLASTY IN VERTEBRAL FRACTURES WITH PERSISTENT BACK PAIN: A REPORT OF 64 VERTEBRAL AUGMENTATION FROM A UNIVERSITY HOSPITAL

O. Fernandez-Berrizbeitia¹, M. Gonzálezdegaraday², M. L. García-Vivar¹, A. López-Medina², E. Ruiz-Lucea¹, I. Torre-Salaberri¹, A. Intxaurre-Pellejero¹, J. Blanco-Madrigal¹, E. Guerrero-Basterretxea¹, I. Calvo-Zorrilla¹, O. Ibarguengoitia-Barrena¹, C. Pérez-Velásquez¹, D. Montero¹, N. Rivera-García¹, M. J. Allande-Lópezlinares¹, A. Bilbao-González³, E. Galíndez-Agirregoikoa¹

¹Rheumatology Department, Basurto University Hospital, ²Radiodiagnostic Department, Basurto University Hospital, ³Research Department, Basurto University Hospital, Bilbao, Spain

Objective: Management options for patients with persistent back pain after a vertebral fracture include vertebral augmentation, especially in an acute phase, but its use is controversial. Our aim was to evaluate the fracture cause, efficacy and complications of consecutive vertebroplasties performed in our hospital in a 12-year period.

Methods: Retrospective study of vertebroplasties performed at a University Hospital in the last 12 years (April 2005 to April 2017). The duration of follow-up was >12 months. Epidemiological variables, indications, time elapsed, efficacy and complications of the procedure were collected. The indication of vertebroplasties in fractures was pain refractory to usual symptomatic treatment in these pathologies: osteoporosis, trauma, leukemia/lymphoma, metastasis and hemangioma. Efficacy was assessed at 6 and 12 months with a simple verbal scale according to the pain response (improvement/nonimprovement). Patients who died before 12 months were excluded for the that parameter. A comparative study of the efficacy between a) cause of fracture, b) location, c) time elapsed, d) access route and e) complication was performed. For the descriptive analysis we used frequencies and percentages in the case of qualitative variables, and mean and standard deviation (SD) or median and interquartile range for quantitative variables. Chi-square test or Fisher's exact test was used in for qualitative variables, and Wilcoxon's non-parametric test for evolution time. Statistic analysis was performed with the SAS System for Windows V 9.2.

Results: Sixty-six vertebroplasties were performed in 44 patients (75% female/25% male). Their mean age was 70.63 ± 10.60 years (range, 46-96 years). The description of the causes of fracture, its level, the access route and the cement leaks are expressed in the Table. The median time from fracture to vertebroplasty was 3 months [1-6]. 78% of the fractures were osteoporotic and had a better response to pain at 6 months than all other fractures ($p<0.05$), although at 12 months there were no differences

($p=0.42$). Only 12.5% had refracture. Pain control and vertebral refracture did not differ between neither the access route nor the cement leakage and its magnitude. In the 12-month follow-up, 7 patients died (6 due to neoplasia, 1 due to sudden death) and no case was related to vertebroplasty.

Conclusions: In our experience vertebroplasty has been shown to be an effective technique for the control of refractory pain in vertebral fractures regardless of cause and time of evolution. Likewise, only 12.5% presented refracture in the following 12 months to the procedure. According to our study we can consider vertebroplasty as an effective and safe alternative in this type of patients.

FRACTURE CAUSE

- Osteoporosis, n (%)	50 (78.13)
- Trauma, n (%)	6 (9.38)
- Lymphoma/leukemia, n (%)	5 (7.81)
- Metastasis, n (%)	2 (3.13)
- Hemangioma, n (%)	1 (1.56)

FRACTURE LEVEL

- Lumbar, n (%)	25 (39.06)
- Dorsal, n (%)	37 (57.81)
- Cervical, n (%)	2 (3.13)

VERTEBROPLASTY ACCESS ROUT

- Unipedicular, n (%)	15 (23.44)
- Bipedicular, n (%)	44 (68.75)
- Parapedicular, n (%)	2 (3.13)
- Spine-Jack, n (%)	1 (1.56)
- Anterior, n (%)	2 (3.13)

CEMENT LEAKAGE

- No, n (%)	38 (59.38)
- Mild, n (%)	20 (31.25)
- Moderate, n (%)	5 (7.81)
- Severe, n (%)	1 (1.56)

REFRACTURE

- No, n (%)	56 (87.5)
- Yes, n (%)	8 (12.5)

EFFICACY AT 6 MONTHS/12 MONTHS

- Improvement, n (%)	38 (59.38) / 43 (75.44)
- Lack of improvement, n (%)	26 (40.63) / 14 (24.56)

malnutrition had first degree, 14 (34.14%) had second-degree and 12 (29.26%) had third-degree malnutrition. The average number of casts per patient and 8+ casts given in undernutrition group was higher in malnutrition group than the number of 6+ casts given to good nutrition group. The number of Achilles tenotomy performed in undernutrition group was also high.

Conclusion: A significant correlation between patient nutritional status and outcome of Ponseti technique is found, as it influences the number of casts, possible relapse and failure of treatment.

Table 1. Patient details and nutrition status.

Number of patients	153	
Age	1 week to 156 weeks (3 years) 78.5 mean $\pm$ 109.6 S.D	
Age distribution	0-3 months	68 (44.44%)
	age 3-6 months	30 (19.06%)
	age 6-12 months	23 (15.03%)
	1-2 years	19 (12.41%)
	2- 3 years	13 (8.49%)
Sex distribution	Boys: 98 (64.05%)	Girls: 55 (35.94%)
Laterality of club foot:	Unilateral: 58 (37.90)	Bilateral: 95 (62.09%)
Total feet 248		
Nutrition status	Good nutrition: 112 (79.73%)	Undernutrition: 41 (20.26%)
	Boys=78 (79.59%)	Boys=20 (20.40%)
	Girls=34 (61.81%)	Girls=21 (38.18%)
		First-degree: 15 (36.58%)
		Second-degree: 14 (34.14%)
		Third-degree: 12 (29.26%)

Table 2. Study outcomes

	Good nutrition Group n=112 (79.73%)	Undernutrition Group n=41 (20.26%)
Number of cast per patient	Average 4-7 weekly cast 6+ cast=21.42% (24)	Average 6-9 weekly cast 6+ cast=45.45% (25)
Maintenance phase in foot abduction bracing	106 (94.64%)	35 (81.81%)
Percutaneous achillestenotomy	58 (51.78%)	42 (76.36%)

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MALNUTRITION IN CLUBFOOT PATIENT: PREVALENCE AND ITS IMPACT ON PONSETI TECHNIQUE IN KARACHI PAKISTAN

M. Muzzammil¹

¹Jinnah Postgraduate Medical Center, Karachi, Pakistan

Objectives: To determine the prevalence malnutrition and effects of nutritional status of clubfoot patient in outcome of Ponseti technique.

Method: From Jan 2016 to Dec 2016, 153 clubfoot patients were treated and the WHO classification of weight-for-age index was used to assess the nutritional status of patients and its impact on outcome of Ponseti technique recorded and analyzed.

Results: Out of 153 patients, 112 (79.73%) were found in good nutrition status and 42 (20.6%) were malnourished. 15 (36.58%) out of 41 patients with

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LEVEL OF OSTEOPOROSIS AWARENESS AND ITS RELATED FACTORS IN LOW DENSITY DISTAL RADIUS FRACTURES PATIENTS AGED 50 YEARS AND OLDER IN ASIAN COUNTRY

M. Muzzammil¹

¹Jinnah Postgraduate Medical Center, Karachi, Pakistan

Objective: Because of rapid increase in ageing population in Asia, osteoporosis has become one of the most prevalent and costly health problems. Distal radius fracture which is considered as one of the most frequent fractures seen is now shown to be associated with an increased risk of further fractures. Not much is known about the level of awareness of the condition among these

patients of distal radius fracture in Asian country. Awareness and treatment of osteoporosis is significant to prevent further fractures in patients with osteoporosis. The aim of this study was to evaluate the awareness of osteoporosis and related factors in distal radius fracture patients.

Method: Cross-sectional study was conducted on low energy distal radius fracture patients aged 50 years and over who presented in Emergency Department of tertiary care hospital Karachi Pakistan from Jan 2016 to Dec 2016. The questionnaire designed had three sections: demographic information, knowledge about osteoporosis and the risk factors for osteoporosis which was applied to all patients after receiving consent. Data was analyzed on SPSS 21 for statistical significance.

Results: Total number of patient with distal radius fracture were 480, 352 (73.33%) female and 128 (26.66%) male. The average age was 72.5 years, with a minimum of 50 and a maximum of 95 SD±31.81. Only 98 (20.41%) had awareness about osteoporosis, and 382 (79.58%) did not know what it was. Considering the educational levels 210 (43.75%) of patients were not able to read and write or ever went to school, 52.5%, 158 (32.91%) did not get primary education and 112 (23.33%) were secondary or high school graduates. Awareness of osteoporosis was directly related to the level of education. With regard to sources of information, 312 (65%) of patients reported physicians/doctors as the main source of information, followed by TV (15%), newspaper (10%). Other sources of information included: books (2%), family members (3%), friends (2%), radio (1%), pharmacists (1%) and Internet (1%). 382 (79.58%) indicated they did not know anything about osteoporosis and could not answer the remaining questionnaire. Lifestyle practices varied considerably. Nearly 15% reported smoking (observed mainly in male patients), 20% indicated they exercised for at least 30 min daily, and 1% reported drinking alcoholic beverages occasionally. Only small number of patients reported that they take calcium and vitamin D supplements on regular basis (25% and 15%, respectively). 382 (79.58%) patients did not know what were the risk factors leading to the development of osteoporosis. More than three quarters of patients could not identify risk factors such as vitamin D deficiency, family history of osteoporosis, poor eating habits, smoking, alcohol consumption, increasing age, some medications and menopause. There appeared to be a relationship between education and awareness of risk factors. When compared to respondents with a lower educational level (high school or less), a greater proportion of respondents with higher educational level (college or post-graduate education) were able to identify risk factors such as lack of exercise (32% vs. 11%), vitamin D deficiency (22% vs. 8%), family history (18% vs. 8%), smoking (12% vs. 6%), alcohol consumption (6% vs. 2%), and certain medicines (5% vs. 1.5%).

Conclusion: With this study we were able to demonstrate that the level of awareness of osteoporosis in patients with distal radius fracture is very low and related to the educational level of the patients. The recognition of osteoporosis and thus starting its treatment earlier is necessary to prevent the osteoporotic fractures. Public education campaigns must address risk factors and the strategies to overcome those that are modifiable in order to prevent the development of osteoporosis and its complications.

Patient demography

Total number of patients	480
Age	50-95 years (mean 72.5 SD±31.81)
Gender	
Female	352 (73.33%)
Male	128 (26.66%)
Education Status	
Able to read and write or ever went to school	210 (43.75%)
Did not get primary education	158 (32.91%)
Secondary or high school graduates	112 (23.33%)

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EFFECTIVENESS OF EXTRACORPOREAL SHOCKWAVE THERAPY FOR CHRONIC ACHILLES TENDINOPATHY: A CASE REPORT WITH 18 MONTHS FOLLOW-UP

E. Nikolikj Dimitrova¹, C. Gjerakaroska Savevska², B. Mitrevska², V. Koevska², M. Gocevska², M. Manoleva², B. Kalchovska Ivanovska²

¹Institute of Physical Medicine and Rehabilitation, Medical Faculty, "Ss Cyril and Methodius" University, ²Institute of Physical Medicine and Rehabilitation, Medical Faculty, "Ss Cyril and Methodius" University, Skopje, Macedonia

Objective: Achilles tendinopathy (AT) is a pathological state resulting from repetitive loading or stress on the tendon. Two main disorders are noninsertional and insertional conditions. Conservative treatment is mainstay in these conditions. The aim of the presentation is to evaluate the effects of the radial (low-energy) extracorporeal shockwave therapy (RESWT) in treatment of the adult with chronic insertional Achilles tendinopathy (AT) after the unsuccessful conservative treatment, with 18 months follow-up evaluation.

Methods: We report the case of a 55 years-old male suffering from severe right posterior heel pain for 4 months. Plane radiography showed presence of retrocalcaneal enthesophyte. For his chronic insertional Achilles tendinopathy on the right heel he received conservative treatment in the Institute of Physical Medicine and Rehabilitation. For outcome assessment, numerical rating scale (NRS) for pain, range of motion in the ankle, and Roles-Maudsley score (RMS) for assessment of function were used. At the baseline the pain was severe, NRS 7 points, and his functioning was assessed with RMS as poor (point 4, pain-limited activities). He received physical therapy treatment. After unsuccessful conservative treatment (NRS 5 points, and RMS 3 points, some discomfort after prolonged activity) he was underwent on RESWT treatment, with application of 2000 shocks per session, a total number of 5 sessions with time interval of one week.

Results: NRS was significantly decreased at immediate and long-term follow-up. After the last treatment the patient had no pain (NRS was 0 point), and function RMS was excellent (point 1, no pain, full movement and activity). At the follow-up check at 3 months, 6 months, 12 and 18 months the patient has no pain and excellent functional results.

Conclusion: Radial ESWT is a safe and effective treatment even for longer period of time for patients with chronic insertional Achilles tendinopathy.

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TOLERABILITY AND SAFETY OF HIGH DOSE VITAMIN D LOADING REGIMEN IN HIP FRACTURE PATIENTS

R. Shukla¹, A. Gupta², H. Shukla¹

¹Prince Philip Hospital, Llanelli, ²Glangwili General Hospital, Carmarthen, UK

Objectives: Vitamin D deficiency is common in elderly and has an association with osteoporosis, falls fractures. Our preliminary study showed that 96% hip fracture patients either had vitamin D deficiency (<30 nmol/L) or Insufficiency (30-50 nmol/L) when tested in serum soon after admission. Patients due for bisphosphonates and denosumab are required to be vitamin D replete. We studied the safety and tolerability of high dose oral vitamin D supplementation in hip fracture patients without the need to test for serum levels.

Methods: Observational prospective study done at a teaching hospital in UK receiving about 500 hip fractures per year. Rapid loading vitamin D protocol was agreed and approved by Medicines Management Group. Consecutive hip fracture patients (excluding patients with hypercalcaemia) admitted to an Acute Hip unit were prescribed high dose

oral vitamin D tablet 25,000 units once daily for 12 days without testing for serum vitamin D levels (to achieve rapid supplementation of total 300,000 units). Maintenance therapy was oral calcium 1000 mg plus vitamin D 800 IU with antiresorptive drugs as indicated.

Results: 190 patients Age range 60-100 yrs mean 84 yrs 75% females. All patients tolerated loading regimen of oral vitamin D. No adverse effects were noted. No hypercalcaemia, nephrocalcinosis or unmasking of primary hyperparathyroidism was observed.

Conclusion: High dose oral vitamin D is feasible and safe for optimisation of vitamin D status of elderly hip fracture patients soon after their admission. Rapid correction allows supervised dose administration, avoids need for serum vitamin D testing thereby saving costs on testing. The regime allows starting patients on potent antiresorptive drugs pre-discharge from the hospital and this protocol is established as hospital guidance for management of hip fractures in the elderly. Our real world experience is applicable to similar hip fracture admissions in other hospitals.

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THE IMPACT OF LOW DOSE GLUCOCORTICOID ON DISEASE ACTIVITY, BMD, FRAGILITY FRACTURE, AND 10-YEAR PROBABILITY OF FRACTURE IN RHEUMATOID ARTHRITIS (RA) PATIENTS

T. T. Cheng¹, Y. C. Chen¹, S. F. Yu¹, H. M. Lai¹, F. M. Su¹, B. Y. J. Su¹, W. C. Chiu¹, C. Y. Hsu¹, J. F. Chen¹, C. H. Ko¹

¹Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan

Objectives: To investigate the impact of low dose glucocorticoid on disease activity, bone density and fracture in RA patients.

Methods: This is an interim analysis of RA registry, conducted at Chang Gung Memorial Hospital in Kaohsiung. In the registry, consecutive RA patients who visited Rheumatology clinic at Chang Gung Memorial Hospital in Kaohsiung (CGMHK) since 01-Sep- 2014 and fulfilled classification criteria for RA were enrolled. The demographic data and clinical characteristics, including life style, including diet, evidence of previous fragility fracture, and risk factors of fracture in FRAX[®] were collected. Anti-CCP, rheumatoid factor (RF), erythrocyte sedimentation rate (ESR), disease activity-28 joint-erythrocyte sedimentation rate score (DAS-28-ESR), C-reactive protein (CRP), 25(OH) Vit D, iPTH, and BMD was measured at enrollment.

Those participants who were not on low dose glucocorticoid (2.5-7.5 mg/d prednisolone or equivalent dose) were included as control group and study group comprised of 1:4 randomly selected age- and sex-matched on chronic LDG RA patients.

Results: A total of 425 participants were enrolled. There were 85 (20%) and 340 (80%) in the control and study group, respectively. The demographics and clinical characteristics revealed comparable between the groups. Compared to control group patients, patients on LDG had significant lower vertebral BMD (L 1-4) (g/cm^2), (0.854(0.200) vs. 0.896 (0.201), $p=0.046$), higher rate of previous fracture (103 (30.3) vs. 13 (15.3), $p=0.006$), substantially higher 10-year probability of major (14 (15.5) vs. 8 (8.6), $p<0.0001$) and hip (4.4 (8.4) vs. 2 (3.9), $p<0.0001$) fracture, respectively.

Conclusions: It seems RA patients on LDG had similar impact on disease activity (ESR, CRP, and DAS-28 (ESR)), as non-LDG users. While, RA on chronic LDG had lower BMD at spine (L1-4), higher rate of previous fracture that predicts substantial higher 10-year probability of fracture than non-LDG users.

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INFLUENCE OF SPINAL FRACTURE ON THE NUTRITIONAL STATE IN ELDERLY WITH HIP FRACTURE

C. Martinez Aznar¹, M. E. Monge Vazquez¹, M. Campoamor Gonzalez¹, A. Martin Martinez¹, C. Martin Hernandez¹

¹Hospital Miguel Servet, Zaragoza, Spain

Objective: Osteoporosis is a serious health problem due to its high prevalence, socio-economic cost and morbidity. One way to assess the magnitude of this disease is based on quantifying the incidence of fragility fractures. There is a high percentage of concomitant vertebral fractures in patients with HF (hip fracture). Of all the factors involved in osteoporotic disease, calcium and vitamin D are the most important both for the development and maintenance of bone mass. We aim to study the existence of statistically significant differences in the biochemical parameters between patients with or without VF (vertebral fracture) associated with HF, to verify a worse nutritional status in patients with associated vertebral fracture.

Methods: A comparative case-control study of patients with and without associated VF was conducted on a sample of 505 patients with HF admitted to the HUMS (Miguel Servet Hospital) during 2011. A dorso-lumbar spine radiograph and a blood analysis were carried out in each of the subjects to study parameters of calcium-phosphorus metabolism, albumin, PTH, vitamin D, as well as markers of bone remodeling.

Results: Only 12.1% of the sample took calcium or vitamin D supplements, reaching 13.7% in patients with VF. The mean vitamin D, which indicates generalized hypovitaminosis in patients with HF, is significantly lower in patients with associated VF ($P=0.000$) compared to patients without VF. Likewise, both the mean albumin ($p=0.005$) and calcium ($p=0.000$) levels are significantly lower in patients with VF. The number of VF is inversely proportional to the levels of vitamin D ($p=0.020$), albumin ($P=0.017$) and calcium ($p=0.005$).

Conclusion: There is a generalized degree of hypovitaminosis D among patients with HF, being even lower among patients with VF, just as it happens with calcium and albumin levels. All this leads to a poor nutritional status concomitant to HF, being more severe among patients with VF. Prevention is considered to be important among elder patients, preferably by applying nutritional measures.

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CAN MOXIBUSTION TREATMENT IMPROVE PERFORMANCE IN JUMPING?

Y. Liu¹, G. Fekete², S. Shen¹, D. Sun²

¹Ningbo University, Ningbo, China, ²Eötvös Loránd University, Szombathely, Hungary

Objective: Moxibustion has been known by more and more people as a traditional Chinese treatment technique. Although the mechanism of moxibustion is not clear, the therapeutic effect of moxibustion is obvious to all. The purpose of this paper is to investigate whether moxibustion can alleviate the fatigue state after the movement of human body by means of biomechanics testing.

Methods: Analysis of hip, knee and ankle kinematics during forefoot landing from a vertical jump and comparison of moxibustion treatment vs. no treatment could identify further evidence of its practicality when dealing with exercise induced fatigue. The joint angle and the angular velocity of the joint were obtained from Vicon motion analysis system, and peak vGRF and time was measure with Kistler. Overall, it can be concluded that moxibustion can have a direct effect on a UK citizens vertical jump lower limb kinematics during a fatigued state.

Results: This was particularly evident within the significant differences between peak knee angle during the take-off phase and peak ankle angle during the take-off and landing phases. Furthermore, statistically significant differences between the vertical jumps angular velocity of the knee and hip joints provide further evidence that moxibustion treatments physiological adaptations can alter and improve vertical jump biomechanics. Moreover, not only did moxibustion treatment improve peak angles and angular velocity, statistically significant differences in jump time were evident providing further evidence that moxibustion can in fact improve fatigued individuals jumping kinematics, but there is no significant difference in peak vGRF.

Conclusion: Not only did moxibustion treatment improve peak angles and angular velocity, statistically significant differences in jump time were evident providing further evidence that moxibustion can in fact improve fatigued individuals jumping kinematics. Evidence from these results could perhaps suggest that moxibustion could be used as an injury preventative measure to reduce fatigue and aid performance. Further investigation with a larger sample size and perhaps an alternative control is required to further validate these findings.

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BONE-CARTILAGE RESORPTION IN PATIENTS WITH EARLY RHEUMATOID ARTHRITIS

D. Nikitina¹, D. Rekalov¹

¹Zaporizhzhia State Medical University, Zaporizhzhia, Ukraine

Objective: The most important characteristic feature of rheumatoid arthritis (RA) is systemic disorganization of connective tissue with early disruption of its matrix metabolism, which is clinically manifested by chronic progressive erosive-destructive polyarthritis [1]. A sharp disruption of the exchange of structural proteoglycans, collagen and bone resorptive processes arise as a result of the action of various damaging mechanisms of inflammation in RA, including cytokine activation [2]. The purpose of this work is to study the significance of bone-cartilage resorption as an integral indicator of inflammatory-destructive processes in patients with early RA.

Methods: 78 patients with a reliable, according to the criteria of the American Rheumatological Association, diagnosis of RA aged from 20–65 years were examined. Patients were assessed the quantitative content and qualitative composition of glycosaminoglycans (GAG) in blood serum, and studied excretion of GAG in urine, calculating the concentration per 1 g of creatinine. oxypoline (OP) and its fractions (free (OPf), protein-bound (OPp) and protein-bound (OPp) hydroxyproline) were determined in serum and urine.

Results: Analysis of the obtained data showed that in patients with minimal activity of the inflammatory process (IP), the content of GAG in serum was statistically significantly higher by 43.1%, compared with the control group. The level of excretion of GAG in urine did not depend on the degree of activity in RA, although it was significantly higher than normal even with minimal activity. At the same time, the fractional composition of excreted GAGs in the urine varied in RA patients, as evidenced by a significant decrease in the sulfated GAG content by 35% compared to the control group, although the differences between the groups were statistically unreliable. Bone remodeling markers, C-terminal telopeptides of collagen type I serum, also proved to be almost 3 times higher in RA than the level of healthy individuals, in which the indicated index was 0.15 ng/ml. In the RA patients examined, a statistically significant increase in the level of the collagen degradation marker - OP along with an increase in the concentration of the PG metabolite - GAG was detected. No significant differences were found in the evaluation of OPf and OPp, although there was a tendency to decrease the content of OPf and increase OPp when compared with those of the control group.

Conclusions: 1. The level of the biochemical marker of bone resorption, C-terminal telopeptides of collagen type I serum, was elevated even in individuals with early RA, indicating the activity and generalization of the processes of osteoporosis. 2. The content and qualitative composition of GAG in the blood serum adequately reflect the clinical features of the disease, being a sensitive integral test that reliably attests to the severity of inflammatory-destructive changes in the tissues of the affected joints and increases depending on the degree of activity and the timing of debut of the disease.

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THE LEVEL OF BMD IN WOMEN WITH DIFFERENT SEVERITY OF MENOPAUSAL DISORDERS

I. Zakharov¹, G. Kolpinskiy¹

¹Kemerovo State Medical University, Kemerovo, Russia

Objective: Postmenopausal osteoporosis is a pathology that consists not in isolated damage to the skeleton, but in the systematic disturbance of metabolic processes associated with the onset of menopause. Despite the complexity of the pathogenesis of menopausal disorders, the main role in the mechanism of their development is played by a decrease in the level of estrogens. In this regard, there are various morpho-functional changes in the female body, forming the so-called menopausal syndrome. The purpose of the study was to assess the BMD in persons with different severity of menopausal disorders.

Methods: The study included 96 women who were in the early postmenopausal period. Using the DXA method, a study was made of the mineral density of the bone in the lumbar spine. This zone of interest is chosen in connection with the fact that the lumbar vertebrae are largely represented by trabecular bone tissue. Clinical evaluation of menopausal disorders was carried out using the international menopause scale (menopause rating scale, MRS). The retesting was carried out 2–3 weeks after the first study. When evaluating the reliability of the tests, the α -coefficient Cronbach was 0.80; retest correlation – 0.98. These indicators indicate the internal consistency of the results of the assessment of climacteric disorders in women in this sample.

Results: The study of the prevalence of various degrees of severity of menopausal disorders determined the following structure: absence or minimal manifestations of the menopausal syndrome (0–4 points) were observed in 20.8±4.1%, light degree (5–8 points) in 22.9±4.3%, moderate (9–15 points) in 31.3±4.7% and heavy (16 points and above) in 25.0±4.3% of women of early postmenopausal period. Women with more pronounced manifestations of menopausal disorders in the early postmenopausal period have significantly lower values of the BMD (T-score) of the lumbar vertebrae. The median of climacteric disorders was statistically significantly higher in subjects with a T-score of –2.5 and below, being 13.0 (10.0–16.0); in women with T-score values of lumbar vertebrae that are above –2.5, the median of the total estimates of menopausal disorders was 9.0 (5.0–15.0) ($p=0.04$). When studying the results of bone densitometry, there was a decrease in BMD with a weighting of menopausal disorders. In persons who, according to the scores of the menopausal scale, scored 0–4 points, the median of the T-score for lumbar vertebrae was –0.05 (–0.6, 1.0), in patients who received a 5–8 MRS test score, the median of the T-score corresponded to –0.7 (–1.1, 0.4), with 9–15 points this indicator was –1.5 (–2.7, –0.6) and with a score of 16 and above median was –2.1 (–2.3, –1.9). The Kraskel-Wallis criterion (H) is 41.4 ($p=0.001$); $\chi^2=37.8$ ($p=0.001$), which indicates statistically significant differences in the BMD in the subgroups presented.

Conclusion: The revealed relationship of menopausal disorders and the level of BMD may be an additional marker in predicting postmenopausal osteoporosis.

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QUALIFICATION OF GENERAL PRACTITIONERS FOR THE MANAGEMENT OF RHEUMATIC DISEASES: RESULTS OF AN ANONYMOUS POLL

N. Nikolov¹, B. Zhelezarova¹, M. Panchovska²

¹Medical University Pleven, Clinic of Rheumatology, Pleven, ²Medical University Plovdiv, Department of Propeutics of Internal Diseases, Plovdiv, Bulgaria

Objective: From the appearance of the first symptoms of rheumatic disease, the first review with the GP and the consultation with a specialist

rheumatologist, passes through a different period of time. Sometimes it goes through additional consultations with other medical specialists, most often with orthopedics and neurologists, which slows down the timely an accurate diagnosis. Assessing the pathway of the patient with rheumatic illness in prehospital medical care, provides the information why the proper diagnosis and treatment are delayed. The detailed analysis of this process makes it possible to clarify the reasons for the delayed diagnosis, to identify and detail the mechanisms for its optimization. An important role in the healthcare system in Bulgaria at the first pre-hospital level are the General Practitioners (GPs). This article presents and analyzes the data from a survey among 22 GPs, which refer to 28286 patients for the Lovech city region and details the attitudes of GPs to manage the rheumatic diseases and their approach to diagnosis and treatment. Our aim was to determine the attitudes of GPs to manage with the rheumatic diseases and the reasons for delayed and wrong consultations.

Methods: anonymous poll conducted among 22 GPs in the town of Lovech with total number of patients 28286. The questionnaire contains 16 open and closed questions.

Results: The descriptive data collection methods were used and were statistically processed with descriptive and alternative analysis at a significance level below 0.05. In 12-20% of the examined patients have rheumatic diseases. In 72% is prevalence of degenerative joint diseases. In 13.6% of the patients with soft tissue diseases are consulted with orthopedists and 22.7% of the patients with low back pain with neurologists. In 59% of the patients are treated by the GPs.

Conclusions: The analysis of the results shows that GPs mainly refer to patients with degenerative joint diseases. The average delay from the onset of the complaints to the medical examination is over 1 month. The consultations with a specialist of rheumatic patients occur late and often they are provided with other specialists, mainly orthopedists and neurologists. This is one of the main reasons for delayed diagnosis and untimely treatment.

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IN PATIENTS WITH DIFFERENT FORMS OF OSTEOPOROSIS EXCELLENT ADHERENCE TO 6-MONTHLY DENOSUMAB INJECTIONS CAN BE ACHIEVED BY POSITIVE FEEDBACK BASED ON 6 AND 12 MONTHS BMD INCREASES AND RARE ADVERSE EVEN

J. D. Ringe¹, P. Farahmand¹

¹West German Osteoporosis Center (WOC), Klinikum Leverkusen, University of Cologne, Cologne, Germany

Objective: More than 50% of osteoporosis patients discontinue bisphosphonate therapy within the first year of treatment. Denosumab's (Dmab) longer dosing interval with its s.c. administration every 6 months might result in a better real life treatment adherence and persistence than weekly or monthly oral bisphosphonate treatment regimens.

Methods: In an open investigator-initiated prospective observational study in routine clinical practice we aimed to assess whether a careful medical explanation of treatment results 6 and 12 months after the first Dmab injection focusing on no or only mild and probably not drug related AEs, changes in back pain and on significant BMD increases have effects on patients' drug perception and future adherence with further Dmab injections. We included 142 patients (69 with postmenopausal, 42 with male, and 32 with GC-induced osteoporosis).

Results: At onset almost all patients had concerns about possible AEs, but 93% reported no negative changes in their health condition at all after two injections of Dmab, and only 7.0% reported mild to moderate AEs. Besides this good tolerability patients were very impressed by demonstrating and explaining to them the original DXA-protocols showing a significant increase in lumbar spine (LS) and/or total hip (TH) BMD. The therapeutic effect of Dmab on BMD did not differ between the three different types of osteoporosis. The mean increase rates at month 6 were +4.7% at the LS site and +2.1% at the TH area and at month 12 +7.8%

at the LS site and +3.7% at the TH area, respectively. There were only 5 vertebral and 4 non-vertebral fractures during the 142 patient years follow-up. The back pain score measured by VAS 0-10 decreased in all 3 groups significantly after 6 and 12 months. This clinical effect together with the scarcity of AEs and the positive feedback of a rapid BMD-increase at both sites resulted for 141 (99%) patients after 6 months and 139 (97%) after 12 months in a willingness to accept a further injection.

Conclusion: Results indicate that the convenient treatment regime together with back pain improvements, rarity of adverse events and the consistency of rapid and highly significant BMD-increases after 6 and 12 months of Dmab therapy used as a positive reinforcement had a significant, positive impact on patient's adherence to continue with the 6-monthly s.c. Dmab injections.

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THERAPY ADHERENCE AND SECONDARY PREVENTION IMPACT ON OSTEOPOROTIC FRACTURES: CASE REPORT

K. Miladinovic¹, N. Vavra-Hadžiahmetović¹

¹Clinic for Physical Medicine and Rehabilitation, Clinical Center of University of Sarajevo, Sarajevo, Bosnia-Herzegovina

Introduction: Lack of good education of patient and non-achievement of therapeutic adherence increases the risk of bone fractures in patients with osteoporosis, whether it is an interruption of the pharmacological or nonpharmacological component of treatment.

Case: Female patient, aged 83, was DXA diagnosed with osteoporosis 13 years ago (2004) (total T-score for L spine: -3.3. s.d.), so bisphosphonate with calcium supplements were prescribed. The patient was taking therapy for two years, after which bone loss was improved, but with lumbar spine finding still being significant in osteoporosis (T-score: -3.1 s.d.). After this finding, patient interrupted therapy on her own. Also, she was not conducting the proposed kinesiotherapy with osteogenic effects without exceeding the biomechanical competence, nor did other physical procedures with osteogenic effects. She did not go to the checkups, regardless of the spinal pain and "stinging", until April 2017. In the period from April to August 2017, successively three attacks of osteoporotic fractures occurred, which are successively treated with vertebroplasty: in June at level L3, in July at levels Th8, Th9 and L2, and in August at level L4. Then, patient was not recommended for osteoporosis therapy. After the physiatric examination, the recommended DXA densitometry shows T-score for L1: -3.19 s.d. Serum calcium level showed a reference value, and serum 25(OH)-D vitamin level showed a value of 23.4 ng/ml (normally 30-100 ng/ml), which is in the domain of insufficiency. The following therapy was prescribed: denosumab subcutaneous injection of 60 mg at 6 months; daily calcium supplement of 1200 mg, daily magnesium supplement of 400 mg daily vitamin D3 supplement of 3200 i.u.; physical therapy with an emphasis on kinesiotherapy with osteogenic effects without overcoming biomechanical competence. The importance of regular and long-term therapy, as well as of regular control was explained. After three months, at the first checkup, there was assessment of following: improvement of the muscular strength of the paravertebral and lower extremity muscles for one evaluation according to manual muscular test, independence in carrying out daily living activities with adopted protective spine positions, better posture during walking, and improvement of serum 25(OH)-D vitamin level: 31 ng/ml. Next checkup is planned for three months, together with control of 25(OH)-D vitamin level, and control DXA densitometry is planned for 12 months.

Conclusion: Nonachieved therapeutic adherence is very important risk factor for bone fractures in patients with osteoporosis. The absence of secondary prevention of osteoporotic fractures is still present in clinical practice. In order to prevent the emergence of further fractures, in clinical practice, it is necessary to develop a strategic program for the measures to be taken.

P359

FEATURES OF CEREBROSPINAL FLUID DYNAMIC DISORDERS IN PATIENTS WITH INITIALLY CHRONIC VIRAL ENCEPHALITIS

A. N. Filipovich¹¹Research Center of Medical Assessment and Rehabilitation, Minsk, Belarus

Methods: MRI head, spinal cord, research of cerebrospinal fluid and its dynamic, immunological researches.

Results: At an estimation of the received data of general content of IgE in blood serum the following parameters of the food allergy were considered: 0 - absence or below a threshold [0.00-0.34 IU/ml], 1 - threshold level [0.35-0.69 IU/ml], 2 - moderately increased [0.70-3.49 IU/ml], 3 - considerably increased [3.50-17.49 IU/ml], 4 - high [17.5-49.9 IU/ml], 5 - very high [50.0-100 IU/ml], 6 - exclusively high level [> 100.0 IU/ml]. Thus it is necessary to underline, that threshold level was regarded by us as a fact of presence of a food allergy at patients MS, which indicators (the general IgE) could accrue, especially at increase of available clinical symptoms MS or occurrence of the new symptoms. Thus changes of immunogram indicators simultaneously took place. Among 23 patients with MS surveyed by us, the food allergy is revealed in 4 people (17.4%). It has allowed to exclude the application of glucocorticoid therapy, which is counter-indicative and not safe for patients and to appoint the effective pathogenetic treatment including antiallergic, antihistamine preparations in a combination with probiotics (linex, etc.).

Conclusion: At formation of the program of medical rehabilitation of patients with MS it is necessary to consider not only activity of demyelination process, but also to exclude food allergy presence. It is necessary to exclude also the use of multicomponent dishes by patients with MS with a food allergy.

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ACTIVITY CRITERIA OF DEMYELINIZATION PROCESS

A. N. Filipovich¹¹Research Center of Medical Assessment and Rehabilitation, Minsk, Belarus

Methods: 396 multiple sclerosis patients from 15-33 years old were examined and assessed by a set of factors: clinical methods, immunoassays, myelinotoxic activity (MTA), CT and MRI of cerebrum and spinal cord, myelinotoxic activity (MTA).

Results: A latent phase (the first group, 79 patients, 19.9%) is characterized by slight increase in MTA of blood serum (7.6 ± 1.2 units; control group – 3.9 ± 0.82 units; $p < 0.001$), decrease of CD4+ in blood ($34.8 \pm 1.64\%$, control group – $40.1 \pm 2.4\%$; $p < 0.001$) and by large increase in CIC levels (92.56 ± 3.1 optical units compared to 69.32 ± 4.28 in control group; $p < 0.001$). A slow protracted phase of MS (second group, 156 patients, 39.4%) is distinguished by moderate evident (apparent) increase in MTA of blood serum (22.3 ; $p < 0.01$ in comparison with 1st group), significant decrease of T-lymphocyte in blood serum by 32.4%, CD22+ by 71.1%, CD4+ by 33.9%, CIC levels by 12.4%, along increase in CD8+ by 1.3 times, weak induction of TNF- α at 84.3%; IL-8 at 4.8% patients. An acute phase (third group, 144 patients, 36.3%) coupled with significant increase in MTA of blood serum (40.4 ± 1.22 units) in comparison with 1st and 2nd groups. Acute condition of MS distinguished by significant increase in blood CD8+, IL-2P+, Ig G,A,M, CIC level along decrease of T-lymphocyte ($51.7\% \pm 1.56\%$) and CD22+ levels. Increase in IL-2P+ at 64.1% patients coupled with significant increased TNF- α и IL-8. In the fourth group (17 patients, 4.4%) fast progress of MS distinguished by high MTA level of blood serum (78.2 ± 4.4 units), persistent immunological changes: increase in CD4+, CD8+, IL-2P+, IgG,

IgM, IgA, CIC along decrease of T-lymphocyte, CD22+. In comparison with 3rd group significant decrease of CD8+ along increase in CIC took place.

Conclusions: Measurement of blood serum MTA and immune reactivity in combination with clinical and MRI findings helps to correctly estimate the rate of demyelination in multiple sclerosis patients.

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FETUIN-A LEVEL AND SECONDARY OSTEOPOROSIS IN WOMEN WITH RHEUMATOID ARTHRITIS

E. V. Papichev¹, L. E. Sivordova¹, J. V. Polyakova¹, R. Akhverdyan¹, B. V. Zavadovsky¹¹Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy", Volgograd, Russia

Objective: Osteoporosis is one of the most frequent and severe complications of chronic rheumatic diseases. This is due to the additional risk factors, which play an important role in pathogenesis of rheumatic diseases. High levels of TNF α , IL-1, 3, 6, M-CSF stimulate osteoclasts function leading to the loss of BMD (1). Recent evidence suggests that fetuin-A plays an important role in bone mineralization and shows contradictory effects on inflammation (2). The aim of the study was to evaluate the fetuin-A level in women with rheumatoid arthritis (RA) complicated with osteoporosis.

Methods: At baseline we measured fetuin-A level, femoral neck, total hip and LI-LIV BMD by DXA in 110 women with RA (mean age 54.5 ± 12.6 ; hereinafter $M \pm \text{Std.dev.}$) and 30 healthy controls. The diagnosis of osteoporosis was set according to the recommendations of WHO T-score ≤ -2.5 for patients without glucocorticoid therapy in anamnesis, T-score ≤ -1.5 for patients treated with glucocorticoid for 3 months in anamnesis or with an osteoporotic fracture in anamnesis. Fetuin-A in serum was determined by ELISA using a commercial test system (Human Fetuin-A ELISA Biovender Cat No.191-0371).

Results: Mean concentration of fetuin-A in group with RA was 765.69 ± 120.64 ug/ml, which was lower than of healthy controls – 812.95 ug/ml ($p = 0.0438$). Secondary osteoporosis was revealed in 52 patients (47%) with RA with mean level of fetuin-A at 733.7 ± 18.83 ug/ml vs. 794.36 ± 12.83 ug/ml ($p = 0.0078$) of 58 (53%) non-osteoporotic patients. The significant positive correlation was found between fetuin-A level and BMD of femoral necks ($r = 0.328$; $p < 0.05$), somewhat lower correlations were observed with BMD of LI-LIV ($r = 0.194$; $p < 0.05$) and total hip ($r = 0.293$; $p < 0.05$). Lower levels of fetuin-A were detected in patients with higher activity of RA according to DAS-28.

Conclusion: As a result of our study patients with secondary osteoporosis had lower level of fetuin-A, than healthy controls and nonosteoporotic patients. These findings suggest that there is a possible role of fetuin-A in progression of secondary osteoporosis in patients with RA.

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CORNUS MAS EXTRACT ATTENUATES CHOLESTEROL-INDUCED BONE METABOLISM DISTURBANCES

B. Nowak¹, T. Sozański¹, A. Matuszewska¹, A. Kucharska², N. Piórecki³, M. Landwójtowicz⁴, D. Jędrzejuk⁴, J. Magdalan¹, M. Bolanowski⁴, A. Szela¹¹Wrocław Medical University, Department of Pharmacology, Wrocław,²Wrocław University of Environmental and Life Sciences, Department of Fruit, Vegetable and Plant Nutraceutical Technology, Wrocław,³Bolestraszyce Arboretum and Institute of Physiography, Przemyśl,⁴Wrocław Medical University, Department and Clinic of

Endocrinology, Diabetology and Isotope Therapy, Wrocław, Poland

Objective: The aim of the study was to assess the influence of Cornelian cherry extract on bone metabolism disturbances induced with cholesterol-rich diet in rabbits.

Methods: Extract used in the experiment was obtained from fruits of *Cornus mas L.* harvested in Bolestraszyce Arboretum, Przemyśl, Poland. The study was conducted on forty sexually matured New Zealand rabbits, aged 8–12 months, divided in 4 groups: CON – control group fed with normal diet and 3 groups fed with cholesterol-rich diet (CHOL – receiving placebo, CHOL+EX – receiving examined extract, CHOL+SIM – receiving simvastatin). Animals were sacrificed on day 60. Serum concentrations of bone turnover markers were measured with commercial ELISA kits. Femoral BMD was measured with DXA using Hologic DXA equipment.

Results: Cholesterol-rich diet significantly decreased BMD in rabbits (CON vs. CHOL: 0.449 ± 0.02 g/cm² vs. 0.429 ± 0.011 g/cm², $p < 0.05$). BMD in CHOL+EX was significantly higher than in CHOL (0.459 ± 0.016 g/cm², $p < 0.05$), whereas no difference between CHOL and CHOL+SIM (0.422 ± 0.021 g/cm²) was detected. In CHOL group we osteocalcin (OC) concentration was significantly decreased comparing to CON (0.67 ± 0.16 ng/ml vs. 1.00 ± 0.30 ng/ml, $p < 0.05$). Cholesterol-induced decrease in OC concentration was ameliorated in CHOL+EX (0.86 ± 0.16 ng/ml, $p < 0.05$) but not in CHOL+SIM (0.72 ± 0.19 ng/ml, $p > 0.05$). In CHOL group we observed concomitant increase in C-terminated telopeptide of type I collagen (CTX) concentration (10.05 ± 1.28 ng/ml vs. 7.72 ± 1.19 ng/ml, $p < 0.05$), whereas there was no differences I CTX concentration between CON and CHOL + EX (7.74 ± 1.05 ng/ml, $p > 0.05$ and CON and CHOL + SIM (7.25 ± 1.06 ng/ml, $p > 0.05$).

Conclusions: The results obtained suggest that Cornelian cherry extract attenuates cholesterol-induced bone resorption and it promotes new bone formation leading to increase in BMD.

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EFFECTS OF GLUCOCORTICOIDS ON MINERAL BONE DENSITY AND BIOCHEMICAL MARKERS IN RHEUMATOID ARTHRITIS

T. Jankovic¹, J. Zvekec Svorcan², J. Novakovic Paro³, S. Teodosijevic Subin⁴

¹Faculty of Medicine, University of Novi Sad, Special Hospital for Rheumatic Diseases, Rheumatology, Novi Sad, ²Faculty of Medicine, University of Novi Sad Special Hospital for Rheumatic Diseases, Rheumatology, Novi Sad, ³Faculty of Medicine, University of Novi Sad, Clinic for Endocrinology, Diabetes And Metabolic Diseases, Clinical Center of Vojvodina, Novi Sad, ⁴General Hospital "Dr Djordje Joanović", Rheumatology, Zrenjanin, Serbia

Introduction: Glucocorticoid therapy (GC) is significant because of the changes in the value of bone density and bone metabolism in patients with rheumatoid arthritis (RA).

Methods: The study involved 135 patients with RA of median age 54.3 with average disease duration of 10.2 years. All patients were on a stable dose of prednisone, average value 10 mg/d, during the year. The patients were undertaken to osteodensitometric (DXA) examination at the beginning, as well as the determination of biochemical markers of bone synthesis - osteocalcin (reference values for women in the generative period 12–41 ng/ml) and bone resorption - β -CrossLaps (reference values for women in the generative period 0.162–0.436 ng/ml) in the blood. Biochemical markers of bone synthesis and bone resorption were determined by Roche

Diagnostics, Elecsys® β -CrossLaps / N-MID osteocalcin. Statistical analyses were done in the Statistical Package for The Sciences 20.0 program.

Results: In the first measurement (32.8%) patients had normal DXA findings. Osteopenia (47.1%) with mean T-score and LS BMD (0.857 g/cm²) and at hip (0.835 g/cm²). Osteoporosis was present in (20.1%) patients with the finding at the LS (0.744 g/cm²) and hip (0.775 g/cm²). At the medical examination after one year, normal DXA findings were present in 22.3% patients, 44.6% had osteopenia and 33.1% had osteoporosis. The average value of T-score and BMD in patients with osteopenia for LS (0.819 g/cm²) and hip (0.757 g/cm²) and osteoporosis for LS (0.709 g/cm²) and hip (0.725 g/cm²) showed a significantly statistical difference compared to the first received valuable asset DXA examination ($p < 0.001$). Initially the osteocalcin value was 38 ng/ml while the measured β -CrossLaps value was 0.365 ng/ml. After one year, the average measured value of osteocalcin was 28 ng/ml while the β -CrossLaps were 0.498 ng/ml ($p < 0.001$).

Conclusion: The usage of glucocorticoids significantly affects the value reduction of the bone density and affects the change in the value of biochemical markers in patients with RA.

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EVALUATION OF KNOWLEDGE AND SELF EFFICACY PERCEPTION OF PATIENTS ON LONG TERM

H. Shukla¹, A. Gupta², R. Shukla¹

¹Prince Philip Hospital, Llanelli, ²Glangwili General Hospital, Carmarthen, UK

Objective: Knowledge about osteoporosis is crucial in gaining healthy behaviours but knowledge alone is not enough in tackling health problem. Self-efficacy perception has been shown to be important determinant in the management of chronic illnesses and shown to be effective in gaining positive health behaviours. Knowledge-based intervention programmes have been effective in increasing osteoporosis awareness. By utilizing the health belief model, an understanding of health behaviours and reasons for noncompliance are possible. Osteoporosis educational programs can utilize this model to plan and intervene with at risk populations.

Methods: A prospective cohort study was undertaken. Setting patients who attended specialist osteoporosis clinic or admitted to a teaching hospital in UK and were on long term oral corticosteroids. Following informed consent, data were collected by a single trained professional on demographic questionnaire, osteoporosis knowledge test (OKT) and osteoporosis self-efficacy scale (OSES).

Results: 50 patients studied. The mean age of the patients was 65 years range 50–85 yrs. Females 65%. Patients' osteoporosis knowledge mean score (8.2 out of 24) and osteoporosis self-efficacy perception mean score (525 out of 1200) were low. Both OKT subscale items on calcium (mean 6/18) and exercise (mean 7/16) were low. The reported scores on OSES subscales- OSES exercise scale (mean 205/600) and OSES calcium scale (mean 320/600) – both were low. **Conclusions:** The study showed that patients at high risk of osteoporosis and fractures displayed both a low knowledge and self-efficacy on the subject of osteoporosis. Not only the knowledge but also strengthening the perceptions of changing their lifestyles is needed especially advice on dietary calcium intake and exercise. If patients are more informed about risk behaviours and risk factors associated with osteoporosis, prevention and treatments then they are more likely to engage in appropriate behaviours. More informed patients are likely to cope better with their chronic illness. Educational programs aimed at understanding patients behaviours can prevent and treat this potentially serious disease.

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INADEQUATE VITAMIN D LEVEL: ASSOCIATION WITH LOW ENERGY FRACTURES OF DISTAL RADIUS IN YOUNG PATIENTS AND ITS PREDICTORS IN KARACHI PAKISTAN

M. Muzzammil¹¹Jinnah Postgraduate Medical Center, Karachi, Pakistan

Objectives: To determine association of inadequacy of vitamin D level with low energy fractures of distal radius and its predictors in young patients in Karachi Pakistan.

Method: This cross-sectional study conducted in Accident And Emergency Department of Jinnah Postgraduate Medical Center Karachi, Pakistan from Jan 2016 to Jun 2016. Patient visited hospital with low energy fracture of distal radius and fulfilled the inclusion and exclusion criterion. A questionnaire was designed and filled after taking consent includes details regarding age, gender, occupation, area of skin and sun exposure duration, dietary habits, type of clothing and residence used. Serum vitamin D3 levels were determined and compared with serum calcium levels, serum phosphorus and alkaline phosphatase levels. Serum vitamin D level <20 µg/ml defined as deficiency.

Results: Among 220 patients ranging from 12-45 years, mean 28 ±23.33SD. Female were 172 (78.18%). Patients were predominantly married (68%). All patients have low energy distal radius fracture. Mostly have history of fall (58%), RTA (29) and assault (8%). Exposure of face and hands while outdoor by most of them was (52.2%). Sun exposure duration in majority of participant was 1-2 h/d (60%). Mostly are resident of apartments (46.6%). Variable coloured clothes used by majority participant (61%) and variable fabric (46%). 202 (91.8%) patients had deficiency of vitamin D and correlated with duration of sunlight exposure significantly, also with exposure of large skin area, dietary consumption of vitamin D rich food and worn variable clothing colours. Serum phosphorus level and serum alkaline phosphatase level were negatively correlated with vitamin D significantly whereas positively correlated with serum calcium.

Conclusion: Prevalence of vitamin D deficiency is very high in low energy fracture of distal radius in young population and sun exposure duration found to be most common predictor of inadequate D levels. To combat this epidemic the government support and commitment are needed. A national food fortification program of vitamin D and campaign of public awareness to increase sunlight exposure and increase intake of vitamin D rich food are urgently needed.

Table 1. Study outcomes

	Study outcomes
Vitamin D status	Deficiency <20 µg/ml=202/220 (91.8%)
Duration of sun exposure	<1 h (24%) 1-2 h/d (60%) 2-4 h/d (16%)
Vitamin D rich food consumption	Poor (90.2%) Adequate (9.8%)
Variable clothes colour	(61%)
Variable clothes fabrics	(46%)

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NEW OPTIONS IN CAREFUL THERAPY OF MUSCULOSKELETAL PAIN: COLLAGEN-CONTAINING INJECTIONS

D. Kollar¹¹Dept. of Orthopaedics, Faculty Hospital Nove Zamky, Nove Zamky, Slovakia

Painful musculoskeletal diseases such as inflammatory and degenerative conditions, represent the most common reasons why patients seek medical attention. Given that most of commonly used drugs affecting inflammation and pain (e.g., NSAIDs) bring a burden of side effects, hence a more gentle, safer therapeutic option of counteracting these painful pathological processes is needed. Since one of the leading causes of musculoskeletal pain is weakness of internal and external joint stabilization systems, one of rational options represent local and intraarticular administration of collagen-containing injections.

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SM04690, A WNT PATHWAY INHIBITOR: ANTI-INFLAMMATORY AND CARTILAGE PROTECTIVE EFFECTS IN PRECLINICAL OA MODELS

V. Deshmukh¹, T. Seo¹, C. Swearingen¹, Y. Yazici¹¹Samumed, LLC, San Diego, USA

Objective: Osteoarthritis (OA) is characterized by pain, swelling, and reduced function in the knee joint. Upregulated Wnt signaling drives OA through synovial inflammation, increased subchondral bone, and thinning cartilage. SM04690, a small molecule Wnt pathway inhibitor that demonstrated chondrogenic and anti-inflammatory properties pre-clinically¹, was further evaluated to determine its potential to reduce inflammation, protect cartilage, improve joint health and modify pain in OA.

Methods: Cytokine secretion (IL-6 and TNF-α) from IL-1β-stimulated and SM04690-treated synovial fibroblasts was measured by ELISA. A single intra-articular injection of SM04690 or vehicle was evaluated in an *in vivo* rat knee monosodium iodoacetate (MIA) OA model. Joint inflammation was evaluated by H&E staining, inflammatory cytokines (IL-1α, IL-1β, IL-6, TNF-α and IFN-γ) by qPCR, and cartilage protection by qPCR for matrix metalloproteinases (MMPs). Histological evaluation of cartilage health was performed using OARSI score and thickness by Safranin-O staining. Pain was measured as paw withdrawal threshold using Von Frey apparatus and weight distribution using incapacitance meter and analyzed using generalized estimating equation regression.

Results: SM04690 dose-dependently inhibited IL-1β-induced cytokine secretion in synovial fibroblasts (EC₅₀ ~30nM; Fig.1). In the rat MIA OA model, compared to vehicle, SM04690 injection reduced visible knee swelling, inflammatory cells, and proinflammatory cytokine and MMP production (p<0.05). SM04690 increased (p<0.01) paw withdrawal threshold from day 6 and improved weight distribution to the affected limb in treated rats, at multiple time points, compared to vehicle (Fig.2). SM04690 increased Safranin-O stained cartilage thickness and decreased OARSI score (p<0.05) compared to vehicle.

Conclusion: In a rat MIA OA model, SM04690 injection reduced inflammation, protease production, and pain, with improved cartilage and joint health, compared to vehicle. Previously demonstrated regenerative effects in nonclinical studies¹, along with anti-inflammatory properties, show SM04690 may improve symptoms and potentially provide disease modification in OA. Clinical studies are ongoing.

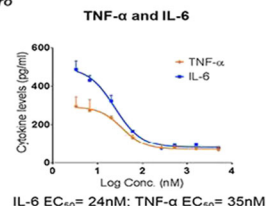
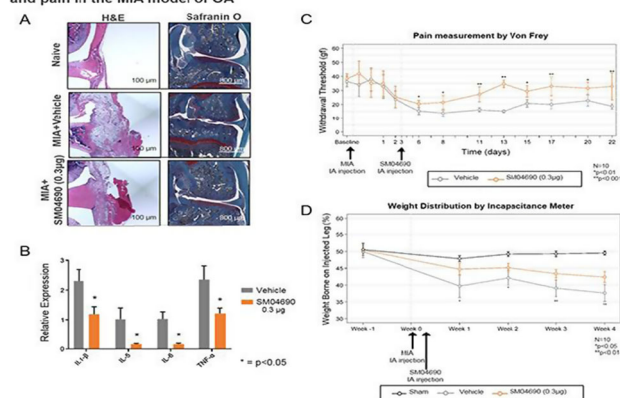
Figure 1. SM04690 inhibited inflammatory cytokine production in synovial fibroblasts *in vitro*

Figure 2. SM04690 inhibited inflammatory cytokine production and decreased inflammation and pain in the MIA model of OA



Reference: ¹Deshmukh et al. OAC 2017.

Disclosures: V. Deshmukh, T. Seo, C. Swearingen, and Y. Yazici are all employees and shareholders of Samumed, LLC.

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OSTEOPOROTIC VERTEBRAL FRACTURE IN PATIENT WITH ACROMEGALY: CASE REPORT

S. Subin-Teodosijevic¹, J. Zvejkic-Svorcan², T. Jankovic², B. Erdeljan²

¹General Hospital Dr Djordje Joanovic, Zrenjanin, ²Special Hospital for Rheumatic Diseases, Novi Sad, Serbia

Objectives: We summarized the diagnosis, clinical picture, disease course and management of skeletal complications of acromegaly focusing on secondary osteoporosis and fracture risk in acromegaly.

Methods: Female patient age of 55 years, came to our clinic because of painful joints and low back pain which lasted for several months, after unsuccessful treatment with NSAIDs. She was initially referred to neurologist who performed MR of the spine which showed vertebral fracture of v L2 and VL3 and osteoporosis, blood hypercalcaemia and hypercalciuria. We ruled out chronic rheumatic diseases. She told us that she had diabetes mellitus, hypertension, hypertrophic cardiomyopathy, that she had visual difficulties, headaches, and many musculoskeletal discomforts. We noticed enlarged nose and forehead, ears, lips, hands and feet, and started investigation due to suspicious acromegaly. She had typical signs of the disease but due to slow progression she did not pay attention to enlargement of hands, feet and face but low back pain was the main reason she decided to be examined.

Results: Radiographic changes on RTG of hands revealed distal phalanges in "spades" shape, widened intervertebral spaces, vertebral fractures, hypertrophic changes of the skull and forehead, paranasal sinuses, ultrasound showed visceral organomegaly, dilative cardiomyopathy with EF 30%. DXA was performed, vL1-4 BMD 0.733 g/cm², T-score -3.5, total hip BMD 0.710 g/cm², T-score -1.9, VFA confirmed vertebral fracture of v L2 and vL3. Endocrinology tests revealed increased IGF 1 587 ng/ml and growth hormone, normal PTH, TSH, PRL, cortisol, MR of Turkish seat revealed pituitary adenoma with destruction of sphenoid sinus. Diagnosis of acromegaly was confirmed, and started treatment with somatostatin analogues monthly and bisphosphonates - ibandronate amp 3mg/3ml iv 4x times a year, vitamin D and analgesics.

Conclusions: If left untreated acromegaly can lead to various complications, joint problems and osteoporosis are common, so patients can be initially referred to rheumatologist as our patient did, so we wanted to highlight this problem.

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WHOLE-EXOME SEQUENCING IDENTIFIES NOVEL RECURRENT SOMATIC MUTATIONS IN SPORADIC PARATHYROID ADENOMAS

Z. L. Zhang¹, Z. Wei¹

¹Metabolic Bone Disease and Genetic Research Unit, Department of Osteoporosis and Bone Diseases, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, Shanghai, China

Objective: The pathogenic genes and molecular pathogenesis of sporadic parathyroid adenomas, the commonest cause of Primary hyperparathyroidism (PHPT), is still largely unknown by now, especially in the Chinese population. We aimed to identify pathogenic somatic mutations in sporadic parathyroid adenomas by whole-exome sequencing (WES) analysis.

Method: Whole-exome sequencing (WES) analysis was carried out on 22 pairs of matched tumor-constitutional DNA samples from sporadic parathyroid adenoma patients to identify somatic mutations. Sanger sequencing was performed to further confirm variants found by exome sequencing analysis.

Results: *CDC73* harbored two different somatic mutations in two different tumor samples, a nonsense mutation Y54X, which was previously identified in parathyroid carcinoma by several studies; and a novel frame-shift truncate mutation N35Mfs*2. *EZH2* harbored one missense somatic mutation Y646N. In addition, 19 possible somatic driver mutations were detected in our study, including a recurrent gene *ASXL3*, which harbored two novel missense mutations (H278R and A315E) in two different tumor samples. No mutation in *MEN1* or *CCND1* was observed in our study.

Conclusions: Parathyroid adenomas and carcinomas may possess similar molecular signatures, since the same mutation of *CDC73* we identified in sporadic parathyroid adenomas was also identified in parathyroid carcinomas before. *EZH2* mutation might be one of the pathogenic factors of sporadic parathyroid adenomas in the Chinese population. The previously unassociated gene, *ASXL3*, may also play an important role in parathyroid adenoma tumorigenesis. Differences in parathyroid adenoma tumorigenesis may exist between Chinese and the westerns, since no mutation in *MEN1* or *CCND1* was observed.

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TO FIND OUT THE PREVALENCE OF OSTEOPOROSIS AND TREATMENT PROVIDED TO ELDERLY PATIENTS IN A COMMUNITY HOSPITAL IN SINGAPORE

D. Chan¹, K. Mamun²

¹Ang Mo Kio-Thye Hua Kwan Hospital, ²Singapore General Hospital, Singapore

Objective: To find out the prevalence of osteoporosis and treatment provided to elderly patients in a community hospital in Singapore.

Method: Patients aged 60 years and above admitted to a community hospital for rehabilitation in a calendar month were included in the study. Basic demographic data was collected. Data was reviewed to see if BMD was done previously; if not done then what was the reason for omission. If BMD was done, then what the results were and treatment if any.

Results: In November 2017, 265 patients were admitted to the community hospital, of which 229 met the inclusion criteria of age. Average age of the patients was 72 years, race: Chinese 84%, Malay 7.9%, Indian 4.8% and others 3.5%. Out of 229 study patients, only 78 had BMD done (34%). Of these, 46 (59%) were diagnosed with Osteoporosis, 26 (33%) with osteopenia, 6 (7.7%) had normal results. Those who did not have BMD done, 42 (28%) patients had End Stage Renal Failure (ESRF), 25 (17%) were bedbound and deemed to have no clinical benefit from the diagnosis of osteoporosis, 11 (7%) terminal diseases and 73 (48%) patients did not have BMD for no apparent reasons or contraindications. Of the 46 patients who had osteoporosis, only 14 (30%) received treatment (57% oral bisphosphonates, 29% denosumab, 7% zoledronic acid and 7% teriparatide). 32 patients who had osteoporosis but were not treated, 13 (40%) were awaiting vitamin D repletion, 5 (16%) were waiting for dental clearance and 12 (37%) were waiting for orthopedic review. 2 (6%) patients refused treatment.

Conclusion: This study shows that only 34% patients were sent for BMD, so there is indication that large numbers of at risk patients were not assessed for osteoporosis. Various factors may be responsible - lack of awareness among the health care providers and at risk population, cost of assessment and treatment of osteoporosis. Most patients are amenable to treatment for osteoporosis - treatment refusal rate is only 6%. It is critical for health care providers to assess the people at risk early and initiate osteoporosis treatment to prevent future complications.

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AN INVESTIGATION OF THE RELATIONSHIP BETWEEN TEMPOROMANDIBULAR DISORDER WITH UPPER QUADRANT POSTURE

G. Ergezen¹, M. Sahin¹, C. Algun¹

¹Istanbul Medipol University, Istanbul, Turkey

Objective: Temporomandibular joint is connected to muscular and ligamentous structures which is forming from functional association with cervical region. Movement in the atlanto-occipital joint and cervical vertebrae occurs simultaneously with activation of the masticatory muscles and jaw movements. However, due to the cervical vertebrae directly connected to the cranium and the skeletal structure through joints, muscles and neurovascular units, changes in one of the two regions affect the other region (1,2). The aim of the study is to evaluate the cervical, shoulder and upper back posture as upper quadrant of body in individuals with temporomandibular disorder and also in people with healthy temporomandibular joints.

Methods: A study group aged between 18-35 years, 30 patients, who were diagnosed with research diagnostic criteria for temporomandibular disorders (RDC/TMD) who applied us with jaw pain and 30 healthy people at the same age range as a control group were included in the study. Both groups received postural assessments by using mobile application which is using four side photographs and with New York posture scale (NYPS).

Results: There was no statistically significant difference between groups from anterior and posterior posture assessments in results from PSM ($p>0.05$). There was no statistically difference between the groups in terms of body regions in NYPS posterior evaluation ($p>0.05$). On the lateral left side, there was significant difference between the groups in terms of neck, chest and upper back posture ($p<0.05$) and no difference between shoulder values ($p>0.05$).

Conclusion: Postural misalignments may result in development of TMD or as a consequence of TMD. Assessment of postural alignment and giving postural alignment exercises by physiotherapists will play an active role in preventing or treating TMD.

References:

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P372

ARE WE DOING ENOUGH WITH SECONDARY PREVENTION OF FRAGILITY FRACTURES?

J. F. Leong¹, N. A. Bujang², K. Pande

¹RIPAS Hospital, Orthopaedic Department, ²RIPAS Hospital, Orthopaedic Department, Bandar Seri Begawan, Malaysia

Objective: Osteoporosis is defined as deterioration in bone and architecture resulting in weakness of the bone, which is then prone to fracture. The major complication is osteoporotic fracture, which occurs with minimal trauma, such as simple fall from standing height. Patients who sustain an osteoporotic fracture are at increased risk of sustaining another fracture hence efforts are directed towards secondary fracture prevention. The aim of this study was to identify osteoporosis care gap in Bruneian

patients admitted with hip fracture and to compare it with regional and international studies.

Methods: Patients admitted to a tertiary care hospital with hip fracture were identified from the Medical Records Unit using the ICD code from January 2014 to December 2015. The demographic data, referral for BMD assessment, medications at discharge, occupational therapists/geriatricians referral and medications at latest outpatient review were obtained.

Results: A total of 80 patients were recruited (M:F 24:56; average age 79.5 ± 9.1 years). Surgery was performed on 64 patients. The average follow up after discharge was 3.5 months (1-13 months). Only 1 patient underwent BMD assessment. About 50% of patients were discharged with calcium and vitamin D supplements and 75% of these continued with their medication at last review. Bisphosphonate was prescribed to only 14 (18.4%) patients. The number of patients referred for occupational therapy and geriatrician was low in 2014 (42.3% and 0%, respectively) but showed considerable improvement in 2015 (79.6% and 46.3%, respectively).

Conclusion: There is considerable care gap in osteoporosis treatment for patients with hip fracture in Brunei Darussalam. It is expected that findings of this study would help in improving the standard of care for patients admitted with hip fracture in future.

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PERIPHERAL ARTERIAL DISEASE PREDICTS HIP FRACTURE IN MEN.MR OS SWEDEN STUDY

D. M. Mellström¹, T. B. Bokrantz², M. L. Lorentzon¹, M. K. Karlsson³, L. Ljunggren⁴, K. M. Manhem⁵, C. O. Ohlsson⁶

¹Geriatric Medicine, Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, University of Gothenburg, Gothenburg, ²Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, University of Gothenburg, Gothenburg, ³Clinical and Molecular Osteoporosis Research Unit, Department of Clinical Sciences Malmö, Lund University and Department of Orthopedics, Skane University Hospital, Malmö, ⁴Department of Medical Sciences, University of Uppsala, Uppsala, ⁵Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, University of Gothenburg, Gothenburg, ⁶Department of Medicine and Clinical Nutrition, Institute of Medicine, University of Gothenburg, Gothenburg, Sweden

Objective: Peripheral arterial disease (PAD) has been related to bone loss and increased risk for incident fractures. The association between PAD and hip fracture risk in elderly men is uncertain.

Population and methods ankle-brachial index (ABI) was assessed in the Swedish part of the MrOS (Osteoporotic fractures in Men) study ($n=3014$, average age 75.4 years). PAD was defined as ABI <0.90 . Incident fractures were assessed in computerized X-ray archives. The risk for hip fractures was calculated using Cox proportional hazard models. Areal BMD at hip sites and lumbar spine as well as lean and fat mass were assessed at baseline using DXA (Lunar Prodigy and Hologic QDR 4500). Standardized BMD was calculated. Hand grip strength was measured with a Jamar hand dynamometer and glomerular filtration rate (GFR) was calculated with serum cystatin C.

Results: At baseline, 2893 men had an ABI measurement and PAD was found in 10.9%. The number of men with an incident hip fracture after 10 years of follow up was 186. Men with PAD were older and had reduced lean mass, BMD at all sites and hand grip strength while their BMI and fat mass was normal. Men with PAD were more often current smokers (20% vs. 7%), had more often diabetes type 2 (18% vs. 7%) and had more often hypertension (49% vs. 32%). GFR was also lower in men with PAD. Number of falls tended to be higher in men with PAD ($p=0.09$). The hazard ratio (HR) for hip fracture among men with PAD was 1.70 (CI 1.14-2.54), adjusted for age and site. Additional adjustment for femoral neck BMD only marginally affected this association (HR 1.64; CI 1.10-2.45), suggesting that the association between PAD and hip fracture is not mediated via BMD. In a

multivariate model, the HR for hip fracture in men with PAD was 1.53 (CI 1.01–2.31) adjusted for age, site, BMD, BMI, falls, hypertension, diabetes, current smoking, estimated GFR and hand grip strength.

Conclusion: PAD predicts hip fracture independently of BMD in Swedish men. We propose that PAD might be a useful BMD independent risk marker for hip fractures in men.

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SOFT TISSUE LESIONS IN KNEE OSTEOARTHRITIS BASED ON ULTRASOUND EXAMINATION

V. Mukuchyan¹, A. Haroyan¹, N. Mkrtchyan²

¹Erebouni Medical Center Rheumatology Department, ²Erebouni Medical Center Ultrasound Department, Yerevan, Armenia

Purpose: Osteoarthritis is the most common form of arthritis. It is strongly associated with aging and typically affects the knee, hip, spine and joints of hand. Due to aging of western society and the obesity epidemic, the frequency of OA can only be expected to increase over the next 20 years. We aimed at performing X-ray and joint ultrasound examination to estimate the involvement of soft tissue in knee joint depending on age.

Methods: 294 patients of ages between 40–75 with pain in knee joint were screened. Knee X-ray and ultrasound examination were done to all patients. Were estimated the presence of synovitis, tendinitis, presence of osteophytes, Baker's cyst, chondromalacia patellae and tear of meniscus of 2 aging groups: 1st <55 y.o. (n=148), 2nd >56 y.o. (n=146).

Results: Synovitis were present in 29.9% of patients with knee OA (n=88) 25.7% in 1st group (n=38), 34.2% in 2nd group (n=50), p=0.109. Tendinitis were present in 12.9% of patients with knee OA (n=38) 8.1% in 1st group (n=12), 17.8% in 2nd group (n=26), p=0.013. Baker's cyst were present in 31.6% of patients with knee OA (n=93) 24.3% in 1st group (n=36), 39.0% in 2nd group (n=57), p=0.007. Chondromalacia were present in 9.9% of patients with knee OA (n=29) 16.9% in 1st group (n=25), 2.7% in 2nd group (n=4), p=0.000. Tear of meniscus were present in 31.6% of patients with knee OA (n=93) 21.6% in 1st group (n=32), 41.8% in 2nd group (n=61) / p=0.000 / respectively.

Conclusion: We noticed significant difference as of chondromalacia patellae in two age groups with high prevalence in first group due to consistent physical activities and dealing with sport. Secondly we observed that the high rate of tear of meniscus in second group is a significant factor of insufficient efficacy of pharmacological treatment for knee osteoarthritis. Therefore patients with tear of meniscus always should be consulted by orthopedics.

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IMPAIRED TRABECULAR BONE MICROARCHITECTURE IN PREGNANCY AND LACTATION-ASSOCIATED OSTEOPOROSIS

M. B. Zanchetta¹, F. Scioscia², V. Longobardi², J. R. Zanchetta²

¹IDIM, Cátedra de Osteología y Metabolismo Mineral, Universidad del Salvador, ²IDIM, Cátedra de Osteología y Metabolismo Mineral, Universidad del Salvador, Buenos Aires, Argentina

Objective: Pregnancy and lactation associated osteoporosis (PLO) is a rare condition characterized by the occurrence of fragility fractures - most commonly vertebral - in late pregnancy or during the postpartum period. The etiology and pathogenesis of this condition is not completely clear. Our aim was to assess bone microarchitecture measured by HR-pQCT in a group of women who suffered PLO.

Methods: Bone microarchitecture was assessed by HR-pQCT (Scanco, Switzerland, Xtreme CT) in radius and tibia, in addition to the standard tests to evaluate bone health (DXA scans, lab test and clinical evaluation). A group of 8 healthy postpartum and lactating women of similar age and BMI, were included as a control group.

Results: Median age was 30.6±3.3 years, BMI was 20.9±1.9. All patients except one had vertebral fractures (between pregnancy 8th month and 120 d

postpartum) and only one suffered a hip fracture during pregnancy 7th month. There were all primiparous and 6/7 had minor factor risks for osteoporosis (family history, very low calcium intake, low BMI, late menarche). The median time between fracture occurrence and assessment was 18 months (5–52 months). Medium menarche age was 13.2±1.3 years. In radius, total density and all trabecular parameters were significantly decreased compared to the control group. In the tibia there was also a tendency to lower values but it reached statistical significance only in trabecular number, trabecular separation and heterogeneity. Cortical density was 20% and 14.4% lower in radius and tibia respectively but did not reach statistical significance either.

Radius	PLO	Control	Δ PLO vs Control (%)	p
Total Density (mg HA/cm ³)	240.0 ± 60.7	319.4 ± 53.5	+24.8	<0.02
Trab Density (mg HA/cm ³)	94.6 ± 25.8	143.4 ± 31.1	-4.1	<0.01
BV/TV(%)	7.9 ± 2.1	12.0 ± 2.6	-4.1	<0.01
Trab Number (1/mm)	1.48 ± 0.23	1.86 ± 0.18	-20.4	0.01
Trab Thickness (mm)	0.053 ± 0.011	0.067 ± 0.009	-20.9	0.01
Trab Separation (mm)	0.634 ± 0.100	0.473 ± 0.047	+34	<0.01
Tibia				
Total Density (mg HA/cm ³)	240.1 ± 66.0	284.6 ± 41.9	-15.7	0.16
Trab Density (mg HA/cm ³)	116.4 ± 31.4	141.6 ± 31.7	-17.8	0.15
BV/TV (%)	9.71 ± 2.60	11.8 ± 2.63	-17.8	0.15
Trab Number (1/mm)	1.47 ± 0.20	1.75 ± 0.17	-16	0.01
Trab Thickness (mm)	0.065 ± 0.012	0.067 ± 0.013	-2.9	0.78
Trab Separation (mm)	0.628 ± 0.105	0.508 ± 0.060	+23.6	0.03

Conclusion: In these women with PLO we found a profound deterioration of bone microarchitecture in peripheral sites. We hypothesize that they had begun their pregnancies with some alteration in bone microarchitecture due to acquired or inherited factors. The physiological decrease that took place during pregnancy and lactation was not resisted by their already decreased bone mass and therefore, fractures had occurred. Prospective studies are necessary to determine whether women affected by this condition would be able to recover or at least improve their trabecular and cortical microarchitecture.

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FOUR YEARS FOLLOW-UP FOR TREATING PATIENTS WITH GRADE 4 OSTEOARTHRITIS WHO ARE UNFIT FOR SURGERY WITH YEARLY HYALURONIC ACID INTERARTICULAR INJECTION

A. Ali¹, N. Neji¹, H. Elazaly¹

¹King Faisal Medical Complex, Taif, Saudi Arabia

Objectives: Evaluate results for yearly injection of Hyaluronic acid in severe osteoarthritis (OA) of the knee for patients refusing or unfit for total knee replacement (TKR).

Methods: In King Faisal Medical Complex, during the period of 4 years (from January 2014 to January 2018) we conducted a case-series study of 64 knees (39 patients; 27 of them with bilateral knee OA). All classified as grade 4 osteoarthritis; with severe narrowing of the joint space, multiple osteophytes, bone scoliosis and deformity. All these knees needed TKR. However, TKR was

not carried out due to either patient's refusal or due to the presence of severe general illness. Patients were on NSAIDs and physiotherapy in the course of the treatment. Interarticular injection of Hyaluronic acid was given to all the patients. Injection was repeated yearly for 4 years. Initial knee society score was recorded and re-measured after 3 months of each yearly injection. Follow-up x-rays were done yearly.

Results: Improvement of the knee society score for the first and second years was significant with mean value improvement of +13.6 and +13.1 respectively. Pain score, walking distance and upstairs mobilization were the most items increasing the knee society scoring, while improvement in the range of motion was minimal. However, Improvement of the knee society score for the third and fourth year was insignificant with mean value improvement of +3.3 and +2.9, respectively.

Conclusion: Significant symptomatic improvement was evident in our study for patients refusing or unfit for TKR, when Hyaluronic interarticular injection was used for the first 2 years.

Nevertheless, no significant improvement was found after two years of yearly injection suggesting limited time benefit of interarticular injection in grade 4 osteoarthritic knees.

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HOW MANY FRAGILITY FRACTURE PATIENTS ARE MISSED FOR PROPER TREATMENT FOR OSTEOPOROSIS BY ORTHOPAEDIC SURGEONS?

A. Ali¹, N. Neji¹, H. Elazaly¹

¹King Faisal Medical Complex, Taif, Saudi Arabia

Objective: To measure the awareness of orthopaedic surgeons to diagnose and initiate the treatment of established osteoporosis for patients presented to their clinic after fragility fractures.

Methods: This is a retrospective study, conducted in the two main hospitals of the Ministry of Health in Taif, both are referral hospitals with >500 bed each, serving a community of about 2 million citizens. In this study 9673 Files have been studied in the period of the last 6 months of the year 2017. Patients attended 20 weekly clinics for treating and follow-up fractures, clinics were conducted by 27 different orthopedic surgeons. The including criteria in this study was as follow; age above 65, not previously diagnosed as osteoporotic patient, experienced either vertebral or nonvertebral fracture after a low-energy trauma. Selected patients files were seen and termed "diagnosed" if either diagnosed as fragility fracture (established osteoporosis) and treatment initiated for the patient, or if patient was referred to endocrinology clinic for further investigations and treatment for osteoporosis. Otherwise the file will be termed "osteoporosis diagnosis missed".

Results: According to the including criteria 1289 patients out of total of 9673 were fitting to our study. All these patients received orthopaedic treatment for their fracture. However, only 468 patients (36.31%) received osteoporosis treatment or referred to endocrinology clinic. 821 patients (63.69%) were discharged from the clinic after fracture healing with no further management for osteoporosis.

Conclusion: Orthopaedic surgeons are missing a high percentage of patients (63.69%) presenting to their clinic with fragility fractures. They are concerned about fracture reduction and fixation and not on treating the underline cause. More awareness for Orthopaedic surgeons is needed in our area towards diagnosing and treating established osteoporosis.

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COMBINED FRACTAL- AND ENTROPY-BASED ANALYSIS OF BONE TEXTURE PREDICTS INCIDENT OSTEOARTHRITIS OF THE KNEE: DATA FROM THE MULTICENTER OSTEOARTHRITIS STUDY (MOST)

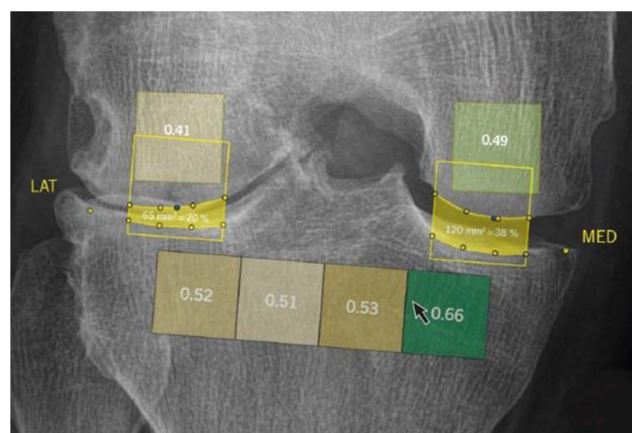
Z. Bertalan¹, R. Ljuhar¹, S. Nehrer², D. Ljuhar³, A. Fahrleitner-Pammer⁴, H. P. Dimai⁴

¹Image Biopsy Lab, Vienna, ²Danube University Krems, Krems, ³BRAINCON Technologies Research, Vienna, ⁴Medical University of

Graz, Dept. of Internal Medicine, Div. of Endocrinology & Metabolism, Graz, Austria

Objective: Osteoarthritis (OA) is one of the leading causes of pain and disabilities worldwide. Effective prevention, treatment and disease-progression slowdown depend on early detection and quantification of OA severity. However, current assessment parameters and indicators, like joint space width (JSW), have proven to be insufficient for the prediction of OA. The purpose of the present study was to investigate if combining fractal- and entropy-based bone texture analyses with joint space width (JSW) and joint space area (JSA) may improve prediction of OA.

Methods: Conventional posterior-anterior (PA) knee radiographs of men and women were obtained from the Multicenter Osteoarthritis Study (MOST¹) database. Oriented fractal- and entropy based texture algorithms were applied, using state-of-the-art computer hardware and a newly developed software which involves machine-learning algorithms. The selected subchondral area used for textural analyses included 4 regions of interest (ROI) in the proximal tibia and one on each condyle of the distal femur (Figure). In addition, JSW and JSA were assessed using a newly developed and fully automated software.



Results: 1092 knee radiographs were screened for eligibility. Of these, a total of 574 radiographs (230 women, 344 men) met the inclusion criteria, i.e., a Kellgren & Lawrence (KL) score of 0 at baseline. At month 84, 41 female and 79 male patients had developed KL1, and 189 female and 265 male patients remained at KL0. Area-under-the-curve (AUC) for incident OA using JSW/JSA and clinical features was 0.67 ± 0.08 for women, and 0.61 ± 0.1 for men. In contrast, combining fractal/entropy-based texture, JSW/A and clinical features resulted in significantly improved AUC for women and men (0.80 ± 0.07 for women and 0.69 ± 0.1 for men, respectively). To test whether these differences in predicting incident OA were significant, we performed classifier comparison: $t = 3.84$, $p < 0.0001$ for women; $t = 3.38$; $p < 0.0001$ for men.

Conclusion: This study provides strong evidence, that a combination of fractal- and entropy-based textural analyses of plain subchondral bone radiographs together with JSW/A and clinical features is superior to JSW/A and clinical features alone in predicting incident OA in men and women.

Reference: 1. <http://most.ucsf.edu/>

P379

RISK OF SEVERE LUMBAR SPINAL STENOSIS ON MRI SCANS IS INCREASED BY HEAVY MANUAL WORK: THE WAKAYAMA SPINE STUDY

Y. Ishimoto¹, C. Cooper¹, K. Walker-Bone¹, G. Ntani¹, H. Yamada², H. Hashizume², K. Nagata², S. Muraki³, S. Tanaka⁴, N. Yoshimura⁴, M. Yoshida²

¹MRC Lifecourse Epidemiology Unit, Southampton General Hospital, Southampton, UK, ²Orthopedic Surgery, Wakayama Medical University, Wakayama, ³Department of Preventive Medicine for

Locomotive Organ Disorders, 22nd Century Medical & Research Center, Faculty of Medicine, University of Tokyo, Tokyo, ⁴Department of Orthopedic Surgery, Sensory and Motor System Medicine, Graduate School of Medicine, University of Tokyo, Tokyo, Japan

Objective: To investigate the contribution of occupation and physical workplace exposures to lumbar spinal stenosis (LSS) as investigated by MRI in a population-based cohort.

Methods: The Wakayama Spine Study recruited a population sample of adults from a range of different occupations. All participants underwent total spinal MRI in a mobile MRI unit (Excelart 1.5T; Toshiba, Tokyo, Japan). The severity of LSS, including central stenosis was rated on a four-grade scale: none, mild, moderate, and severe by a spine surgeon. Using the job exposure information, occupations were classified in 6 groups: Clerical/Technical; Agricultural/Fishermen; Factory/Construction; Clinical/ Housekeeper/Shop assistants/Hairdressers/Dressmakers; Teachers and Others/No answer.

Results: Complete data were available for 722 participants (245 males, 477 females; mean age, 70.9 years; range, 53–93 years). In total, 239 (33%) of subjects were defined with severe LSS and became the cases for these analyses and the remaining 483 patients were controls. We performed logistic regression analyses to estimate odds ratio (OR) and 95%CI for associations between occupational group and severe LSS. Unadjusted analysis showed that Agricultural/Fishermen and Factory/Construction workers had a significantly higher risk of severe LSS as compared with Clerical/Technical workers (Agricultural/Fishermen: OR 1.99, 95%CI 1.22–3.26, Factory/Construction: OR 2.08, 95%CI 1.09–3.96). The significant associations were lost after adjustment for: age, sex, BMI, smoking, and usual walking speed. However, stratification of the analyses by age (<75 years and ≥75 years) showed that the associations with severe LSS remained for Factory/Construction workers aged <75 years even after adjustment for all the same confounders (Factory/Construction: OR 3.97, 95%CI 1.46–10.85).

Conclusion: Our data suggest that heavy manual work increases the risk of severe spinal stenosis on MRI scans. More research is required but attention to ergonomic factors during working life may reduce the burden of long-term musculoskeletal symptom improving quality of life at older ages.

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EFFECT OF EXERCISE WITH OR WITHOUT ELECTROMAGNETOTHERAPY ON HAND FUNCTION IN PATIENTS WITH OSTEOARTHRITIS: A PRELIMINARY STUDY

D. Balen¹, T. Nemcic¹, S. Grazio¹

¹Department of Rheumatology, Physical Medicine and Rehabilitation University Hospital Centre Sestre Milosrdnice, Zagreb, Croatia

Objective: To evaluate the effect of therapeutic exercise with or without electromagnet therapy on functional ability in patients with hand osteoarthritis (OA).

Methods: The study included 30 consecutive patients with verified diagnosis of hand OA, according to ACR criteria, who visited the physiatric and rheumatological outpatient clinic of the University Hospital Centre Sestre Milosrdnice in Zagreb (Croatia). All patients underwent therapeutic exercise for hands and received the active or sham electromagnet therapy in duration of 15 min. In the active group the frequency of the magnetic field was 900–1500 Hz and the power of the magnetic field was 0.5–52 Gauss. In the sham group the device was not active. For evaluation of hand functional ability we used AUSCAN questionnaire. The intensity of pain in rest and in movement was tested on visual analog scale. Those variables were obtained before the therapy (T0), after 15 therapies cycle (T1), as well as one month upon completion of the therapy (T2). Significance was set up at the level of 0.05.

Results: There was a statistically significant reduction of pain in rest in all patients in T1 time point and reduction of pain in movement in T1 and T2 time points. Also, in all patients in T1 and T2 time-points there was a statistically significant improvement in AUSCAN variables: Pain in lifting, Total pain, Total physical functioning, Total and one month upon completion the therapy in variable Lifting heavy objects. There was neither statistically significant difference in variables pain in rest and pain in

movement, nor in AUSCAN variables, between patients who underwent electromagnet therapy and those who did not.

Conclusion: Hand exercises have positive effect on pain reduction and on improvement of AUSCAN parameters in patients with hand OA, while electromagnet therapy did not show positive synergistic effect.

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PRELIMINARY DATA ON THE FIRST YEAR OF FRACTURE LIAISON SERVICE AT THE THIRD LEVEL CENTER IRCCS ISTITUTO ORTOPEDICO GALEAZZI (MILAN, ITALY)

E. Passeri¹, A. Mottadelli¹, C. Aresta², V. Favero³, S. Corbetta³

¹Endocrinology Service, IRCCS Istituto Ortopedico Galeazzi, ²Department of Biomedical Sciences for Health, University of Milan, ³Endocrinology Service, IRCCS Istituto Ortopedico Galeazzi, Department of Biomedical Sciences for Health, University of Milan, Milan, Italy

Objectives: We presented the first year experience of the recently established fracture liaison service at IRCCS Istituto Ortopedico Galeazzi, in Milan (Italy). Our mission, according to Capture the Fracture Project, was to create a multi-disciplinary approach, between Endocrinologist and Orthopedics, for secondary fracture prevention.

Methods: Since February 2017 to January 2018 we evaluated 190 patients admitted to Traumatology Unit for fragility fractures (28 males, 162 females). Median age was 80 years (IQ range 71–85, minimum 39 and maximum 95 years).

Results: Bone localization of fractures were as follow: 144 (75%) proximal femoral fractures, 12 (6%) diaphyseal femoral fractures and 24 proximal humerus fractures (24%). The remaining 10 patients suffered from distal radial fractures requiring surgery or mobilization of previous hip prosthesis. The common mayor fractures risk factors were frequently detected: smoking habits (actually or in the past) was reported by 36% of patients, fragility fracture familiarity was stated in 21% of patients, diabetes mellitus was present in 17% of patients, nephrolithiasis in 8%, and 7% of patients were actually or previously treated with corticosteroids (> 5 mg/d for >3 months). Moreover, overt malabsorption was reported in 3%; early menopause (before 45 years of age) occurred in 5% of women. Half of the patients had comorbidities and were on multidrug treatment with more than three medications. Notably, an anamnestic previous fragility fracture was reported in 85 patients (44%), and among these, only 28 patients (33%) received any antiosteoporotic treatment for secondary fracture prevention. Anatomical site of previous fragility fractures were distal radial (32%), proximal femur (29%), vertebra (24%) and humerus (15%). Among all evaluated patients, only 51 patients (26%) were supplemented with vitamin D. Moreover, 27 patients (14%) experienced fragility fractures during osteoporosis treatment (mainly bisphosphonate) and one patients presented atypical diaphyseal fractures associated with long-term (10 years) treatment with ibandronate. We finally compared fractured patients younger than 70 years (n=46) and older than 70 years (n=144). Localization of fractures and main clinical characteristics were similar in the two groups. Nonetheless, it was interesting to note that in younger patients a familiarity for fragility fractures was often reported (34% vs. 16%, P 0.08).

Conclusions: These preliminary data from real-life clinical experience in a single center traumatology unit suggested that about half of hospitalized patients were experiencing a further fragility fracture, and among these only one third received any antiosteoporotic treatment for secondary fracture prevention. Sensitivity towards refractured risk is low and the fracture liaison model should be promoted in orthopedic division.

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RISK FACTORS OF OSTEOPOROTIC FRACTURES IN SIBERIAN POPULATION SAMPLE AGED OVER 50 YEARS

E. Poltoratkaia^{1,2}, O. Rymar¹, L. Shcherbakova¹, S. Mustafina¹, S. Malyutina¹

¹Research Institute of Internal and Preventive Medicine, Branch of the Institute of Cytology and Genetics, Siberian Branch of Russian Academy

of Sciences, ²Novosibirsk Research Institute of Traumatology and Orthopaedics n.a. Ya.L. Tsiyvan, Novosibirsk, Russia

Objective: To study the association between fractures and potential risk factors in population sample aged 50–69 years.

Method: A representative population sample was examined in the frame of the HAPIEE Project, Novosibirsk in 2003–2005 (9360 men and women aged 45–69 years). Current analysis included 6441 subjects aged 50–69 (among women only postmenopausal were included). Registered history of osteoporotic fractures in the last 12 months, medical history of diabetes mellitus (DM) and other chronic diseases, behavioral and sociodemographic characteristics, blood pressure, anthropometry: height, weight, BMI, waist and hip circumference and ratio (WC, HC, WHR), serum glucose and lipid profile were measured by standard methods. Statistical analysis was carried out by SPSS package (v.13.0).

Results: Among studied 6441 subjects there were 3097 men and 3344 women. 394 persons (6.1%) had a history of falls during the last 12 months; women had falls more often than men (62.2% vs. 37.8% correspondingly, $p=0.0001$). 172 subjects (43.6%) had a history of osteoporotic fracture; women had fractures more frequent than men 62.8% and 37.2%, correspondingly ($p=0.0001$). As a result of a fall, 222 (56.4%) subjects did not experienced a fracture – 61.7% in women and 38.3% in men, $p=0.0001$. In unadjusted comparison there was no significant difference between subjects with fractures and without fractures by age, BMI, height, weight, WC, HC, WHR, duration of menopause in women, levels of glycaemia and smoking. When comparing men and women with fractures and without fractures, 11% of women with fracture smoked and only 5% of women without fracture smoked but the difference was not statistically significant. In men, this tendency was not noted.

Conclusions: In studied Siberian population sample over 50 years, among those who had a history of fall in the last 12 months, every second person experienced a fracture. Women had a history of falls followed by fractures more often than men. 11% of women with fracture smoked and only 5% of women without fracture smoked.

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RISK FACTORS OF OSTEOPOROTIC FRACTURES IN SUBJECTS WITH DIABETES MELLITUS IN SIBERIAN POPULATION

E. Poltoratkaia^{1,2}, O. Rymar¹, L. Shcherbakova¹, S. Mustafina¹, Y. Nikitin¹, M. Bobak³, S. Malyutina¹

¹Research Institute of Internal and Preventive Medicine, Branch of the Institute of Cytology and Genetics, Siberian Branch of Russian Academy of Sciences, ²Novosibirsk Research Institute of Traumatology and Orthopaedics n.a. Ya.L. Tsiyvan, Novosibirsk, Russia, ³University College, London, UK

Objective: To study the relationship between fracture occurrence and their risk factors in population-based sample of subjects with diabetes mellitus (DM).

Method: The cross-sectional study was based on a population cohort (the HAPIEE Project, Novosibirsk) examined in 2003–2005, $n=9360$ men and women aged 45–69 years. A subsample of subjects with DM2 (among women only postmenopausal included) aged 50–69 was included for analysis ($n=925$, mean age 61.6 ± 5.5 years). Registered history of osteoporotic fractures in the last 12 months, medical history of DM and other chronic diseases, behavioral and sociodemographic characteristics, BP, anthropometry, glucose profile was measured by standard methods. DM was defined by fasting blood glucose ≥ 7.0 mmol/l (WHO, 1999) and/or history of treated DM. Statistical analysis was carried out by SPSS (v.13.0).

Results: Among 925 subjects with DM2 there were 414 men and 511 women. A history of fractures in the last 12 months was found in 27 subjects (2.9%); in women (3.7%) it was more frequent than in men (1.9%), $p=0.004$. Among those with DM and fractures (27), 48% subjects were aware of DM and 52% subjects had newly diagnosed DM according to fasting blood glucose ≥ 7.0 mmol/l. Among 898 subjects with DM and without fractures, 42.5% had a history of DM and in 54.6% the diagnosis of DM was first met. In unadjusted comparison, there was no significant difference between

diabetic subjects with fractures and without fractures by age, anthropometric measures, glycaemia level and smoking. 62 subjects (6.7%) with DM2 reported a history of fall during the last 12 months; in women (69.4%) it was more often than in men (30.6%), $p=0.021$. As a result of fall, 22 (35.5%) subjects have got a fracture (22.7% in men, 77.3% in women, $p=0.001$). Women with fracture after fall had longer history of menopause than their counterparts without fracture (16.1 ± 6.4 years vs. 11.4 ± 7.3 , $p=0.039$).

Conclusions: In studied population-based sample with DM 2 (aged 50–69) history of falls during the last 12 months was revealed in 6.7%. Among those experienced fall every third subject had a fracture. Diabetic women had history of falls and fractures more often than men. We did not find difference in diabetic subjects between those with fractures and without fractures by age, BMI, glycaemia and smoking, only the menopause duration in women was associated with frequency of fractures.

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EFFECTS OF LACTATION ON BMD AND TRABECULAR STRUCTURE IN IRANIAN WOMEN: THE BUSHER ELDERLY COHORT STUDY

A. Ostovar¹, E. Taheri¹, G. Shafiee², R. Heshmat², B. Larijani³, I. Nabipour⁴, A. Ghasem-Zadeh⁵

¹Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Endocrinology & Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴The Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, Iran, ⁵Departments of Medicine and Endocrinology, Austin Health, University of Melbourne, Melbourne, Australia

Objective: Lactation defines a challenging period to premenopausal women bones due to significant increased calcium demand and decreased estrogen level, which accompanies an increased erosion depth by prolonging resorption phase of bone remodelling cycle through increased osteoclast lifespan. Areal BMD (aBMD) is not able to fully detect trabecular compartment changes due to its inherent limitations. We hypothesised that in premenopausal women, due to relatively higher bone surface available in trabeculae to initiate bone remodelling, the early bone loss occurs in the trabecular compartment by leading to trabecular network deterioration and increased risk of fragility fracture, so we aimed to measure trabecular bone structure indirectly using trabecular bone score (TBS) algorithm.

Methods: Retrospectively, aBMD of femoral neck, lumbar spine, and TBS of L2–L4 of 1271 women (age range 20–45 years) were collected from Bushehr Elderly Cohort study. The aBMDs and TBS of 1040 women, with >3 periods of lactation, were compared to 194 women with 3 or <3 lactation periods of lactation.

Results: Women with >3 times lactation period had numerically, not statistically, lower L2–L4 and femoral neck aBMDs ($p=0.111$), however TBS was significantly lower in women with >3 time lactation period ($p=0.007$).

Conclusion: We infer trabecular network deterioration is occurred during lactation and increase risk of fragility fracture which is not detectable by aBMD alone. TBS or alternative trabecular bone microstructural measurement method(s) are recommended for premenopausal women with >3 times lactation period to evaluate risk of fragility fracture in addition to aBMD.

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MANAGEMENT OF ADOLESCENTS WITH DYSPLASTIC COXARTHROSIS

M. P. Teplenkii¹

¹Ilizarov Center RTO, Kurgan, Russia

Objective: The significance of pelvic and femoral osteotomies in the condition of developed arthrosis is still disputable. Early osteoarthritis and dis-congruency of the articular surfaces are evaluated by many specialists as contra-indication for the joint preserving operation. Our purpose was to review middle term results of reconstructive treatment in adolescents and young adults with dysplastic coxarthrosis.

Methods: Treatment outcomes of 20 patients with dysplastic coxarthrosis were analyzed. Mean age at intervention was 14 years (12-20 years). The grade of arthrosis in joints were assessed according to Tonnis: grade I - 10, grade II - 7, grade III - 3. The type of congruence of articular surfaces were assessed according to Coleman: III - 8, IV - 12. The initial functional parameters according to Merle d'Aubigne-Postel were: Pain 4.3±0.05 points. Range of motion - 3.6±0.3 points. Walking ability - 4±0.15 points. All subjects underwent extraarticular hip reconstruction with the Ilizarov apparatus included pelvic and femoral osteotomies.

Results: Outcomes were followed from 5-12 years. Functional outcomes according to Merle d'Aubigne-Postel were: Pain 4.7±0.1 points. Range of motion - 4.1±0.2 points. Walking ability - 4.6±0.1 points. Poor functional outcomes were caused by primary severe contracture. In 7 patients congruency improved. Radiographic findings according to Severin were: IIa type - 9, IIb type - 7, III type - 4. The grade of arthritis was unchanged in 14 cases, progressed one grade in 2 joints. The grade of arthrosis reduced in 4 cases. Considering clinical and radiological picture the positive outcomes made up 82%.

Conclusions: Application of reconstructive operations with Ilizarov frame allows to extend fairly the indications for extra-articular reconstructive invasions in dysplastic coxarthrosis. Improved congruence of the articular surfaces in conditions of osteoarthritis in most cases leads to a slowing of progression.

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ETHYLACETATE FRACTION OF MARSILEA CRENATA PRESL LEAVES NOT ONLY INCREASES THE TRABECULAR VERTEBRAE THICKNESS, BUT ALSO INCREASES ERB EXPRESSIONS OF NEURON IN GLUCOCORTICOID-INDUCED OSTEOPOROSIS FEMALE MICE

H. Laswati¹, M. Agil², N. Purwitasari²

¹Dr Soetomo General Hospital, Faculty of Medicine Universitas Airlangga,

²Faculty of Pharmacy Universitas Airlangga, Surabaya, Indonesia

Objectives: To investigate the effect of ethyl acetate fraction of *Marsilea crenata* Presl leaves in enhances the trabecular vertebrae thickness and ERβ expressions of neuron in the somatosensory cortex, in glucocorticoid-induced osteoporosis female mice.

Methods: Thirty glucocorticoid-induced osteoporosis female mice (10-12 weeks old) were randomly divided into five groups: 1. Negative control group (CMC-Na suspension), 2. Positive control group (alendronate suspension), 3. Dose 1 ethylacetate fraction group (0.23 mg/20g body weight), 4. Dose 2 ethylacetate fraction group (0.46 mg/20g body weight), and 5. Dose 3 ethylacetate fraction group (0.92 mg/20g body weight). Treatment were given for 4 weeks and at the end of intervention, the trabecular vertebrae thickness were determined histomorphology by light microscopy using HE staining, and ERβ expression of neuron were determined by immunohistochemistry using ERβ monoclonal antibodies. Statistical analysis using one-way ANOVA and post hoc test to determine differences between groups. Statistical significance was set at $p < 0.05$ for all analysis.

Results: The trabecular thickness from positive control group, dose 2 and 3 ethylacetate fraction groups were increased significantly ($p < 0.05$) from the negative control group and the highest trabecular thickness showed from dose 3 ethylacetate fraction group. The ERβ expressions of neuron in the somatosensory cortex from dose 2 and dose 3 ethylacetate fraction groups increased significantly ($p < 0.05$) from the negative control group and either dose 2 and 3 have the same effects ($p > 0.05$).

Conclusion: Ethylacetate fraction of *Marsilea crenata* Presl leaves not only has a bone protective effect, but also neuroprotective effect.

Acknowledgment: This study was supported by Research Grant of Faculty of Pharmacy Airlangga University Indonesia

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BARRIERS TO KINETOTHERAPY ADHERENCE IN PATIENTS WITH KNEE OSTEOARTHRITIS: A QUALITATIVE STUDY

A. Vizdoaga¹, V. Salari¹, V. Sadovici-Bobeica¹, M. Cebanu¹, L. Mazuri-Nicorici¹, M. Mazur¹

¹PI SUMPh "Nicolae Testemitanu", Chisinau, Moldova

Objective: Kinetotherapy is a nonpharmacological treatment approach that is recommended in clinical guidelines for the management of knee osteoarthritis (OA) and should be considered prior to pharmacological interventions. However, nonadherence to treatment remains high among patients with knee OA, with negative impact on the treatment outcomes. The aim of this study was to evaluate patients' barriers to adherence to kinetotherapy programs in rehabilitation practice in Republic of Moldova.

Methods: A structured interviews were conducted with 51 patients with knee OA that were referred to kinetotherapy in 10 family physician offices in Republic of Moldova. By interviewing the patients, this study evaluates their opinion, acceptability and adherence to kinetotherapy programs. This study was conducted according to the principles of the Helsinki Declaration (1996) and Good Clinical Practice.

Results: There were 51 patients enrolled in the study including 39 females (76.5%), mean age 64.45±8.07 (range 50-82) and the disease duration was 9.9±6.97 (range 2-24) years. Knee pain was present in 49 (96%) of patients. The radiographic characteristics: KLI- 1(1.9%), KLII- 29 (56.9%) patients, KLIII- 17 (33.3%) and the most severe form KLIV- 4 (7.9%) cases. Barriers of adherence were identified under two domains (patient, health system). From patients perspective the most frequently cited reasons were: low levels of physical activity at baseline (66.7%), worsening pain during hard exercises (45.1%), believe that activities can be harmful in the presence of co-morbidities (33.3%), low self-efficacy (29.4%), anxiety and depression (15.6%). The health system problems were about: long way to the rehabilitation center (70.5%), kinetotherapist's timetable (56.8%) and interference with the patient's work schedule (27.4%).

Conclusion: Patients with knee osteoarthritis experience clinical and organizational difficulties for rehabilitation treatment. This study reconfirmed that the adherence to kinetotherapy are determinate by different factors, based on these findings a kinetotherapist should reevaluate the modalities of services organization and the time spent for communication and explanation to patients.

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ADIPOCYTOKINES AND BMD

A. Andreeva¹, T. Karanova¹, O. Belyaeva², M. Budanova¹, E. Vasilieva¹, E. Grineva¹

¹Almazov National Medical Research Centre, St. ²Pavlov First State Medical University, St. Petersburg, Russia

Objectives: Recent studies suggested relationship between BMD and adipocytokines concentration. We analyzed BMD and adipocytokines concentration in women of late reproductive age.

Methods: DXA (Lunar Prodigy, USA) was performed in 204 women aged 30-52 years. Serum adiponectin, leptin and resistin levels were analyzed by ELISA (ImmunoChem-2100 device, DRG Diagnostics, Marburg, Germany).

Results: The study results showed that mean total BMD in hip was 1.1±0.1 g/cm², in neck was 1.0±0.1 g/cm², BMD L1-L4 was 1.2±0.1 g/cm². Thirty-eight (18.6%) women had low BMD in spine or hip regions. Mean BMC was 2.8±0.1 g, Fat was 33.7±0.8 g. Bone density was higher in obese women than those with normal BMI or overweight (1.13±0.02 & 1.05±0.01 g/cm², $p = 0.001$). BMD in femoral region was strongly associated with BMI ($r = 0.35$, $p = 0.001$). Serum leptin concentration was 17.9±0.6 ng/ml, adiponectin - 41.9±1.6 ng/ml and resistin - 4.9±0.3 ng/ml. Leptin concentration was higher in obese women than those with normal BMI or

overweight (45.9 ± 3.4 and 35.6 ± 3.4 ng/ml, $p=0.012$). BMI correlated with leptin ($r=0.22$; $p=0.01$) and adiponectin ($r=-0.17$; $p=0.04$) level and fat was positively associated with leptin ($r=0.46$; $p=0.001$) and negatively with adiponectin concentrations ($r=-0.21$; $p=0.01$). Women with normal BMD had higher leptin level, than subjects with low BMD (43.3 ± 2.8 & 26.2 ± 4.0 ng/ml, $p=0.006$) and lower adiponectin level (16.9 ± 0.9 & 21.4 ± 2.1 ng/ml accordingly, $p>0.05$). We found an association between BMD in femoral region and leptin concentration ($r=0.22$, $p=0.03$). Also BMC correlated with leptin ($r=0.22$; $p=0.008$) and adiponectin ($r=-0.17$; $p=0.04$).

Conclusions: Our results showed that each fifth women of late reproductive age had low BMD. Obese women had high serum leptin level. Women with normal BMD had higher leptin level. So, a high leptin level could potentially play a protective role in bone remodeling.

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TRABECULAR BONE SCORE (TBS) CONTRIBUTES TO BONE DISEASE ASSESSMENT IN DIABETIC PATIENTS

M. Brodavka¹, S. Stainlauf¹, E. Leshem¹, S. Segev², I. Vered³, R. Malka^{*4}, L. Tripto-Shkolnik^{*3}

¹Chaim Sheba Medical Center, Internal Medicine C, ²Chaim Sheba Medical Center, Medical Screening Institute, ³Chaim Sheba Medical Center, Endocrine Institute, ⁴Chaim Sheba Medical Center, Innovation Center, Ramat Gan, Israel

*equal contribution

Objective: Osteoporosis in diabetic patients is now increasingly recognized as a disease complication. People with diabetes are at higher fracture risk. Poor glucose control correlates with fracture incidence. In diabetics, both BMD and FRAX under-perform as fracture risk predictors. Recently, TBS was proposed as a promising tool in evaluation of microarchitectural damage in patients with diabetes. Our aim was to assess the differences in BMD and TBS between diabetic and non-diabetic patients and examine correlations of TBS with the degree of dysglycemia and with prevalent fractures.

Methods: TBS scores were retrieved by Medimaps[®] software from BMD database. Diagnosis of diabetes, relevant medication and HbA1c were obtained from electronic medical records. Risk factors information was extracted from self-administered questionnaires. Data analysis was performed by R-programming language.

Results: A total of 6423 BMD results were available for analysis. 1043 examinees (16.2%) had diabetes. The diabetic patients were older (70.1 ± 12.6 vs. 64.3 ± 12.3 , $p<0.01$) and had higher BMI (29 ± 4.6 vs. 26.6 ± 4.6 , $p<0.01$). BMD was significantly higher in patients with diabetes but TBS was significantly lower in an age and BMI adjusted model. HbA1c negatively correlated with TBS in women ($r=-0.23$, $p=0.0015$). TBS was lower in diabetic patients with reported fractures (1.20 ± 0.14 vs. 1.24 ± 0.14 , $p<0.001$).

Conclusions: TBS is significantly lower in patients with diabetes, correlates with the degree of glucose control and prevalent fractures. TBS should be incorporated in a clinical decision-making model for osteoporosis in diabetic patients.

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WHAT PATIENTS WANT – A MULTIDISCIPLINARY EDUCATIONAL AND ACTIVITY COURSE TO IMPROVE KNOWLEDGE AND SELF-MANAGEMENT IN PATIENTS AT HIGH RISK OF FRACTURE: INITIAL OUTCOMES

T. Stocker¹, M. Domaille¹, N. Bentham-Hill¹, M. Roy¹, S. Clarke¹

¹University Hospitals Bristol NHS Foundation Trust, Bristol, UK

Objective: To design (guided by responses from a patient survey) implement and evaluate education and activity sessions to encourage effective exercise and self-management in patients at increased fracture risk.

Methods: Responses from an anonymous patient survey (2015; 37 respondents) informed the design of a 6 x 60 min weekly programme combining

educational and physical activity (roughly 30 min each). The sessions were delivered by a specialist osteoporosis nurse, physiotherapist and occupational therapist and covered identified topics including osteoporosis, fracture risk, treatments, nutrition, and benefits of exercise. Participants also took part in a 12-station activity circuit, practiced strength/balance exercises, Tai Chi, Pilates, relaxation and getting up after a fall over the 6 weeks. 6-10 participants joined each group and completed questionnaires (knowledge/confidence/feedback) at weeks 1, 6 and a Group review (Oct. 2017).

Results: 61/68 patients (59 female, mean age 69, range 55-89) completed a course (5 transport difficulty/2 unrelated illness) in one of 7 groups. 51/61 (84%) had previously experienced fragility fracture (28 spine and 3 hip). There were no reported injuries and qualitative (to be presented) participant satisfaction was high. 37/61 patients attended Group Review 5-22 months after course completion. Group review showed participants retained improved personal knowledge of osteoporosis diagnosis, treatment, diet and exercise (mean improvement by 46% to 8/10) but confidence in taking part in exercise fell significantly by average 17% between course completion and review.

Conclusion: An education and activity intervention for patients at high risk of fragility fracture is safe, accepted by participants and can provide knowledge around self-management, retained for at least 5 months. However, a strategy to maintain improved patient confidence in individual ability to exercise is required.

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PREMENOPAUSAL WOMEN WITH ACROMEGALY HAVE LOWER TRABECULAR BONE SCORE DESPITE NO DIFFERENCE IN BMD IN COMPARISON TO HEALTHY CONTROLS

M. Kužma¹, P. Vaňuga², I. Ságová³, D. Pávai², P. Jackuliak¹, Z. Killinger¹, N. Binkley⁴, H. K. Genant⁵, J. Payer¹

¹Comenius University Faculty of Medicine, 5th Department of Internal Medicine, University Hospital Bratislava, Bratislava, ²National Institute of Endocrinology and Diabetology, Lubochna, ³Comenius University Jessenius Faculty of Medicine, 1st Department of Internal Medicine, University Hospital Martin, Martin, Slovakia, ⁴University of Wisconsin, Department of Medicine, Madison, USA, ⁵University of California San Francisco, San Francisco, USA

Objective: We hypothesize that impaired trabecular bone structure potentially play a role in fracture development among acromegaly patients. However, bone status in women is significantly affected by menopause. This study evaluates the effect of acromegaly on trabecular bone score (TBS) and BMD in premenopausal women. Our aim was to compare bone parameters in premenopausal women with acromegaly in comparison to healthy controls.

Methods: This cross-sectional study compared women with acromegaly to age- and BMI-matched healthy controls. Study group was recruited from all acromegaly patients who came for follow-up visit from 6/2016 – 8/2017 and the control group consisted of healthy subjects. In all subjects a single measurements of pituitary axis hormone levels, bone turnover markers, BMD, (total hip and lumbar spine) and TBS was performed. N-terminal type 1 procollagen (P1NP) – a marker of bone formation and C-terminal telopeptide (CTx) – a marker of bone resorption were analyzed.

Results: Fourteen patients with acromegaly (mean age 41.4 years, mean 24.6 BMI kg/m²) and 35 control subjects (mean age 40.4 years, mean 25.6 BMI kg/m²) were included. There was no difference in BMD (both measured sites), P1NP, gonadotropin levels, free thyroxine or plasma cortisol between study groups. Patients with acromegaly had lower TBS (1.3 ± 0.06 vs. 1.45 ± 0.12 ; $p<0.0001$), higher levels of IGF-1 (289.8 ± 285.24 vs. 112.4 ± 25.67 ng/ml; $p=0.002$) and CTx (427.8 ± 432 vs. 333.7 ± 162 ng/l; $p<0.0001$).

Discussion: This study supports the hypothesis that growth hormone hypersecretion in premenopausal women could lead to significantly increase in bone resorption with consequent degradation of trabecular bone structure as assessed by TBS, surrogate of trabecular structure. It is likely that impaired trabecular microarchitecture contributes to higher fracture prevalence in women with acromegaly.

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PASSIVE COPING STRATEGIES ARE ASSOCIATED WITH MORE IMPAIRMENT IN QUALITY OF LIFE IN PATIENTS WITH FIBROUS DYSPLASIA

M. Rotman¹, C. D. Andela¹, B. C. J. Majoor², N. A. T. Hamdy¹, A. A. Kaptein³, P. D. S. Dijkstra⁴, N. M. Appelman-Dijkstra¹¹Leiden University Medical Center, Department of Endocrinology,²Leiden University Medical Center, Department of OrthopaedicSurgery, ³Leiden University Medical Center, Department of MedicalPsychology, ⁴Leiden University Medical Center, Department of

Orthopaedic Surgery, Leiden, The Netherlands

Objective: Impairments in quality of life (QoL) have been reported in patients with fibrous dysplasia (FD). Here we examine coping strategies in FD and assess whether these coping strategies are associated with QoL and disease severity.

Methods: Ninety-two patients (66% females) filled out the Utrecht Coping List (UCL), Short Form-36 and the Brief Pain Inventory (BPI). Coping strategies of patients with FD were compared with reference data from an a-select sample of Dutch women and patients with chronic pain.

Results: Compared to healthy women, patients expressed more emotions ($p<0.01$) (Figure 1). Compared to patients with chronic pain, patients with FD used more active coping strategies ($p<0.001$), sought more distraction ($p=0.01$) and more social support ($p<0.001$) (Figure 1). Using more passive coping strategies was associated with more impairment in social function, physical role, mental health, vitality (all $p<0.001$) and general health ($p<0.01$). Using more avoidant coping strategies was associated with worse mental health and less vitality (both $p<0.01$). More expression of emotions was associated with worse mental health ($p<0.01$). Type and clinical severity of FD were not associated with coping behavior.

Conclusion: Patients with FD have different coping strategies compared to an a-select Dutch sample and patients with chronic pain. Using more passive coping was associated with more impairment in QoL. Coping behavior was not associated with clinical characteristics suggesting that biomedical variables do not influence how patients cope with the consequences of their disease. Recognition of less effective coping strategies can be helpful in the understanding and adaptation of these coping strategies, improving personalized clinical care, with the ultimate goal to improve QoL in patients with FD.

Disclosures: M. Rotman and B.C.J. Majoor were supported by a grant from the Leiden University Bontius Foundation during the conduct of the study.

Fig. 1 Comparison of UCL scores between FD patients, the UCL reference population and chronic pain patients

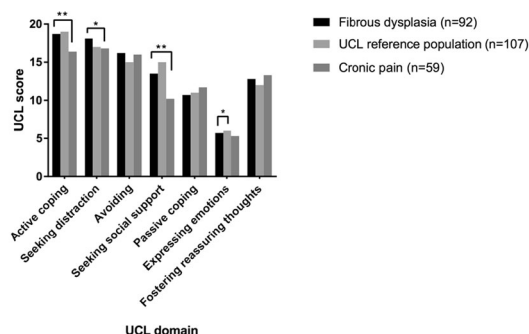


Figure 2. Bar chart comparing the UCL scores between FD patients and the UCL reference population of a-select Dutch women and between FD patients and patients with chronic pain. Significant differences are illustrated by * $P<0.01$ or ** $P<0.001$

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PREVALENCE OF SARCOPENIA IN ELDERLY NORTHWESTERN REGION OF THE RUSSIAN FEDERATION

Y. Safonova¹, E. Zotkin², A. Lila²¹Northwestern State Medical University named after II Mechnikov, St. Petersburg, ²Nasonova Research Institute of Rheumatology, Moscow, Russia

Objectives: This first study in Russia was undertaken to evaluate the prevalence of sarcopenia among the elderly in the Northwest Region.

Methods: A total of 230 community-dwelling subjects aged 65 years or older have been enrolled in this study. BMI (kg/m^2) was calculated by dividing body mass by the square of height in meters. Total body lean mass (kg), appendicular lean mass (ALM/ h^2) were acquired from total body scans by using fan-beam DXA (Hologic QDR). Gait speed was assessed by measuring the usual time to complete a 4-m walk. Muscle strength was estimated by grip strength by a handheld dynamometer and muscle functioning was estimated on the basis of with SPPB tests (gait speed, sit-to-stand time, and standing balance). Condition of sarcopenia was estimated in accordance with criteria of sarcopenia EWGSOP.

Results: Among the 230 subjects (96.5% of women, mean age of 74.0 ± 6.5 years) enrolled in the study, 69 have been diagnosed sarcopenic, which represented a prevalence of 30% (2.6% in men, 27.4% in women). The number of patients with sarcopenia increased with age and reached 13% at the age of 85+ years ($\chi^2=9.71$; $p<0.01$). In men, the risk of developing sarcopenia (OR:2.64;95%CI: 1.68-4.15) higher than in women ($p<0.0001$). The patients with sarcopenia often had a low or normal BMI ($p<0.001$). The mean $\pm$ SD ALM was in patients with sarcopenia 5.40 ± 1.0 in patients without sarcopenia 6.77 ± 1.0 ($p<0.001$). Muscular strength was in patients sarcopenia 15.1 ± 5.4 kg, without sarcopenia 18.2 ± 5.4 kg ($p<0.001$). The common point of SPPB in patients with sarcopenia was 6.89 ± 3.1 , in patients without sarcopenia significantly higher - 7.85 ± 2.6 ($p<0.01$). There were no statistically significant differences in walking speed in the study groups.

Conclusions: There was a high prevalence of sarcopenia. Significant conjugation was established between age and sarcopenia, male sex is a risk factor for sarcopenia. Patients with sarcopenia had lower levels of muscle mass, muscle strength and muscle function.

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LOW CALCIUM INTAKE AND LOWER LEAN BODY MASS ARE ASSOCIATED WITH OSTEOPENIA IN SEVERE OBESITY

M. M. Brzozowska¹, D. Bliuc², J. A. Eisman³, P. A. Baldock⁴, J. R. Center⁵¹Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Sutherland and St George Hospital, Sutherland and St George Clinical School, University of New South Wales, ²Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, ³Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Department of Endocrinology, St Vincent's Hospital, St Vincent's Clinical School, University of New South Wales, School of Medicine, University of Notre Dame, ⁴Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Faculty of Medicine, University of New South Wales, School of Medicine, University of Notre Dame, ⁵Osteoporosis and Bone Biology Division, Garvan Institute of Medical Research, Department of Endocrinology, St Vincent's Hospital, Faculty of Medicine, University of New South Wales, NSW, Australia

Although epidemiological evidence suggests that obesity is associated with an increased bone mass recent reports show that excess adiposity may be detrimental to bone and fracture risk.

The aim of this study was to define the relationship between calciotropic indices and low bone density (T-scores <-1.0) in obese patients about to undergo bariatric surgery. Coeliac disease, endocrinopathy or malignancy were excluded. A cohort of 44 women (17 premenopausal) and 16 men with BMI of 40 ± 7 was included. BMD was assessed by DXA at total hip (TH). Twelve (20%) participants had low BMD, i.e., a total hip T-score $<-$

1.0. In univariate analysis patients with low BMD had lower lean body mass ($p=0.009$), significantly elevated parathyroid (PTH) hormone ($p=0.035$), serum osteocalcin ($p=0.045$) and borderline lower calcium intake ($p=0.079$) compared to those with normal BMD (Table). In women only, low BMD was predicted by calcium intake ($p=0.038$) and only borderline by menopause ($p=0.054$). In summary, in severe obesity, low calcium intake, elevated PTH and lower lean body mass are associated with osteopenia. These findings suggest that dietary micronutrient deficiencies or a different set-point for the calcium-PTH relationship may affect bone homeostasis. Thus careful monitoring of skeletal health in combination with dietary intervention may be indicated to prevent future development of osteoporosis following bariatric surgery.

Table: Patients characteristics according to TH BMD (g/cm²)

Variable	Normal BMD (T-score>-1)	Low BMD (T-score≤-1.0)	(P value)
Number ¹	48 (80)	12 (20)	
Age ² , years	51 (12)	54 (8)	0.36
Females ¹	33 (69%)	11 (91%)	
TH BMD (g/cm ²)	1.18 (0.11)	0.95 (0.08)	0.0001
Weight ² (kg)	118 (22)	102 (22)	0.026
BMI ² (kg/m ²)	41 (7)	39 (8)	0.33
Whole body fat ² (kg)	53 (10)	50 (13)	0.47
Lean body mass ² (kg)	57 (9)	49 (7)	0.009
Ca intake ² (mg/d)	911 (408)	680 (386)	0.079
25 (OH) D ² (nmol/L)	66 (22)	55 (24)	0.17
iPTH ² (pmol/L)	5.0 (2.9)	6.9 (2.1)	0.035
Osteocalcin ² (ug/L)	8 (3.3)	11 (6.3)	0.045
Urinary NTx ² mol/mMCR	29 (12)	30 (18)	0.89

¹n (%); ²mean (SD)

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AN ALTERNATIVE PLATELET-RICH PLASMA PREPARATION METHOD

J. Chavez¹, P. How¹, J. A. M. Bengzon¹

¹Philippine Orthopedic Center, Quezon City, Philippines

Objectives: To introduce a noncommercial platelet-rich plasma (PRP) preparation method and demonstrate that the platelet concentrations it yields are at therapeutic levels.

Methods: This experimental study involving 26 adults was carried out at the Department of Laboratories of the Philippine Orthopedic Center. PRP was prepared using common medical disposables instead of commercial kits. Using a 10 cc syringe, peripheral blood was extracted from each volunteer. 8.5 cc of each extraction was transferred to a yellow-top blood collection tube containing anticoagulant citrate dextrose solution A (ACD-A). The remaining 1.5 cc was transferred to a lavender-top tube containing ethylenediaminetetraacetic acid (EDTA). The yellow-top tube was centrifuged for 15 min at 1500 rpm. The separated plasma component was then transferred to a red-top tube (containing no anticoagulant) using another 10 cc syringe with a 25G spinal needle, and was subjected to a second spin for 5 min at 4000 rpm. Using the same syringe and needle, the supernatant was aspirated from the tube, leaving around 1 cc of plasma. This remaining plasma and the whole blood contained in the lavender-top tube were sent for platelet count.

Results: The platelet concentration ratio was computed as (PRP platelet count)/(whole blood platelet count). A ratio of 3 or greater is considered therapeutic. The mean platelet counts for baseline whole blood and PRP were $310.27 \pm 54.79 \times 10^9/L$ and $1893 \pm 493.38 \times 10^9/L$, respectively. This makes the mean platelet concentration ratio 6.15 ± 1.13 , which is within therapeutic levels. Significant differences between the whole blood and PRP platelet

counts were observed with $p < 0.05$. There was a moderate correlation between the platelet count from whole blood and PRP samples, with $r = 0.66$.

Conclusion: Within the limits of the study, the proposed PRP preparation method is effective in yielding therapeutic platelet concentrations.

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FEATURES FOR THE FORMATION OF LEVEL OF SUBJECTIVE CONTROL IN PATIENTS WITH FIBROMYALGIA SYNDROME

M. B. Ramkhalawon¹, R. A. Grekhoff¹, G. P. Suleymanova², E. J. U. Polukeev³

¹Research Institute for Clinical and Experimental Rheumatology,

²Volgograd Medical State University, ³Gorodishchensky Central Regional Hospital, Volgograd, Russia

Objective: The level of subjective control (or the locus of control) is a quality that characterizes the tendency to attribute responsibility for the results of its activity to external forces (external locus of control) or to one's own abilities and efforts (internal locus of control). The aim of the study was to investigate the features of the formation of subjective control in patients with fibromyalgia syndrome (FM).

Methods: The examination was performed in an outpatient department using the USC standardized psychological method (Bazhin E.F. et al., 1984). 100 FM patients were included in the study. All patients were females aged from 24-51 years.

Results: The study of level of subjective control in FM patients made it possible to note a significant decrease of indices in the areas of general internality (2.98 ± 0.31), internality in the field of achievements (3.08 ± 0.34) and failures (3.42 ± 0.30), interpersonal relations (3.54 ± 0.25) and health (2.87 ± 0.32). This indicates to the externality of the settings in relation to these subjective control scales in FM patients. In general, these tendencies may indicate that the majority of FM patients do not see the connection between their actions and significant events occurring in their lives, do not consider themselves capable of controlling their development and assign responsibility for the events occurring to them to other people, including doctors, which can cause the most passive positions in the fight against their disease, the unwillingness to adhere to the prescribed course of treatment; less active in prophylaxis activities. This can complicate the course of the disease and create significant difficulties during the treatment and rehabilitation activities. Thus, successful treatment requires active involvement of patients in the therapy process, as well as changing their lifestyle. The condition of the majority of FM patients can be greatly facilitated if the patient and the doctor form a working partnership and the patient becomes an active participant in the treatment process.

Conclusions. The positive attitude of patients towards therapy is very important for the treatment to be effective. Some types of specific psychotherapeutic methods can be used in order to inform and educate patients so that they have a clear understanding of their illness, and also gain experience in the controllability of the situation in which they found themselves, took responsibility for strict adherence to the treatment and rehabilitation regime. Participation in so-called "schools" where patients see that they are not alone, receive emotional support from other patients and are trained to more successfully cope with their disease, also can bring significant benefits.

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THE STUDY OF CLINICAL AND PSYCHOLOGICAL CORRELATIONS IN PATIENTS WITH FIBROMYALGIA SYNDROME

R. A. Grekhoff¹, M. B. Ramkhalawon¹, G. P. Suleymanova², E. J. U. Polukeev³

¹Research Institute for Clinical and Experimental Rheumatology,

²Volgograd Medical State University, ³Gorodishchensky Central Regional Hospital, Volgograd, Russia

Objective: To identify the relationship between pain syndrome and psychological status in patients with fibromyalgia (FM).

Methods: The group under investigation consisted of 100 patients. All patients were women aged from 24 to 51 years. Standardization of the results of muscle pain syndrome was carried out using a visual analog scale. The personal attitude to the disease was assessed by the TOBOL test. The study of the neuroticism level was carried out according to the UNP method in the modification of Dmitrieva L.L. (1990).

Results: FM patients were divided into two groups by terms of the severity of muscle pain syndrome: 1st group (57 patients) with moderate, recurring muscle pain and 2nd (43 patients) with severe, almost constant pain. A study of the relationship between the results obtained for these groups and the TOBOL test showed that, the presence of a strong and persistent pain syndrome in FM patients was associated with the formation of a neurasthenic ($Kc=0.309$ for $p<0.05$), sensitive ($Kc=0.265$ for $p<0.05$) and egocentric ($Kc=0.211$ at $p<0.05$) types of response. Among the persons of the 1st group, there was an association with the most adaptive ergopathic type of attitude towards the disease. It was also noted that a significant increase in neurotic traits such as depression (6.17 ± 0.16 points), asthenia (6.37 ± 0.21 points) and, especially, anxiety (8.16 ± 0.69 points) in patients of 1st group. Along with the increase of muscle pain intensity to 8–10 points (2nd group), the indices on depression scales (7.3 ± 0.20 points), asthenia (7.29 ± 0.20 points) and hypochondria (6.16 ± 0.30 score) significantly increased ($p<0.05$).

Conclusions: The obtained data can be useful and should be taken into account when developing individual tactics of treatment and rehabilitation measures in order to improve the quality of the FM treatment.

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THE IMPACT OF PRIOR TOTAL SHOULDER ARTHROPLASTY ON PERIOPERATIVE OUTCOMES AND LENGTH OF STAY IN PRIMARY TOTAL KNEE ARTHROPLASTY

K. Aziz¹, M. Best¹, R. Sterling¹, H. Khanuja¹

¹Johns Hopkins Department of Orthopaedic Surgery, Baltimore, USA

Objective: Total knee arthroplasty (TKA) is a safe and exceptionally effective treatment for patients suffering from severe osteoarthritic symptoms. Many patients have arthritic changes in more than one joint, and shoulder arthroplasty is becoming increasingly common. Patients who have undergone shoulder arthroplasty may have decreased ability to use their upper extremities to assist with weight bearing, which is often necessary while participating in early physical therapy for total knee arthroplasty and may lead to impaired mobility; however, there is a paucity of literature that addresses whether history of shoulder arthroplasty may impact the immediate perioperative outcomes in patients undergoing primary elective TKA. We sought to investigate this and hypothesized that history of shoulder arthroplasty would be associated with a greater length of stay, increased risk of discharge to a rehabilitation facility, and greater major and minor perioperative surgical complication rates in patients undergoing primary elective TKA without a history of shoulder arthroplasty.

Methods: Using the Nationwide Inpatient Sample (NIS), we reviewed 4,182,887 patients undergoing primary elective TKA between 2000 and 2009. We used International Classification of Disease version 9 codes to identify patients who had a history of total shoulder arthroplasty. All subtypes of shoulder arthroplasty were included in pooled analysis, and included hemiarthroplasty, total shoulder arthroplasty, and reverse total shoulder arthroplasty. Patients with history of shoulder arthroplasty (9043 patients) were compared to a control group without delirium (4,173,844 patients). Major complications were defined as mortality, pulmonary embolism, myocardial infarction, stroke, pneumonia, and acute renal failure. Minor complications were defined as wound infection, seroma, deep vein thrombosis, dislocation, wound dehiscence, and hematoma. Descriptive statistics of age, sex, length of stay, discharge

location (described as rehab or home) and Elixhauser comorbidities were assessed for both groups. Multivariate logistic regression models using Elixhauser comorbidities, age, and sex as covariates were constructed to assess the association of delirium with major and minor surgical complications. Statistical significance was set at $p<0.01$.

Results: Patients with history of shoulder arthroplasty undergoing primary elective TKA were older (mean 69.5 vs. 66.8, $p<0.0001$), less likely to be female (58% vs. 64%, $p<0.0001$), had shorter length of stay (mean 3.5 vs. 3.7, $p=0.0002$), and had higher Elixhauser comorbidity counts (mean 1.8 vs. 1.7, $p<0.0001$). There was no statistically significant association with shoulder arthroplasty and discharge to rehab (0.4% vs. 0.6%, $p=0.28$). Chi-squared analysis demonstrated that patients with shoulder arthroplasty were less likely to have both major surgical complications (2% vs. 3%, $p<0.0001$) and minor surgical complications (3% vs. 5%, $p<0.0001$). In order to account for demographic variance in comparative groups, multivariate logistic regression was performed. Multivariate logistic regression demonstrated that shoulder arthroplasty was protective against risk for major surgical complications (OR 0.65 95%CI: 0.48 to 0.88) and minor surgical complications (OR 0.7 95%CI 0.55 to 0.90) in patients undergoing primary elective TKA.

Conclusions: Shoulder arthroplasty does not have any impact on disposition, and patients with shoulder arthroplasty have shorter length of stay and lower risk of major and minor surgical complications in primary elective TKA.

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THE IMPACT OF PRIOR TOTAL SHOULDER ARTHROPLASTY ON PERIOPERATIVE OUTCOMES AND LENGTH OF STAY IN PRIMARY TOTAL HIP ARTHROPLASTY

K. Aziz¹, M. Best¹, R. Sterling¹, H. Khanuja¹

¹Johns Hopkins Department of Orthopaedic Surgery, Baltimore, USA

Objective: Total hip arthroplasty (THA) is a safe and exceptionally effective treatment for patients suffering from severe osteoarthritic symptoms. Many patients have arthritic changes in more than one joint, and shoulder arthroplasty is becoming increasingly common. Patients who have undergone shoulder arthroplasty may have decreased ability to use their upper extremities to assist with weight bearing, which is often necessary while participating in early physical therapy for total hip arthroplasty and may lead to impaired mobility; however, there is a paucity of literature that addresses whether history of shoulder arthroplasty may impact the immediate perioperative outcomes in patients undergoing primary elective THA. We sought to investigate this and hypothesized that history of shoulder arthroplasty would be associated with a greater length of stay, increased risk of discharge to a rehabilitation facility, and greater major and minor perioperative surgical complication rates in patients undergoing primary elective THA without a history of shoulder arthroplasty.

Methods: Using the Nationwide Inpatient Sample (NIS), we reviewed 2,006,522 patients undergoing primary elective THA between 2000–2009. We used International Classification of Disease version 9 codes to identify patients who had a history of total shoulder arthroplasty. All subtypes of shoulder arthroplasty were included in pooled analysis, and included hemiarthroplasty, total shoulder arthroplasty, and reverse total shoulder arthroplasty. Patients with history of shoulder arthroplasty (4328 patients) were compared to a control group without delirium (2,002,193 patients). Major complications were defined as mortality, pulmonary embolism, myocardial infarction, stroke, pneumonia, and acute renal failure. Minor complications were defined as wound infection, seroma, deep vein

thrombosis, dislocation, wound dehiscence, and hematoma. Descriptive statistics of age, sex, length of stay, discharge location (described as rehab or home) and Elixhauser comorbidities were assessed for both groups. Multivariate logistic regression models using Elixhauser comorbidities, age, and sex as covariates were constructed to assess the association of delirium with major and minor surgical complications. Statistical significance was set at $p < 0.01$.

Results: Patients with history of shoulder arthroplasty undergoing primary elective THA were older (mean 68.4 vs. 65.2, $p < 0.0001$), less likely to be female (59% vs. 56%, $p < 0.0001$), had shorter length of stay (mean 3.6 vs. 3.8, $p = 0.007$), and had higher Elixhauser comorbidity counts (mean 1.8 vs. 1.4, $p < 0.0001$). There was no statistically significant association with shoulder arthroplasty and discharge to rehab (0.6% vs. 0.5%, $p = 0.53$). Chi-squared analysis demonstrated that patients with history of shoulder arthroplasty had comparable rates of major surgical complications (3% vs. 3%, $p = 0.76$) and minor surgical complications (6% vs. 5%, $p = 0.4$). In order to account for demographic variance in comparative groups, multivariate logistic regression was performed. Multivariate logistic regression models using Elixhauser comorbidities, age, and sex as covariates demonstrated that shoulder arthroplasty was not associated with major surgical complications (OR 0.94 95%CI: 0.63 to 1.4) and minor surgical complications (OR 1.0 95%CI 0.75 to 1.4) in patients undergoing primary elective THA.

Conclusions: Total shoulder arthroplasty patients undergoing primary elective THA have a shorter length of stay during their hospitalization, and are not at increased risk for major and minor perioperative surgical complications in primary elective THA. Additionally, patients with history of shoulder arthroplasty are not at increased risk for being discharged to a rehabilitation facility.

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PROFILES AND RISK FACTORS FOR THE OCCURRENCE OF OSTEOSARCOPENIA: THE ROAD STUDY

N. Yoshimura¹, S. Muraki¹, H. Oka², T. Iidaka¹, C. Horii³, H. Kawaguchi⁴, K. Nakamura⁵, T. Akune⁵, S. Tanaka³

¹Department of Prevention Medicine for Locomotive Organ Disorders, 22nd Century Medical and Research Center, University of Tokyo, Tokyo, ²Department of Medical Research and Management for Musculoskeletal Pain, 22nd Century Medical and Research Center, University of Tokyo, Tokyo, ³Department of Orthopaedic Surgery, Sensory and Motor System Medicine, Graduate School of Medicine, University of Tokyo, Tokyo, ⁴JCHO Tokyo Shinjuku Medical Center, Tokyo, ⁵National Rehabilitation Center for Persons with Disabilities, Saitama, Japan

Purpose: To clarify the characteristics of subjects with both osteoporosis (OP) and sarcopenia (SP), also known as osteosarcopenia (OSP), among men and women in the general Japanese population.

Methods: The second survey of the Research on Osteoarthritis/Osteoporosis Against Disability (ROAD) study was conducted between 2008-2010; 1083 subjects (aged ≥ 60 years, 372 men, 711 women) completed all the examinations of OP, and SP. The third survey was conducted between 2012-2013; 767 individuals who had initially enrolled in the second survey (70.8%, 253 men, 514 women) completed assessments identical to those in the second survey. OP was defined based on the WHO criteria, while SP was defined as per the algorithm of the Asian Working Group for Sarcopenia.

Results: The prevalence of OSP in the second survey was 4.7% (men, 1.9%; women, 6.2%). The cumulative incidence of OSP was 0.9%/year (men, 0.3%/year; women, 1.1%/year). Logistic regression analysis using the occurrence of OSP as an objective factor indicated that, higher age and the presence of OP at the second survey

raised the risk of the occurrence of OSP (age, +1 yr; odds ratio, 1.24; 95%CI, 1.12–1.38; $p < 0.001$, presence of OP, vs. nonpresence, 23.21, 5.25–102.7, $p < 0.001$). However, factors like higher BMI and residing in a coastal area significantly decreased the risk of OSP (BMI, +1 kg/m², 0.74, 0.61–0.91, $p = 0.004$, residing in a coastal area vs. mountainous area, 0.23, 0.07–0.72, $p = 0.012$). In contrast, gender and presence of SP was not significantly associated with the occurrence of OSP.

Conclusions: Preventing OP may help reduce the risk of OSP.

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MECHANICAL PROPERTIES OF BONE TISSUE CAN BE RESTORED BY LOADING AFTER CHANGING DURING UNLOADING HANGING

T. V. Baltina¹, O. A. Sachenkov¹, O. V. Gerasimov¹, I. A. Lavrov², M. E. Baltin¹, N. F. Ahmetov¹, A. O. Fedyanin¹

¹Kazan Federal University, Kazan, Russia, ²Mayo Clinic, Rochester, USA

Studies performed in conditions of a microgravity models and microgravity models with putting on animal's feet. The hypothesis that influence of gravitational load on a various parts of the musculoskeletal system can be a consequence of evolution of biomechanical structures and can be restored by applying external loads. It was shown previously that in the conditions of a microgravity, postural muscles have the greatest loss in weight and the changes in muscular force can be observed without increase in muscle mass. All tests were conducted on nonlinear laboratory rats (180-200 g). As a model of gravitational unloading we used antiortostatic support model. All experiments were performed according to bioethical standards and were approved by local ethical committee of the Kazan Federal University. Chloral hydrate was used for anesthesia (5mg/kg, intraperitoneal, Sigma-Aldrich). The femoral bones were dissected from all tested rats with following weight measurement, density evaluation, and measurement of geometrical parameters. At the end, the stress tests with a three-points bending were performed. After testing Jung's module and limits of tension was calculated. Furthermore bones was scanned on μ CT in diaphysis, metaphysis and epiphysis regions. After scanning porosity was calculated. The structure of porosity was analyzed (in terms of fabric tensor). It was investigated different groups: control, microgravity models for 7 days of unloading hanging and models 7 days of unloading hanging with putting on animal's feet for 3 hour every day. In "hypogravitational" models Jung's module decreased slightly (25%), but limits of tension decreased significantly (60%). In case of putting on animal's feet Jung's module restores its value (deviation about 5%) and limits of tension increases up to 33% (in comparison with "hypogravitational" models). Against the background of control group limits of tension decreased up to 45%. These results emphasize that the bone atrophy can be decreased by influence of external forces. This emphasize that the rehabilitation strategy directed on preservation of a muscle also helps to support bone structure during gravitational unloading hanging.

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DEMYELINATING DISEASES AFTER ANTITNF TREATMENT IN RHEUMATIC DISEASES

M. Novella-Navarro¹, M. M. Muñoz-Gómez², J. Pons-Dolset³, M. Pavo-Blanco⁴, E. Raya-Alvarez⁴, J. Salvatierra-Ossorio⁴

¹Department of Rheumatology, HM Hospital Madrid Norte Sanchinarro, Madrid, ²Departament of Rheumatology, Hospital Torrecárdenas, Almería, ³Departament of Rheumatology, Hospital Royo Villanova, Zaragoza, ⁴Departament of Rheumatology, Complejo Hospitalario Universitario de Granada, Granada, Spain

Objective: The onset of Demyelinating Diseases due to anti-TNF α therapy in rheumatic diseases is an uncommon side effect. Currently, the evidence-based data are available from case reports or case series which try to understand the possible cause-effect association. According to “BIOBADASER” (Spanish Register of Adverse Events of Biologic Therapy in Rheumatic Diseases), the incidence of demyelinating diseases

in Spain is 0.05 cases 1000 person-year with an TNF α (studies performed with etanercept, adalimumab, infliximab) compared to 0.02-0.04 in general population. We report our clinical experience about six clinical cases.

Methods: We expose six patients whom developed neurologic symptoms compatible with demyelinating disease over the course of a year with anti-TNF α therapy.

	Diagnosis	antiTNF	Neurologic features and diagnosis	Evolution of neurologic symptoms after antiTNF withdrawal	Current treatment
Case 1	Ankylosing spondylitis	Golimumab	Demyelinating brain lesions. Cervical myelitis	Clinical persistence	Glateramer acetate
Case 2	Psoriatic arthritis	Etanercept	Demyelinating motor-sensitive neuropathy (peroneal nerve)	Clinical remission	Ustekinumab
Case 3	Ankylosing spondylitis	Golimumab	Demyelinating brain lesions	Clinical persistence	Fingolimod
Case 4	Rheumatoid arthritis	Adalimumab	Distal axonal demyelinating polyneuropathy	Clinical remission	Rituximab
Case 5	Rheumatoid arthritis	Adalimumab	Axonal motor-sensitive demyelinating polyneuropathy	Clinical remission	Rituximab
Case 6	Psoriatic arthritis	Infliximab	Demyelinating polyradiculopathy (Guillain-Barré)	Clinical remission	Ustekinumab

Results: The four patients who developed Peripheral Nervous System affection, responded successfully to medication withdrawal, regarding to the improvement of neurologic features, even clinical remission. Although a switch of the therapeutic target was necessary in order to manage the baseline inflammatory disease. On the other hand, patients who suffered from Central Nervous System disease did not improve after anti-TNF discontinuation, so to establish a specific treatment was required.

Conclusion: So far, the association between demyelinating diseases onset and anti-TNF therapy remains unclear. It is still unknown if these drugs are able to cause these pathologies, reveal a previous unidentified latent disease or conversely, there is not any causal link. However, in most cases, an improvement in neurologic symptoms and signs is detected once the drug is removed. This fact, prompt us to consider that a cause-effect relationship is plausible. In view of the above, some recommendations should be made: it is mandatory to discontinue the anti-TNF treatment if any neurologic symptoms or signs appear and, the use of these drugs must be avoided in patients (and first-degree relatives) with medical history of demyelinating disease.

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THE EFFECT OF VITAMIN B12, FOLATE, URIC ACID, AND SERUM BIOMARKERS OF INFLAMMATION ON BONE MINERAL DENSITOMETRY IN POSTMENOPAUSAL WOMEN

F. Beyazit¹, E. Pek²

¹Canakkale 18 March University Faculty of Medicine, Canakkale, ²Afyonkarahisar Dinar State Hospital, Afyonkarahisar, Turkey

Objective: Despite the accumulating evidence suggesting a possible relationship between femur and lumbar BMD and serum uric acid (UA), it is unclear whether alterations in UA levels reflect any underlying subclinical inflammatory conditions in postmenopausal osteoporosis. In addition, a mechanistic link between osteoporosis and dietary factors including vitamin B12 and folate in postmenopausal women is still obscure. The aim of the present study is to investigate the association between serum vitamin B12, folate, UA, and subclinical inflammation markers on BMD measurements in postmenopausal women.

Methods: 184 postmenopausal women were recruited for the present study. Clinical data, as well as serum vitamin B12, folate, UA, conventional

inflammation markers, and other related biochemical markers, were assessed for each subject. BMD measurements of proximal femur and lumbar spine was done by using DXA. Correlation analysis was done between serum vitamin B12, folate, UA and other biochemical and metabolic parameters.

Results: Although no association was found between serum inflammatory markers, vitamin B12 and folate levels with femur neck and lumbar spine BMD measurements, elevated UA levels were observed in normal BMD values (Table 1). Higher BMD values were consistently obtained in higher UA tertiles (Figure 1). UA ($p<0.001$) and BMI ($p=0.003$) were found to be correlated with femur neck BMD measurements.

Conclusions: The femoral and lumbar BMD measurements were associated with serum UA levels. Higher serum UA levels were found to have a protective effect on postmenopausal osteoporosis irrespective of inflammation and dietary factors.

Figure 1. Femur neck and lumbar spine BMD measurements according to uric acid tertiles.

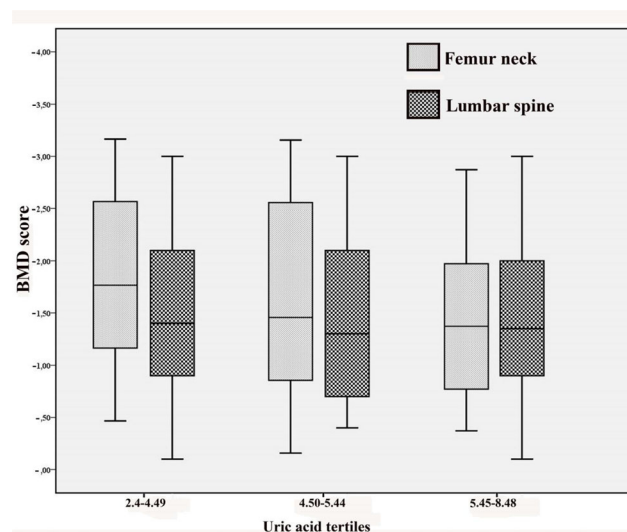


Table 1. Clinical and biochemical characteristics of the study participants according to BMD measurements. (^{a,c}Osteoporotic vs. Osteopenic and Normal group; ^{b,c,d,f,g}Osteoporotic vs. Osteopenic vs. Normal group)

	Femur neck measurement			Lumbar spine measurement				
Normal (n=59)	Osteopenic (n=68)	Osteoporotic (n=57)	p	Normal (n=68)	Osteopenic (n=94)	Osteoporotic (n=22)	p	
Age (years)	57.5±9.5	57.9±10.1	56.0±9.0	0.537	57.2±9.4	57.4±10.1	56.1±7.7	0.849
Weight (kg)	83.3±9.5	83.3±11.8	87.4±9.1	0.058	84.0±8.7	84.2±11.9	87.6±7.8	0.337
Height (m)	156.5±3.4	156.4±3.8	155.0±2.9	0.051	156.4±3.6	156.0±3.5	154.8±2.6	0.168
BMI (kg/m ²)	34.1±4.6	34.1±5.4	36.4±4.2	0.014 ^a	34.4±4.4	34.7±5.5	36.5±3.3	0.192
Uric Acid (mg/dL)	5.3±1.0	5.0±1.2	4.39±0.9	0.001 ^b	5.0±1.2	4.9±1.2	4.3±0.9	0.015 ^c
Vitamin B12 (pg/mL)	321±187	375±283	310±144	0.199	321±220	355±225	318±181	0.556
Folate (ng/mL)	7.7±2.8	7.8±2.2	8.1±2.6	0.730	7.5±2.5	8.1±2.7	7.7±1.9	0.346
hs-CRP (mg/L)	0.74±1.1	0.60±0.8	0.56±0.81	0.527	0.7±1.1	0.6±0.7	0.5±0.9	0.528
ESR (mm/h)	11.6±12.6	12.6±7.5	11.6±5.0	0.568	11.5±4.2	12.5±7.1	11.4±3.4	0.458
PTH (pg/ml)	59.6±29.9	63.8±25.7	61.0±17.2	0.635	59.6±29.3	62.9±23.1	62.3±16.9	0.719
ALP (U/L)	94.5±88.0	85.6±25.2	84.9±19.0	0.544	91.3±82.7	86.9±23.1	84.5±16.2	0.819
T. Cholesterol (mg/dL)	197.3±32.2	199.0±28.8	193.5±35.3	0.625	201.1±33.2	192.9±30.8	199.8±31.9	0.243
Triglyceride (mg/dL)	164.2±75.2	171.1±89.4	145.7±58.5	0.164	163.9±61.8	162.7±90.6	145.5±48.7	0.594
LDL-C (mg/dL)	115.0±27.1	115.1±29.1	115.2±30.2	0.998	116.9±29.5	112.5±28.4	119.9±27.1	0.437
HDL-C (mg/dL)	53.6±11.6	55.3±9.5	55.5±12.9	0.605	54.1±9.9	55.4±12.4	54.5±10.8	0.775
Calcium (mg/dL)	9.5±0.8	9.1±0.9	9.2±0.9	0.091	9.4±0.7	9.2±0.9	9.1±0.9	0.129
Phosphorus (mg/dL)	3.3±0.6	3.3±0.5	3.2±0.6	0.710	3.2±0.5	3.4±0.6	3.2±0.7	0.306
BUN (mg/dL)	31.7±8.5	33.2±9.7	31.5±7.3	0.484	31.7±8.1	32.7±9.1	31.1±8.5	0.640
Kreatinin (mg/dL)	0.7±0.2	0.7±0.1	0.7±0.2	0.308	0.7±0.2	0.7±0.2	0.7±0.1	0.200
Femur neck BMD (g/cm ²)	-0.74±0.16	-1.65±0.37	-2.7±0.18	0.000 ^c	-0.91±0.37	-2.00±0.65	-2.84±0.19	0.000 ^f
Lumbar spine BMD (g/cm ²)	-0.77±.34	-1.39±0.50	-2.34±0.48	0.000 ^d	-0.70±0.19	-1.76±0.47	-2.81±0.20	0.000 ^g

P404**ASPECTS OF HEALTH IN RELATION TO THE EVOLUTION OF THE CONFIDENCE DEGREE IN PHYSICAL EXERCISE**L. Vicas¹, C. Nistor Cseppento¹, A. Venter¹, F. Cioara¹¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: Disease prevention is a cost-effective alternative. Efforts in health policies are geared toward promoting health through strategies that impose an adequate lifestyle among the population. Encouraging physical activity and maintaining a good musculo-skeletal functionality is an important strategy for several aspects of health and for improving the quality of life. Confidence or belief that exercise has positive health effects has been subject to variation among the population. The scope of the study is to evaluate compliance with educational programs on practicing physical exercise and healthy diet.

Methods: We chose two groups of homogeneous patients in terms of demographic criteria: age and gender. The first batch of 486 patients was developed and analyzed in 1997 and the second of 502 patients in 2017. The inclusion criteria in the batch were between 30-60 years of age and the absence of physical exercise contraindications. These patients followed a spa cure in Baile-Felix Romania. We analyzed the physical activity index, BMI, personal pathological history, quality of life, and a questionnaire on accepting a physical training program. We calculated the risk of fracture for female patients using the FRAX instrument. We applied a questionnaire assessing patient satisfaction with lifestyle changes and compliance with this change. The frequency of the various pathologies in the two batches was compared using the Fisher test.

Results: The results showed that the 1997 lot had a medium or poor physical condition of 65.94%, while in lot 2017 the proportion of this condition was 43.35%. Acquiring and systematically practicing a physical training program is convincingly accepted by 31.25% of the patients in the 1997 lot compared to 69.76% of the 2017 lot. Corresponding to these aspects in the 1997 lot there is a 58% incidence of obesity, 50.78% of hypertension, compared to the 38.70% incidence of obesity and 42.33% of hypertension in the 2017 lot. ($P<0.05$).

Conclusions: the persevering promotion of a healthy lifestyle has an appreciation in the population and that elements of a lifestyle such as physical exercise and body weight control can reduce the incidence of cardiovascular and musculoskeletal diseases.

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P405**ASPECTS OF RECOVERY OF WALKING IN THE ELDERLY PATIENT**L. Vicas¹, C. Nistor Cseppento¹, M. Veres¹, M. Rus¹, F. Cioara¹¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: The aging process causes changes in all body apparatus and systems, resulting in so-called geriatric syndromes. There is a decrease in strength, mass and muscle volume in the elderly, a decrease attributable to the disappearance of muscle fibers and to the qualitative changes in the

contractile properties. These changes can create issues of autonomy and vulnerability. The aim of the study was to highlight aspects of preventing and recovering elderly patient dependence by practicing physical training to diminish the continuous limitation of performance of physical activities.

Methods: The study was conducted over a period of one year on a group of 30 patients aged between 85-95 years, followed by recovery in Baile-Felix, Romania and at home. Common pathology was lower limb osteoarthritis, osteoporosis, sarcopenia, equilibrium disorders, neurological sequelae, mental disorders and incontinence. Patients have undergone treatment based on the hydrokinetotherapeutic means specific to Felix Spa along with drug therapy for associated conditions. The program consisted of two cures per year of ten days of kinetotherapy, hydrokinetotherapy, electro and thermotherapy, occupational therapy and masotherapy. Besides intensive treatment periods, we performed kineto and occupational therapies three times a week at home or in specialized centers. The treatment aimed at modifying lifestyle and adopting personalized exercises. Equilibrium and coordination exercises aim to improve gait and balance, diminish vertigo and enhance physical activity in general. We have identified for each case the disturbances present in the global disability and we have used customized programs. For evaluation, we used the tandem standing, up and go, chair rising test group, we measured pain, balance, coordination, and quality of life.

Results: Physical training has improved the functional tests during the follow-up, the type of physical training focused on daily gestures has achieved the most beneficial improvements and rewards. Physical condition improved in patients involved in self-care and in actions to decrease the degree of functional dependence. The risk of falling is great for the patient who lives alone.

The negative impact on the quality of life was represented by the changes in the family status that create psychotrauma situations (the departure of children, the restriction of living conditions, the leaving of the dwelling, the death of one of the partners, etc.).

Conclusions: The external spa therapy with oligomineral thermal water influences the body's reactivity and the positive state that the patient perceives due to the natural factors of cure that moderate the effects of stress and contribute to the achievement of the proposed therapeutic goals. The variety of social factors influences the functional status and quality of life of the patients. Completion of treatment depends on prophylaxis and professional therapy with a full team engagement.

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P406

BENIGN JOINT HYPERMOBILITY SYNDROME IN A 14 YEAR OLD GIRL

A. Bitzidis¹, S. Spanou², M. Kyrou¹, N. Samaras¹, A. Koundoudis¹

¹Orthopaedic Department, ²Paediatric Department, Mpodosakeio General Hospital Ptolemaida, Ptolemaida, Greece

Objective: We present an interesting case of benign joint hypermobility syndrome (BJHS) in a 14 year old girl.

Method: The adolescent presented in the outpatients department, complaining of progressive bilateral hip pain associated with clicking noise for the last 6 months. Additionally, during physical education she had several episodes of unilateral hip locking followed by a mechanical fall. On examination she had a normal walking posture associated with bilateral hip clicking noise. She had an extreme range of movement in all 5 metacarpo-phalangeal, elbow, shoulder and hip joints bilaterally and in the cervical and lumbar spine. In standing position she had bilateral knee recurvatum and could voluntarily dislocate and relocate her hip bilaterally with an associated clicking. From her past medical history no other pathologies were noted. Intravenous tests, plain x-rays and MRI of the hip bilaterally were normal. Based on the above she

was given a 9/9 Beighton score and a BJHS was diagnosed. She was advised of focused trunk and hip muscle strengthening with avoidance of extreme hip movement.

Conclusion: BJHS is an autosomal dominant connective tissue disorder related to an abnormal collagen synthesis. Its musculoskeletal symptoms occur in the absence of a systemic rheumatic disease. Beighton was the first clinician who set the major and minor inclusion criteria, forming a scoring system for the diagnosis of the BJHS with the higher value of 9/9. We would like to emphasize on the existence of the BJHS, even with extreme symptoms as the voluntary hip dislocation and the long term management which focuses on lifestyle modification and physiotherapy.

P407

CELIAC DISEASE IMPACT ON BONE METABOLISM

I. Bojoga¹, O. Enache², S. Martin¹, S. Fica¹

¹Elias University Hospital, Endocrinology Department & Carol Davila University of Medicine and Pharmacy, Endocrinology Department, ²Elias University Hospital, Endocrinology Department, Bucharest, Romania

Objective: The celiac disease is an autoimmune disorder characterized by gluten intolerance, with a 1% estimated global prevalence. This disease may be associated with malabsorption, leading to vitamin D deficiency and metabolic bone disease. We present the case of a 59 year old female patient, recently diagnosed with celiac disease and severe low BMD.

Methods: The patient had a history of premature menopause (age 40), Barret esophagus and was recently diagnosed with celiac disease based on upper gastrointestinal endoscopy biopsy and high level of anti-transglutaminase antibodies (984 U/ml). Physical examination showed: height=150 cm, weight=40 kg, important kyphosis without known prevalent fragility fractures. The laboratory findings revealed hypocalcemia (6.7 mg/dl), hypomagnesaemia (1.43 mg/dl), phosphorus level in the lower normal range (2.6 mg/dl), high level of alkaline phosphatase (177U/L), low 25-hydroxyvitamin D level (12.44 ng/ml) and secondary hyperparathyroidism (PTH=151.2 pg/ml). DXA of the lumbar spine and the right hip showed low BMD: L1-L4 T-score=-6.7 SD, Z-score=-4.7 SD, total right hip T-score=-4.5 SD, Z-score=-3.1 SD). FRAX score showed: major osteoporotic fracture probability=18% and hip fracture probability=13%. Thoracolumbar spine x-ray revealed medium-high thoracic kyphosis with minimal scoliosis and vertebral trabecular structures rarefaction, suggesting an important demineralization degree.

Results: The clinical and paraclinical findings led to the diagnosis of osteoporosis and possibly osteomalacia secondary to celiac disease. Based on the DXA and FRAX score, we decided to initiate anti-osteoporotic treatment with alendronic acid. We also recommended to continue the gluten free diet and supplementation with 1 g calcium, 2000 IU vitamin D3, 1 µg alphacalcidol and 500 mg magnesium daily.

Conclusions: The early diagnosis of celiac disease and other disorders causing malabsorption is important in order to detect and treat the deficits the patients might have and that might cause mineral bone disease. In our case the premature menopause and the late diagnosis of celiac disease were two factors that had an important impact on the bone metabolism, leading to osteomalacia and severe osteoporosis.

P408

IMPACT OF RHEUMATOID ARTHRITIS ON LIFE QUALITY: BEFORE AND AFTER TREATMENT

X. Grapton¹, P. Lemesle², L. Arabian³, V. Strotz⁴

¹Private Rheumatology Practice, Colombes, ²Private Rheumatology Practice, Bois-Colombes, ³Private Rheumatology Practice, Clamart,

⁴Private Rheumatology Practice, Antony, France

Objective: Explore and quantify the impact of rheumatoid arthritis (RA) on life quality via everyday life and psychological items and the effect of treatment (tt) on them.

Methods: 20 private practice rheumatologists (Rh) collected RA cases and provided information about the patient and his disease. A questionnaire including 12 themes and 41 items was filled in by the patient.

Results: 167 cases collected: 82% women, mean age 57 years, 56% moderate and 14% severe disease, 76% ACPA positive, 73% structural damage. Initial and post tt DAS-28 4.7 and 2.7. Classic DMARDs 95%, biological DMARDs 22%, combination therapy 76%, corticosteroids 73%. In 82% of the cases, the Rh recommends associated measures: rest (47%), physiotherapy, ergotherapy, balneotherapy (42%), adapting professional activity and environment, help for housework (33%). Before tt, psychological wellbeing and housework ability are altered in >50% of the cases. Impact on economy, food and social life occurs in <25%. 72% of the patients feel a lack of listening by their families. Life quality is mostly altered by: pain (85%), fatigue (75%), handicap (58%). We find a correlation between the severity of RA and the importance of the impact on psychological wellbeing, sexual life and hobbies. After tt, psychological wellbeing improves in 53% of the patients, and social life, work, getting about and sexual life in 45–32%. Items improved around 50% of the patients are in order: sleep, relation to other people, feeling excluded, social life, depression, sick leave, concentration problems, anxiety and shopping. We find an improvement in a third of cases in house-keeping, going out, sports and libido.

Conclusion: Tt of RA, including drugs and associated measures, reduces its negative impact on life quality. While DAS-28 drops by 43%, the frequency of RA related repercussions diminishes by 31% (14–50%) on the chosen items. A qualitative evaluation of the improvement will be subject of a further study.

P409

PSYCHOLOGICAL IMPACT IN RHEUMATOID ARTHRITIS: IMPROVEMENT BY SPECIFIC TREATMENT AND ASSOCIATED MEASURES

X. Grapton¹, P. Lemesle², L. Arabian³, V. Strotz⁴

¹Private Rheumatology Practice, Colombes, ²Private Rheumatology Practice, Bois-Colombes, ³Private Rheumatology Practice, Clamart, ⁴Private Rheumatology Practice, Antony, France

Objectives: Analyse psychological impact in rheumatoid arthritis (RA) and its repercussions. Evaluate improvement by disease treatment (tt) and associated measures.

Methods: 20 private practice rheumatologists (Rh) collected RA cases and provided information about the patient and disease. Questionnaire including 14 items about psychological and life quality involvement filled in by patients.

Results: 167 cases collected: 56% moderate, 14% severe disease, 76% ACPA+, 73% structural damage. Initial and post-treatment DAS-28: 4.7 and 2.7. Classic DMARDs 95%, biological DMARDs 22%, combination therapy 76%, corticosteroids 73%. In 82% of the cases, the Rh recommends associated measures: rest (47%), physiotherapy, ergotherapy, balneotherapy (42%), adapting professional activity and environment, help for housework (33%), psychological support or psychoactive drugs (19%), relaxation exercises (11%). Psychological mood is altered by: disease announcement, pain (85%), physical fatigue (71%), handicap (58%). Are limited: housework (51%), getting about (44%), do-it-yourself (55%), sports (61%), artistic (41%) and professional activities (29%). Social life is affected by: lack of being listened to (72%), lack of being understood (68%), lack of empathy (49%). RA tt reduces all those factors in a third of patients, except impact on family relations. Before tt, patients report: sleeping trouble (70%), anxiety (57%), lack of motivation (55%), dependency (49%), frustration (42%), lack of self-esteem (37%), concentration problems (35%), disillusion (31%), depression (30%). After tt, all those factors are 41–55% less frequent. 55% sleep better, 49% aren't depressed anymore, concentration problems diminish by 48% and social life is improved by 50%.

Conclusion: There is a major psychological impact in RA patients, with repercussions on their wellbeing and life quality. This can be improved by specific anti RA tt and associated measures. All items are improved, except impact on family relations.

P410

IMPACT OF SPONDYLOARTHRITIS ON LIFE QUALITY: BEFORE AND AFTER TREATMENT

X. Grapton¹, P. Lemesle², L. Arabian³, V. Strotz⁴

¹Private Rheumatology Practice, Colombes, ²Private Rheumatology Practice, Bois-Colombes, ³Private Rheumatology Practice, Clamart, ⁴Private Rheumatology Practice, Antony, France

Objective: Explore and quantify the impact of spondyloarthritis (SPA) on life quality via everyday life and psychological items and the effect of treatment (tt) on them.

Methods: 14 private practice rheumatologists (Rh) collected SPA cases and provided information about the patient and his disease. A questionnaire including 12 themes and 41 items was filled in by the patient.

Results: 50 cases collected, 59.5% men, mean age 45 years, 82% working. Axial SPA 42%, periphic 4%, mixt 52%. Mean duration before study: 14 years. Moderate disease 57%, severe 26.35%. HLA B27 positive 84%. Drugs: NSAIDs 96%, classic DMARDs 31%, biological DMARDs 84%, corticosteroids 36%, combination therapy 42%. Before tt, 72% of the patients report consequences on their hobbies, 68% on their psychological wellbeing, 54% on their getting about, 50% on their family relations. The less impacted items are food (26%) and economy (24%). Life quality is mostly altered by pain (71%), fatigue (17%), handicap (7%) and other people's attitude (5%). After tt, social repercussions diminish by 47%, getting about, housework, family relations, holidays, sexual life, psychological wellbeing, hobbies and work by 44 to 21%. Drug intolerance: 36%. The items improving by >50% after tt are: cultural life, transports, house-keeping, do-it-yourself, sleep, going out, work (53% less sick leave). Tt is less efficient (<22%) on economy, dependence, disillusion, depression and sexual life. Family circle lacks empathy in 66% of the cases, family relations stay difficult after treatment.

Conclusion: SPA diminishes quality of life in 75% of our patients. All the parameters impacted by SPA were significantly improved after tt. The best improvement concerned hobbies, including culture, do-it-yourself and going out. One patient of two found correct sleep and felt psychologically better. Sick leave was reduced by half, but family relations did not improve.

P411

FALLS AND FRACTURE RISK ASSESSMENT IN DAYTIME INPATIENT RHEUMATOLOGY DEPARTMENT INFLAMMATORY ARTHRITIDES PATIENTS

A. A. Popov¹, N. V. Izmozherova¹, P. A. Palabugina¹, A. A. Vikhareva¹, O. Y. E. Antipova²

¹Urals State Medical University, ²Municipal Central City Clinical Hospital 6, Ekaterinburg, Russia

Objective: To assess personal risk of falls and fractures in patients of daytime inpatient Rheumatology Department.

Methods: 26 patients (16 females) aged from 40 to 65 had signed informed consent to join cross-sectional study. Inclusion criteria: age of 40 or older, inflammatory joint and spine diseases requiring daytime inpatient care due to high inflammation activity resistant to ambulatory treatment. Absolute 10-year individual risk of osteoporosis (OP) related fracture has been assessed by the Russian version of on-line FRAX calculator. Short physical performance battery (SPPB) and 30-m walking time were registered. Kidney glomerular filtration rate (GFR) has been assessed by CKD-EPI.

Results: 12 subjects with rheumatoid arthritis, 8 cases of psoriatic arthritis and 4 males with ankylosing spondylitis were identified. Disease

duration varied from 3–25 years (median 12 years). All patients were reporting daily nonsteroidal anti-inflammatory drugs consumption. Disease modifying drugs included methotrexate 10 mg per week or higher (8 pts), leflunomide 20 mg per day (5 pts) sulfasalazine (2 pts). 19 pts were taking glucocorticoids (GCS) equivalent to 7.5 mg or less prednisolone. 20 of 26 subjects reported history of intraarticular GCS injections. Long term consumption of vitamin D and calcium was reported in 13 subjects, 5 persons confirmed periodical vitamin D administration. Oral bisphosphonate treatment for 12 month or more had been reported in 4 females. No subject could perform all 4 tests of the SPPB, 30-m walking time varied from 28–420 s. FRAX treatment threshold has been surpassed in 17 subjects. All participants showed decreased GFR, in 12 subjects GFR being below 60 ml/min/m². Charlson comorbidity index median scored 2 (range 1 – 4). Hypertension was the most frequent comorbidity (19 pts). The subjects had history of myocardial infarction (4 pts), ischemic stroke (3 pts), class 2 chronic heart failure (3 pts), peptic ulcer (12 pts). Also, 14 subjects had mild or moderate chronic anemia.

Conclusion: All active inflammatory arthritis patients had increased falls propensity and OP related fracture risk, decreased physical performance capacity. Frequent comorbidities may significantly affect the safety and efficacy of OP related fracture prophylactic measures.

P412

FRACTURE RISK ASSESSMENT IN CHRONIC HEART FAILURE PATIENTS

A. A. Popov¹, N. V. Izmozherova¹, P. A. Palabugina¹, A. A. Vikhareva¹
¹Urals State Medical University, Ekaterinburg, Russia

Objective: To assess personal 10-year fracture risk in chronic heart failure (CHF) patients and increase cardiologists awareness.

Methods: 63 patients (46 females) aged from 42–88 (median 69) consented to join cross-sectional study. Inclusion criteria were the following: age of 40 or older, unplanned hospitalization for ischemic origin CHF worsening. Exclusion criteria: hospitalization due to acute myocardial infarction or pulmonary embolism. Absolute 10-year individual risk of osteoporosis (OP) related fracture has been assessed by the Russian version of on-line FRAX calculator.

Results: All subjects had history of myocardial infarction as the main cause of CHF and 12 subjects had personal history of low intensity trauma fracture, while 10 participants reported parental hip fracture (Pearson's chi-square 3.384; P=0.066). BMI varied from 43–130 kg (median 70; 25% -75% 70–87.5). Reported fracture risk factors included current smoking (8 cases), glucocorticoid consumption (4 cases), rheumatoid arthritis (5 cases), secondary osteoporosis (5 cases), alcohol consumption (4 cases). 3 subjects had bone densitometry performed previously, but no one knew the results. FRAX derived intervention threshold was overcome in 21 cases, while no one was receiving fracture prophylaxis.

Conclusion: Every third CHF patient may have high fracture risk. Cardiologists and general practitioners should pay more attention to fracture and falls prophylaxis in this group of patients.

P413

PSEUDARTHROSIS OF THE SPINE: THREE-DIMENSIONAL COMPUTED TOMOGRAPHY AND MULTIPLANAR REFORMATIONS

A. Venter¹, O. Straciuc¹, F. Cioara¹, C. Mraz¹

¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: Spinal fusions are performed for so-called mechanical instability resulting multiple or extensive decompression procedures. Following spinal fusion, 30–40% of patients will have persisting or recurrent pain and proportion of these patients will demonstrate failure of bony fusion called pseudoarthrosis.

Methods: In 98 patients with persisting low-back pain after lumbar fusion were examined with conventional radiographs, magnetic resonance and three-dimensional computed tomography and multiplanar reformations. Pseudoarthrosis was classified into four distinct morphologic categories: atrophic, transverse, single and complex. The results of different imaging methods have been compared in all 78 patients.

Results: In 21 patients with atrophic pseudoarthrosis results were similar in CT and conventional radiographic explorations. In 63 patients with other pseudoarthrosis types, CT and multiplanar reformations are the best imaging study. In 14 patients with unstable fusion, MR demonstrated vertebral signal intensity changes. None of the patients has findings that suggest vertebral osteomyelitis. Pseudoarthrosis surgical confirmation have been possible in ten patients.

Conclusions: Conventional radiographs have lower sensitivity in detecting pseudoarthrosis. Three-dimensional and multiplanar reformations images provide realizable information in demonstrating postlumbar fusion pseudoarthrosis.

P414

HIGH-RESOLUTION CT OF THE SCAPHOID: TECHNIQUE AND RESULTS

A. Venter¹, F. Cioara¹, I. Oswald¹, L. Daina¹

¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Purpose: To detect traumatic lesions of the scaphoid and degenerative changes of the periscaphoidal joints by using high-resolution CT, and to compare the results to conventional radiograms.

Methods: A total of 610 CT exams were done on 502 patients suffering from acute trauma or chronic wrist pain (95 control exams). Oblique sagittal scans parallel to the long axis of the scaphoid were performed: 1 mm thickness, FOV 60 mm, high-resolution reconstruction and MPRs.

Results: 52 acute fractures were detected, either exclusively with CT or in greater extension compared to X-rays, and in 98 doubtful cases lesions could be excluded. 121 CTs were done after treatment, and 134 exams to stage the extend of non-unions. Finally, in 174 cases arthrodesis of the scapho-trapezio-trapezoidal joints were controlled. High-resolution CT was significantly superior to X-ray in detecting (a) acute fractures and their extension, (b) humpback deformity, (c) the fracture consolidation or the delayed union and nonunion, (d) precise morphology of nonunions, and (e) posttraumatic osteoarthritis in the radiocarpal or/and mediocarpal joints.

Conclusions: High-resolutions CT of the wrist is highly recommended for imaging the acutely injured scaphoid, in the follow-up after therapy, in detecting and staging delayed unions and nonunions of the scaphoid, and for the early diagnosis of posttraumatic osteoarthritis.

P415

IMPLICATIONS OF X-RAYS IN THE PATHOLOGY OF OSTEOARTICULAR SYSTEM: CALCULATION ALGORITHMS IN DETERMINING BMD

I. Oswald¹, A. Venter¹, F. Cioara¹, C. Mraz¹, E. Antonescu²

¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea,

²University of Sibiu, Faculty of Medicine and Pharmacy, Sibiu, Romania

X-rays are electromagnetic radiations with wavelength $\lambda \sim 1 \text{ \AA}$. In the medical diagnosis this property is exploited through the degree of absorption in bone mass varying depending on density. Physiologically, the bone, through the metabolic processes, maintains a continuous equilibrium between osteoformation and osteoresorption. The elderly, on one hand, corroborated with other risk factors, on the other hand, lead to a disequilibrium between osteoformation and osteoresorption on the net favour of resorption and, implicitly, to changes of BMD. Osteoporosis is considered a disease characterized by the decrease of bone mass and by

the deterioration of bone tissue microarchitecture, which causes the increase of fragility and susceptibility to fractures. The evaluation of bone quality is crucial for determining the management of patients with osteoporosis. DXA evaluation of this pathology consists in a two-dimensional analysis of a three-dimensional anatomical structure, ex (level of lumbar spine L1-L4). The mathematical analysis and the mathematical algorithms specific to this type of quantitative analysis are complex and it supposes (Silva, 2014): Fournie conversion and run-length matrix analysis. The particularity of DXA examination that uses various types, from where penetration degree function, one with low penetration and other with large penetration can extend in this way through a specific algorithm a two-dimensional evaluation to a three-dimensional one.

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FREQUENCY AND RELATED FACTORS OF OSTEOSARCOPENIA IN ELDERLY OUTPATIENTS

S. Cotel¹, O. Deniz¹, H. D. Varan¹, M. C. Kizilarslanoglu¹, B. Goker¹

¹Gazi University School of Medicine, Department of Internal Medicine, Division of Geriatrics, Ankara, Turkey

Objective: Osteosarcopenia is a newly defined condition that consists of both sarcopenia and osteoporosis in an elderly patient. The studies investigating the patients with osteosarcopenia are limited. We planned a study to find out the frequency and the related factors of osteosarcopenia in an outpatient geriatric clinic.

Methods: This study was conducted in a geriatric outpatient clinic of a tertiary university hospital. 171 patients were included in the study. All patients were underwent comprehensive geriatric assessment including the evaluation of co-morbidities, medications, activities of daily living, nutritional status, cognitive functions and mood changes. Sarcopenia was defined as loss of skeletal muscle mass evaluated by bioelectrical impedance analysis plus at least one of the following situations; low handgrip strength or slow walking speed. BMD was performed for the evaluation of the osteoporosis.

Results: The median age of the patients was 74 years (min-max: 65-91) and 60.8% was female. The frequency of the sarcopenia and osteosarcopenia were 13.5% (23/171) and 7.0% (12/171), respectively. Sarcopenia was more common in patients with low BMD than patients without (21.1% vs. 9.6%, respectively, $p=0.039$). The patients with osteosarcopenia had worse results of height, weight and BMI, calf circumferences, handgrip strength, walking speed, basic and instrumental activities of daily livings, clock drawing and mini-mental state examination tests scores and mini-nutritional assessment compared to the nonosteosarcopenic patients (all parameters had $p<0.05$). In multivariate analysis, calf circumferences (OR: 0.595, $p=0.011$), clock drawing test (OR: 0.597, $p=0.024$) and BMI (OR: 0.716, $p=0.032$) were found to be independently correlated factors for osteosarcopenia.

Conclusion: The study has shown that nearly half of the sarcopenic patients may also be osteosarcopenic (12/23). Moreover, approximately each one of the five elderly patients with low BMD may be sarcopenic.

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VITAMIN D STATUS AND EFFECTS OF 25-HYDROXYVITAMIN D (25OHD) SERUM LEVELS ON THE RISK OF FRACTURES IN THE TERIPARATIDE VS. RISEDRONATE: VERO CLINICAL TRIAL

S. Minisola¹, F. Marin², D. Kendler³, P. Geusens⁴, C. Zerbinì⁵, L. Russo⁶, S. Greenspan⁷, E. Casado⁸, A. Fahrleitner-Pammer⁹, J. Stepan¹⁰, E. Lespessailles¹¹, R. Moericke¹², A. Bagur¹³, P. Lakatos¹⁴, P. López-Romero², J.-J. Body¹⁵

¹Sapienza Rome University, Rome, Italy, ²Lilly Research Center Europe, Madrid, Spain, ³University of British Columbia, Vancouver, Canada,

⁴Maastricht University Medical Center, Maastricht, The Netherlands,

⁵Centro Paulista de Investigação Clínica, Sao Paulo, Brazil, ⁶Centro de Analises e Pesquisas Clínicas LTDA, Rio de Janeiro, Brazil,

⁷Osteoporosis Center, University of Pittsburgh, Pittsburgh, USA,

⁸University Hospital Parc Tauli Sabadell (UAB), Barcelona, Spain,

⁹Division of Endocrinology, Medical University of Graz, Graz, Austria,

¹⁰Institute of Rheumatology and Faculty of Medicine 1, Charles

University, Prague, Czech Republic, ¹¹Regional Hospital, University of

Orleans, Orleans, France, ¹²Institut Préventive Medizin & Klinische

Forschung, Magdeburg, Germany, ¹³Centro de Osteopatías Comlit,

Buenos Aires, Argentina, ¹⁴Semmelweis University Medical School,

Budapest, Hungary, ¹⁵CHU Brugmann, ULB, Brussels, Belgium

Objective: VERO is a 24-month, active-controlled fracture endpoint study in postmenopausal women with low bone mass and prevalent vertebral fractures (VFX). The risks of new VFX and clinical fractures in patients randomized to teriparatide (TPTD) were reduced by 56% and 52% respectively ($p<0.001$ both) compared with risedronate (RIS). We analyzed the serum 25OHD status during the study and fracture incidence in women with 25OHD sufficiency vs. insufficiency at screening.

Methods: 1360 women were randomized and received TPTD or RIS. Patients with serum 25OHD<9.2 ng/mL (23 nmol/L) were excluded. Patients were categorized as having 25OHD insufficiency (>9.2 ng/mL and <20 ng/mL [50 nmol/L]) or 25OHD sufficiency (>20 ng/mL) at screening. Patients took 1 g of calcium and 400-800 IU/d of vitamin D supplements, or 2000 IU/d if they had 25OHD insufficiency at screening. 25OHD was evaluated by chemiluminescence (DiaSorin). Incidence of new fractures was compared using logistic regression adjusted by treatment, baseline 25OHD category, treatment-by-baseline 25OHD category interaction, a recent clinical VFX and a recent use of bisphosphonates.

Results: At screening, the mean (SD) serum 25OHD levels were 31.9 (26.4) ng/mL and 31.5 (19.1) ng/mL in the TPTD and RIS groups, respectively. 233 (17%) women had 25OHD insufficiency [mean (SD): 15.7 (3.0) ng/mL]. The frequency of shifting from 25OHD sufficiency to insufficiency levels during the trial was 19.1% and 16.3% in the TPTD arm compared with 1.8% and 1.6% with RIS after 3 and 6 months, respectively. Mean (SD) serum levels were 23.8 (7.7) and 31.9 (9.8) at 3 months, and 24.5 (7.9) and 32.2 (10.4) ng/mL at 6 months in TPTD and RIS respectively (between groups difference: $p<0.001$). The risk reduction with TPTD vs. RIS for new VFX, clinical fractures, and non-vertebral fractures did not significantly differ in any of the 25OHD categories (treatment-by-category interaction $p>0.1$). Table shows fracture data.

Conclusion: In postmenopausal women with severe osteoporosis, TPTD vs. RIS therapy was associated with lower 25OHD levels (possibly due to a greater 25OHD to 1,25-di-OHD conversion). However fracture risk reduction of TPTD vs. RIS did not significantly differ in women with baseline 25OHD insufficiency or sufficiency.

Table: Fracture incidence by 25OHD categories

	TPTD (n=680)	RIS (n=680)	OR (95%CI) TPTD vs. RIS
Vertebral fractures			
25OHD sufficient	22 (5.2%)	54 (12.2%)	0.38 (0.22-0.63) ^c
25OHD insufficient	6 (6.7%)	10 (11.1%)	0.62 (0.22-1.76)
Clinical fractures			
25OHD sufficient	24 (4.2%)	52 (9.3%)	0.45 (0.27-0.72) ^c
25OHD insufficient	6 (5.3%)	9 (7.6%)	0.71 (0.25-2.01)
Non-vertebral fragility fractures			
25OHD sufficient	20 (3.5%)	32 (5.7%)	0.61 (0.35-1.07) ^d
25OHD insufficient	5 (4.4%)	6 (5.0%)	0.91 (0.28-2.99)

^athe incidence of new VFX was estimated from 516 TPTD and 533 RIS patients who had baseline and follow-up spine x-rays; ^bclinical VFX plus non-vertebral fragility fractures; ^c $p<0.001$; ^d $p=0.08$.

Reference: ¹Kendler DL et al. Lancet (2017)

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THE COMPARATIVE EVOLUTION OF THE QUALITY OF LIFE OF PATIENTS WITH COXARTHROSIS BASED ON SEX AND ASSOCIATED DISEASES

C. D. Nistor-Cseppento¹, L. Lazar¹, F. Cioara¹, L. Vicas¹, D. Vasilieva², C. Bochis³, D. C. Iovanovici³, N. Pascalau¹

¹Faculty of Medicine Oradea, Oradea, Romania, ²Goce Delchev University Shtip, Shtip, Macedonia, ³University of Medicine Timisoara, Timisoara, Romania

Objective: To compare the quality of life of patients with coxarthrosis, sex and associated illness.

Method: We performed a retrospective study over a one-year period. The study group consisted of 144 patients with coxarthrosis, primary and secondary, divided into two subgroups. The first subgroup included 78 women aged 55-82 years (average age 62.0±7.5) and the second group comprised 66 men aged 39-82 (mean age 62.7±7.3 years). All patients followed a complex recovery program. We followed the evolution of quality of life based on sex and associated pathology. The data obtained were statistically processed. Parameter averages, frequency ranges, standard deviations, statistical significance tests by the Student method (t test) and χ^2 were calculated. Sensitivity to change was evaluated by calculating Effect Size (ES).

Results and Discussion: The incidence of associated diseases differs statistically ($p<0.001$), being 69.2% in the first group of women, vs. 72.7% in the second group of men. We found that the incidence of osteoporosis in women is much higher, as expected, in 38.5%, compared with 7.6% in males, and the incidence of osteoporosis with other sites is similar in both sexes. Primary coxarthrosis prevailed in both groups (85.9% and 74.2%, respectively). In our study, secondary coxarthrosis is 1.8 times more common in males than in females ($p=0.0074$). In the study I found the 1.9-fold incidence of radiographic stage 4 coxarthrosis in males to females, where stage II and III radiology prevailed. ($P=0.0051$). The difference in the HAQ score between the two lots is statistically significant ($p>0.05$). The change in sensitivity to change in effect is slightly higher ($ES=-0.56$ for females and $ES=-0.62$ for males), the effect of treatment on males is a result that lasts for 6 months and one year: 6 months ($ES=1.63$ for women and $ES=2.00$ for males) and 1 year ($ES=0.19$ for females and $ES=0.28$ for males).

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FEMUR GEOMETRIC PARAMETERS IN WOMEN WITH TYPE 2 DIABETES MELLITUS

V. V. Vadzianava¹

¹Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus

Objective: Bone fragility depends on BMD and bone material composition and structural design. The aim of this study is the assessment of the geometric parameters in women with type 2 diabetes mellitus (T2DM). Methods: we examined 72 type 2 diabetic females, age: 57.5(53.8-60.9) yrs, duration of DM: 56.2(51.4-59.2) yrs, duration of menopause 7(3-11) yrs, HbA1c: 8.6(6.8-10.4)%, BMI: 32.8(28.4-36) kg/m². The control group consisted of 45 women age: 56.2 (51.4-59.2), duration of menopause 5(2-8) yrs, BMI: 31.6(27-36). BMD at femoral neck (FN) was measured with DXA. Geometric parameters were determined using Advanced Hip Analysis program. Advanced Hip Analysis program including hip axis length (HAL), cross-sectional moment of inertia (CSMI), cross-sectional area CSA and the femur strength index (FSI). Calculation of CSMI, CSA, and FSI was previously described by Yoshikawa T.

Results: Postmenopausal women with T2DM had significantly lower BMD (Z-score) at femoral neck (T2DM: -0.6((-1.2)-(-0.4)) vs. controls: -0.1((-0.5)-0.6), $p=0.004$) compared to the control group. The hip axis

length, femur strength index, neck-shaft angle in both groups were comparable. In women with T2DM such geometric parameters as cross-sectional area (CSA) (T2DM: 140(124-156) vs. controls: 151(141-167), $p=0.002$ respectively) and cross-sectional moment of inertia (CSMI) (T2DM: 9932(8436-11320) vs. controls: 1106(9951-12803), $p=0.001$) were significantly lower compared to the control group.

Conclusions: In women with T2DM geometric parameters CSA and CSMI were statistically lower than in the control group.

P420

THE DIFFERENT INFLUENCE OF PAIN IN WOMEN AND MEN WITH GONARTHROSIS

C. D. Nistor-Cseppento¹, L. Lazar¹, C. Bochis², F. Cioara¹, L. Vicas¹, J. P. C. Judea Pusta¹

¹Faculty of Medicine Oradea, Oradea, ²University of Medicine Timisoara, Timisoara, Romania

Objective: To compare the pain intensity in gonarthrosis patients over one year, depending on sex.

Method: We performed a retrospective study over a one-year period. The study group consisted of 28 patients with primary gonarthrosis, divided into two subgroups of 24 female and male patients, respectively. All patients followed a complex recovery program.

Results and Discussion: Evolution of pain, assessed at admission, at 10 d of treatment, at 6 months and one year, is included in the Table below.

	female	male
admission	50.3±6.5	46.1±5.8
at 10 days of treatment	24.4±4.2	20.8±4.1
at 6 months	43.8±6.1	39.3±5.2
one year	45.9±6.8	41.5±5.5

Other men and women recorded a significant decrease in pain intensity ($p<0.001$), but also a significant increase in 6 months ($p<0.001$), followed by an increase in insignificant pain in the following 6 months ($p>0.05$). The magnitude of the effect reveals a strong impact of pain treatment on extension ($ES=-3.98$ for women and $ES=-4.36$ for men). At 6 months, the effect of treatment actually disappears ($ES=4.61$ in women and $ES=4.51$ in males). Over the next 6 months, the pain score is poor ($ES=0.34$ for females and $ES=0.42$ for males). From the analyzed ones we can argue with the necessity to resume the treatment at intervals of maximum 6 months.

P421

COMPARISON BETWEEN T-SCORE, CORONARY CALCIUM SCORE AND VITAMIN D

S. Sokolovic¹, F. Zukic², R. Alimanovic-Alagic³

¹Clinic for Heart, Blood Vessel and Rheumatic Diseases, University Clinical Center Sarajevo, ²Radiology, University Clinical Center Sarajevo, ³Institute for Nuclear Medicine, University Clinical Center, Sarajevo, Bosnia-Herzegovina

Objective: Osteoporosis is decalcification of bone, atherosclerosis is calcification of arteries and vitamin D is linked to both disorders. The coronary calcium score is numeric value of calcium in the coronary artery walls that predict the risk of coronary heart disease. T-score express normal bone density or either osteopenia or osteoporotic value. The evidence based medicine supports the link between cardiovascular and bone diseases. Aim of this study is to investigate relationship between osteoporosis and atherosclerosis.

Method: The open clinical prospective observational study was designed. Patients who had all three investigated values were included in statistical analysis. BMD was measured by DXA. The coronary calcium score was obtained by multislice CT scan (MSCT). Vitamin D blood values were obtained as 25(OH)D. The cardiovascular risk profile was performed in all examined subjects. Cardiovascular disorders included in this study were arterial hypertension and coronary artery disease.

Results: The preliminary results obtained shows direct relationship between T-score, the coronary calcium score and vitamin D values. The lower level of vitamin D is associated with lower T-score and higher coronary calcium score, whereas normal level of vitamin D and normal T-score is associated with normal coronary calcium score.

Conclusion: This study show clear link between BMD and atherosclerosis. Osteoporosis and atherosclerosis as degenerative diseases influence each other and vitamin D plays significant role in both disorders. The osteoporotic patients although asymptomatic for cardiovascular disease should be screened for the significant atherosclerotic plaques.

P422

THE ROLE OF NEIGHBOURHOOD PERCEPTIONS OF THE ENVIRONMENT ON ASSOCIATIONS BETWEEN SOCIAL DISADVANTAGE AND SELF-REPORTED ARTHRITIS: MULTILEVEL DATA FROM THE HABITAT COHORT

S. L. Brennan-Olsen¹, J. N. Rachele², D. Green¹, B. Oldenburg², G. Turrell³

¹University of Melbourne; Australian Institute for Musculoskeletal Science, St Albans (Melbourne), ²University of Melbourne, Melbourne, ³Queensland University of Technology, Brisbane, Australia

Objective: Perceptions of neighbourhood attributes influence health behaviours, with a subsequent impact on lifestyle related diseases. We investigated, using multilevel analyses, the role played by these perceptions in the association between social disadvantage and arthritis.

Methods: We used survey data from 9914 population-based adults (40-65 yrs) recruited from 200 neighbourhoods in Brisbane, Australia (54.6% women). Perceptions of the neighbourhood were measured using the Neighbourhood Environment Walkability Scale. Principal Components Analysis was used to develop six Walkability Scales to measure perceptions of crime/safety, physical surroundings, streets/footpaths, traffic volume, incivilities, and neighbourliness. Neighbourhood disadvantage was measured using a census-based composite index, and individual disadvantage measured by self-reported education, household income, and occupation. Arthritis was self-reported. Data were analysed using cross-sectional multilevel modelling.

Results: The overall rate of arthritis was 23%, with a higher proportion in the most vs. least disadvantaged quintile (32% vs. 18%). Independent of sex, age, and individual- and household-level socioeconomic variables, individuals from the most disadvantaged neighbourhoods were 42% (OR 1.42, 95%CI 1.19-1.69) more likely to report arthritis compared to individuals in the least disadvantaged neighbourhoods. Across all quintiles of disadvantage, the largest reductions in OR were observed after adjustment for crime and safety, with reductions in OR also observed after adjusting for physical surroundings, traffic volume and incivilities.

Conclusion: Self-reported arthritis was greater in disadvantaged neighbourhoods, independent of individual disadvantage. While negative perceptions of the neighbourhood may act as a barrier to using the outdoor environment, further work is necessary to elucidate the role that these perceptions play in arthritis.

P423

DISCORDANT INTERPRETATION OF SERIAL BMD MEASUREMENTS BY DXA USING VENDOR'S AND INSTITUTIONAL LEAST SIGNIFICANT CHANGES: SERIOUS IMPACT ON DECISION MAKING

N. Fatima¹, M. Z. Zaman², N. Hameed², S. Salim³, A. Zaman⁴, S. Zaman⁴

¹Dept of Radiology, Aga Khan University, ²Dept of Radiology, Aga Khan University Hospital, ³Dept of Radiology, Aga Khan University Hospital, ⁴Dow Medical College, Dow University of Health Sciences (DUHS), Karachi, Pakistan

Objective: BMD is measured serially to ascertain disease progress and treatment response evaluation. A meaningful change should be equal or higher than institutional least significant change (LSC). However, it is not uncommon that some facilities use vendor's LSC which is discouraged by ISCD. Aim of this study was to find impact of scan interpretation upon interval BMD changes using vendor's and institutional LSCs.

Method: This prospective study was conducted at a Joint Commission International (JCI) accredited facility of Pakistan from April-June 2017 using Hologic Discovery-A. As per ISCD recommendations, precision error and LSC of two technologists were measured. Due to higher precision error, Technologist-B was sent for retraining and LSC of Technologist-A was used as institutional LSC. Serial BMD changes like deterioration or improvement interpreted based on vendor's and institutional LSCs were compared.

Results: Serial BMD changes in DXA studies of 102 patients were included, having a mean age, male:female ratio and mean BMI of 63 years, 94%:06% and 29.274 kg/m², respectively. Mean menopausal age was 47 years and mean duration between DXA studies was 03 years. BMD changes over hip were found significant in 55% and 53% cases against vendor's and institutional LSCs respectively (nonsignificant discordance in 02% cases). BMD changes using vendor's and institutional LSCs were found significant over L1-4 spine (62% vs. 46%; discordance: 14%) and distal forearm (77% vs. 35%; discordance: 41%), respectively. Interpretations based on vendor's LSCs revealed significantly overestimated deterioration over forearm and improvement over L1-4 spine BMD values.

Conclusion: We conclude that vendor's provided LSC for interpretation of serial DXA is misleading and has significant negative impact upon patients' management. Every DXA facility must use its own LSC as per ISCD guidelines. Furthermore, ISCD must consider publishing cutoff values for precision error and LSC for distal forearm measurement.

P424

ULTRASOUND FINDINGS IN PATIENTS WITH KNEE OSTEOARTHRITIS AND THEIR CORRELATION WITH PAIN

P. D. Rath¹, S. Bhasin¹, S. Pandey¹, S. Shrivastava¹

¹Max Super Specialty Hospital, New Delhi, India

Objective: To assess ultrasound findings in patients with knee osteoarthritis and to see any correlation of USG findings with pain.

Methods: This was a single centre cross sectional observational study. All Patients presenting between Feb 2017 - March 2017 and satisfying the ACR clinical criteria for osteoarthritis of knees were taken. Osteoarthritis secondary to any inflammatory disease/trauma were excluded. Pain was assessed in each knee using a numerical rating scale (NRS) from 0 to 10. USG was done using Alpinion E CUBE i7 machine with a high frequency (12 MHz) linear probe. Affected knees were scanned using standard protocols in Ant Longitudinal, transverse for assessment of joint space and cartilage, medial and lateral scans for detection of osteophytes, meniscal protrusion, and posterior scans for baker's cyst. All findings in USG were defined as per OMERACT defining criteria. Statistical analysis: A composite US inflammatory score was calculated by allocating one point for each of the inflammatory components (effusion, synovial hypertrophy and infrapatellar bursitis), resulting in a score ranging from 0 to 3. Regression analyses were performed with NRS pain as dependent

variables and composite US inflammation score as an independent variable.

Results: 9 patients and 17 knees were examined. Correlation of pain with ultrasound findings: no statistically significant correlation of any ultrasound findings was found in correlation to pain using a univariate regression analysis.

Table 1. Baseline demographics

No of patients	9	
No of knees examined	17	
Age	Mean: 65.7 years	
Sex	Male 3 (33.3%)	Female 6 (66.6%)
Disease duration	Mean: 6 years	
NSAIDS n%	8 (88.8%)	
NRS pain	Mean: 6.5	
BMI	Mean: 29.57	

Table 2. Ultrasound findings

Cartilage loss	17 (100%)
Cartilage loss grade	Mean: 3
Osteophytes	16 (94%)
Synovitis	13 (76%)
Bakers cyst	6 (35%)
Infrapatellar bursitis	2 (11%)
Meniscal protrusion	14 (82%)

Conclusion: Ultrasound can assess many soft tissue pathologies, which cannot be seen on conventional radiography, however the importance of these soft tissue pathologies are uncertain and remain to be determined. In our study we could not find any significant correlation between pain and several ultrasound findings.

P425

EFFECTIVENESS OF 1-YEAR CALCIFEDIOL TREATMENT ON MUSCLE MASS, STRENGTH AND PERFORMANCE IN POSTMENOPAUSAL WOMEN: A PROSPECTIVE COHORT STUDY

A. Moretti¹, A. De Sire¹, S. Liguori¹, G. Iolascon¹

¹Department of Medical and Surgical Specialties and Dentistry, University of Campania "Luigi Vanvitelli", Naples, Italy

Objective: To date, there is still no clear agreement about the appropriate vitamin D status in order to obtain an optimal effect in terms of muscle performance in individuals with bone fragility. Calcifediol demonstrated to be immediately effective in improving lower extremity function along with the correction of vitamin D deficiency [1]. The objective of this study is to investigate the effectiveness of calcifediol on muscle mass and function and its role in prevention of falls in postmenopausal women.

Methods: In this cohort study we included women over 55 with a diagnosis of osteoporosis, osteopenia or vitamin D deficiency [serum 25 (OH)D₃<30 ng/ml]. All participants received calcifediol (20 µg/d) for 12 months. We assessed at baseline, after 6 months, and after 1 year the following parameters: sun exposure, levels of physical activity, alcohol and smoking habits, comorbidity burden, serum 25(OH)D₃, calcium and PTH, muscle mass (appendicular lean mass, ALM, by DXA), handgrip strength, the short physical performance battery (SPPB), and the percentage of fallers during treatment. Moreover, we calculated the number of patients with a ALM/BMI ratio<0.512, handgrip strength<16 kg and 4-m gait speed<0.8 m/s [2].

Results: 113 women were enrolled, with a mean age of 66±8.4 years, and a mean BMI of 25.3±4.1 kg/m². After 12 months, no statistically significant variations in both mean ALM and percentage of sarcopenic patients, according to ALM/BMI cutoff, occurred at 1-year. On the other hand, statistically significant reduction in the percentage of patients with impaired muscle strength (54.9% vs. 33.6%, 0.001) and of those with reduced walking speeds (64.6 vs. 25.7%, <0.001) were reported. At 1-year, a statistically significant decrease of the percentage of fallers (23.9 vs. 13.3%, p<0.040) was reported.

Conclusions: Our findings suggest that calcifediol is effective in improving muscle strength and performance along with a reduction in percentage of fallers after one year of treatment in postmenopausal women. Presumably, the stable increase of serum 25(OH)D₃ might have relevant clinical implications that result in better physical performance thus enhancing the prevention of falls.

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P426

A 24 MONTHS, PROSPECTIVE, RANDOMISED, DOUBLE-BLIND STUDY TO ASSESS THE EFFECT OF DAILY ORAL ADMINISTRATION OF 2 G OF STRONTIUM RANELATE VS. PLACEBO ON BMD IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN PREVIOUSLY TREATED WITH BISPHOSPHONATES

D. Felsenberg¹, R. Chapurlat², R. Rizzoli³, J.-Y. Reginster⁴, P. Belissa-Mathiot⁵

¹Charité, Campus Benjamin Franklin, Klinik und Poliklinik für Radiologie und Nuklearmedizin, Zentrum für Muskel- und Knochenforschung, Berlin, Germany, ²INSERM UMR 1033, Université de Lyon, Hôpital Edouard Herriot, Lyon, France, ³Division of Bone Diseases, Department of Internal Medicine Specialties, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland, ⁴University of Liège, Liège, Belgium, ⁵Institut de Recherches Internationales Servier, Suresnes, France

Objectives: The primary objective was to demonstrate the effect of daily oral administration of 2 g of strontium ranelate (SrRan) vs. placebo over 24 months of treatment on the lumbar areal BMD in postmenopausal women with osteoporosis previously treated with bisphosphonates.

Methods: This study was an international, multicentre, prospective, randomised, double-blind, parallel-group (SrRan vs. placebo) phase 3 study, over 24 months. Main inclusion criteria were women of at least 50 years of age, postmenopausal for at least 5 years, with osteoporosis and having a high risk for fracture, previously treated with bisphosphonate therapy for at least 30 months. The study had been prematurely stopped due to difficulties in patients' recruitment, leading to a lower number of included patients than planned (83 vs. 160). Therefore, only descriptive statistics were performed.

Results: Demographic and other baseline characteristics were similar in the SrRan and placebo groups, and in line with inclusion criteria. All patients (mean age 70) but one received at least one previous treatment for osteoporosis for a mean duration of 6 years, mostly bisphosphonates. The mean baseline lumbar L1-L4 BMD was 0.829±0.098 g/cm², and the mean T-score was -2.93±0.82. The study lasted on average for one year, with a maximum of about 2 years. No relevant difference in lumbar spine BMD between the SrRan and placebo group was observed at each 6-month visit. The lumbar spine BMD (g/cm²) was in the SrRan group: 0.860±0.098 g/cm² at 12 months (n=22 patients) and 0.877±0.094 g/cm² at 24 months (n=6 patients) vs. in the placebo group: 0.863±0.085 g/cm² at 12 months (n=21 patients) and 0.893±0.018 g/cm² at 24 months (n=3 patients). Safety results were in accordance with the SrRan European SmPc. As regards the important identified risks of SrRan, there was one case of pulmonary embolism, not considered as treatment-related by the investigator, leading to treatment withdrawal, that resolved.

Conclusion: No relevant difference in lumbar spine L1-L4 BMD was observed after 2 years of treatment with SrRan in comparison with placebo.

However, no conclusion can be drawn regarding the low number of patients having completed the study, due to the premature study discontinuation.

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EE JOINT REPLACEMENT IN PATIENTS WITH KNEE OSTEOARTHRITIS: A LONG TERM FOLLOW-UP STUDY IN PATIENTS OF THE CL3-12911-018 STUDY

C. Cooper¹, J.-Y. Reginster², P. Belissa-Mathiot³

¹University of Southampton, Southampton General Hospital, Southampton, UK, ²University of Liège, Liège, Belgium, ³Institut de Recherches Internationales Servier, Suresnes, France

Objectives: To collect data on knee joint replacement procedures or procedures practiced in the knee (arthroscopy, osteotomy or other) over 5 years in patients with knee osteoarthritis having participated in the CL3-12911-018 study and having received at least one year of CL3-12911-018 study treatment (strontium ranelate (SrRan) 1 g/2 g or placebo).

Methods: The study was an international, multicentre, follow-up study planned over 5-year, conducted in patients with a primary knee osteoarthritis having participated in the previous CL3-12911-018 study (1), and having received at least one year of treatment (SrRan 1 g/2 g or placebo). Results of the CL3-12911-018 study showed that SrRan compared with placebo was associated with smaller degradations in joint space width (2). As no study drug was tested in the present study, patients were analysed according the treatment received during the CL3-12911-018 study. The study was prematurely ended following the Sponsor decision, for strategic reason, leading to a maximum study follow-up of 2 years. Therefore, only descriptive statistics were provided.

Results: Of the 1206 patients included in the CL3-12911-018 study, 878 could have participated in the present study (SrRan 1 g: 288 patients, SrRan 2 g: 296 patients, placebo group: 294 patients). Most of the patients (96.5%) reached 2 years of follow-up. Demographic and other baseline characteristics did not show any relevant between-group differences. Patients, including mostly women (70%), were in average 68 years, and 18% were receiving a treatment for osteoporosis. At the end of the study, a knee joint replacement was reported with similar frequency in the groups (SrRan 1 g: 9.0%, SrRan 2 g: 10.8%, placebo: 9.2%). No relevant between-group difference in weight (the only safety parameter assessed) was observed at the end of the study.

Conclusion: Following the Sponsor decision, the study was prematurely discontinued, leading to a maximum study follow-up of 2 years. During the study, the knee joint replacement was performed with similar frequency whatever the treatment previously received for at least 1-year (SrRan 1g, 2g, or placebo) during the CL3-12911-018 study. However, results should be interpreted with caution as results over the longer initially planned follow-up could not be available.

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P428

TREATMENT OUTCOMES AFTER TERIPARATIDE USE IN GREECE: COUNTRY SUBANALYSIS OF THE EFOS AND EXFOS COMBINED OBSERVATIONAL STUDIES

K. Aloumanis¹, V. Drossinos¹, J. Hondrelis¹, D. Disch²

¹Department of Medical Research, Pharmaserve Lilly Saci, Athens, Greece, ²Eli Lilly and Company (retired), Indianapolis, USA

Objectives: A combined analysis of four observational studies of teriparatide (TPTD) showed that during treatment, nonvertebral, clinical vertebral, and all clinical fracture rates were significantly reduced after the first six months of therapy [Osteoporos Int (2017) (Suppl1): OC36]. The present report replicates that analyses for the patients from Greece who were included in two European studies (EFOS and ExFOS) and extends it to include 18 months post-TPTD treatment follow-up.

Methods: EFOS included women, and ExFOS included both women and men with osteoporosis receiving teriparatide 20 µg/d SQ for 18 to 24 months as prescribed during real-world practice. Results for both studies have been previously reported. Here we assessed non-vertebral (NVF), clinical vertebral (CVF), and clinical fracture (CF) rates in the Greek patients only. We compared the TPTD treatment period 0-6 months (0-6 mo), a period during which NVF rates were similar for placebo and TPTD in phase 3 trials, as a reference vs. 6-months to end of dosing (6 mo-EoD) or study (6 mo-EoS). We use a piecewise exponential model for the first occurrence of each fracture type for each patient. Rates are reported as fractures per 100 patient-years; significance is $p \leq 0.05$, two-sided.

Results: The 735 Greek patients were 95.4% female, mean age of 69.8 yrs, mean time on TPTD treatment of 1.62 yrs, and mean time participation in the studies of 3.23 yrs. During therapy, observed rates for 0-6 mo and 6 mo-EoS for NVF were 2.57 and 1.10 ($p=0.071$), for CVF were 1.42 and 0.84 ($p=0.371$), and for CF were 4.01 and 1.97 ($p=0.052$), respectively. During the entire participation on the studies, including post-TPTD follow-up during which time patients may have been on other drugs, observed rates for 0-6 mo and 6 mo-EoS for NVF were 2.49 and 0.87 ($p=0.011$), for CVF were 1.38 and 0.66 ($p=0.158$), and for CF were 3.89 and 1.50 ($p=0.004$), respectively.

Conclusions: In pooled analysis of 735 Greek patients from two European observational studies, both NVF and all CF rates decreased significantly during the period from 6 months to end of participation in the studies relative to the reference first 6 months of therapy. Results need to be considered in the context of observational studies.

P429

A WINDOW OF OPPORTUNITY: IDENTIFICATION OF MEDICALLY HOSPITALIZED PATIENTS WITH FRAGILITY FRACTURE RISK

S. Merwin¹, G. Lopez Vega¹, B. Tauberg¹, V. Tabatabaie¹, W. Horn¹, B. Mikhail¹, P. Levin¹

¹Montefiore Medical Center, New York, USA

Objective: Despite increasing prevalence, osteoporosis is widely undiagnosed and undermanaged with fragility fracture risk (FFR) underdocumented. 90% of fragility fractures (FF) occur in people >60 years. Fracture Risk Assessment Tool (FRAX) is a validated instrument to predict FFR in ensuing 10 years. Our aim was to increase FFR awareness in providers. Inpatient admission offers an opportunity to intervene with human alert methodology previously demonstrated as effective. We hypothesized increased surveillance, documentation and referral to outpatient services to prevent FF in at-risk patients identified as a result of the intervention.

Methods: IRB-approved educational intervention via alerts to providers of at-risk patients identified by concurrent chart review on medical units at urban tertiary care teaching. Study instruments were FRAX calculator and script for provider encounters. Patient inclusion: females ≥ 65 years, males ≥ 70 years, and known osteoporosis risk factors. Exclusion: age <18 or >100 years, current consult with endocrine service, admission to orthopaedic or palliative service, predicted survival <6 months, current/previous antiresorptive or anabolic agents. Primary outcome measure was FFR documentation or initiation of treatment.

Results: Pre-intervention review of charts revealed 0% documentation for FFR. During the initial 8 weeks, 36 of 118 screened charts met inclusion criteria: mean age $85 \pm SD$ 6.5 years, female 53% (N=19), most prevalent admitting diagnosis was pneumonia

(16%). Mean FRAX:13% (major osteoporotic fracture -MOF), 6.5% (hip fracture -HF). Eight patients (22%) had FFR documentation on discharge summary: mean age $85 \pm \text{SD } 6.7$ years, mean FRAX: 17.1% (MOF), 8.4% (HF).

Conclusion: To our knowledge and confirmed by preliminary data, documentation of FFR of medically hospitalized patients is uncommon. With our intervention we have verified an increase in documentation as hypothesized, suggesting that medical providers recognize the importance of enhanced prevention measures to offset the risk of fragility fractures. This study lays groundwork to consider integration of a systems-based approach using electronic alerts to complement human alert methodology to enhance communication and support continuity across transitions of care.

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OSTEOPOROTIC FRACTURES IN A TERTIARY TRAUMA CENTER (IOT-HC-FMUSP)

G. Ocampos¹, M. Shu¹, A. Canhos¹, P. Plapler¹, O. Camargo¹, M. Rezende¹

¹Medical School, University of Sao Paulo, Institute of Orthopedics and Traumatology, Hospital das Clinicas HCFMUSP, São Paulo, Brazil

Objective: To evaluate the profile of patients with osteoporotic fractures treated at tertiary hospital. **Methods:** Seventy patients with osteoporotic fractures (OF) were compared to 50 outpatient followed with multiple osteoarthritis (OA) using questionnaires.

Results: The group OF were older ($p < 0.001$), had lower weight ($p = 0.003$), lower BMI ($p = 0.006$), higher rate of Caucasians ($p = 0.011$), previous falls, previous fractures, ancient fractures (> 1 year), fall in the last 12 months, fracture due to fall and need more assistance ($p < 0.05$); lower Lawton & Brody IADL (instrumental activities of daily living, $p < 0.05$), and reported less lower limb deficiency, foot pathology, muscle weakness, hypothyroidism, and vitamin D intake than patients in the OA group. White race and previous falls and fractures increase the risk of osteoporotic fractures by 10.5, 11.4 and 4.1 times, respectively. The fracture chance reduced 29% with each increase of one unit Lawton & Brody IADL. Married status fracture less than other marital status.

Conclusion: Jointly, ethnicity, marital status, previous falls; pathologies in the feet, previous fractures and IADL are important factors on the profile of these patients with osteoporotic fractures.

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PREVALENCE OF OSTEOARTHRITIS (OA) OF DORSAL AND LUMBAR SPINE MEXICAN POPULATION OVER 50 YEARS, EVALUATED RADIOGRAPHICALLY BY THE LANE INDEX

T. Flores¹, P. Clark², C. Garcia³, E. Denova²

¹Clinical Epidemiology Research Unit, Hospital Infantil de México Federico Gómez, ²1. Clinical Epidemiology Research Unit, Hospital Infantil de México Federico Gómez, 2. Faculty of Medicine, Universidad Nacional Autónoma de México (UNAM), ³Radiology, General Hospital of Mexico, Mexico City, Mexico

Objective: To determine the prevalence of radiographic osteoarthritis (OA) of lumbar and dorsal spine in a group men and women 50 years and over, using standardized spine X-rays

Methods: Lateral dorsal and lumbar radiographs of 691 selected at random participants from the Latin American Vertebral Osteoporosis Study (LAVOS) were analyzed. These images were taken according to a protocol previously described, with a standardized technique. Using the Lane Criteria, x-rays were evaluated by a radiologist and a general practitioner, trained for this purpose in an independent manner to establish the diagnosis and degree of severity of spinal osteoarthritis. Descriptive statistics were used to evaluate demographic variables, mean and standard deviation for quantitative variables (age, weight, height and BMI), and simple frequencies and percentages for the qualitative variables. The prevalence of OA was evaluated accordingly with the Lane criteria from 0-2 for osteophytes and space narrowing and present or absent for sclerosis. The intra- and interobserver agreement between and within observers was very good ($k = 0.9$).

Results: An overall prevalence of 58.5% was observed however women had a higher rate than men (64.5% vs. 54.5%). The prevalence was not very different between age groups but younger patients have more risk factors added: they smoke more, drink more alcohol and are more obese than older patients.

Conclusions: A prevalence of radiographic OA of 58.5% in the Mexican population was found. This prevalence is lower than similar radiological surveys. Differences might be due to the different criteria used (Lane vs. Kellgren). Additionally, our data suggest that people with worse lifestyles (i.e., smoking, lower calcium ingestion, higher alcohol consumption) have a higher prevalence OA, offsetting the risk assumed by age. Weight is what seems to influence more the prevalence of OA in our population since its frequency is higher in obese participants under 80 years.

Variable	Total	50-59 years	60-69 years	70-79 years	≥ 80 years
Women	39.9%	37.0%	41.6%	41.3%	39.5%
Weight (kg)	66.8 (12.5)	73.1 (12.3)	68.7 (11.6)	65.4 (12.1)	60.4 (10.6)
Size (cm)	154.9 (8.9)	158.3 (8.3)	156.4 (8.1)	153.4 (8.5)	151.8 (9.4)
BMI (kg/m ²)	27.8 (4.5)	29.6 (7.1)	28.0 (4.2)	28.2 (7.2)	27.8 (11.7)
BMI (%)					
Normal	24.9	14.8 (9.3-20.3)	21.3 (15.3-27.4)	26.3 (19.7-32.7)	40.7 (33.2-48.1)
Overweight	47.3	44 (36.7-52.5)	50 (42.6-57.4)	47.5 (40.1-54.9)	43.0 (35.5-50.5)
Obesity	26.8	40.7 (33.1-48.4)	28.6 (21.9-35.4)	26.3 (19.7-32.8)	16.3 (10.7-21.8)
Currently smokes	20.3	34.6 (27.1-41.9)	29.2 (22.4-35.9)	15.6 (10.3-21.0)	21.5 (15.3-27.7)
Smoke but no longer	28.1	19.1 (13.0-25.3)	25.8 (19.3-32.3)	34.6 (27.6-41.7)	31.9 (24.9-39.0)
Never Smoke	51.6	46.3 (38.5-54.1)	44.9 (37.6-52.3)	49.7 (42.3-57.1)	46.5 (38.9-54.0)
Alcohol <5 g	39.8	55.6 (47.8-63.3)	48.3 (40.9-55.7)	36.9 (29.7-44.0)	33.7 (26.6-40.9)
Physical activity ≥ 30 min/d	41.5	48.1 (40.4-55.9)	50.6 (43.1-57.9)	37.4 (30.3-44.5)	30.4 (23.4-37.3)
Calcium intake ≥ 800 mg	21.0	11.7 (6.7-16.7)	24.7 (18.3-31.1)	22.9 (16.7-29.1)	24.4 (19.3-30.9)

References:

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P432

PREVALENCE AND CUMULATIVE INCIDENCE OF MORPHOMETRIC VERTEBRAL FRACTURES IN JAPANESE MEN AND WOMEN: THE RESEARCH ON OSTEOARTHRITIS/OSTEOPOROSIS AGAINST DISABILITY STUDY

C. Horii¹, T. Iidaka², S. Muraki², H. Oka³, H. Hashizume⁴, H. Yamada⁴, M. Yoshida⁴, S. Tanaka¹, N. Yoshimura²

¹Department of Orthopaedic Surgery, Faculty of Medicine, University of Tokyo Hospital, Tokyo, ²Department of Preventive Medicine for Locomotive Organ Disorders, 22nd Century Medical & Research Center, Faculty of Medicine, University of Tokyo, Tokyo, ³Department of Medical Research and Management for Musculoskeletal Pain, 22nd Century Medical & Research Center, Faculty of Medicine, University of Tokyo, Tokyo, ⁴Department of Orthopaedic Surgery, Wakayama Medical University, Wakayama, Japan

Objective: Although vertebral fracture (VF) is a major cause of low back pain and disability in elderly individuals, few epidemiologic studies have been performed in Japan. This study aimed to estimate the prevalence, cumulative incidence, and exacerbation proportion of morphometric VF in Japanese men and women, using a large-scale population-based cohort study entitled Research on Osteoarthritis/Osteoporosis against Disability (ROAD).

Methods: From the third survey of the ROAD study performed in 2012–2013, data from 1544 participants (506 men and 1038 women), aged 19–94 years (mean, 65.6 years), living in mountainous and coastal communities were used. Of these, 1,213 participants (78.6%, 391 men and 822 women) also participated in the fourth survey of the ROAD study 3 years after the third survey. Whole spine X-ray examination was performed for all participants. VF was determined on all vertebrae from T4 to the most caudal vertebra of each participant, using the Genant semiquantitative (SQ) method. Morphometric and severe VFs were defined as SQ $\geq$ 1 and SQ $\geq$ 2, respectively. Exacerbation was determined when at least one vertebra diagnosed as SQ $\geq$ 1 at the third survey was determined to have greater SQ at the fourth survey.

Results: The prevalence of morphometric VF was 25.9% and 19.1% in men and women, respectively, and that of severe VF was 4.7% and 9.1%, respectively. The prevalence of VF was significantly higher in men than in women ($p=0.002$), whereas the prevalence of severe VF was significantly higher in women than in men ($p=0.003$). The prevalence of severe VF increased in an age-dependent manner in both men and women. The cumulative incidence of morphometric VF was 5.6%/year (men, 7.2%, women 4.8%), which was significantly higher in men than in women ($p=0.002$). The exacerbation proportion was 0.77%/year (men, 0.59%/year; women, 0.85%/year), and no significant difference in sex was found.

Conclusions: The prevalence, cumulative incidence, and exacerbation proportion of morphometric VF in Japanese men and women were estimated using whole spine X-ray images.

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ATYPICAL SUBTROCHANTERIC FEMORAL FRACTURE IN A PATIENT WITH FAMILIAL PAGET'S DISEASE OF BONE NOT ON BISPHOSPHONATE THERAPY

G. Trovas¹, T. Themakonidis²

¹Laboratory for Musculoskeletal Research University of Athens, Athens, Greece, ²Private office, Kavala, Greece

We present the case of a 37 years-old woman H=1.65 cm, W=78 kg who diagnosed with Paget's disease involving the left proximal femur and right anonomous bone at the time of a left femur fracture. The patient presented a few hours earlier with progressively worsening left thigh pain becoming unable to ambulate. A radiograph of the left hip showed a complete transverse fracture through pagetic bone which satisfy the definition of atypical femur fracture of ASBMR task force. The bone scintigraphy showed increased uptake of the radioisotope (Tc99m-HDP) in the left femur and right anonomous bone. The laboratory investigation regarding bone metabolism was as follows: SCa=9.4 mg/dl, SPhos=4.4 m/dl, ALP=527 U/L (45-104) PTH=38.4 pg/ml(10-65), 25OHD3=12.9 ng/ml. The woman suffers from Rheumatoid arthritis treated with hydroxychloroquine and small doses of prednisolone (1.25-5 mg) and her mother has also Paget disease. The initial orthopedic management consisted in locking plates which failed two times and the fracture was stabilized in a third operation with intramedullary full-length nails (Fig. 1). In addition she received an infusion with 5 mg zoledronic acid in combination with calcium and vitamin D.



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RELATIONSHIPS BETWEEN THE HYPOTHALAMIC-PITUITARY-ADRENAL AXIS AND BONE MICROARCHITECTURE: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

N. R. Fuggle¹, L. D. Westbury², H. E. Syddall², K. Ward², N. A. Duggal³, J. Lord³, C. Cooper², E. M. Dennison²

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ²MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ³MRC-ARUK Centre for Musculoskeletal Ageing, Institute of Ageing and Inflammation, University of Birmingham, Birmingham, UK

Objectives: Circulating cortisol levels increase slightly with age but levels of dehydroepiandrosterone sulphate (DHEAS) decline rapidly from the age of 30 years. As cortisol is primarily catabolic and DHEAS

is converted to the anabolic steroid DHEA, this increase in the cortisol:DHEAS ratio with age may have significant implications for bone health. The objective of this study was to examine the longitudinal associations between morning cortisol and DHEAS, in relation to bone microarchitecture outcomes in a population-based UK cohort of older adults.

Methods: Analyses were based on a sample of 339 community-dwelling older persons (aged 59–70 years at baseline) from the Hertfordshire Cohort Study. At baseline, serum cortisol and DHEAS levels were measured by ELISA (IBL international, Hamburg, Germany). HR-pQCT imaging of the radius and tibia (XtremeCT, voxel size 82 μm) was performed at follow-up (median follow-up time: 11.6 years [IQR 11.0–12.4]). Gender-adjusted linear regression was used to examine the relationships between cortisol, DHEAS and cortisol:DHEAS ratio, in relation to bone microarchitecture outcomes, with and without adjustment for anthropometric and lifestyle factors.

Results: Higher cortisol was associated with higher radial cortical porosity and pore volume in fully-adjusted analyses only ($p < 0.03$). Higher DHEAS was associated with higher tibial cortical BMD and trabecular thickness, and lower tibial total and trabecular area in gender-adjusted analyses ($p < 0.04$); the association regarding trabecular thickness remained significant in fully-adjusted analyses. In gender- and fully-adjusted analyses, higher values of the cortisol:DHEAS ratios were associated ($p < 0.04$) with lower values of the following tibial parameters: cortical BMD, total volumetric BMD and trabecular thickness.

Conclusions: Our work identifies the HPA axis as a contributor to bone microarchitecture and musculoskeletal phenotype and suggests a particular role for DHEAS. These findings build on previous work performed using DXA and further dissect the relationship between the HPA axis and bone parameters. This may have future therapeutic implications, however, further research is required to investigate these associations.

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METABOLIC SYNDROME AND TRAJECTORIES OF KNEE PAIN

F. Pan¹, J. Tian¹, F. Cicuttini², G. Jones¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart,

²Monash University Medical School, Melbourne, Australia

Objective: Metabolic syndrome (MetS) has been suggested as having a role in the pathogenesis of osteoarthritis (OA). However, no study has assessed whether MetS and its components are associated with OA pain and its change over time. This study aimed to examine the association of MetS and its components with knee pain trajectories over 10.7 years.

Methods: 985 participants (mean age 63 years) from a population-based cohort had baseline demographic, psychological, lifestyle and comorbidities, blood pressure, glucose, triglycerides, and high-density lipoprotein (HDL) cholesterol. MetS was defined based on National Cholesterol Education Program-Adult Treatment Panel III criteria. Knee radiographic OA (ROA) was assessed by X-ray at baseline. Knee pain was measured by Western Ontario and McMaster Universities Osteoarthritis Index pain questionnaire at each time-point. Group-based trajectory modelling was applied to identify pain trajectory.

Results: Three pain trajectories were identified: ‘Mild pain’ (52%), ‘Moderate pain’ (33%) and ‘Severe pain’ (15%) with 32% of participants having MetS. MetS was significantly associated with increased risk of both ‘Moderate pain’ (relative risk [RR]: 1.47, 95%CI: 1.10 to 1.96) and ‘Severe pain’ (2.22, 1.54 to 3.20) relative to ‘Mild pain’ in univariate analysis. After adjustment for age, sex, smoking, physical activity, emotional problems, comorbidities and ROA, central obesity was associated with increased risk of both ‘Moderate pain’ (1.70, 1.17 to 2.49) and ‘Severe pain’ (3.28, 2.16 to 4.98), but MetS, hypertriglyceridemia and low HDL were only associated with increased risk of ‘Severe pain’.

However, these associations became weak and non-significant after further adjustment for BMI, but hypertension became significantly protective with ‘Moderate pain’ (0.70, 0.50 to 0.99). Similar associations were found in those with knee OA (RR: 1.70 to 2.75, all $P < 0.05$).

Conclusions: The MetS is predominantly associated with knee pain trajectories through central obesity, and hypertriglyceridemia and low HDL can predict ‘Severe pain’ trajectory in those with MetS. An unexpected inverse association between hypertension and moderate pain trajectory needs a further investigation, which may reflect an interaction between blood pressure and pain sensitivity in ‘Moderate pain’ trajectory.

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DETERMINANTS OF TRAJECTORIES OF MULTI-SITE PAIN IN KNEE OSTEOARTHRITIS

F. Pan¹, J. Tian¹, F. Cicuttini², G. Jones¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart,

²Monash University Medical School, Melbourne, Australia

Objective: Pain in osteoarthritis (OA) is very common especially in elderly and commonly occurs at multiple sites. Multi-site pain (MSP) has been shown to be associated with more severe symptoms and worse health-related quality of life compared to single-site pain. Limited evidence exists about understanding the course of MSP and its determinants. The aims of this study were to identify distinct trajectories of MSP over 10.7 years in an older population, and to examine risk factors for identified trajectories.

Methods: 1099 participants (mean age 63 years) from the population-based Tasmanian Older Adult Cohort study were recruited at baseline. 875, 768 and 563 participants attended years 2.6, 5.1 and 10.7 follow-up, respectively. Demographic, psychological, lifestyle and comorbidities data were obtained at baseline. Knee radiographic OA was assessed by X-ray at baseline. Group-based trajectory modelling was applied to identify distinct trajectories of MSP. Multi-nominal logistic regression was used for the analyses with adjustment for potential confounders.

Results: Three distinct MSP trajectories were identified: a group of participants with ‘no MSP’ (11%), a group with ‘fluctuating MSP’ (38%), and a group with ‘persistent MSP’ over time (51%). In multivariable analyses with the ‘no MSP’ trajectory as reference, emotional problems and comorbidity were significantly associated with both ‘fluctuating MSP’ and ‘persistent MSP’ trajectory. In addition, female sex, being obese and radiographic knee OA predicted the trajectory of ‘persistent MSP’ in the whole population. Results were similar with emotional problems (relative risk [RR]: 2.57 for ‘fluctuating MSP’ and 5.70 for ‘persistent MSP’, both $P < 0.05$), being obese (RR: 3.80 for ‘persistent MSP’, $P = 0.007$) and comorbidity (RR: 2.45, $P = 0.010$) in either ‘fluctuating MSP’ or ‘persistent MSP’ trajectory in those with radiographic knee OA. **Conclusions:** MSP trajectories appear stable once established and can be predicted by factors both peripheral and central in origin.

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A BAD BIOLOGICAL ENVIRONMENT INCREASES THE “CUT OUT” RISK IN HIP FRACTURES

B. Limousin¹, E. Fernandez¹, C. Arraiz¹, D. Guzman¹, C. Collado¹

¹Hospital Universitario Infanta Leonor, Madrid, Spain

Objective: The hip fracture is one of the XXI century epidemics. The most common treatment for pertrochanteric hip fractures is the intramedullary nailing, although other types of devices are used also like the nail-plate. The objectives of this work are: to identify the type indecency of screw “cut-out” in our series; analyze the potential mechanical or biological origin; and study the functional significance in those patients.

Method: We analyzed retrospectively a case series of patients with pertrochanteric hip fracture. In our series are 1349 cases treated between 2009 and 2017 in our hospital. We selected cases of complications with

subsequent reoperation grouped by DRGs. We found 21 cases of "cut out" reoperation. We analyzed demographics data, functional parameters (BARTHEL Index), laboratory parameters (Vit. D), radiological parameters (Tip-Apex Distance (TAD) and Parker Ratio (PR)).

Results: With a comparable groups of cases and controls with respect to demographic data. We found a higher rate of BARTHEL in the series of cases (14%). The analytical parameters indicated a clear hypovitaminosis D in patients with peritrochanteric hip fracture, being more marked in our case series. In our cases the radiological parameters analyzed indicated a TAD>25 in 64% and 36% TAD<25. In 100% the screw was in a middle position as PR. The incidence of screw cut-out was 1.55%. We detected a possible mechanical origin in 64% of cases and biological in the remaining 36%. We detected a reduction in the functional parameters of 21.78% in the BARTHEL Index.

Conclusion: Even though we have a low incidence of screw cut-out in our series in comparison to the literature, this has not less importance. This phenomenon has a significant impact on the functional parameters of patients. Two important routes of improvement for reducing the incidence are improve the surgical technique (TAD<25 mm and PR>66%) and improve the biological environment, placing great importance to vitamin D.

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EFFICACY OF DENOSUMAB ON BMD IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

M. Tsagareli¹, E. Giorgadze¹, N. Dolidze¹, T. Sulikashvili¹, T. Zerekidze¹, N. Jeiranashvili¹

¹National Institute of Endocrinology, Tbilisi, Georgia

Objective: To assess the effect of Denosumab on BMD in postmenopausal Caucasian women with type 1 diabetes mellitus (T1DM).

Methods: 23 Caucasian women (46-57 years) with T1DM were enrolled in the study. We measured ionized calcium (Ca⁺⁺), 25(OH)D values, lumbar spine (LS) and proximal femur (PF) BMD values were obtained using DXA. Bone density was measured at baseline and after 12 months.

Results: At the baseline the mean value of T-score was (-3.3) SD at LS and (-2.5) at PF. 70% of patients revealed 25(OH)D values <30 ng/ml. All patients received 60 mg denosumab injections + elemental calcium 500-1000 mg/d (calcium carbonate) + Vit D 800-1000 IU/d for 12 months. Denosumab therapy was initiated after achieving 25(OH)D levels >30 ng/ml. After a year of commencing treatment majority of patients (80%) revealed significant increase of BMD with mean value of 4.1% at LS and 3.2% at PF.

Conclusion: Administration of 60 mg denosumab injections every 6 months effectively increases BMD at LS and PF in patients with T1DM.

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BIOFEEDBACK ON THE STABILOMETRIC PLATFORM FOR THE TREATMENT OF CHRONIC BACK PAIN

A. Barulin¹, O. Kurushina¹, A. Drushlyakova¹, B. Kalinchenko¹, A. Puchkov¹, E. Chernovolenko¹, O. Agarcova¹, V. Dumtsev¹

¹Volgograd State Medical University, Volgograd, Russia

Objective: Determine the effectiveness of training on the stabilometric platform with the correction of pain syndromes in the lower back.

Methods: 72 people with pain in the lower back were examined. Age of participants is 27-51 years. The average age is 33.2±8.3 years. The duration of the disease is 8.7±1.1 months. Patients are divided into two groups. The first group: pharmacotherapy+classical physiotherapy. The second group: pharmacotherapy+stabilometric platforms training. The clinical-neurological examination were performed. Severity of pain was assessed by VAS. Stabilometric parameters were studied: the statokinesiogram area, displacement of the center of pressure, the energy spent.

Results: The dynamics of pain according to VAS in the first group showed a lower decrease (from 6.8±0.86 to 5.1±0.87) than in the second group (from 6.7±0.86 to 4.1±0.89). The parameter 'statokinesiogram area': the best dynamics of return to the norm of the second group was 105

±10.2 mm², while in the first only 148±10.4 mm². The parameter 'energy spent' demonstrated the same direction of the changes and made a decrease in the first group of 18.4%, while in the second group it was 29.6%. The degree of displacement of center of pressure in the first group decreased by 13.7%, in the second group by 46.3%.

Conclusions: The use of the biofeedback method on the stabilometric platform for the correction of biomechanical disorders improves the results of treatment of pain syndromes in the lower back and helps to reduce its chronization.

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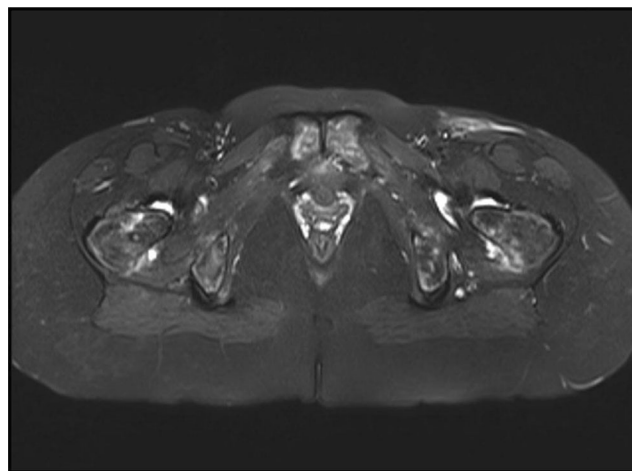
A RARE OSTEONECROSIS CASE WHICH WAS PRESENTED BILATERAL HIP AND PELVIS JOINTS

A. Celik¹, H. Uzkeser¹, B. Seferoglu¹

¹Department of Physical Medicine and Rehabilitation, Erzurum, Turkey

Osteonecrosis is the condition that results in ischemic necrosis of bone and bone marrow, either directly or indirectly through the vessels feeding the bone. It has been reported that high doses of steroid treatment protocols and steroid treatments combined with radiotherapy and chemotherapy increase the risk of osteonecrosis. Some anatomical areas such as hip, knee, shoulder joint, talus, lunatum, scaphoid bones are more susceptible to ischemic necrosis due to its geometry, nutritional characteristics and hemodynamic reasons. The application of advanced chemotherapy protocols in patients with acute lymphoblastic leukemia (ALL) prolongs the survival time but causes some complications in the treatment. Bone pain, particularly affecting the long bones, and caused by leukemic involvement of the periosteum, is a presenting symptom in 21 to 38 percent of cases of acute leukemia. Bone pain also results from osteonecrosis because of malignant cell necrosis in the bone marrow. Osteonecrosis is a relatively common comorbidity in ALL but multiple sites is unusual.

Multifocal osteonecrosis is defined as osteonecrotic lesions affecting three or more separate anatomic sites. Multifocal osteonecrosis is defined as osteonecrotic lesions affecting three or more separate anatomic sites. We report a case of a 29-year-old woman diagnosed with ALL when she presented bilateral hip and pelvic pain. Osteonecrosis may presented various clinical symptoms such as persistent pain for weeks and months, progressive joint damage, limitation of movement, articular collapse and arthritis.



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BIOMECHANICAL DISORDERS IN INDIVIDUALS WITH CHRONIC PELVIC PAIN

A. Barulin¹, O. Kurushina¹, B. Kalinchenko¹, A. Drushlyakova¹, E. Chernovolenko¹, A. Puchkov¹, O. Agarcova¹

¹Volgograd State Medical University, Volgograd, Russia

Objective: The factor of biomechanical disorders of musculoskeletal system (MSS) is involved in the pathogenesis of chronic pelvic pain (CPP). The purpose of this study was to reveal the peculiarities of biomechanical changes in patients with CPP.

Methods: 60 patients were examined (average age was 20-32 years). 30 participants with CPP, 30 participants without any complaints. Exclusion criteria: degenerative, inflammatory and traumatic lesions of the spinal column. Complex of tests: neurological examination, manual muscle test (MMT), original visual optical test (VOT).

Results: MMT in participants with CPP: hypotension of the lumbar ilioc (40%), the gluteus medius (35%), the obturator muscles (22%) and of the adductors muscles of the hip (20%). In participants without CPP: hypotension of the lumbar ilioc (20%), gluteus medius (12%), the obturator muscle (8%) and of the adductors muscles of the hip (2%). VOT: the average deviation for biauricular line was 2.1° ($p < 0.05$) in individuals with CPP and 1.2° ($p < 0.05$) in individuals without CPP, for bicristoiliacal line 3.3° ($p < 0.05$) in individuals with CPP and 1.4° ($p < 0.05$) in individuals without CPP.

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SUBCHONDRAL BONE STRUCTURE AND SEVERE OSTEOARTHRITIS

T. M. Minasov¹

¹University Hospital, Ufa, Russia

Morphological analysis of subchondral bone structure after 34 TKA of both knees had been made. Treatment after first TKA with PHT significantly ($p < 0.05$) changed the subchondral bone and cartilage structure of 28 (82,35%) patients. In osteoarthritis (OA), subchondral bone becomes sclerotic and undergoes structural changes such as the formation of osteophytes and bone cysts. It has been suggested that first tissue-level changes in OA would occur in the subchondral bone before any signs of degeneration in the overlying articular cartilage and thus contribute to the pathogenesis of OA. Increasing evidence of subchondral bone modifications with OA, these changes are generally not assessed until late OA stages with clinical diagnostics and histopathology. Recently, it has been suggested that different OA phenotypes (post-traumatic, metabolic, ageing, genetic, pain) should be considered when studying OA and developing potential treatment or intervention.

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FRAME STUDY: THE FOUNDATION EFFECT OF REBUILDING BONE WITH ONE YEAR OF ROMOSUZUMAB LEADS TO CONTINUED LOWER FRACTURE RISK AFTER TRANSITION TO DENOSUMAB

F. Cosman¹, D. B. Crittenden², S. Ferrari³, A. Khan⁴, N. E. Lane⁵, K. Lippuner⁶, T. Matsumoto⁷, C. E. Milmont⁸, C. Libanati⁹, A. Grauer⁸

¹Helen Hayes Hospital, Columbia University, West Haverstraw, New York, USA, ²Amgen Inc., Thousand Oaks, USA, ³Geneva University Hospital, Geneva, Switzerland, ⁴McMaster University, Hamilton, Ontario, Canada, ⁵UC Davis Medical Center, Sacramento, CA, USA, ⁶Osteoporosis Polyclinic, Inselspital, Bern University Hospital and University of Bern, Bern, Switzerland, ⁷University of Tokushima, Tokushima, Japan, ⁸Amgen Inc., Thousand Oaks, CA, USA, ⁹UCB Pharma, Brussels, Belgium

Objective: In the FRAME study (NCT01575834), romosozumab (Romo) for one year achieved large BMD increases at the lumbar spine (LS) and total hip (TH) vs. placebo (Pbo).¹ BMD differences between groups remained after all subjects transitioned to denosumab (DMAb). Here, we further characterise the BMD gains

with Romo and the effect of Romo on fracture (Fx) risk reduction after transition to DMAB.

Methods: Subjects were randomised to Romo 210 mg QM or Pbo for 12 months. All subjects then received DMAB 60 mg Q6M for a further 12 months. In the current analysis, endpoints were mean change from baseline in BMD T-score, subjects (%) with a BMD gain, and Fx incidence in study year 2.

Results: 7180 subjects participated (Romo, N=3589; Pbo N=3591). At month 12, mean change from baseline in LS BMD T-score was 0.88 for Romo and 0.03 for Pbo. At month 24, after both treatment groups had also received DMAB, mean LS T-score increased by 1.11 for Romo/DMAB and 0.38 for Pbo/DMAB. At month 12, mean TH T-score increases from baseline were 0.32 for Romo and 0.01 for Pbo and at month 24 were 0.45 for Romo/DMAB and 0.17 for Pbo/DMAB. Romo increased LS BMD in 99% of subjects at month 12, and 89% had $\geq 6\%$ gains. Romo/DMAB led to relative-risk reductions in Fx vs. Pbo/DMAB during year 2, when both groups were receiving DMAB (reductions of 81%, vertebral Fx [$p < 0.001$]; 32%, clinical Fx [$p = 0.052$]; 39%, major osteoporotic Fx [$p = 0.034$]).

Conclusions: Romo resulted in substantially higher BMD T-score increases vs. Pbo after 1 year. After transition to DMAB, BMD gains in both groups were similar in year 2. One year of Romo before transition to DMAB resulted in unprecedented gains in BMD and reduced Fx rates during year 2, when subjects in both groups received DMAB. These data support the clinical benefit of rebuilding the skeletal foundation with Romo before transition to DMAB.

Reference: 1. Cosman F et al. N Engl J Med 2016;375:1532

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OSSIFICATION OF POSTERIOR LONGITUDINAL LIGAMENT ASSOCIATED WITH OSTEOPATHIA STRIATA WITH CRANIAL SCLEROSIS

M. Siddiqi¹, S. Graham¹, J. O'Hare¹

¹University Hospital Aintree, Liverpool, UK

Introduction: Ossification of posterior longitudinal ligament (OPLL) is a hyperostotic condition resulting in abnormal calcification of the posterior longitudinal ligament of the spine and presents with varying neurological symptoms [1]. Prevalence rates are higher amongst the Japanese population between 1.9% and 4.5% as compared to 0.12% in Caucasians [1]. Osteopathia striata cranial sclerosis (OSCS) is a rare X-linked dominant condition characterised by linear bony striations affecting the long bones and pelvis in combination with cranial sclerosis. Prevalence is estimated at 1 per 10 million. It displays high phenotypic variability, with lethality in most affected males. Clinical features may include craniofacial dysmorphism, learning difficulties and cardiac malformations [2].

Case presentation: A 35 year old Caucasian woman, with no significant past medical or family history, presented with signs of cervical myelopathy. Computed topography and magnetic resonance imaging scans of the cervical spine demonstrated OPLL at C3-C4 [Fig.1] with evidence of cord impingement. The patient underwent a C3/C4 laminectomy. A skeletal survey showed thickening and increased density in the skull vault and prominent vertical striations in the long bones [Fig.2]. All biochemical parameters were normal including bone turnover markers. Subsequent genetic testing confirmed a diagnosis of OSCS.

Discussion: OSCS is known to be due to mutations in the gene encoding AMER1/ WTX (Wilms' tumor on X chromosome), a repressor for WNT signalling, which plays an anabolic role in bone formation by osteoblasts. Perturbation of this pathway is

involved in other sclerosing bone dysplasias. There is also a relationship between OPLL and the WNT pathway. Presence of bone sclerosis is a prominent feature in OPCS and is in keeping with the evidence that other sclerosing bone phenotypes have been explained by increased WNT signalling causing increased bone formation. Although rare, OPCS carries a high disease burden and has significant genetic implications. It should be considered when investigating cases of OPLL. This is, to our knowledge, the first presented case of an association between OPLL and OPCS.

Fig.1



Fig.2



References:

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SHORT TERM EFFECTS OF BARIATRIC SURGERY ON BALANCE CONTROL AND FALL RISK OF OBESE PATIENTS

H. Fonseca¹, F. Diniz-Sousa², G. Bopp², H. Sousa³, V. Devezas³, J. Preto³, L. Machado⁴, J. P. Vilas-Boas⁴, J. Oliveira²

¹CIAFEL, Faculty of Sport, University of Porto; Department of Surgery, Centro Hospitalar de São João, ²CIAFEL, Faculty of Sport, University of Porto, ³Department of Surgery, Centro Hospitalar de São João, ⁴CIFI2D, Faculty of Sport, University of Porto, Porto, Portugal

Objective: Despite increasing bone mass, obesity also increases fracture risk which may be related to poor balance and more falls. Loss of weight has been shown to improve balance. Our purpose was to determine if as early as 1-month following bariatric surgery (BS) there are improvements in balance and if these are explained by changes in anthropometry, body composition and muscle strength.

Methods: Thirty-one obese (111.9 ± 10.7 kg; $\text{BMI} = 44.8 \pm 4.8$ kg/m²) sedentary adults (42 ± 10.7 years; female=24) without orthopedic or neurologic disabilities were recruited. Subjects were tested 1 to 3 months before and 1 month following BS (RYGB or sleeve gastrectomy) for anthropometry (weight, height, waist and hip perimeter), body composition by DXA (lean, fat mass) knee extension and flexion strength assayed by isokinetic dynamometer (concentric peak torque; 60°/s

angular velocity) and postural stability by standing 30 s barefoot on a force platform (center of foot pressure (CoP) area, distance and velocity) along the anteroposterior (AP) and mediolateral (ML) axes with and without vision. Variation was determined as percentage of change from pre- to post-surgery.

Results: One month after BS patients lost on average 12.2 ± 4.2 kg of weight, $19.6 \pm 5.0\%$ of excess body weight, 5.0 ± 2.9 kg of fat mass, 5.7 ± 2.5 kg of lean mass, 8.1 ± 4.4 cm of waist perimeter and 7.2 ± 2.7 cm of hip perimeter. Knee extension strength decreased on average by $6.5 \pm 13.7\%$ ($p < 0.005$) and flexion by $9.3 \pm 23.6\%$ (NS) but there was a nonsignificant trend for strength relative to body weight and to lean mass to increase. CoP distance and velocity in the AP but not in the ML axes were significantly improved with ($-8.3 \pm 17.9\%$ for distance and velocity) and without vision ($-11.1 \pm 17.2\%$ for distance and velocity). Regarding the variation of postural stability, a significant inverse correlation was identified only between the variation of lean mass in the lower limbs and the total ($R = -0.333$, $p = 0.047$) and along the AP axis ($R = -0.399$, $p = 0.013$) variation of CoP distance and between the total ($R = -0.333$, $p = 0.047$) and along the AP axis ($R = -0.399$, $p = 0.013$) variation of CoP velocity without vision.

Conclusions: As soon as 1 month following BS there are improvements in balance control but these may be hindered by losses in lower limbs lean mass.

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CORRELATION BETWEEN TRABECULAR BONE SCORE, CLINICAL RISK FACTORS AND FRACTURES IN POSTMENOPAUSAL SERBIAN WOMEN

J. Aleksic¹, J. Zvekic Svorcan², J. Elez³, F. Gojkovic¹

¹Railway Healthcare Institute, Department of Physical Medicine and Rehabilitation, Belgrade, ²University of Novi Sad, Medical Faculty of Novi Sad, Special Hospital for Rheumatic Diseases, Novi Sad, ³Railway Healthcare Institute, Department of Internal Medicine, Belgrade, Serbia

Objective: Osteoporosis is a disease characterized by low BMD and impaired microarchitecture of bone tissue, leading to increased bone fragility and a consequent increase in fracture risk. Conceptual description of the disease puts into focus two important characteristics of bone: BMD and quality, especially bone microarchitecture. Our aim was to investigate the correlation between trabecular bone score (TBS), clinical risk factors and fractures.

Methods: Cross-sectional study was conducted in Railway Healthcare Institute, Belgrade, in period Jan 1 - Oct 31, 2016. 330 postmenopausal women, aged 45-86 years, were included. Study included only those who were first time on BMD testing and never had treatment therapy for osteoporosis before. BMD was measured on Hologic Discovery C device, on lumbar spine and hip region. The vertebral fracture assessment was performed, and Th4-L4 region was analysed in aim to detect vertebral fractures on the same device. The lumbar spine scans were reanalysed in TBS iNsight[®] software (V1.9.2, Med-Imaps, France) and TBS was calculated. All the participants were previously tested using an epidemiological questionnaire.

Results: In relation to the existence of a small trauma fracture, the subjects are divided into two groups: with no previous fracture 161 (48.7%) and group with fracture 169 (51.3%). Postmenopausal women with fractures have a higher percentage of osteoporosis measured on the lumbar spine (48.3% vs. 32.1%; $\chi^2 = 4.753$, $\text{df} = 2$, $p = 0.08$) according to DXA findings and totally degraded microarchitecture than women without fractures (83.6% vs. 47.2%; $\chi^2 = 40.10$, $\text{df} = 2$, $p = 0.00$). TBS is lower in smokers ($F = 11.9$; $p = 0.00$), women with low BMI ($F = 4.55$; $p = 0.03$), with low level of physical activity ($F = 19.74$; $p = 0.00$), and in those with presence

of one or more chronic diseases ($F=29.39$; $p=0.00$). There is a statistically significant positive correlation between presence of at least one chronic disease and TBS ($r=0.333$, $p=0.00$). This correlations is of medium intensity.

Conclusion: TBS is a useful adjunct in the evaluation of fracture risk. Combining the normal and osteopenic BMD values with the lowest range of TBS and clinical risk factors can help in defining a significant subset of non-osteoporotic women at higher risk of fracture which is useful in clinical practice and patient management.

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GRANULOMATOSIS WITH POLYANGITIS WITH SKIN BIOPSY SHOWING LEUKOCYTOCLASTIC VASCULITIS AND 'FULL HOUSE' IMMUNOFLORESCENCE: CASE SERIES

H. Alam¹, L. Nazir¹, T. Perveen Umer¹

¹Liaquat National Hospital, Karachi, Pakistan

Granulomatosis with polyangiitis (GPA), is a rare multisystem autoimmune disease of unknown etiology. GPA is a rare disease with an undetermined incidence. Its hallmark features include necrotizing granulomatous inflammation and pauci-immune vasculitis in small and medium-sized blood vessels in the lungs, nose, sinuses, and kidneys, although other organs can be involved. Vasculitis causes scarring and tissue death in the vessels and impedes blood flow to tissues and organs. The c-ANCA/PR3 antibody test is a helpful diagnostic tool that is used most effectively when patients are thought to possibly have GPA. The diagnosis of GPA is generally confirmed with tissue biopsy from a site of active disease. We present this case series of two patients who presented, were diagnosed and treated as GPA, both having negative lupus workup and positive c-ANCA/PR3 antibodies. They had active skin lesions which were biopsied and showed leukocytoclastic vasculitis with "full-house" immunofluorescence which is a rare entity for GPA.

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BODY COMPOSITION IS A BETTER PREDICTOR OF STATIC BALANCE IN OBESE PATIENTS THAN LOWER LIMBS MUSCLE STRENGTH

H. Fonseca¹, F. Diniz-Sousa², G. Bopp², V. Devezas³, L. Machado⁴, J. P. Vilas-Boas⁴, J. Preto³, H. Sousa³, J. Oliveira²

¹CIAFEL, Faculty of Sport, University of Porto; Department of Surgery, Centro Hospitalar de São João, ²CIAFEL, Faculty of Sport, University of Porto, ³Department of Surgery, Centro Hospitalar de São João, ⁴CIFI2D, Faculty of Sport, University of Porto, Porto, Portugal

Objective: Obese subjects have a higher fall risk due to poor balance, but the causes for this remain elusive. Our purpose was to determine in what way balance in obese subjects is influenced by body composition, anthropometry and muscle strength.

Methods: Obese subjects ($n=72$; 114.1 ± 15.9 kg; $BMI=44.7\pm5.0$ kg/m²; age= 43.8 ± 9.8 years; women= 59 , men= 13) without orthopedic or neurologic disabilities were recruited. Anthropometric measures collected were: weight, height, abdominal and waist perimeter. Body composition was assessed by DXA. Quadriceps and hamstrings strength (peak torque corrected for the gravity effect) were determined by isokinetic dynamometer during maximal concentric knee extension and flexion, respectively, at 60°/s angular velocity and between 0°- 90° range. Static balance (center of pressure total length; CoP length) was determined while subject stood for 30 s barefoot on a force-plate. Trials were performed with and without vision.

Results: With-vision conditions, CoP length was 26.86 ± 11.77 cm (median $\pm$ IQR) and correlated with abdominal perimeter ($r=0.311$, $p<0.01$), trunk mass ($r=0.338$, $p<0.01$) and trunk fat mass ($r=0.307$; $p<0.01$), but not with trunk or lower limbs lean mass. In no-vision conditions, median CoP length was 38.32 ± 17.97 and correlated with abdominal perimeter ($r=0.269$, $p<0.05$) and trunk mass ($r=0.233$, $p<0.05$). In vision conditions, regression analysis showed that neither strength, anthropometric measures or lower limbs body composition predict CoP length while whole body lean mass and trunk lean mass together explained 14.4% of CoP length ($r^2=0.144$; $F=5.817$; $p<0.01$) and whole body fat mass and trunk fat mass together explained 12.2% of CoP length ($r^2=0.122$; $F=4.790$; $p<0.05$). In without vision conditions, anthropometric measures ($R^2=0.044$, $p=0.076$), whole body ($R^2=0.077$; $p=0.141$) and upper body fat mass ($R^2=0.077$; $p=0.141$), legs lean mass ($R^2=0.005$; $p=0.549$) and muscle strength ($R^2=0.006$; $p=0.803$) were not able to predict CoP length while whole body and upper body lean mass explained 19% of CoP length variation ($R^2=0.192$; $p<0.01$).

Conclusions: In obese subjects, body composition, particularly lean mass, is a better predictor of balance than anthropometry or lower limbs muscle strength, explaining however no >20% of CoP length variance.

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RELATIONSHIP BETWEEN MUSCLE STRENGTH AND BMD IN PATIENTS WITH OBESITY CLASS II AND III

H. Fonseca¹, F. Diniz-Sousa², G. Bopp², V. Devezas³, J. Preto³, H. Sousa³, L. Machado⁴, J. P. Vilas-Boas⁴, J. Oliveira²

¹CIAFEL, Faculty of Sport, University of Porto; Department of Surgery, Centro Hospitalar de São João, ²CIAFEL, Faculty of Sport, University of Porto, ³Department of Surgery, Centro Hospitalar de São João, ⁴CIFI2D, Faculty of Sport, University of Porto, Porto, Portugal

Purpose: Muscle contraction increases bone formation by direct mechanical stimulation. Obese subjects have a higher risk of fracture despite having higher lean mass, which may be attributable to a worse muscle function. Our purpose was to clarify the relationship between BMD and muscle strength in patients with different degrees of obesity.

Methods: Eighty-six obese subjects were recruited and divided according to their BMI: class II ($n=18$, 13 female; 38.0 ± 1.3 kg/m²; 42.9 ± 11.0 years), class IIIa ($n=56$, 44 female; 44.7 ± 2.7 kg/m²; 44.2 ± 9.0 years) and class IIIb ($n=12$, 10 female; 54.8 ± 4.9 kg/m²; 42.2 ± 10.1 years). BMD (lumbar spine, femoral neck and total hip), lean and fat mass were measured by DXA. Quadriceps (knee extension peak torque (PT)) and hamstrings (knee flexion PT) strength were measured by maximal concentric contraction with an isokinetic dynamometer (60°/s; between 0°-90°). Peak torque was analyzed both as absolute and relative to body weight and lean mass.

Results: Subjects with higher BMI tended to have a higher BMD at the femoral neck (class II= 0.840 ± 0.100 g.cm-2; class IIIa= 0.907 ± 0.124 g.cm-2; class IIIb= 0.981 ± 0.096 g.cm-2; $p=0.002$) and total hip (class II= 0.972 ± 0.124 g.cm-2; class IIIa= 1.043 ± 0.100 g.cm-2; class IIIb= 1.117 ± 0.081 g.cm-2; $p=0.002$) but not at the lumbar spine (class II= 1.032 ± 0.117 g.cm-2; class IIIa= 1.049 ± 0.120 g.cm-2; class IIIb= 1.101 ± 0.086 g.cm-2; $p=0.288$). Despite no significant differences in absolute strength between BMI classes, when relativized to lean or whole body mass, strength tended to be lower in subjects with higher

BMI. In BMI class II, femoral neck BMD correlated with both extension PT ($r=0.498$, $p=0.035$) and flexion PT ($r=0.561$, $p=0.015$). In BMI class IIIa, femoral neck BMD correlated with extension PT ($r=0.304$, $p=0.024$) and flexion PT ($r=0.318$, $p=0.018$) and lumbar spine BMD correlated with extension PT ($r=0.284$, $p=0.034$) and flexion PT ($r=0.294$, $p=0.028$). In subjects with BMI class IIIb no significant correlation was identified between muscle strength and BMD.

Conclusion: The correlation between muscle strength and BMD varies according to BMI degrees. For increasingly higher BMIs, muscle strength tends to correlate less with BMD.

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ANISOTROPIC PROPERTIES OF BONE TISSUE CHANGING DURING UNLOADING HANGING

O. V. Gerasimov¹, E. V. Koroleva¹, O. A. Sachenkov², T. V. Baltina¹, N. F. Ahmetov¹, A. O. Fedyanin¹, M. E. Baltin¹, I. A. Lavrov³

¹Kazan Federal University, Kazan, Russia, ²Kazan National Research Technical University, Kazan, Russia, ³Mayo Clinic, Rochester, USA

Objective: Studies performed that anisotropic properties of the bone tissue changes significantly in case of a microgravity models. It means that physical activity influence on the musculoskeletal system and it can be a reason of evolution of biomechanical structures. All tests were conducted on nonlinear laboratory rats (180–200 g). As a model of gravitational unloading we used antitortostatic support model. All experiments were performed according to bioethical standards and were approved by local ethical committee of the Kazan Federal University. Chloral hydrate was used for anesthesia (5 mg/kg, intraperitoneal, Sigma-Aldrich).

Method: The femoral bones and shoulder bones were dissected from all tested rats with following weight measurement, and measurement of geometrical parameters. Bones was scanned on μ CT in diaphysis, metaphysis and epiphysis regions. After scanning the bone porosity was calculated. The structure of porosity medium was analyzed in terms of fabric tensor. It was investigated different groups: control and "hypogravitational" on different time of unloading hanging (7, 14, 21, 30 and 40 d).

Results: The result of anisotropic properties of diaphysis of the bone was as follows. Main stiffness directed in longitudinal direction. Structure of bone tissue looks like adaptive to bending with compression. Anisotropic properties of a femur changes after some period of unloading. Stiffness in longitudinal direction became not constant (it decreases in distal regions). Main stiffness direction turns at an angle relative to longitudinal direction. The value of the angle increases in dependence of time of unloading (up to 35 degree in 40 days of unloading hanging). In transverse plane stiffness changes aspect ratio in radial and tangent direction. It means that it becomes more ductility for torsion. Anisotropic properties of a shoulder don't changes significantly after unloading.

Conclusion: These results emphasize that the bone atrophy during unloading. Shoulder in contrast to femur was loaded during unloading hanging. Bone tissue in unloaded bones adapt to external forces and anisotropic properties of the tissue changes significantly.

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SERUM 25-HYDROXYVITAMIN D AND ITS METABOLISM IN BONE TISSUE IS ASSOCIATED WITH IMPROVED BONE QUALITY IN ELDERLY HIP PATIENTS

D. K. Shamma¹, R. Stamenkov², T. Robertson³, C. J. M. Stapledon³, G. J. Atkins³, L. B. Solomon⁴, P. M. Clifton¹, P. H. Anderson¹, H. A. Morris¹

¹University of South Australia, ²Department of Orthopaedics and Trauma, Royal Adelaide Hospital, ³University of Adelaide, ⁴Department of Orthopaedics and Trauma, Royal Adelaide Hospital and University of Adelaide, Adelaide, Australia

Objective: Vitamin D and calcium supplementation significantly reduces the risk of fractures although improvement of BMD is controversial suggesting that such action may arise through improvement of bone quality and not through increasing BMD. We have investigated the relationship between vitamin D status and trabecular bone quantity and quality in intertrochanteric biopsies retrieved from elderly hip fracture patients.

Methods: Intertrochanteric trabecular bone biopsies and serum samples were collected from hip fracture patients undergoing hip replacement surgery (70 females, 41 males, mean age 86 years) at Royal Adelaide Hospital. Trabecular bone was analysed by micro CT (SkyScan 1076), mean wall thickness was measured by histology and serum 25(OH)D, 1,25(OH)2D, and PTH were measured by immunoassay (Diasorin Liaison). Bone mRNA levels for vitamin D metabolising genes CYP27B1 (converting 25(OH)D to 1,25(OH)2D) and CYP24A1 (degrading vitamin D metabolites) were measured by RT-PCR.

Results: Serum 25(OH)D correlated positively with trabecular thickness ($r=0.209$, $p<0.05$) and negatively to the ratio of bone surface to bone volume (BS/BV) ($r=-0.214$, $p<0.05$), both indicators of bone quality. Patients with higher vitamin D status had significantly higher mean wall thickness ($p<0.001$). No correlation was found between serum 25(OH)D and any variable describing bone quantity. No bone quality or quantity variables correlated with either PTH or 1,25(OH)2D levels. Serum 25(OH)D, gender and bone mRNA levels for CYP27B1 and CYP24A1 accounted for 19% of the variability of BS/BV ($P=0.001$).

Conclusion: Three measures of bone quality relate to serum 25(OH)D and support the concept that bone metabolism of 25(OH)D to 1,25(OH)2D improves bone quality through increasing plate-like trabeculae even in elderly patients. Plate-like structures improve bone strength (1). At the cellular level these structures arise from an increase in the bone formation period with osteoblasts forming bone for longer. These data support the need for maintaining adequate vitamin D status in the elderly to promote bone health and BMD is likely an inadequate measurement for vitamin D action on bone.

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PSEUDOHYPOPARATHYROIDISM AND ITS RELATIONSHIP WITH BMD: CASE REPORT

M. Alvarez¹, J. García², C. Gutierrez¹, A. Cuervo³, M. M. Ulloa¹

¹Universidad Militar Nueva Granada, ²Hospital Militar Central, ³Universidad de la Sabana, Bogotá, Colombia

Pseudohypoparathyroidism (PHP) is an infrequent entity that encompasses a group of heterogeneous disorders in which peripheral resistance to PTH is observed with consequent

hypocalcemia, hyperphosphatemia, high levels of PTH and variable bone alterations ranging from low BMD and Albright hereditary osteodystrophy to osteitis fibrosa cystica and osteosclerosis^{1,2,3,4,5,6,7,8,9}.

We present the case of a 37-year-old female patient who presented with a ten year history of hypocalcemia, hyperphosphatemia and persistently elevated levels of PTH, despite normalization of levels of 25 hydroxyvitamin D and normal renal function. The diagnosis of PHP was considered. The thyroid profile showed hypothyroidism and thyroid stimulating hormone (TSH) resistance and the level of urinary cyclic AMP was low despite PTH. This was consistent with the diagnosis of PHP type Ib. In addition, we performed a bone densitometry study with DXA finding values of BMD, T-score and Z-score, normal for age.

The patient was treated with a calcium carbonate supplement and 1,25-dihydroxyvitamin D. Follow-up corrected calcium and phosphorus were near normal levels despite persisting high levels of PTH.

Several case reports and descriptive studies have associated PHP with bone disorders, not only the Albright Hereditary Osteodystrophy in PHP type Ia and Ic, but also alterations in BMD, ranging from low mineral density to osteitis fibrosa cystica and osteosclerosis^{1,2,3,4,5,6,7,8,9}. We performed an analysis of the bone alterations described in PHP and we describe our experience in a case of type Ib PHP without bone involvement.

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THE STUDY OF LIPID METABOLISM MODIFICATIONS IN HYPOGONADAL OSTEOPOROSIS

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, I. S. Vasile², D. M. Albulescu⁴, N. Ionovici⁵, A. Covei⁶, A. Camen¹, A. S. Enescu⁷, A. Enescu⁸, E. Stefan⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴University of Medicine and Pharmacy, Department of Radiology, Craiova, ⁵University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, ⁶Philanthropy Hospital, Department of Endocrinology, Craiova, ⁷University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁸University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁹Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, Romania

Objectives: Hypogonadal osteoporosis refers to the absence or the low level of estrogen, progesterone and androgen, singularly or in combination. The more and more often screening of cases with hypogonadism (feminine or masculine), motivates the approach of the study of metabolic and hormonal modifications in hypogonadal osteoporosis, which is established early.

We highlight lipid metabolism modifications at patients with hypogonadal osteoporosis

Method: The total number of patients enrolled in the study was 57 from which: 1. late puberty 26 cases with age between 12-25 years, from which: gonadal dysgenesis 13 cases (Turner syndrome with female phenotype 9 cases, Klinefelter syndrome 4 cases), 2. hypogonadotropic hypogonadism 13 cases from which: pituitary dwarfism with sexual infantilism 3 cases, adiposogenital syndrome 8 cases (female 3 cases, male 5 cases), pituitary tumor insufficiency 2 cases; 3. Premature ovarian failure 31 cases with age between 20-33 years. At all cases, BMD was evaluated through DXA.

Results: After the lipid metabolism study, were obtained the following values: normal values - premature ovarian failure (31 cases), Klinefelter syndrome (4 cases); low values - pituitary dwarfism with sexual infantilism 3 cases and pituitary tumor insufficiency 2 cases; elevated values - Turner syndrome with female phenotype 9 cases and adiposogenital syndrome 8 cases

Conclusions: 1. At cases with Turner syndrome and adiposogenital syndrome where all components of lipid metabolism had elevated values, the explanation lies in the association of hypothyroidism whose effect is increasing the deposits and the concentration of plasma lipids. 2. It is necessary to combine hypolipidemic therapy with antiresorptive/proformative medication.

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PREDICTIVE VALUE OF BIOCHEMICAL MARKERS OF BONE TURNOVER IN HYPOGONADAL OSTEOPOROSIS

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, A. Covei⁵, A. S. Enescu⁶, A. Enescu⁷, A. Camen¹, I. S. Vasile², N. Ionovici⁸, D. M. Albulescu⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁷University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁸University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Romania, ⁹University of Medicine and Pharmacy, Department of Radiology, Craiova, Romania

Objectives: Generally, the clinical utility of biochemical markers of bone turnover in osteoporosis management has been in researcher's attention for the last years.

Method: The casuistry is represented by a number of 38 patients with hypogonadal osteoporosis, with age between 16-29 years. Biochemical markers of bone turnover were evaluated: serum osteocalcin (for bone formation) and telopeptides C terminals of the procollagen type I - CrossLaps (for bone resorption). The fundamental method for evaluating the two markers is based on the action of high specificity monoclonal antibodies against the amino acid sequence of the bone matrix.

Results: Serum osteocalcin had values ranging from 29.4-112.9 ng/ml at 16 cases, (42.1%), comparable to those of postmenopausal women, 7 cases of 16 (18.4%), 45-22.18 ng/ml as in the premenopause, in contrast to the other cases (39.5%), where the limits were normal. CrossLaps values correlate with those of

osteocalcin, from 0.197-1.768 ng/ml for cases with osteoporosis and osteopenia.

Conclusions: The paper suggests the need to monitor anti-osteoporotic therapy by measuring the biochemical markers of bone turnover, being an accessible method for clinical practice.

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CLINICAL ASPECTS OF ODONTAL LESIONS IN ENDOCRINOPATHIES

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Enescu⁵, A. S. Enescu⁶, A. Covei⁷, A. Camen¹, N. Ionovici⁸, D. M. Albulescu⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁶University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁷Philanthropy Hospital, Department of Endocrinology, Craiova, ⁸University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, ⁹University of Medicine and Pharmacy, Department of Radiology, Craiova, Romania

Objectives: By accepting the concept of hormonal receptor it is considered that the buccal dentistry is also included in the category of hormone-dependent tissues. Excess secretion or deficiency of endocrine glands, hormone transport, and differential tissue responsiveness are important factors that should be clinically and biologically assessed to determine, with certainty, the rate of hormonal participation in the induction of a dento-maxillary abnormality. The aim of the paper included the following coordinates: highlighting the clinical particularities of endocrinopathic patients with buccal dentistry modifications; evaluating the biochemical and hormonal constants of the patients in the study in order to identify interdependencies between biochemical parameters and endocrinopathic status; early diagnosis, stage of tooth damage and periodontitis.

Method: The casuistry is represented by a total of 12 patients - women, men and children - with endocrine pathology that also exhibited buccal dentistry. Case distribution: acromegaly 3 cases, primary hypothyroidism post-thyroidectomy 1 case, thyrotoxicosis 3 cases, mixedem 1 case, nanism 3 cases, Turner syndrome 1 case. The group consists of 2 patients aged <17 years and 10 patients with age between 26-72 years. In order to establish the endocrine diagnosis, were used both clinical criteria (anamnesis, objective and subjective examination) as well as paraclinical investigations (usual biochemical, dynamic/static and imaging hormones).

Results: The main clinical manifestations existing at patients with hormonal diseases studied are: dyslipidemia, mellitus diabetes, ischemic cardiopathy, hypertension, arterial fibrillation. A particular attention is paid to patients with hyperthyroidism as they may present: pulp chamber obliteration, late dental eruption, tooth spacing, thin lamellar, periodontal ligament widening, teeth become sensitive at percussion and mastication, root resorption, generalized osteoporosis of the jaw, the patient mentioning jaw bone pain. These cases need to be carefully considered because the radiopainting of osteoporosis can be confused with apical diseases, where the endodontic treatment is contraindicated.

Conclusions: 1. Changes in the buccal-dental device are sometimes suggestive for the diagnosis of an endocrine diseases. 2. In case of suspicion of an endocrine diseases at an undiagnosed patient, all

dental work will be postponed until the endocrine status is assessed, and is required a collaboration between a dentist and an endocrinologist.

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THE STUDY OF HORMONAL INVESTIGATIONS IN HYPOGONADAL OSTEOPOROSIS

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, I. S. Vasile², E. Stefan⁴, A. Covei⁵, A. Camen¹, A. Enescu⁶, A. S. Enescu⁷, D. M. Albulescu⁸, N. Ionovici⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁷University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁸University of Medicine and Pharmacy, Department of Radiology, Craiova, ⁹University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Objectives: Till now, most studies have been conducted on postmenopausal osteoporosis, and the mechanisms involved in hypogonadal osteoporosis have been less researched, which explains the low number of bibliographic information sources in this field. Our aim was the identification of the etiology of gonadal insufficiency with the support of basic and dynamic hormonal investigations, mass and bone turnover assessment at patients included in the study, with gonadal insufficiency with different etiologies;

Method: The casuistry is represented by 47 patients, out of which: late puberty: 26 cases, whose ages are between 12-25 years, premature ovarian failure: 21 cases with age between 20-33 years. Hormonal investigations performed for cases of late puberty: LH, FSH, PRL, estradiol, progesterone, testosterone, TSH, FT4, GH, IGF1, cortisol. For cases with premature ovarian failure: LH, FSH, PRL, estradiol, progesterone. The evaluation of BMD for the detection of sexoidopriva hypogonadal osteoporosis was done by DXA.

Results: zTardive puberty: different values in correlation with the clinical form. Turner syndrome: plasmatic estradiol 13-20 pg/ml (Normal: 30-120 pg/ml), plasmatic progesterone 0.4-1.2 pg/ml (Normal: 4.9-18.8 pg/ml), LH-ul 190-290 mUI/ml (Normal: 0.110-190 mUI/ml), FSH-ul între 180-240 mUI/ml (Normal: 0.110-190 mUI/ml). Klinefelter syndrome: plasma testosterone 0.01-0.02 ng/ml (Normal: 0.2-14 ng/ml), LH și FSH 210-325 mUI/ml (Normal: 0.110-190 mUI/ml). Pituitary dwarfism with sexual infantilism: GH 0.5-0.7 ng/ml (Normal: 0.5-7 ng/ml), LH 0.11-12 mUI/ml (Normal: 0.110-190 mUI/ml), FSH 0.14-18 mUI/ml (Normal: 0.110-190 mUI/ml), IGF1 193-750 ng/ml (Normal: 183-850 ng/ml). Adipose-genital syndrome: LH: 0.18-22 mUI/ml, FSH: 0.20-33 mUI/ml. After the stimulation test with clomiphene citrate 100 mg/day x 5 days, the values are doubled. Tumor pituitary insufficiency: testosterone: 1.4-1.5 ng/ml; LH: 0.8-2 mUI/ml; FSH: 1.2-4.8 mUI/ml. Premature ovarian failure: 11 of the cases: - low values for estradiol and progesterone; - elevated values for gonadotrophic hormones. DXA: late puberty-osteoporosis 10 cases, osteopenia 6 cases, normal DMO 10 cases. Premature ovarian failure: osteoporosis 10 cases, osteopenia 6 cases, normal DMO 5 cases.

Conclusions: The exclusion of sexual hormones from the body's economy, in both cases of late puberty and those with premature ovarian failure, severely influences bone structure, being the main cause of hypogonadal osteoporosis.

P457

THERAPEUTIC MANAGEMENT IN HYPOGONADAL OSTEOPOROSIS

S. A. Bugala¹, D. M. Albulescu², N. Ionovici³, A. Camen¹, A. S. Enescu⁴, A. Enescu⁵, A. Covei⁶, I. S. Vasile⁷, E. Stefan⁸, L.-P. Pavel⁹, O. R. Pavel⁷

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova,

²University of Medicine and Pharmacy, Department of Radiology, Craiova,

³University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova,

⁴University of Medicine and Pharmacy, Department of Human Anatomy, Craiova,

⁵University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova,

⁶Philanthropy Hospital, Department of Endocrinology, Craiova,

⁷University of Medicine and Pharmacy, Department of Endocrinology, Craiova,

⁸Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti,

⁹Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, Romania

Objectives: Hypogonadal osteoporosis can be installed early, is asymptomatic for a long time and the etiologic diagnosis is sometimes laborious. Premature diagnosis of gonadal insufficiency requires the adoption of bone prophylaxis measures from the prepubertal, pubertal or postpubertal stage to ensure a maximum bone mass appropriate to gender and age.

Method: The casuistry is represented of 57 patients, including: late puberty (26 cases) and premature ovarian failure (31 cases).

Results: To elucidate the etiological diagnosis, clinical and paraclinical criteria were used.

Conclusions: The paper suggests two major goals in the therapeutic strategy of hypogonadal osteoporosis: a) early diagnosis of gonadal insufficiency in order to adopt prophylactic measures of bone changes; b) estrogen-progestative substitution.

P458

EFFICACY AND SAFETY OF AMTOLMETIN GUACYL IN THE MANAGEMENT OF KNEE OSTEOARTHRITIS AND ASSOCIATED DYSPEPSIA IN ROUTINE CLINIC SETTING

N. Denisov¹, S. Tsvetkova¹, L. Nasonov¹

¹Institute of Rheumatology, Moscow, Russia

Objectives: To evaluate the efficacy and safety of amtolmetin guacyl in the management of osteoarthritis (OA) of knee and associated dyspepsia in routine clinic setting.

Methods: In the observation study conducted in the OA outpatients between February 2015 and December 2015, patients with knee joint (KJ) pain ≥ 40 mm on visual scale (VAS) and dyspepsia were enrolled. Amtolmetin guacyl 600 mg tablets twice daily was administered for up to 28 d. Patients were evaluated at baseline, Day 14 $\pm$ 3, and at Day 28 $\pm$ 3 for severity of pain in "target" knee (VAS), WOMAC pain and stiffness, and Severity of Dyspepsia Assessment (SODA).

Results: Of the 219 OA patients, approximately 72.5% patients reported decrease in pain in the target KJ by $\geq 40\%$ at the end of the study. Main pain reduced from 65 mm at baseline to 27 mm at the end of the study. A significant decrease in WOMAC pain score (from 239 to 120), morning stiffness (from 100 to 58), decrease in functional limitations in all the measured scales – I to IV and total WOMAC score (from 1187 to 643). This decrease in all the domains of WOMAC questionnaire was statistically significant ($p < 0.001$). A significant decrease in SODA score and increase in satisfaction was observed. Amtolmetin guacyl tolerability was comparatively better than previously used NSAIDs.

Conclusion: Amtolmetin guacyl is effective and safe in OA patients with associated dyspepsia and has comparatively better tolerability than other NSAIDs.

P459

ANDROGEN INSENSITIVITY SYNDROME AND OSTEOPOROSIS: CASE PRESENTATION

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, I. S. Vasile², A. Covei⁴, A. Enescu⁵, A. S. Enescu⁶, A. Camen¹, E. Stefan⁷, D. M. Albulescu⁸, N. Ionovici⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova,

²University of Medicine and Pharmacy, Department of Endocrinology, Craiova,

³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova,

⁴Philanthropy Hospital, Department of Endocrinology, Craiova,

⁵University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova,

⁶University of Medicine and Pharmacy, Department of Human Anatomy, Craiova,

⁷Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti,

⁸University of Medicine and Pharmacy, Department of Radiology, Craiova,

⁹University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Objectives: Androgen insensitivity syndrome (AIS) is typically characterized by evidence of feminization of the external genitalia at birth, abnormal secondary sexual development in puberty, and infertility in individuals with a 46,XY karyotype. We present here the case of a 24-year-old patient diagnosed with AIS. We have proposed to evaluate whether the side effects of androgen resistance may extend to skeletal tissue.

Method: We determined BMD, T- score, Z-score by DXA method. The diagnosis of androgen insensitivity was confirmed by karyotype and assay of sex hormones.

Results: Our patient had osteoporosis in both the lumbar spine (T-score -3.25) and femoral neck (T- score -2.91).

Conclusions: Osteoporosis in patients with androgen insensitivity may relate to defective androgen action, oestrogen deficiency or a combination of the two thus, specific treatment is required.

P460

PREVALENCE OF OSTEOPOROSIS IN ACROMEGALY

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Covei⁵, A. Camen¹, A. Enescu⁶, A. S. Enescu⁷, D. M. Albulescu⁸, N. Ionovici⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova,

²University of Medicine and Pharmacy, Department of Endocrinology, Craiova,

³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova,

⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti,

⁵Philanthropy Hospital, Department of Endocrinology, Craiova,

⁶University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova,

⁷University of Medicine and Pharmacy, Department of Human Anatomy, Craiova,

⁸University of Medicine and Pharmacy, Department of Radiology, Craiova,

⁹University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Objectives: Acromegaly, by high serum levels of growth hormone (GH) and IGF-1, which stimulate proliferation, differentiation and extracellular matrix production in osteoblastic cells and stimulate recruitment and bone

resorption activity in osteoclastic cells is frequently associated with osteoporosis. The aim of this study was to evaluate the prevalence of osteoporosis at patients diagnosed with acromegaly.

Method: The study were effectuated on 10 acromegaly patients with 32–65 years, 6 women and 4 men. To all the patients taken in to study were determined BMD by DXA. Osteoporotic vertebral fractures were assessed by antero-posterior and lateral x-ray examinations of the thoracic and lumbar spine. To all the patients taken in to study were determined serum levels of osteocalcin and β -CrossLaps.

Results: BMD was reduced at more of 50% of patients, in each skeletal sites measured. Z-score values were lower in males than in females. The prevalence of vertebral fractures was 39% (43% in women, 57% in men).

Conclusions: The vertebral fractures are frequent in acromegaly and, even mild and asymptomatic, play an important role on life quality and survival, already decreased in acromegaly patients. A chronic GH and IGF-1 excess produces an increased bone turnover, reflected in an increase of bone formation and resorption markers; bone resorption markers are disproportionately increased respect bone formation markers and their increase could reflect the degree of bone loss of ten observed. DXA are not sufficient for identifying patients with risk for fracture, due to the many possible interferences (bone deformities, osteoarthritis, joint rigidity and soft tissue thickening), since BMD is just one determinant of bone fracture. In the screening of acromegaly complications, it is necessary to perform a radiographic study of the spine at the time of diagnosis and during follow up.

P461

THE STUDY OF BONE METABOLISM DURING PREGNANCY

S. A. Bugala¹, L.-P. Pavel², O. R. Pavel³, E. Stefan⁴, I. S. Vasile³, A. Enescu⁵, A. S. Enescu⁶, A. Covei⁷, A. Camen¹, N. Ionovici⁸, D. M. Albulescu⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ,
²Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ³University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁶University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁷Philanthropy Hospital, Department of Endocrinology, Craiova, ⁸University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, ⁹University of Medicine and Pharmacy/ Department of Radiology, Craiova, Romania

Objectives: Pregnancy is associated with deterioration of bone mass at the mother, fact proved by changes in bone density and bone markers. The calcium metabolism changes to meet the needs of fetal skeleton development. The fetus contributes to this process through placental regulators. The aim of this study was to evaluate the impact of pregnancy on the bone metabolism.

Method: The study were effectuated on 35 pregnancy women. To all the patients taken in to study were determined calcium, vitamin D and PTH in serum.

Results: Serum calcium presented low values at 19 patients, normal values at 10 patients and elevated values at 6 women. Vitamin D presented low values at 17 patients, normal values at 15 patients and elevated values at 3 women. Serum PTH presented low values at 9 patients, normal values at 22 patients and elevated values at 4 women.

Conclusions: Understanding of the whole process is limited and some changes are ambiguous. The circulating levels of vitamin D are increased,

but its functional impact is not clear. Fetal PTH and PTH-related peptide play an indirect role by supporting a calcium gradient that creates hypercalcemia in the fetus. Placental GH, which increases until the end of pregnancy, can exert some anabolic effects, either directly or by regulating of IGF1 production. Other hormones involved in bone metabolism, such as estrogens or prolactin, are elevated during pregnancy, but with a uncertain role. The ratio of RANKL to OPG are increased and acts as an additional preresorbing factor in bone. The increase in bone resorption may lead to osteoporosis and fragility fracture, which have been diagnosed, but this condition is transitory. Prevention is limited, first by the lack of identifiable risk factors. When fractures are diagnosed, they impose rest, treatment with analgesics, or, most often, orthopedic intervention. Treatment with anti-osteoporotic drugs could be effective, but its adverse effects on the fetus imposes caution in their use.

P462

THE STUDY OF MALE OSTEOPOROSIS

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Covei⁵, A. Camen¹, A. S. Enescu⁶, A. Enescu⁷, N. Ionovici⁸, D. M. Albulescu⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁷University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁸University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, ⁹University of Medicine and Pharmacy, Department of Radiology, Craiova, Romania

Objectives: Osteoporosis is a disease that primarily affects women, but, with the aging of the population, osteoporosis in men is becoming an increasingly important public health problem.

The BMD at aging men decrease with a rate of approximately 1% per year, and one in five men over the age of 50 years will suffer an osteoporotic fracture during their lifetime. Almost 30% of all hip fragility fractures occur in men, with a great morbidity and mortality. Male osteoporosis is a heterogeneous entity, with multiple underlying causes, and primary osteoporosis could be separated by secondary osteoporosis from certain causes (diseases or drugs). Recent studies have demonstrated the relative contributions of estrogen and testosterone to risk of fragility fracture in men. The aim of this study was to evaluated the levels of serum estrogen and testosterone at the men with osteoporosis.

Method: The study was effectuated on 17 men who were diagnosed with osteoporosis by DXA method. To all the patients taken in to study were determined estrogen and testosterone in serum.

Results: Serum estrogen and testosterone presented low values at all patients, their levels being correlated with age and BMD.

Conclusions: Testosterone and estradiol levels, and their free fractions, declined significantly with age, estrogen played an important, and perhaps dominant role in regulating bone density, bone resorption and bone loss in elderly men. More, the effect of testosterone on fracture risk in elderly men may be mediated via nonskeletal factors, such as muscle strength and/or fall risk.

Although male osteoporosis is recognized as a major health problem, there are still significant gaps in the diagnosis and treatment of this disorder.

P463

THE STUDY OF SECONDARY CAUSES OF OSTEOPOROSIS AT POSTMENOPAUSAL WOMEN

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Camen¹, A. Covei⁵, A. Enescu⁶, A. S. Enescu⁷, D. M. Albulescu⁸, N. Ionovici⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁷University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁸University of Medicine and Pharmacy, Department of Radiology, Craiova, ⁹University of Medicine and Pharmacy Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Objectives: Postmenopausal osteoporosis is characterized by an absolute decrease in the amount of bone, leading to fractures after minimal trauma, most frequently of the vertebrae, the proximal femur, and the distal forearm. Estrogen deficiency is a key factor in the pathogenesis of postmenopausal osteoporosis, but there are secondary causes of osteoporosis at postmenopausal women. The aim of this study was to analyze the prevalence of conditions who contributing to bone loss in postmenopausal women with osteoporosis and to evaluate the impact of these disorders on the severity of the disease.

Method: The study were effectuated on 57 postmenopausal women with age of 49-75 years, who were diagnosed with osteoporosis by DXA. To all the patients taken in to study were determined serum PTH, vitamin D, thyroid hormones, cortisol and calcium.

Results: 47 patients (82.45%) had low 25OHD levels (<30 ng/mL), 12 women (21.05%) had increased PTH levels (>65 pg/mL). PTH levels were related to age and were higher in women with femoral Z-score < -2.0 (P=0.03). Women with low vitamin D levels had lower femoral neck BMD and T-score values. In addition, patients with vertebral fractures had higher prevalence of vitamin D levels <20 ng/mL (P<0.05). 10 women (17.54%) had increased serum thyroid hormones.

Conclusions: Secondary causes that contribute to low bone mass in postmenopausal women with osteoporosis are frequent, especially vitamin D insufficiency, increased PTH values, and hyperthyroidism. In addition, increased bone resorption is frequently observed in this group of women. Most of these processes contributed to these verity of the disease.

P464

TREATMENT WITH ALENDRONATE IN OSTEOPOROSIS SECONDARY TO HYPERTHYROIDISM

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Camen¹, A. Covei⁵, A. Enescu⁶, A. S. Enescu⁷, N. Ionovici⁸, D. M. Albulescu⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁷University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁸University of Medicine and Pharmacy, Department of Radiology, Craiova, ⁹University of Medicine and Pharmacy Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Occupational Diseases, Craiova, ⁹University of Medicine and Pharmacy, Department of Radiology, Craiova, Romania

Objectives: Loss of BMD due to osteoporosis is the main cause of fragility fractures and leads to dropped quality of life and increased mortality. Correct development, achievement of peak bone mass and normal functioning of human skeleton depend on different factors. The pivotal role in bone metabolism plays thyroid hormones. Both excess as well as deficiency of FT₄ and FT₃ can be potentially deleterious for bone tissue. The aim of this study was to evaluate the efficacy and safety of alendronate for the treatment of osteoporosis /osteopenia secondary to hyperthyroidism.

Method: The study were effectuated on 54 patients with hyperthyroidism and osteoporosis, diagnosed by DXA. 28 patients was treated with antithyroid drug, calcium and vitamin D (group A), and 27 patients was treated with antithyroid drug, calcium and vitamin D and alendronate 70 mg weekly (group B). After one year of treatment was determined again BMD, T-score, Z-score.

Results: BMD was significantly higher at 12 months after treatment than at the baseline in group A (P=0.000); T-score, Z-score, and BMD were all significantly higher at 12 months after treatment than at the baseline in group B (P<0.05), but these data could not arrive to normal level. In group A, the percentage increased in BMD was 4.03 ± 1.5% at 12 months after treatment. In group B, the percentage increased in BMD was 6.65 ± 5.02% at 12 months after treatment. There was significant difference in the rate of increase between two groups (P<0.05). BMI increased and thyroid function decreased, after treatment than those before in both of the two groups. (P<0.05).

Conclusion: Alendronate can significantly increase BMD in treating patients with hyperthyroidism and osteoporosis/ osteopenia. Compared with antithyroid drugs alone, treatment with alendronate can obtain more clinical effect and also very safety.

P465

DEMONSTRATING FRACTURE LIAISON SERVICE EFFECTIVENESS: USE OF FRACTURE INCIDENCE AND PRESCRIBING DATA TO DEMONSTRATE CLINICAL AND COST EFFECTIVENESS IN A SMALL POPULATION

T. Jones¹

¹National Osteoporosis Society, Bath, UK

Objectives: The National Osteoporosis Society (NOS) Service Development Team supports Fracture liaison services (FLS) in various ways including demonstrating to payers the effectiveness of services in preventing secondary fractures. Health and social care payers typically use crude, population-level hip fracture rates to evaluate services even though these comprise less than 1 in 5 of prevented fractures and include primary and non-osteoporotic fractures. Alternative indicators of effectiveness are needed such as the number and rate of patients on anti-osteoporosis medication (AOM). This analysis sought to demonstrate whether publically available prescribing data could be used to develop an indicator of FLS effectiveness.

Methods: An analysis was conducted of AOMs dispensed to patients over in England over 48 months. These data were adjusted and standardised to output a rate of patients on treatment per 1000 population aged 50 and above (PoTr). The data were analysed to: Understand national trends in the use of AOMs; Explore whether the PoTr was a useful measure of effectiveness of FLS in given population.

Results: The analysis showed a downward trend in the number and rate of patients on treatment over the study period consistent with international studies. In some case studies the establishment or disestablishment of an FLS was observed to be statistically significantly related to changes in the rate of patients on treatment.

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KYNURENINE MODULATES BONE STRENGTH IN RATS WITH CHRONIC KIDNEY DISEASE DEPENDING ON THE PLACE OF ITS OCCURRENCE

B. Kalaska¹, K. Pawlak², T. Domaniewski², E. Oksztulska-Kolanek², B. Znorko², M. Karbowska¹, A. Mor¹, M. Brzoska³, P. Lipowicz⁴, M. Doroszko⁵, A. Pryczynicz⁶, D. Pawlak¹

¹Medical University of Bialystok, Department of Pharmacodynamics, ²Medical University of Bialystok, Department of Monitored Pharmacotherapy, ³Medical University of Bialystok, Department of Toxicology, ⁴Bialystok University of Technology, Faculty of Mechanical Engineering, Institute of Biocybernetics and Biomedical Engineering, ⁵Bialystok University of Technology, Faculty of Mechanical Engineering, Department of Mechanics and Applied Computer Science, ⁶Medical University of Bialystok, Department of General Pathomorphology, Bialystok, Poland

Objective: Bone and mineral disorders represent a complex clinical complication of chronic kidney disease (CKD). Peripherally and centrally synthesized serotonin exerts opposite effects on the regulation of bone mass. The serotonin and kynurenine pathways are connected; tryptophan is the precursor for both. Our aim was to determine the association between peripheral and central kynurenine pathway metabolites and bone geometrical and biomechanical properties in rats with subtotal 5/6 nephrectomy (5/6 Nx)-induced CKD.

Methods: Wistar rats were randomly divided into sham-operated and 5/6 Nx. After moderate CKD development, serum samples were collected for the determination of kynurenine pathway metabolites, bone turnover biomarkers, and biochemical parameters. Brains were removed and divided into 5 regions for the determination of kynurenine pathway metabolites. Tibias were obtained for determination of bone biomechanics, geometry, histology, microarchitecture, and BMD. Kidneys were removed for macroscopic analysis. The gene expression of aryl hydrocarbon receptor (AhR) as a physiological receptor for kynurenine and AhR-dependent cytochrome (CYP1A1) in the bone tissue was also determined.

Results: 5/6 Nx rats presented higher concentrations of serum urea nitrogen ($p<0.001$), creatinine ($p<0.001$), developed hypocalcemia ($p<0.05$) and hyperparathyroidism ($p<0.001$). Nephrectomy significantly increased osteoclasts number ($p<0.001$) without affecting resorptive activity measured in serum. Several geometrical and biomechanical parameters were significantly elevated in 5/6 Nx rats. A similar trend was observed for the image of bone microarchitecture obtained from μ CT analyses. 5/6 Nx rats revealed higher concentrations of kynurenine ($p<0.01$) and 3-hydroxykynurenine ($p<0.001$) in the serum and higher gene expression of AhR ($p<0.001$) and CYP1A1 ($p<0.01$) in the bone tissue. 5/6 Nx rats also presented higher kynurenine concentrations ($p<0.05$) and lower tryptophan levels ($p<0.01$) in all studied parts of the brain. Serum kynurenine concentration correlated INVERSELY with the main parameters of bone geometry and biomechanics. On the other hand, kynurenine levels in the frontal cortex and tryptophan levels in the hypothalamus and striatum correlated POSITIVELY with the main parameters of bone geometry and biomechanics.

Conclusion: Our data suggest that elevated levels of kynurenine modulates the bone structure in rats with CKD depending on the place of its occurrence; peripherally synthesized kynurenine decreases bone strength whereas it centrally produced exerts opposite effects on bone health.

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X-LINKED HYPOPHOSPHATAEMIA: BURDEN OF DISEASE USING UK PRIMARY CARE DATA

M. K. Javaid¹, A. Delmestri¹, N. Shaw², D. Prieto-Alhambra¹, C. Cooper¹, R. Pinedo-Villanueva¹

¹University of Oxford, Oxford, ²Birmingham Women's Children's NHS Foundation Trust, Birmingham, UK

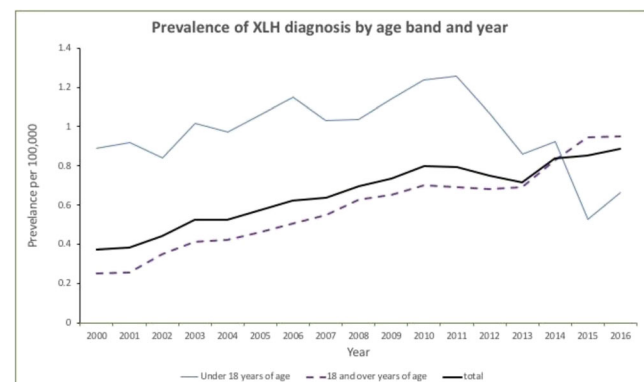
Objectives: To determine the prevalence of X-linked hypophosphataemia (XLH) in children and adults in the UK to inform commissioning of novel therapeutic agents by regulatory authorities.

Methods: The Clinical Practice Research Datalink (CPRD) comprises the entire computerised medical records of a sample of patients attending general practitioners (GPs) in the UK. It contains information including Read codes, laboratory and prescription data on over 11 million patients (around 7% of the population) registered at over 600 general practices in the UK, that are representative of the population in terms of demographics such as age and sex. A list of Read codes was generated that included terms related to rickets, hypophosphataemia and osteomalacia and cases extracted from 1995 to 2016. Two clinicians with experience in paediatric (NS) and adult XLH (MKJ) reviewed the potential cases using the Read codes, laboratory values for alkaline phosphate (maximum recorded levels) and serum phosphate (minimum recorded levels) and at least one year of prescriptions with 1-alfacalcidol or phosphate supplements. Cases were graded as highly likely, probable, possible and unlikely. Only cases scored highly likely or probable where both readers were included.

Results: From the 522 potential cases, 34 (6.3%) were scored as highly likely by both readers. 59 (11%) were scored as either highly likely or probable by both readers (Kappa 0.7). Of the 59 cases, 63% were female. The prevalence of XLH was 0.65 cases per 100,000 (Figure).

Conclusions: This is the first estimation of the prevalence of XLH using routine primary care data, with approximately 430 cases in the UK. This is more aligned with data from Norway than South Denmark. A confirmatory verification questionnaire is being sent to all primary care providers for validation of all cases. Further work is needed to improve coding of XLH patients in primary care.

Disclosures: Kyowa Hakko Kirin Co., Ltd. providing funding for this project to the University of Oxford. The funder was provided reports at the end of each stage of work but had no other influence on the development, conduct and reporting of the project.



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IS MUSCLE FUNCTION OF THE TRUNK DIFFERENT BETWEEN POSTMENOPAUSAL WOMEN WITH AND WITHOUT VERTEBRAL FRACTURE?

L. M. Cangussu-Oliveira¹, D. C. C. Abreu², J. M. Porto¹, J. G. Maciel³, M. H. Nogueira-Barbosa², C. Herrero², F. S. A. Paula²

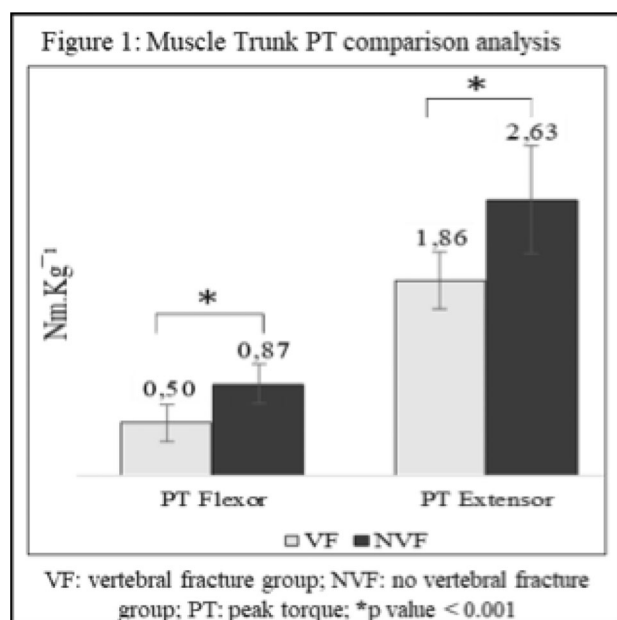
¹Postgraduate Program in Rehabilitation and Functional Performance, USP, ²Department of Health Science, Ribeirão Preto Medical School, University of São Paulo (FMRP-USP), ³Ribeirão Preto Medical School, University of São Paulo (FMRP-USP), Ribeirão Preto, Brazil

Objective: To compare and to correlate the peak torque (PT) of flexors and extensors muscles of the trunk of postmenopausal women with and without vertebral fracture.

Methods: Twenty osteoporotic postmenopausal women were divided into two groups: Group 1 was consisted of women without vertebral fracture (NVF; n=10) and Group 2 was consisted of women with 1 or more vertebral fracture, defined as grade ≥ 2 of the Genant's classification (VF; n=10). The patient's age and the time of menopause were obtained from a questionnaire, while BMI by anthropometric assessment. To evaluate the PT of trunk muscle flexors (PTflex) and PT of trunk muscle extensors (PText), the maximum voluntary isometric contraction using isokinetic dynamometer with body weight ratio were performed. The data normality was verified through the Shapiro Wilk test. The "U" Man-Whitney test was performed for comparison analysis, and the Spearman test for correlations. The significance level was set at 0.05.

Results: There were no significant differences between groups when comparing age (NVF=72.60 vs. VF=68.10 years), BMI (NVF=28.18 vs. VF=27.28 kg/m²), time of menopause (NVF=18.10 vs. VF=24.10 years), T-score of femoral neck BMD (NVF=-2.33SD vs. VF=-2.45SD; p=1.00) and T-score of lumbar BMD (NVF=-2.53SD vs. VF=-2.68SD; p=0.667). There was significant difference between groups in the muscular strength as presented in the Figure 1. The vertebral fractures number had negative correlation with PTflex ($r^2=-0.708$, $p<0.001$) and PText ($r^2=-0.724$, $p<0.001$).

Figure 1: Muscle Trunk PT comparison analys. VF: vertebral fracture group; NVF: no vertebral fracture group; PT: peak torque; *p value < 0.001



Conclusions: Muscle function has been associated with osteoporotic vertebral fractures. Our results indicate that there is a significant deficit in muscle strength of the trunk in women with vertebral fracture. Furthermore, this fact gets worse with the increase in fractures number. Thus, these data encourages a conducting investigations into the trunk muscle function as a risk factor for vertebral fracture.

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ESTABLISHING EFFECTIVE FRACTURE LIAISON SERVICE IN THE UK: AN INNOVATIVE SERVICE SUPPORT MODEL

D. Stone¹

¹National Osteoporosis Society, Bath, UK

Objective: Absolute numbers of hip fractures are projected to double and in-patient costs to treble in the next 20 years.[1] Studies show that 25% of hip fractures could be prevented with identification, treatment and follow-up by a Fracture liaison service (FLS).[2,3] An FLS systematically identifies, treats and refers to appropriate services all patients aged over 50 years within a local population who have suffered a fragility fracture, with the aim of reducing their risk of subsequent fractures. FLS prove cost effective by reducing emergency admissions, bed days and associated costs. This analysis sought to establish whether the innovative service support model developed by the National Osteoporosis Society (NOS) has succeeded in promoting UK-wide adoption of FLS.

Methods: The NOS developed FLS Clinical Standards that advocate a 'whole system' model, and an FLS Implementation Toolkit to support providers and payers. A specialist team with clinical and commissioning experience provide support, from pathway development to successful funding of services.

Results: The charity currently supports 183 sites across the UK. Of these: 101 sites are receiving peer support and/or commissioning assistance to improve quality; 57 sites are developing new services; 27 new services have been commissioned or improved since April 2015. The new services represent FLS provision to an additional 2.6 million people over 50. This represents £49 million benefit for the health and social care economies, with 2456 hip fractures prevented over 5 years.

Conclusion: The NOS service development model of support is driving forward fracture prevention through development and improvement of FLS across the UK.

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PHOTOBIOMODULATION MODULATES DEGENERATIVE PROGRESS AND IMPROVES FUNCTIONALITY IN AN EXPERIMENTAL MODEL OF KNEE OSTEOARTHRITIS IN MIDDLE-AGED RATS

N. Iosimuta¹, L. Assis², P. Dos Santos¹, P. Magnani¹, A. C. Renno², D. C. De Abreu¹

¹Department of Biomechanics, Medicine and Rehabilitation of Locomotor System, University of São Paulo, School of Medicine, Ribeirão Preto, ²Department of Bioscience, Federal University of São Paulo, Santos, Brazil

Objective: To determine if the photobiomodulation (PBM) could slow the degenerative progression of articular cartilage and could improve the functional activity of middle-aged rats in a model of knee osteoarthritis (OA) during 8 weeks.

Methods: Twelve-month-old Wistar rats (n=20) were used and divided into 2 groups (treated and non-treated). The laser irradiation started 4 weeks after the anterior cruciate ligament transection surgery, 3 days/week for 8 weeks. The main outcome measures were tissue organization of articular surface, chondrocytes organization and gait parameters.

Results: The results showed that treated group showed a better pattern of tissue organization, with less fibrillation and irregularities along the articular surface and chondrocytes organization and a lower paw angle values in gait analysis when compared with non-treated group. The lower paw angle value is correlated with lower cartilage and bone destruction scores, according to Boettger et al.

Conclusion: the PBM is promising to improve the cartilage tissue regeneration in degenerative conditions in middle-aged rats, as PBM demonstrated to produce stimulatory effects on cartilage of OA rats, demonstrated by histological and gait analysis. However, further additional studies are needed to understand the molecular interaction of laser light in the presence of degenerative articular diseases and to evaluate different laser parameters to define the ideal protocol of treatment to be used in old patients with this degenerative disease.

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DO NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS) LEAD TO INCREASED RISK FOR CARDIOVASCULAR DISEASES (CVD) AMONG PEOPLE WITH OSTEOARTHRITIS (OA)?

M. Atiquzzaman¹, J. Kopeck², M. Karim², H. Wong², A. Anis²

¹Faculty of Pharmaceutical Sciences, ²School of Population and Public Health, University of British Columbia, Vancouver, Canada

Objectives: Recent research suggests that OA is an independent risk factor for CVD (1). We aimed to investigate the role of NSAIDs in OA-CVD relationship.

Methods: We used linked health administrative data from British Columbia, Canada. From a population-based cohort of 720,055 British Columbians, 7,743 OA patients and 23,229 non-OA controls were assembled without replacement and matched (1:3 ratio) on age and sex. The risk of developing incident CVD (primary outcome) as well as ischemic heart disease (IHD), congestive heart failure (CHF) and stroke (secondary outcomes) was estimated using multivariable Cox proportional hazards models. The mediating effect of NSAIDs, defined as current NSAID use from linked prescription dispensing records, was estimated using a marginal structural model. NSAIDs were further grouped into conventional NSAIDs (con-NSAIDs) and selective Cox-inhibitors (selective coxibs).

Results: Risk of CVD was 23% higher among people with OA compared to non-OA controls after adjusting for SES, BMI, hypertension, diabetes, hyperlipidemia, COPD, & Romano comorbidity score, adjusted HR (95%CI) was 1.23 (1.17, 1.29). Adjusted HR (95%CI) was 1.42 (1.33, 1.52), 1.17 (1.10, 1.27), 1.14 (1.08, 1.24) for CHF, IHD and stroke,

respectively. Current use of NSAIDs explained approximately 68% of increased CVD risk, 45% of increased CHF risk and >90% of increased risk of both IHD and stroke. In sub-group analysis, con-NSAIDs explained approximately 55% of the 17% higher risk of CVD, HR (95%CI) was 1.17 (1.12, 1.24). In contrast, selective coxibs revealed approximately 40% of the HR of 1.13 for CVD outcome. A similar trend (higher risk of disease and higher proportion mediated through conventional NSAIDs) was observed for all secondary outcomes.

Conclusions: Our study is the first to evaluate the mediating role of NSAID in the OA-CVD relationship based on population-based health administrative data. Our findings suggest that NSAID use substantially contributes to the increased risk of CVD among people with OA.

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USE OF INTRAVENOUS PAMIDRONATE (IVPA) FOR TREATMENT OF ACUTE SEVERE KNEE PAIN ASSOCIATED WITH OSTEOARTHRITIS AND LARGE BONE MARROW LESIONS (LBML)

M. Lovy¹, J. Hodgkins¹, B. Hodgkins¹

¹Desert Oasis Healthcare, Palm Springs, USA

Objective: To describe the clinical presentation and response to IVPA of patients presenting with acutely symptomatic osteoarthritis of the knee associated with LBML.

Methods: Retrospective chart review of 10 patients with acute onset severe knee pain associated with LBML on MRI occupying >75% of the femoral condyle or tibial plateau treated with IVPA.

Results: There were 8 females and 2 males, aged 69-87 (average (A)=74.2 years), with symptoms ranging 0.2-6 months (A=3.0), visual analogue scale (VAS) 58-100 (A=77.0), global health 29-100 (A=60.5), MDHAQ 0.67-6 (A=2.33). Four patients were on opioids, 2 on tramadol, 4 on NSAIDs, and 3 were receiving bisphosphonates for osteoporosis. On physical exam BMI ranged from 25-42 (A=29.5), 4 patients had a valgus deformity, 1 varus, 6 flexion contracture, and 8 had effusions containing class 1 non-inflammatory fluid. Radiographs showed Kellgren-Lawrence grade 1-4 changes (A=2.7). All patients failed to improve with conservative therapy, including steroid injections in 7, prior to ordering an MRI. LBML were seen in both medial condyle and tibial plateau in 5, femoral condyle only in 3, and tibial plateau only in 2. Meniscal tears were present in 8 patients and bakers cyst in 3. Five patients were treated with 30mg of IVPA and 5 with 60mg IVPA. Four patients had 100% reduction in VAS and discontinued pain medications in 1-4 weeks, 2 had 100% reduction in VAS after a second 60mg IVPA dose given 1 month later, 2 remain mildly symptomatic with >50% reduction in VAS. Two patients, who had grade 4 radiographic changes, required total knee replacements 5 and 22 months after initial evaluation. Of the 8 non operative patients, who have been followed for 2-51 months (A=16.5) after IVPA, none are taking pain medications and 6 remain asymptomatic.

Conclusions: Patients with acute severe knee pain associated with LBML have a high incidence of non-inflammatory effusions and meniscal tears. IVPA can be an effective and rapidly acting treatment in these patients with a favorable long term outcome. Patients with smaller more localized bone marrow lesions that could represent a different underlying histopathology should also be evaluated for efficacy of IVPA.

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POCOSTEO: POC IN-OFFICE DEVICE FOR IDENTIFYING INDIVIDUALS AT HIGH RISK OF OSTEOPOROSIS AND OSTEOPOROTIC FRACTURE

P. Khashayar¹, F. Leys¹, P. Lopes¹, A. Ostovar², G. Schols³, R. Gransee⁴, D. Latta⁴, P. Biggs⁵, I. J. Riley⁵, C. K. O'Sullivan⁶, I. Katakis⁶, M. Ortiz⁶, J. L. L. Acero⁶, R. Hoogenboom⁷, F. Devlieghere⁸, P. Ragaert⁸, B. Barredo⁹, M. Adriaens¹⁰, B. Obermayer-Pietsch¹¹, H. P. Dimai¹¹, B. Larijani¹², J. Vanfleteren¹

¹Gent University/CMST, Zwijnaarde, Gent, Belgium, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute/Tehran University of Medical Sciences, Tehran, Iran, ³Fundico bvba, Gent, Belgium, ⁴Fraunhofer IMM, Mainz, Germany, ⁵Labman Automation Ltd, North Yorkshire, UK, ⁶Interfibro Research Group, Department of Chemical Engineering, Universitat Rovira i Virgili, Tarragona, Spain, ⁷Supramolecular Chemistry Group, Centre of Macromolecular Chemistry (CMaC), Department of Organic and Macromolecular Chemistry, Ghent University, Ghent, Belgium, ⁸Research Unit Food Microbiology and Food Preservation, Ghent University, Ghent, Belgium, ⁹Microliquid sl, Arrasate, Spain, ¹⁰Department of Analytical Chemistry, Ghent University, Ghent, Belgium, ¹¹Medical University of Graz, Department of Internal Medicine, Division of Endocrinology & Diabetology, Graz, Austria, ¹²Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

As a consequence of the rapidly growing ageing society, osteoporosis and its complications are becoming more prevalent, making the bone disease a health priority worldwide. The disease is usually underdiagnosed and undertreated, imposing a heavy burden on the patient, health system and society.

So far, no simple to use and yet sufficiently accurate or sensitive tools for identification of this disease have been available. This is mainly due to the fact that the causes of osteoporosis are multifactorial, ranging from clinical risk factors and lifestyle habits to genetic makeup.

In order to overcome these gaps in the clinical armamentarium of osteoporosis management, early-stage identification of high-risk individuals who would best benefit from intervention and a low cost accessible monitoring solution for the affected individuals, various technologies including molecular medicine, nanobiotechnology, microfluidics, and biochemistry should be combined.

The EU funded H2020 project, PoCOsteo (No. 767325) focuses on the development of such a solution through integrating proteomics and genomics into a functional point-of-care (PoC) microfluidic device, which later on would be validated in practice. The final device, which brings together biomarker measurement, profiling of genetic variations and assessing the underlying risk factors, would be used by physicians to enhance the predictive accuracy of fracture prognosis and to provide the affected individuals with personalized care.

This would especially revolutionize the treatment monitoring process, making it more efficient. Moreover, a device which can provide results in real-time during consultation is expected to reduce the low-compliance-rate, commonly reported in osteoporotic patients. Finally, it can greatly facilitate access to advanced diagnosis in rural areas, where access to current state-of-the-art equipment is limited. It also limits the amount of both expensive reagents and blood samples needed for the tests, and thus reduces both cost, which is of great importance nowadays when full reimbursement is not practiced in many countries, and patient's pain and discomfort.

To realize these objectives, a balanced consortium of 5 research partners and 3 SME's has been brought together, and a well-considered work plan has been devised. The project is supported and advised by IOF.

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THE ASSOCIATIONS BETWEEN QUALITY OF LIFE AND PSYCHOEMOTIONAL STATE IN ELDERLY WOMEN

A. Cernovas¹, R. Stukas¹, J. Grigaitė¹, M. Tamulaitienė², G. Surkienė¹, V. Alekna¹

¹Vilnius University, Faculty of Medicine, ²Vilnius University, Faculty of Medicine, National Osteoporosis Center, Vilnius, Lithuania

Objective: To investigate associations between quality of life, depression and psychoemotional state in elderly women.

Methods: This cross-sectional study was performed in National Osteoporosis Center (Vilnius, Lithuania). Women aged 60 years and older were included. Exclusion criteria: physical or mental inability to provide signed informed consent and Mini-Mental State Examination (MMSE) result <20 points (moderate cognitive impairment). Quality of life was evaluated by EuroQoL Five Dimensions three levels (EQ-5D) questionnaire with self-rated health status (EQ-VAS) scale. Psychoemotional state was assessed using The Center for Epidemiological Studies-Depression (CES-D) short form questionnaire and Positive Affect Negative Affect Scale (PANAS), using both positive (PA) and negative affect (NA) subscales. The statistical analysis was performed using SPSS software for Windows (version 18.0).

Results: The study sample consisted of 105 elderly women, mean age 69.98±5.14 (from 60 till 83) years. The mean of EQ-5D index 0.847±0.149, EQ-VAS value 72.22±13.50. The mean scores of psychoemotional state scales were: CES-D 7.04±4.58, PANAS-PA 34.89±6.72, PANAS-NA 19.65±6.31. Results of our analysis showed that EQ-5D index was weakly negatively associated with CES-D score ($r=-0.33$, $p<0.001$) and PANAS-NA score ($r=-0.33$, $p=0.001$). Associations between EQ-5D index and PANAS-PA score were not found. Self-related health status value was weakly negatively associated with scores of depression, CES-D ($r=-0.35$, $p<0.001$) and negative emotional status ($r=-0.22$, $p=0.03$); positively with PANAS-PA ($r=0.27$, $p=0.01$) scores. Further analysis revealed that CES-D score was moderately associated with PANAS-NA score ($r=0.6$, $p<0.001$) and negatively associated with PANAS-PA ($r=-0.4$, $p<0.001$) scores.

Conclusion: In elderly women, quality of life and self-rated health status were weakly associated with positive emotional affect and lower score of depression. Moderate association was found between depressive state and negative emotional affect.

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RELATIONSHIPS OF PLASMA TOTAL HOMOCYSTEINE, FOLATE AND VITAMIN B12 LEVELS TO VERTEBRAL FRACTURE AND BMD IN MOROCCAN HEALTHY POSTMENOPAUSAL WOMEN

A. El Maataoui¹, S. Nadifi², A. El Maghraoui³, Z. Ouzzi⁴

¹Ibn Zohr University, Faculty of Medicine and Pharmacy, Biochemistry Department, Agadir, ²Hassan II University, Faculty of Medicine and Pharmacy, Casablanca, ³Mohamed V University, Faculty of Medicine and Pharmacy, Military Hospital, Rheumatology Department, Rabat, ⁴Mohamed V University, Faculty of Medicine and Pharmacy, Military Hospital, Biochemistry Department, Rabat, Morocco

Objective: A potential role of homocysteine in bone metabolism has been considered from the observation of high prevalence of osteoporosis in subjects with Homocystinuria about 50 years ago. But the mechanism linking the increased level of HCY to increased fracture risk is not clear. The objective of this study was to investigate the possible relationship between vertebral fracture, BMD, homocysteine, vitamin B12 status and folates on Moroccan postmenopausal women.

Methods: 122 healthy postmenopausal women gave their informed consent to participate in this cross-sectional study. Women were recruited through advertisements and mouth to mouth between January 2017 and May 2017. BMD was determined by a Lunar Prodigy Vision DXA system. Vertebral fracture assessment image was inspected visually by 2 clinicians.

Results: We found that a high level of homocysteine or low levels of vitamin B12 and folate are not associated to the BMD and are not risk factors for VF in healthy postmenopausal women. Whereas, the presence of vertebral fracture was associated to the number of years since menopause and to the OC level. Probably this is due to the young age of the patients with VF involved in this study. We also showed that high level of homocysteine is associated with the number of years since menopause and not age for women.

Conclusions: We found that a high level of homocysteine or low levels of vitamin B12 and folate are not associated to the BMD and are not risk factors for vertebral fracture in healthy postmenopausal women.

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BMD AND MTX USE IN PATIENTS WITH PSORIASIS OR PSORIASIS ARTHRITIS

D. Freier¹, K. Zeiner¹, R. Biesen¹, E. Wiebe¹, T. Buttgerit², S. Hermann¹, F. Buttgerit¹

¹Department of Rheumatology and Clinical Immunology, ²Department of Dermatology, Charité University Medicine Berlin, Berlin, Germany

Objectives: Reports on the prevalence of osteoporosis, osteoporotic fractures and risk factors for osteoporosis in patients with psoriasis (PSO) or psoriasis arthritis (PSOA) are scarce, and the published results on this are, at least in part, contradictory. [1-4] Additionally, there is no firm understanding of the impact of potential risk factors such as glucocorticoid cumulative dose (GCCD) as well as the possible influence of disease modifying drugs (e.g., methotrexate-MTX) on functional status and current glucocorticoid use. Rh-GIOP is an ongoing prospective study monitoring glucocorticoid (GC)-induced osteoporosis of rheumatic patients, established in 2015 at the Charité University Hospital. To date, the database comprises clinical data and BMD data measured by DXA of 592 patients with inflammatory rheumatic diseases. (ClinicalTrials.gov Identifier NCT02719314) The objective of this cross-sectional analysis was to evaluate the prevalence of osteoporosis in patients with PSO or PSOA. Additionally, the use of MTX and glucocorticoids in these patients were investigated with regard to BMD.

Method: We analyzed the initial visits of 42 patients with PSO (n=10, 80% female) or PSOA (n=32, 59% female). Descriptive analyses were performed, and values are displayed as means and standard deviations. For subgroup analyses non-parametric tests were used.

Results: Overall mean age was 61 years (± 13 years), and 64% of all patients were female. The mean disease duration was 17 ± 13 years, and patients generally showed a good functional status as quantified by the Health Assessment Questionnaire (HAQ mean: 0.9 ± 0.8). The prevalence of decreased BMD was 50% (32% osteopenia, 14% osteoporosis). GC were taken by 23% of all patients, and the mean GCCD was $8.2 \text{ g} \pm 20.6 \text{ g}$. 49% of PSOA patients but no patient with psoriasis were treated with

MTX. The current GC use was higher ($p < 0.001$) in PSO patients (40%, n=4) compared to PSOA patients (18.8%, n=6), but this difference did not confirm significantly for GCCD (PSO=9.7 g vs. PSOA=6.7g). Only two (13%) of 15 patients with MTX used additionally GC. In patients without MTX, the prevalence of GC use was nearly 30%. Medians of BMD did not differ significantly between patients with or without MTX. The mean HAQ-Score of MTX patients was 0.8 ± 0.7 vs. a mean score of 1.0 ± 0.9 in patients without MTX.

Conclusion: According to current literature, the prevalence of osteoporosis seems to be in the same range as in the normal population. [5] The need of GC is higher in patients without any additional therapy. MTX patients seem to have a better functional status, even all of them belong to the PSOA group. No difference between BMD was found with regard to the use of MTX, but the absolute numbers may be still too small to draw valid conclusions. Therefore, further investigations are necessary to evaluate to impact of MTX on tapering prednisolone and how this is connected with BMD.

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CLINICAL CASE OF LOW-TRAUMATIC FRACTURE RESULTING IN DELAYED UNION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS WITH NORMAL BMD, BUT LOW TBS AND SUCCESSFUL TREATMENT WITH TERIPARATIDE

T. Grebennikova¹, Z. Belaya¹, N. Tarbaeva¹, G. Melnichenko¹

¹The National Research Centre for Endocrinology, Moscow, Russia

Type 2 diabetes mellitus (T2DM) is associated with higher fracture risk, despite low bone turnover and an increase in BMD compared to the general population. Teriparatide accelerates bone metabolism mainly due to increased bone formation.

A 63-year-old female suffering from T2DM for 18 years without compensation (HbA1c 11.6%) suffered a low-trauma fracture of the right tibia resulting in delayed union over the next 7 months with consequent restrictions in the patient's mobility. The routine investigation revealed: serum calcium – 2.21 mmol/l (2.10-2.55); osteocalcin 7.29 ng/ml (11-43), C-terminal crosslinked telopeptide of type I collagen – 0.13 ng/ml (0.01-0.6), vitamin D – 16 ng/ml (30-100), GRF level $87 \text{ ml/min/1.73 m}^2$, L1-L4 T-score 0.3, Neck T-score -0.4, Total hip T-score 0, whereas a trabecular bone score (TBS) demonstrated a sign of degraded microarchitecture L1-L4 - 1.186 (T-score -3.3). After 3 months of treatment with teriparatide, the patient was able to walk independently. During this period osteocalcin levels increased to 25.8 ng/ml. According to the results of CT (Figure 1), the fracture had healed after 8 months of treatment with teriparatide. However, we observed a slight decline in BMD and gain in TBS values.

Conclusion: Teriparatide was effective in the treatment of fracture in patients with T2DM, and TBS can be an additional method for assessing the risk of low-trauma fractures.



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WHAT MATTERS MOST? PROMOTING PATIENT CENTRED HIP FRACTURE CARE

C. Jones¹, A. Gupta¹¹Hywel Dda UHB, Carmarthen, UK

Objectives: Patient experience and feedback can improve clinical effectiveness, patient care and outcomes. Aim of this study was to work in partnership with patients, measure patient experience, interpret patient feedback to implement quality improvement in hip fracture care.

Methods: Setting - A teaching hospital Acute Hip fracture unit in UK. A 'Health and Care Standards National Audit patient Feedback Tool' 2016 version was used. Anonymised responses were collected by a trained professional from hospitalised cognitively intact hip fracture patients using a standard questionnaire containing 34 both open and closed ended questions.

Results: 7 female 9 Male patients Age range 60-90 years. Some responses out of 34 item questionnaire"

Overall experience - 10/10 (31%) 9/10(25%) 8/10(25%) 7/10(12%)

Treated with dignity- always (69%) usually(19%) sometimes(12%)

Given enough privacy- always (75%), usually (25%)

Kept pain free – always(62%) usually(38%)

Given help for feeding –always (75%) usually(25%)

Responding quickly for toilet- always(56%) usually (25%) sometimes(19%)

Given help to become independent- always(100%)

Able to get enough rest/sleep- always(25%), usually (25%) sometimes(50%)

Given information always(56%) usually(38%) sometimes(6%)

Most patients acknowledged they had excellent care from hardworking, kind nurses, good support for recovery after hip operation. Shortcomings reported- more bedside assistance, special food items needed, more meals assistance, care-staff shortage, reassess pillows and mattresses.

Data from this survey enabled a nursing champion to organise staff engagement, training and support for improvements which have been implemented and are ongoing.

Conclusions: Hospital patient experience and feedback program has offered valuable insight and understanding where care is meeting expectations and where it is deficient. This enabled healthcare providers develop and implement targeted Improvement plans and thereby have raised standards of care for elderly hip fracture patients. A patient partnership and patient-centred culture has been promoted locally for this vulnerable group.

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IMPROVING FUNDAMENTALS OF CARE FOR HIP FRACTURE PATIENTS AND FACILITATING QUALITY IMPROVEMENT

C. Jones¹, A. Gupta¹¹Hywel Dda UHB, Carmarthen, UK

Objective: To identify gaps between current and best practice in fundamentals of patient care, establish priorities and facilitate quality Improvement. The 22 Health and Care Standards (April 2015) are core Standards for NHS Wales, UK(UK) for organisations to provide high quality patient care and to comply with legislation and guidance.

Methods: Setting- teaching hospital acute hip fracture unit in UK. Subjects - hospitalised patients following hip fracture. A trained nurse collected data about clinical care of 5 randomly selected patients from documents (nursing, food/fluid/drug charts), by observing clinical care, checking manual handling aids. 'Health and Care Standards Audit Tool October 2017 version' was used which is 114 item questionnaire based upon 7 quality themes - staff resources, staying healthy, Individual care, timely care, dignified care, effective care, safe care. Responses generated were compared with Standard and scored on 5 point scale or Yes/No answers.

Results: High compliance with standards and areas of good practice noted were on smoking cessation advice, manual handling, pressure sore prevention, falls assessment and prevention, infection control, supporting nutrition, hydration/ food/ medication charts/trolley compliance, safeguarding systems in place, care of patients who lack capacity, DOLS applications, communication about care with patient, pain/toilet/hygiene/butterfly care plans, discharge assessment and care plan. Standards requiring further attention noted were alcohol risk care plan, assessment of carer needs, oral healthcare plan, wearing of ID badges by all staff. Following the study, frontline staff were given feedback, education and were facilitated to use a range of quality Improvement Standards and Guidelines and this Improvement program is ongoing. The next step is encouraging other wards/departments/hospitals to identify and deliver high quality fundamentals of Care for all patients.

Conclusion: Good compliance with majority of standards of fundamental care implies that high quality care is being delivered in acute hip unit. Evidence gathered from current practice and patient care has provided a basis for improving quality and safety of healthcare services for hip fracture patients.

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EFFECTS OF CHRONIC STRETCHING ON MUSCLE TROPHISM AND CONNECTIVE TISSUE IN AGED FEMALE RATS

A. R. S. Gomes¹, H. Martins², K. Massenz³, N. Bertoncini⁴, T. Campos⁴, L. Noronha⁵, M. Azevedo⁶, S. Nagashima⁶, T. Zotz⁷

¹Federal University of Parana, Prevention and Rehabilitation in Physiotherapy Department, Physical Education, ²Federal University of

Parana, Physical Education, ³Federal University of Parana, Physical Education, ⁴Federal University of Parana, Physiotherapy, ⁵Pontifical Catholic University of Paraná, School of Medicine, Experimental Pathology Laboratory, Health Science, ⁶Pontifical Catholic University of Paraná, Experimental Pathology Department, ⁷Federal University of Parana, Prevention and Rehabilitation in Physiotherapy Department, Curitiba, Brazil

Objectives: Aged muscles are several-fold stiffer, characterized by the deposition of extracellular matrix (ECM) which in turn influences the biomechanical properties of the muscle-tendon unit and joints, impairing the functionality. In order to maintain flexibility and avoid deleterious effects of aging, stretching exercises have been recommended. Our aim was to verify the effects of chronic stretching on soleus muscle histomorphometry and connective tissue of aged female rats.

Methods: Fourteen 26-month old female rats were divided into two groups: Stretching (n=7, 321±32 g, SG) and control (n=7, 335±39 g, CG). The mechanical passive stretching protocol consisted of 4 repetitions of 1 min each with 30 seconds interval between repetitions. The rat was positioned on an apparatus with the tibio-tarsal joint in maximum dorsal flexion to stretch the soleus muscle, 3 times a week, for 3 weeks. Twenty four hours after last stretching session, the rats were anesthetized and the left soleus muscle was removed. The following analyses were carried out: body and muscle weight; Immunohistochemistry to quantify type I collagen and hematoxylin eosin staining to measure the muscle fiber cross-sectional area (MFCSA). ANOVA one way was used to compare parametric data and Kruskal-Wallis nonparametric data between the groups (p<0.05).

Results: There was no significant difference in body weight between groups (335±39 g vs. 321±32 g, p=0.58, ANOVA). The SG showed greater muscle mass (0.26±0.3 g vs. 0.14±0.03 g, p=0.003, ANOVA) but lower (5%) MFCSA when compared to the CG (3919±1694 µm² vs. 4172±1446 µm², p=0.002, Kruskal-Wallis). Moreover SG exhibited less type I collagen (0.07±0.09 vs. 0.48±0.75, p=0.05, Kruskal-Wallis) percentage of immunostaining per soleus muscle fiber area when compared with the CG.

Conclusions: Aged female rats showed an increase in muscle mass suggesting fat infiltration because the MFCSA decreased indicating atrophy, which may be related to the reduced ability of aged muscles to respond to a mechanical load, as stretching. However, chronic stretching protocol was enough to diminish type I collagen demonstrating the reorganization of connective tissue which could contribute for limiting fibrosis and increasing muscle extensibility.

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CHARLSON COMORBIDITY INDEX SCORE IMPACTS EARLY COMPLICATIONS AFTER HIP FRACTURES MORE THAN SURGICAL DELAY

W. L. E. Cher¹, J. C. Allen², S. J. Yeo¹, A. K. Mitra¹, M. A. Peng³, T. S. Howe¹, J. S. B. Koh¹

¹Singapore General Hospital, Orthopaedic Surgery, ²Duke-NUS, Centre for Quantitative Medicine, ³Singapore General Hospital, Diagnostic Radiology, Singapore

Introduction: Co-morbid factors can potentially cause surgical delay in hip fractures, which in turn results in higher short-term complications. We aim to study the impact of baseline co-morbidities on surgical delays and attempt to determine the dominating predictor for early complications in hip fracture patients.

Methods: This is a retrospective study from the Singapore General Hospital between 2013 to 2016. Data collected includes age, gender, Charlson Comorbidity Index (CCI), time to surgery, fracture patterns

and ASA score. Short-term complications analysed include mortality at 30 and 90-days, and readmissions within 90-days. Multivariate logistic regression incorporating a stepwise selection algorithm (significance levels: enter=0.20, stay=0.25) were used in combination with ROC analysis to identify best predictors of short-term complications after hip fracture surgery. The significance level was set at 5% (p<0.05).

Results: 1321 surgeries, with a median age of 77.8 ± 8.4 years were included in this study. Lost to follow up rate was 2.4% and 472 (35.7%) surgeries were performed within 48hrs. The 30 and 90 days' mortality were 19 (1.5%) and 33 (2.5%) respectively. Readmissions at 90-days were 238 (18%). CCI significantly increases surgical delay and the risk of short-term complications was statistically higher with increasing CCI (p<0.05). Age, gender, ASA, surgical delay (defined as >48hrs) and fracture types did not significantly increase the risk of short-term mortality at 30 and 90 days (p>0.05). Taking into consideration the dominating predictor of CCI, both ASA score and surgical delay did not significantly increase area under the ROC curve for both the short-term mortality and readmission.

Conclusion: CCI was correlated with surgical delay and was identified as the dominant predictor for short-term complications. Hence, complications associated with surgical delays may be an inadvertent result of increased co-morbid load.

30-days Mortality				
Contributing Factors	ROC Area	95% Confidence Interval	P-Value	
CCI	0.7443	0.6410	0.8476	-
CCI with Surgical Delay	0.7468	0.6455	0.8482	0.7633
CCI with Surgical Delay and ASA score	0.7699	0.6706	0.8692	0.3842

Contributing Factors	ROC Area	95% Confidence Interval	P-Value	
CCI	0.7673	0.6870	0.8477	-
CCI with Surgical Delay	0.7693	0.6884	0.8503	0.7334
CCI with Surgical Delay and ASA score	0.7740	0.6887	0.8592	0.7238

Contributing Factors	ROC Area	95% Confidence Interval	P-Value	
CCI	0.6414	0.6031	0.6797	-
CCI with Surgical Delay	0.6591	0.6220	0.6963	0.1191
CCI with Surgical Delay and ASA score	0.6611	0.6240	0.6982	0.1079

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EFFECTS OF AN INTENSIVE EXERCISE PROGRAM ON RHEUMATOID ARTHRITIS PATIENTS

S. Patru¹, D. Matei¹, I. R. Marcu¹, A. C. Bighea¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objectives: Many clinical trials found that intensive exercises improve aerobic fitness and muscle strength of Rheumatoid Arthritis (RA) patients without any increase in disease activity. The

purpose of our randomized, controlled trial was to compare the effectiveness of a long term intensive exercise program with usual care.

Methods: we randomized 50 RA patients from Rehabilitation Department in two groups: the high intensity training group (30 min exercises for muscle strength and endurance, joint mobility and activities of daily living, preceded by 10 min of “warm-up” and followed by 10 min of “cool-down”) and control group (usual care). The physical training was adapted to individual disabilities. We assessed the patients in three time points: baseline, at 6 months and at 12 months using the Health Assessment Questionnaire (HAQ) for functional ability and the Hospital Anxiety and Depression Scale (HADS) for emotional status.

Results: The mean difference in change both in the HAQ score and the HADS score between the two groups was statistically significant and in favor of the interventional group only at 12 months ($p=0.005$).

Conclusions: a one year high intensity exercise program improved functional capacity and psychological distress to RA patients without adverse effects on disease activity.

References:

1. Hakkinen A et al. *Arthritis Rheum* 2001;44:515
2. Van den Ende CH et al. *Ann Rheum Dis* 2000;59:615

P483

EFFECTIVENESS OF A CERVICAL PILLOW TO PATIENTS WITH CERVICAL SPONDYLOSIS

S. Patru¹, I. R. Marcu¹, D. Matei¹, A. C. Bighea¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objectives: Some studies concluded that a proper cervical pillow during sleep may help to improve quality of sleep, cervical mobility and to decrease neck pain to patients with cervical spondylosis (CS). Our clinical trial assessed the effects of a cervical pillow in addition to exercises on cervical morning stiffness and pain, cervical range of motion and sleep to CS patients.

Methods: We randomly assigned CS patients into two groups: the Pillow Group (15 patients that use a cervical pillow every time they sleep during the study in addition to a usual exercises program for cervical spine) and the Control Group (15 patients that followed only the exercises program for neck, 30 min/d, 5 times/week). The patients were evaluated baseline and at the end of the study, after 8 weeks, using: cervical flexion, extension and lateral flexion, neck pain on a visual analogue scale (VAS) and neck disability index (NDI) questionnaire.

Results: Our results showed that the cervical range of motion improves none statistically significant in Pillow Group at the end of the study compared to control. Cervical pillow was associated with a statistically significant decreases in neck pain intensity on VAS ($p=0.05$). NDI scores significantly improves in Pillow Group compared to control after 8 weeks ($p=0.05$). There was a significant difference on quality of sleep improvement in favor of cervical pillow patients. **Conclusions:** Even though there was less effect on cervical mobility, cervical pillow in addition to a proper exercise program demonstrated its effectiveness to CS patients.

References:

1. Helewa A et al. *J Rheumatol* 2007;34:151
2. Lavin RA et al. *Arch Phys Med Rehabil* 1997;78:193

P484

BISPHOSPHONATES LONG-TERM THERAPY AND ATYPICAL FEMORAL FRACTURES, MYTH OR REALITY? CASE REPORT

C. Galesanu¹, V. Lisnic², M. R. Galesanu³

¹University of Medicine and Pharmacy “Grigore T. Popa”, ²Sf. Spiridon Emergency Clinical Hospital, ³Romanian Academy of Medical Sciences, Radiology, Iasi, Romania

Objective: Bisphosphonates are considered initial pharmacologic therapy for most postmenopausal women at high risk for fracture. They have all been shown to improve BMD in postmenopausal women with osteoporosis. There is theoretical concern that prolonged bisphosphonate therapy can lead to oversuppression of bone turnover “frozen bone” and increased skeletal fragility, resulting in atypical femoral fractures (AFF) (subtrochanteric or diaphyseal fractures). The absolute risk of an atypical fracture is low.

Case report: We present a 77 years-old woman with no history of trauma, or associated with low-energy trauma, admitted to our clinic after three weeks of a left femoral fracture threatened in orthopedic clinic. The patient was in our clinical observation since 1983 for hypothyroidism after thyroidectomy in treatment with 100 µg LT4. In 2002 the patient was diagnosed with osteoporosis following the DXA examination. The BMD showed T-score at total lumbar spine: -4.0, total hip: -2.1, and left femur neck: -3.0. 25-OHD level varied between 17.69 ng/mL and 5.54 ng/mL. TSH, FT4, and FT3 level was normal in time. Has been established treatment with risedronicum acidum 35 mg/week, alfacalcidol 1 µg/d and calcium 1000 mg/d. Annual DXA-BMD shows a slight increase of BMD; patient medical treatment has been changed in zoledronicum acidum and then on alendronicum acidum. The patient was in treatment with bisphosphonates over 10 years. An association between bisphosphonate long-term use and the occurrence of AFF has been suggested. This diagnostic has been supported and by the x-ray: femoral shaft region transverse fracture configurations, absence of comminution, a medial spike, localized periosteal thickening of the lateral cortex, and generalized thickening of the femoral cortices.

Conclusions: The causal relationship between prolonged bisphosphonate use and the occurrence of AFF has not yet been established. Our case confirms the possible connection between long-term bisphosphonates therapy and AFF. For the patient at high risk of fracture, it may be beneficial to continue bisphosphonate treatment beyond five years. For most people with osteoporosis, the proven fragility-fracture risk-reduction benefits of bisphosphonates outweigh the risks of AFF.

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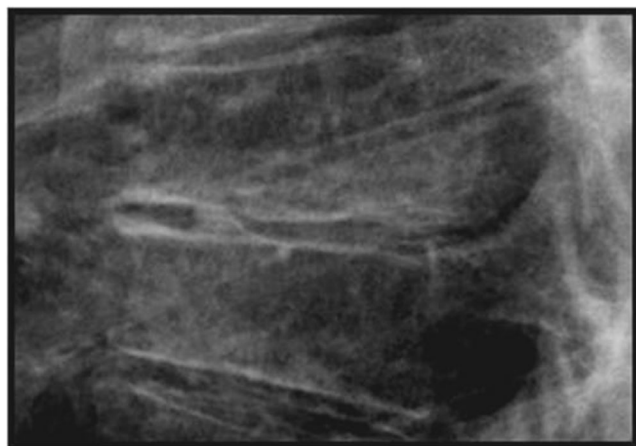
ASSOCIATION OF DORSAL FLAT VERTEBRA/ PLATYSPONDYLIA AS A FORM OF VERTEBRAL DYSPLASIA WITHIN TYPE II COLLAGEN DISORDERS

M. P. Ahijado Guzmán¹, R. Veiga Cabello², M. Cantalejo Moreira¹, J. Ruiz Ruiz¹, A. Zapatero Moreira¹

¹Htal de Fuenlabrada, Fuenlabrada, ²Htal Central de la Defensa, Madrid, Spain

Objective: Defects in the type II collagen gene are described. These predispose humans to various phenotypic combinations in families with skeletal dysplasia, and/or disease by causing deposits of microcrystals and/or early osteoarthritis and/or synovial osteochondromatosis. Flat vertebra is defined as the vertebrae with flattening of the vertebral body, also with irregular surface or with nodules of Schmorl (flat vertebra), in

isolation or two a maximum of two vertebral bodies, to distinguish it from Scheuermann's disease. The purpose of this is to demonstrate the possibility of "dorsal flat vertebra" in relation to pathologies associated with type II collagen disorders.



Methods: Patients attending physician since 1994, in whom type II collagen disease or vertebral dysplasia was suspected, were selected for the study. Their medical history was taken. Also available radiographs, including dorsal lateral spine x-rays, were assessed for a flat vertebra, by triple-observer (two rheumatologists and one radiologist), according to the defined criteria. In all selected patients, a DXA osteoporosis screening was performed, being both densitometric osteoporosis and chest trauma exclusion criteria.

Results: The 84 patients assessed included 43 women and 41 men, with a mean age of 47.1 years, mean weight of 84.6 kg in men and 74.4 kg in women, and mean height 168.8 cm in men and 159 cm in women. From a radiological and clinical point of view it was obtained: atypical arthrosis: 64.3%, synovial osteochondromatosis: 15.5%, chondrocalcinosis: 7.1%, lower dorsal kyphotic apex: 38.1%, calcifying enthesopathies: 4.8%, exostoses: 4.8%, other calcifications: 20.2%, scoliosis: 33.3%, family history of flat vertebrae: 3.6%, dysplastic peripheral traits: 27.4%, personal history of microcrystalline arthritis: 4.8%. None developed T-score suggesting osteoporosis by DXA.

Conclusion: The association of dorsal flat vertebra (according to the defined criteria) is seen as a form of vertebral dysplasia within type II collagen disorders. All patients or their parents were born in small towns, leading to suspicion in endogamy.

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VITAMIN D SUPPLEMENTATION AND BIOMARKERS OF INFLAMMATION IN PATIENTS WITH KNEE OSTEOARTHRITIS: POST HOC ANALYSIS OF A RANDOMIZED CONTROLLED TRIAL

S. Zheng¹, W. Wang², W. Y. Han¹, Z. H. Zhu¹, X. Wang¹, X. Z. Jin¹, B. Antony¹, F. Cicuttini², A. Wluka², T. Winzenberg¹, D. Aitken¹, L. Blizzard¹, G. Jones¹, C. H. Ding¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart,

²Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia

Objectives: To determine whether vitamin D supplementation and maintaining vitamin D sufficiency are associated with changes in inflammatory and metabolic biomarkers in patients with knee osteoarthritis (OA) and vitamin D deficiency.

Methods: 413 participants with symptomatic knee OA and vitamin D deficiency were enrolled in a randomized, placebo-controlled trial and received 50,000 IU vitamin D₃ or placebo monthly for 24 months across two sites. In this post-hoc analysis, 200 participants from one site (94 from placebo group and 106 from vitamin D group; mean age 63.1±7.3 years, 53.3% females) were randomly selected for measurement of serum levels of inflammatory and metabolic biomarkers at baseline and 24 months using direct competitive chemiluminescent immunoassays. Additionally, participants were classified into two groups according to serum 25-hydroxyvitamin D [25(OH)D] levels at month 3 and 24: 1) not consistently sufficient [25(OH)D ≤50 nmol/l at either month 3 or 24, N=61], and 2) consistently sufficient [25(OH)D >50 nmol/l at both month 3 and 24, N=139]. Results: Compared with placebo, vitamin D supplementation had no significant effect on change in serum hs-CRP, IL-6, IL-8, IL-10, leptin, adiponectin, resistin, adiponectin and apelin. Being consistently vitamin D sufficient over 2 years was also not associated with changes in these biomarkers compared to not being consistently sufficient.

Conclusion: Vitamin D supplementation and maintaining vitamin D sufficiency did not alter serum levels of inflammatory and metabolic

biomarkers over 2 years in knee OA patients who were vitamin D insufficient, suggesting they may not affect systemic inflammation in knee OA patients.

Table 1. Baseline characteristics of participants

	Vitamin D Group (N=106)	Placebo Group (N=94)	P value
Age, years	63.3 (7.5)	62.8 (7.3)	0.60
Women, No. (%)	53 (50.0%)	54 (57.4%)	0.29
BMI, kg/m ²	29.4 (7.5)	29.6 (4.0)	0.80
Serum 25(OH)D (nmol/L)	42.5 (11.7)	43.5 (12.6)	0.57
Serum biomarker			
*hs-CRP (ug/ml)	1.5 (0.8, 2 2.6)	1.3 (0.7, 2.5)	0.62
*IL-6 (pg/ml)	1.4 (0.4, 3.8)	1.2 (0.4, 3.7)	0.81
*IL-8 (pg/ml)	7.8 (5.7, 10.4)	7.6 (6.1, 10.9)	0.98
*IL-10 (pg/ml)	0.9 (0.3, 5.2)	0.6 (0.3, 3.5)	0.56
Resistin (pg/ml)	38.4 (14.9)	39.3 (13.2)	0.32
*Leptin (ng/ml)	19.2 (9.4, 58.1)	23.6 (9.7, 44.1)	0.90
*Adiponectin (ng/ml)	32.9 (18.2, 50.3)	26.5 (15.5, 43.8)	0.11
Adipsin (ng/ml)	4.0 (1.5)	3.9 (1.2)	0.84
Apelin (ng/ml)	1.0 (0.3)	1.0 (0.4)	0.84

Values are mean (standard deviation) or percentage unless otherwise stated.

* Skewed distribution, values are median (interquartile range).

Abbreviations: BMI, BMI; hs-CRP, high sensitivity C-reactive protein. BMI was calculated as weight in kilograms divided by height in meters squared.

Student's t-tests or Chi-square tests.

Table 2. Comparisons of change in inflammatory biomarkers between vitamin D and placebo groups over 24 months

	Vitamin D group Change (N=106), Mean (95%CI) ^a	Placebo group Change (N=94), Mean (95%CI) ^a	Between-Group Difference, Mean (95%CI) ^b	P Value
hs-CRP (ug/ml)	0.3 (-0.2, 0.7)	-0.0 (-0.5, 0.5)	0.3 (-0.4, 1.0)	0.43
IL-6 (pg/ml)	-2.3 (-5.6, 0.9)	-0.7 (-4.2, 2.8)	-1.6 (-6.4, 3.2)	0.51
IL-8 (pg/ml)	-3.1 (-6.5, 0.3)	-0.0 (-3.7, 3.6)	-3.1 (-8.1, 2.0)	0.24
IL-10 (pg/ml)	-2.3 (-5.6, 0.9)	-0.7 (-8.5, 7.1)	-1.6 (-6.4, 3.2)	0.51
Resistin (pg/ml)	4.4 (2.7, 6.2)	1.9 (0.1, 3.8)	2.5 (-0.0, 5.1)	0.05
Leptin (ng/ml)	-0.2 (-3.4, 3.0)	-0.8 (-4.2, 2.6)	0.6 (-4.0, 5.3)	0.79
Adiponectin (ng/ml)	0.01 (-0.02, 0.04)	0.00 (-0.03, 0.03)	0.01 (-0.04, 0.06)	0.66
Adipsin (ng/ml)	0.2 (0.1, 0.4)	0.1 (-0.0, 0.3)	0.1 (-0.1, 0.3)	0.39
Apelin (ng/ml)	-0.1 (-0.1, 0.0)	0.0 (-0.1, 0.1)	-0.1 (0.2, 0.0)	0.13

¶ box-cox transformation;

^a Change in inflammatory biomarkers are generated from mixed models adjusted for age, sex, BMI and change in season of blood sampling;

^b Between-group difference was calculated using vitamin D group values minus placebo group values.

Table 3. Comparison of change in inflammatory biomarkers between different vitamin D status over 24 months[\]

	Consistently sufficient Change (N=139), Mean (95%CI) ^a	Not Consistent- ly sufficient Change (N=61), Mean (95%CI) ^a	Between-group Difference, Mean (95%CI) ^b	P value
hs-CRP (ug/ml)	0.2 (-0.2, 0.7)	-0.1 (-0.7, 0.6)	0.3 (-0.5, 1.1)	0.46
IL-6 (pg/ml)	-2.8 (-5.7, 0.0)	1.3 (-3.0, 5.6)	-4.1 (-9.3, 1.0)	0.12
IL-8 (pg/ml)	-3.0 (-6.0,-0.0)	1.4 (-3.1, 6.0)	-4.5 (-9.9, 1.0)	0.11
IL-10 (pg/ml)	-3.3 (-9.6, 3.1)	2.9 (-6.8, 12.6)	-6.2 (17.8, 5.4)	0.29
Resistin (pg/ml)	3.8 (2.3, 5.4)	1.9 (-0.4, 4.3)	1.9 (-0.9, 4.7)	0.18
Leptin (ng/ml)	-0.1 (-2.9, 2.7)	-1.3 (-5.5, 2.9)	1.1 (-3.9, 6.2)	0.66
Adiponectin (ng/ml) ¶	0.02 (-0.01, 0.04)	-0.01 (-0.06, 0.03)	0.03 (-0.02, 0.08)	0.26
Adipsin (ng/ml)	0.3 (0.1, 0.4)	0.1 (-0.1, 0.3)	0.2 (-0.1, 0.4)	0.13
Apelin (ng/ml)	-0.0 (-0.1, 0.0)	-0.1 (-0.1, 0.0)	0.0 (-0.1, 0.1)	0.72

¶ box-cox transformation;

^a Change in inflammatory biomarkers are generated from mixed models adjusted for age, sex, BMI and change in season of blood sampling;

^b Between-group difference was calculated using consistently sufficient group values minus not consistently sufficient group values.

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EFFECT OF MILD OSTEOPOROTIC VERTEBRAL BODY DEFORMITIES ON THE PREVALENCE AND INCIDENCE OF LUMBAR AND DORSAL PAIN ATTACKS REQUIRING MEDICAL ASSESSMENT

C. A. Guillén-Astete¹

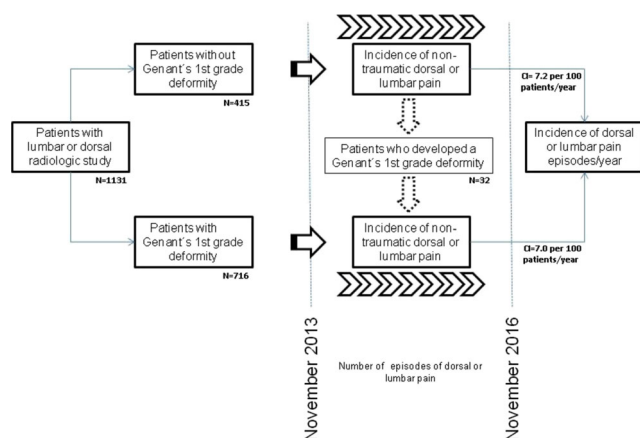
¹Ramon y Cajal University Hospital, Madrid, Spain

Objective: There is a lack of information about the relevance of mild osteoporotic vertebral body deformities and back pain. This kind of wedges can also be interpreted as the effect of osteoarthritis and due to that they are not considered as a reason to start a secondary prevention of osteoporotic axial fractures. One way to measure the relevance of these deformities is realizing its association to the frequency of pain attacks requiring medical assessment. The aim of the present study is to determine the relationship of the number of medical consultations due to dorsal or lumbar pain and two categorical variables: Presence or absence of mild vertebral wedge (Genant's first level of classification) and Kellgren-Lawrence's osteoarthritis classification levels I-II and III-IV.

Methods: We conducted a historical cohort study with 1131 patients with and without mild vertebral body deformities along three years to compare the frequency of axial pain episodes assessed in emergency units and their chance to evolve to moderate or severe wedges.

Results: In the group without deformities, the cumulative incidence of dorsal or lumbar pain episodes was 7.2% per year and the incidence density was 7805 cases per 100 patients-year. In the group with mild deformities, the cumulative incidence of dorsal or lumbar pain episodes was 7.0% per year and the incidence density was 7318 cases per 100 patient-year ($P=0.77$ and 0.58 , respectively). Dividing patients according to their osteoarthritis severity, the cumulative incidence of dorsal and lumbar pain episodes along the period of observation, in patients with a spinal Kellgren-Lawrence's osteoarthritis degree I-II and III-IV were 19.8% (CI95% 12.10%-27.49%) and 31.5% (CI95% 18.27%-44.72%), respectively ($P<0.0001$). The density of incidence for both groups was 6.18 cases per 100 patients-year and 11.3 cases per 100 patients-year, respectively ($P<0.0001$). The difference in proportions of patients who developed a moderate or severe Genant's vertebral deformities was not statistically significant among patients with or without mild vertebral wedges.

Conclusions: Our results point that back pain incidence is not related to the presence of vertebral mild wedges but to the severity of axial osteoarthritis. Also, the behaviour of starting a secondary osteoporosis prevention treatment after the detection of a mild vertebral wedge is not supported by our results.



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PILOT INTRODUCTION OF FRACTURE RISK ASSESSMENT TOOL IN UNDERGRADUATE MEDICAL EDUCATION

A. A. Popov¹, P. A. Palabugina¹, V. Teplyakova¹, A. V. Sarapulova¹

¹Urals State Medical University, Ekaterinburg, Russia

Objective: High fracture rates throughout the Eastern Europe and Central Asia region have been reported according to 2010 Osteoporosis Audition [1]. As major fractures rate increase is predicted by 2050, primary care physicians need to increase awareness of risk assessment and prevention tools. The aim of this pilot study was to assess main issues of FRAX tool introduction into undergraduate medical education.

Methods: Russian version of the IOF approved presentation on FRAX application procedure, results assessment and interpretation as well as Russian Association for Osteoporosis clinical guidelines and reference to www.osteoporoz.ru site have been provided to 248 undergraduate

medical students. To increase osteoporosis related issues study motivation the students were asked to apply the Russian version of online FRAX calculator to assess risk fracture in their close relatives of appropriate age. Also the students were asked to create a FRAX assessment based patient management program.

Results: 207 FRAX assessment reports were received as feedback. FRAX derived intervention threshold was reached in 41 cases (19.8%), while in 45 reports (21.7%) BMI value was mistaken for a 10-year fracture risk. There were 123 cases of the students' parents assessments. These subjects appeared to be quite young (median 48, range 42-62) and relatively healthy to report no fracture risk factors. The students' grandparents or great-grandparents (68 cases) were assessed on rare occasions due to lack of information or absence of personal contacts between students and their relatives. The students reported appreciable difficulties in decision making. Lifestyle and diet modification were not included in 165 of recommendations, while calcium and vitamin D prescriptions were severely biased by TV advertising. The students reported that it was quite difficult for them to give the patients recommendations regarding the choice of drug and administration timeframe.

Conclusion: Pilot study of FRAX introduction into undergraduate medical education helped to ascertain several gaps in teaching of osteoporosis diagnosis, prevention and treatment to be covered during undergraduate medical education.

References: Lesnyak O et al. Arch Osteoporos 2012;7:67

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A 60% INCREASE OF HIP FRACTURE SURGERIES PERFORMED WITHIN 48 HOURS FROM HOSPITAL ADMISSION DID NOT CHANGE THE OVERALL MORTALITY RATES

H. Schermann¹, R. Gurel¹, D. Rotman¹, O. Chechik¹, A. Sternheim², M. Salai¹, T. Ben-Tov¹, A. Kadar¹

¹Orthopedic Surgery Division, Tel Aviv Sourasky Medical Center, affiliated with Tel Aviv University, ²National Unit of Orthopedic Oncology, Tel Aviv Sourasky Medical Center, affiliated with Tel Aviv University, Tel Aviv, Israel

Objective: To investigate the effect of regulatory measures aimed at promoting of early hip fracture fixation on rates of operations performed within 48 hours from admission and on overall mortality.

Methods: Hip fracture surgery performed within 48 h from admission has been associated with a significant decrease in short- and long-term mortality. During the last decade, two major regulatory interventions aimed at promoting early surgery were introduced by the Ministry of Health: in 2010 - staff reimbursement for operations performed in the afternoon (positive reinforcement); in 2013 - penalizing the hospital with fines for each case operated after 48 h (negative reinforcement). In this study, we have compared the rates of early surgery (<48 h) and one-month and one-year mortality rates among 3 groups of patients with hip fractures treated in a single inner-city medical center during three time periods: 2007-2009 (no intervention), 2010-2013 (positive reinforcement) and 2014-2016 (positive and negative reinforcement).

Results: A total of 5084 patients were operated between 2007-2016. The three study groups (n=1479, n=2076 and n=1529, respectively) did not differ significantly with respect to age on admission, gender, type of hip fracture (intracapsular or extracapsular), ASA score, mean hemoglobin on admission and mean socioeconomic status. The percent of operations performed within 48 h was 55%, 65% and 85%, respectively ($p<0.01$). One-month mortality was 3.9%, 5.1% and 5%, whereas one-year mortality was 19.2%, 18.7% and 19.6%, respectively.

Conclusions: Fines to the hospital for late hip surgeries, complimentary with additional reimbursement for afternoon surgeries, were very successful at promoting early hip surgery. However, despite the substantial increase in the rates of early surgery, mortality rates were not affected.

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HOW MUCH THIS JOINT COST? AN ATTEMPT TO ESTABLISH THE DETERMINANTS OF MEDICAL COMPENSATIONS DEMANDED BY RHEUMATIC PATIENTS IN CASE OF A PERMANENT JOINT DAMAGE

D. Mazilu¹, D. Opris-Belinski¹, F. Berghea¹, R. Ionescu¹, M. Suta²

¹Carol Davila University of Medicine Bucharest, Bucharest, ²Medicina Interna si Reumatologie, "Ovidius" University, Constanta, Romania

Objectives: To establish how various social, individual or disease specific determinants (1) modify the patient's demands for financial compensation in case of large joints disabilities due to medical faults.

Methods: A focus group of eight rheumatologists created a list with determinants that could impact on the level of the compensation demanded by affected rheumatic patients. 210 patients have been questioned regarding the compensation they would demand in case of a partial or total compromising of a hip, knee or spine. Various additional data have been also collected and statistically analyzed by using SPSS 16.0.

Results: The general levels of compensation requested by our patients for a total compromising of a large joint have been: 1.06(SD=0.32) for a hip, 0.30 (0.30) for a knee and 3.76 (1.48) for total spine (1=GDP per capita in EU28 zone). The compensations did not vary with sex but with other determinants like age (Pearson index for $p < 0.05 = 0.49$), income (0.758), education (0.658) and urban provenience (0.457). The level of residual pain influenced the level of compensations (Pearson index=0.492). Other correlations are available for disease activity, number of past treatments and EQ5D score.

Conclusion: Level of compensation is highly modified by social and individual determinants: highly educated urban persons having a higher income think to a higher level of such compensation. A unified EU directive regarding this issue should take care of country to country differences.

References: 1. Hifinger M et al. Ann Rheum Dis 2017;76:126

Acknowledgments: We would like to thank to the following colleagues for their generous help: M. Minea, O. Surdu, V. Bojinca, A. Balanescu, D. Predeteanu, M. Iacob.

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IMPACT OF VITAMIN D STATUS ON INNATE IMMUNE RESPONSE AND PHENOTYPE IN A GROUP OF PATIENTS WITH SYSTEMIC SCLEROSIS

L. Groseanu¹, L. Banica², T. Gudu³, I. Saulescu¹, A. Balanescu¹, D. Predeteanu¹, R. Ionescu¹, F. Berghea¹

¹Carol Davila University of Medicine Bucharest, ²Cantacuzino Research Institute, ³Sf. Maria Hospital, Bucharest, Romania

Objectives: To investigate the effects of vitamin D status, VDR expression and its metabolic enzymes on the innate immune response in normal scleroderma patients and the impact on clinical and immunological markers of disease

Methods: 20 scleroderma patients were evaluated according to MEDS evaluation sheets; additional information was collected, too. Healthy

individuals were recruited to provide matched control samples. Vitamin D (25OH vitamin D) was measured using chemiluminescence. The expression of mRNA for VDR, for vitamin D activating/inhibitory enzymes (Cyp27B1/Cyp24A1), for IFN signature genes (IFIT1 and Mx1) and for human cathelicidin antimicrobial peptide (hCap18) in peripheral blood mononuclear cells (PBMCs) freshly isolated from scleroderma patients and healthy donors was evaluated by real-time PCR.

Results: Correlations of vitamin D levels were found with the presence of osteoporosis, muscle weakness, pulmonary arterial hypertension, inflammatory syndrome, negative correlation were found with Rodnan score, Medsger severity score, and intima-media thickness. PBMCs of scleroderma patients expressed high levels of VDR, while CYP27B1 mRNA was significantly reduced as compared with control. There was no statistical difference regarding the expression of mRNAs for IFIT1, Mx1 and of hCap18. CYP24A1 expression correlated with pulmonary fibrosis, use of immunosuppressants; CYP27B1 expression correlated with proteinuria, Rodnan score, muscle atrophy, use of immunosuppressants, joint contractures and HAQ ($p = 0.001$); IFIT and MX1 expression correlated with activity score, Rodnan score, joint contractures and HAQ

Conclusions: Patients with systemic sclerosis have low levels of vitamin D and increased VDR expression. Although, there was no difference for the expression of mRNAs for IFIT1, Mx1 and of hCap18 from control group, important correlations were found with clinical features and activity indices. The role of vitamin D deficiency and its impact on innate immunity in the pathogenesis of systemic sclerosis needs further investigation.

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Groseanu L et al. Eur J Rheumatol 2016;3:50.

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P492

THE TREATMENT OF THREE WINDSWEEP DEFORMITY CASES ACCOMPANYING A SEVERE VALGUS DEFORMITY

E. Shiigi¹

¹Yamaguchi Grand Medical Center, Department of Orthopaedic Surgery, Hofu, Japan

Objective: We investigated the problems associated with the treatment of three windswept deformity cases accompanying a severe valgus deformity. Severe valgus deformity was defined based on a report by Ranawat et al. as standing at $FTA \leq 155^\circ$. To clarify the associated issues, we investigated the cases, excluding those involving coxitis knees.

Case 1: The patient was 78-year-old woman. Three years after undergoing laminoplasty for cervical myelopathy, valgus deformity and pain in the left knee rapidly progressed over the past year. FTA in the dorsal position for right was 197° and that for left was 144° . Independent walking was difficult.

Case 2: The patient was 64-year-old man whose right knee was injured in a traffic accident (details unknown) at the age of 20 years. From several years before presenting to the hospital, the pain in his left knee had worsened. ROM was as follows: right extension -25° ; flexion 75° ; left extension -5° ; and flexion 110° . The patient had a fixed valgus knee, and a 5-cm difference in length was noted. His standing FTA in the right was 144° and that in the left was 188° .

Case 3: The 86-year-old women with a windswept deformity accompanying a severe valgus deformity.

Results: I thought it was effective to first perform TKA on a normal varus deformity to secure an almost normal supporting leg as rehabilitation

during the waiting period before the valgus deformity surgery. The use of step height and long-leg orthoses further reduced the patient's burden. All three cases underwent TKA for the valgus using the lateral approach. The tibial attachment of the patellar tendon became detached during surgery; however, the patellar ligament was collected and the area was reconstructed using an artificial ligament.

Conclusion: 1. TKA was first performed on the varus deformity side, and after securing the supporting leg. TKA was performed on the severe valgus deformity. 2. When undergoing rehabilitation while awaiting surgery, the use of orthosis was effective. 3. Reconstruction was performed with ST +an artificial ligament on a patient who exhibited patellar ligament rupture during surgery.

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ASSOCIATIONS OF ABSOLUTE RISK OF FRACTURES (FRAX[®]) WITH CHRONIC NON-COMMUNICABLE DISEASES (CNCDS) IN THE URBAN POPULATION OF THE RUSSIAN FEDERATION

M. Miagkova¹, I. Skripnikova¹, S. Shalnova¹, A. Deev¹

¹Federal State Institution "National Medical Research Center for Preventive Medicine" of the Ministry of Healthcare of the Russian Federation, Moscow, Russia

Objectives: A number of studies have shown that the combination of various CNCDS with osteoporosis can change its clinical picture and course, the type and severity of complications and worsen the patient's quality of life. However, currently the relationship between CNCDS and the risk of fractures has not been studied. Our aim was to study associations of the absolute risk (AR) of fractures with CNCDS among the urban population of the Russian Federation (RF).

Methods: Representative sample of the Russian urban population was analyzed. In total 9143 Russian residents aged 40-69 years participated in the study. AR of fractures was calculated on the basis of the Russian model FRAX without BMD using the batch processing of data. The associations between the AR of fractures and the following CNCDS: coronary heart disease (CHD), myocardial infarction (MI), heart rhythm disorder (HRD), arterial hypertension (AH), stroke, diabetes mellitus (DM), depression and others were studied. To diagnose diseases epidemiological criteria and anamnesis data were used.

Results: A high risk of fractures was detected in 16% of participants and the majority of them (>90%) had at least one CNCDS. The prevalence of one CNCDS was 16.7% in men and 12.8% in women, and four or more CNCDS was 27.1% in men and 36.6% in women. Adjusted for the age and the city in which the study was conducted, the chance of detecting two CNCDS increased by 1.5 times [1.0-2.38], three CNCDS by 1.7 times [1.03-2.75], four or more CNCDS by 2 times [1.37-2.94]. The prevalence of the CNCDS (except for AH) in women with a high risk of fractures was significantly higher in comparison with those who had a low risk. In men with a high risk of fractures, only the prevalence of anxiety and depression was significantly higher than in those with low risk.

Conclusion: The presence and accumulation of CNCDS were associated with a high risk of fractures in the urban population of the RF. In this connection, for early fractures prevention in people over 40 years old with a combined pathology it is advisable to assess AR of fractures using a simple calculator FRAX.

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EQUAL PREVALENCE OF VDBP AND VDR VARIANTS IN POSTMENOPAUSAL WOMEN WITH NORMAL OR LOW BMD

F. A. Azizieh¹, R. Al-Temaimi², O. Mojiminiyi², D. Shehab², K. Al Jarallah², R. Gupta², R. Raghupathy²

¹Gulf University for Science and Technology, Mubarak Al-Abdullah Area, ²Kuwait University, Faculty of Medicine, Jabriya, Kuwait

Objective: Postmenopausal osteoporosis is a multifactorial bone disease with several genetic variants still being explored. Vitamin D binding protein (VDBP) and Vitamin D receptor (VDR) variants have been suggested to be associated with bone loss in osteoporosis, though this is somewhat controversial. This study aimed at measuring circulatory levels of vitamin D, VDBP as well as common genetic variants of VDBP and VDR in postmenopausal women with normal or low BMD.

Methods: The study population included 93 postmenopausal women of whom 46 had normal BMD, 32 had osteopenia and 15 had osteoporosis. Serum levels of vitamin D and VDBP were measured and patients were genotyped for two single nucleotide polymorphism (SNP) for VDBP (rs7041, rs4588), VDR (rs7975232, rs2228570) and were studied for their association with assessed variables.

Results: As compared to subjects with normal BMD, subjects with low BMD had similar serum levels of vitamin D and VDBP. We also found that the frequency of VDBP and VDR variants in the two groups are similar. None of the genetic variants seem to be associated with higher risk of osteopenia or osteoporosis, and they were not associated with categorical vitamin D groups and VDBP levels.

Conclusion: These data address the need to further investigate the genetic interactions between VDBP and VDR gene variants on osteoporosis risk and underscore the complexity and multivariability of postmenopausal osteoporosis. Further research on ethnically homogeneous populations is as well needed and would be rewarding.

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P495

VITAMIN D SUPPLEMENTATION IMPROVES DEPRESSION IN KNEE OSTEOARTHRITIS PATIENTS

S. Zheng¹, L. D. Tu², F. Cicuttini³, W. Y. Han¹, Z. H. Zhu¹, B. Antony¹, A. Wluka³, T. Winzenberg¹, D. Aitken¹, L. Blizzard¹, G. Jones¹, C. H. Ding¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia, ²Department of Rheumatology, the third Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China, ³Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia

Objectives: To determine the effect of vitamin D supplementation and maintaining sufficient serum vitamin D on depression in patients with knee osteoarthritis (OA) and vitamin D deficiency.

Methods: Participants with symptomatic knee OA and vitamin D deficiency were enrolled in a randomized, placebo-controlled trial and received 50,000 IU vitamin D3 (N=209) or placebo (N=204) monthly for 24 months. Serum 25-hydroxyvitamin D [25(OH)D] was measured at baseline, month 3 and 24. Depression was

measured using the patient health questionnaire (PHQ-9), and knee symptoms were assessed using WOMAC Index at baseline, month 3, 6, 12 and 24. Multilevel mixed-effect models were used to estimate the association between exposures and outcomes adjusting for potential confounders.

Results: Over 24 months, 340 participants (82.3% retention rate) completed the study. The prevalence and incidence of depression were 25.4% and 11.2%, respectively. Depression improved more in the vitamin D supplementation group (β : -0.45, 95%CI: -0.84 to -0.07) compared to the placebo group (β : 0.21, 95%CI: -0.19 to 0.61) ($P=0.02$) and in those participants who maintained vitamin D sufficiency (β : -0.44, 95%CI: -0.88 to -0.00) compared to those who did not maintain sufficiency (β : 0.40, 95%CI: -0.18 to 0.97) ($P=0.02$) over 24 months.

Conclusion: These findings suggest that vitamin D supplementation and maintaining sufficient vitamin D levels over 24 months may have beneficial effects on depression in patients with knee OA.

figure 1. flowchart of the study

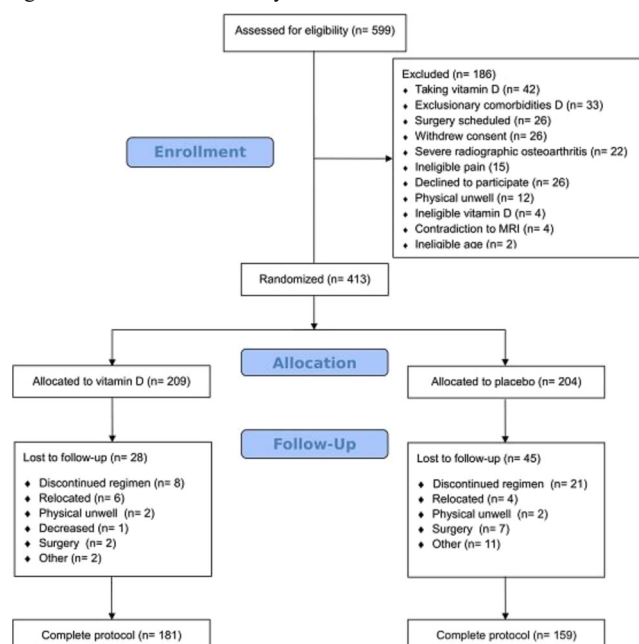


Figure 2. Change in PHQ-9 scores in the vitamin D supplementation group and the placebo group

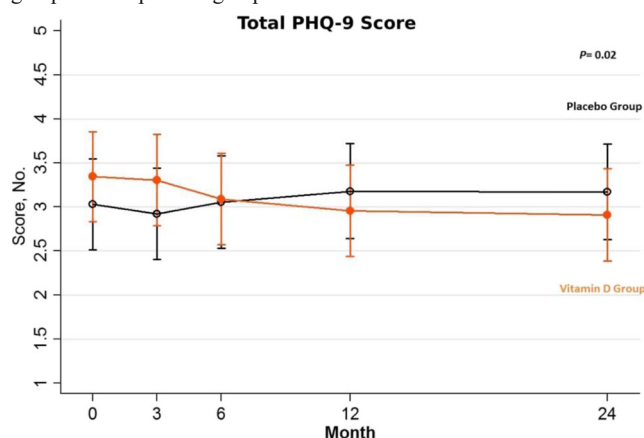
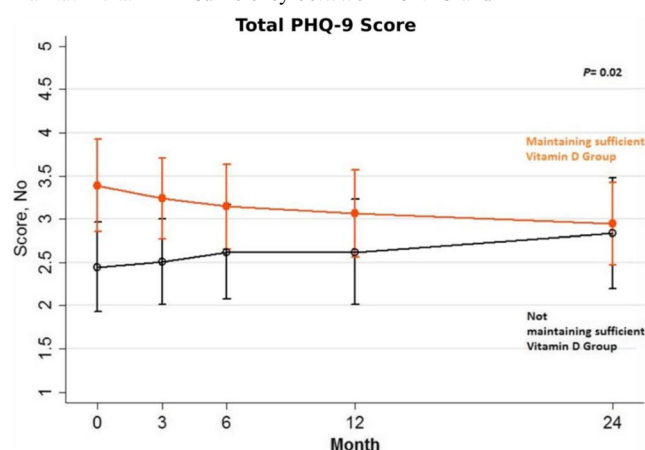


figure 3. Change in PHQ-9 scores in the group that maintained vitamin D sufficiency between month 3 and 24 and the group which did not maintain vitamin D sufficiency between month 3 and 24



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THE ROLE OF EXERCISES ON LIFE QUALITY IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

V. Koevska¹, E. Nikolik-Dimitrova¹, B. Mitrevska¹, M. Manoleva¹, C. Gerakaroska-Savevska¹, B. Kalcovska-Ivanovska¹, M. Goevska¹

¹Institute of Physical Medicine and Rehabilitation, Skopje, Macedonia

Objective: Postmenopausal osteoporosis (PMOP) can negatively affect the quality of life, limiting the performance of the activities of everyday living. Chronic pain caused by PMOP can lead to depression, anxiety, frustration and social isolation. Impact of exercises on the quality of life in patients with PMOP.

Method: The research was conducted in the period from 2013-2016, in which 92 patients aged 45-65 years participated with PMOP. Patients were divided into two groups, the first group that exercised regular exercise for one year and a control group of patients, who did not exercise. Kinesiotherapy consisted of exercises for strengthening and increasing the elasticity of the spine extensors, abductors and hip extensors, upper and lower limb muscles, coordination exercises and balance. At the beginning and after 12 months, they filled out the quality questionnaire Qualeffo-41.

Results: There was no statistically significant difference between the groups for the average age. The average age in the first group was 62.75 ±5.4, in the second group was 61.47±6.6, there was also no statistically significant difference between the groups for the level of education ($X=2.77$, $p=0.59$). The results of the questionnaire Qualeffo-41 showed a significant difference between the groups in all four domains: pain, physical activity and mobility, social activities and perception of the general health status ($p<0.0001$), except for the domain of mental functioning ($p=0.3$).

Conclusion: Exercises play an important role in improving the quality of life of women with PMOP.

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REHABILITATION PROGRAM IN PATIENTS WITH BILATERAL ASEPTIC OSTONECROSIS OF THE FEMORAL HEAD

K. C. Kamal¹, M. R. Trăistaru¹, D. Kamal¹, D. O. Alexandru¹, D. L. Marinescu¹, M. D. Macovei-Moraru¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objectives: Aseptic necrosis of the femoral head has no clinically relevant characteristics. For the complete diagnosis of aseptic necrosis of the femoral head the physician should have a high degree of suspicion, especially in patients with risk factors. Our study objective was the assessment of one year of intense rehabilitation program in patients diagnosed with bilateral aseptic osteonecrosis of the femoral head.

Methods: The rehabilitation methods used in our patients were pharmacological modalities and non-pharmacological modalities, such as: educational, quit smoking and alcohol consumption., dietary and hygienic, posture (activity modification), physical (thermotherapy, TENS, laser, NMES), massage – classic and special massage (Cyrix), kinetic and occupational therapy for ADL rehabilitation. For the assessment of functionality, we used easily reproducible physical performance measures for activities limitation and participation restriction such as VAS scale, the 6-min walk test and the timed up and go test. We used as well scales for status measures (specific health condition): The Harris Hip Score (HHS) and SF-36.

Results: We included 27 patients in our study, aged between 21-54 years, with a mean age of 39.4 years. 18 of the patients were men and 9 were women. The study results according to stage of disease showed that most patients (92.59%) were diagnosed in stages II and III (according to Ficat classification). The mean values of the functionality tests before and after the rehabilitation program were: VAS=8 before, 4 after; 6-min walk=170 m before, 260 m; timed up and go=39 s before, 21 s after rehabilitation program. HHS was 34 before rehabilitation, 48 after rehabilitation program, and SF-36 was 36 before rehabilitation, 50 after rehabilitation program.

Conclusions: Patients should be constantly investigated because for patients whose disease was already presented in one hip joint in 50-60% of cases, bilateral aseptic necrosis occurs, and the rehabilitation program should start immediately after the diagnosis is known, in order to be successful.

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REHABILITATION PROGRAM IN PATIENTS WITH PATELLA FRACTURE

K. C. Kamal¹, M. R. Trăistaru¹, D. Kamal¹, D. O. Alexandru¹, M. D. Macovei-Moraru¹, D. L. Marinescu¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objectives: The patellofemoral joint is exposed to the highest contact stress of any weight bearing joint. A direct blow to the patella most often results in a comminuted fracture. The energy of the blow is absorbed by the fracture and may cause damage to the articular cartilage. The objective of our study was the assessment of a 6 months intensive rehabilitation program after surgical intervention for patella fracture.

Methods: The rehabilitation methods used in our patients were: educational, posture, physical: thermotherapy, cryotherapy, electrotherapy: TENS, laser, NMES, magnetic therapy, massage – classic and Cyriax method, kinetic: range of motion, strengthening, and proprioceptive exercises. For the assessment of functionality, we used an easily reproducible physical performance measures such as VAS scale, the 6-min walk test and the timed up and go test. We used scales for status measures (specific health condition): Modified scale of Bostman, Knee Society Clinical Rating Scale (KSCRS) and SF-36.

Results: We included 47 patients in our study, aged between 34-61 years, with a mean age of 48.7 years. 34 of the patients were men and 13 were women. 59.57% had upper pole patella fracture. The mean values of the functionality tests before and after the rehabilitation program were: VAS=9 before, 5 after; 6-min walk=200 m before, 290 m; timed up and go=31 s before, 23 s after rehabilitation program. The score of the modified scale of Bostman was 15 before

rehabilitation, 23 after rehabilitation program, KSCRS score was 59 before, 67 after, SF-36 value was 36 before rehabilitation, 50 after rehabilitation program.

Conclusions: The rehabilitation program is essential to preserve the joint mobility, to counterbalance flexion deformity of the knee, and above all, to maintain the strength of peri-articular muscles, which assist in improving the joint stability. Rehabilitation programs have to take into account all the comorbidities of the patient in order to have the best results.

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THE POTENTIAL OF KERATOTIC TISSUE TO ACT AS A PROGNOSTIC INDICATOR OF HIP FRACTURE

J. Beattie¹, M. R. Towler², D. Feskanitch³, M. Caraher⁴

¹J Renwick Beattie Consulting, Ballycastle, UK, ²Ryerson University, Toronto, Canada, ³Brigham and Women's Hospital and Harvard Medical School, Boston, USA, ⁴ICON plc, Dublin, Ireland

Objective: Assess the ability of Raman spectra of nail samples from postmenopausal women to discriminate between those who did, and did not, suffer a hip fracture within 20 years post sample collection.

Methods: The Nurses' Health Study commenced in 1976 with 121,700 female registered nurses who were followed up by questionnaire every two years with toenails collected in 1982-3. CRF data from the questionnaire at toenail collection that are part of FRAX include smoking status, weight, height, thyroid hormone use, wrist fracture, osteoporosis and age at menopause. Toenails from postmenopausal women aged 50-63 y were analyzed by a Sierra Reader Raman spectroscope (Snowy Range, WY, USA). Nails from 82 cases who had a hip fracture up to 20 years after nail collection were age-matched with 81 controls. Raman operators were blind to clinical details. Triplicate, spatially separated measurements, each lasting one minute, were carried out on each sample. 80% of the samples were used to train the models, 20% withheld to test the models.

Results: The Raman score from fracture cases and controls up to 20 years post toenail collection achieved an odds ratio (OR) of 2.2 (95%CI 1.5-3.1) in the test set; the risk of hip fracture was more than double per 1 SD change in Raman score for the full 20-year period. Combining the Raman score and CRFs together improved the odds ratio (OR=3.8, 95%CI 2.6-5.4). We also demonstrated that the contrast between cases and controls improved as the period between collection and fracture shortened, such that risk was increased over 6-fold when limited to a 13-year period, post nail collection. The Raman score provided discriminatory power greater than the available CRFs.

Conclusions: Raman spectroscopy of the nail is a promising tool for identifying postmenopausal women who are at increased risk of hip fracture over a period of up to 13 y. The results compare favourably with existing QUS, DXA and CRF-based technologies.

P500

BMD EVALUATION IN WOMEN WITH RHEUMATOID ARTHRITIS

J. Kollcaku¹, A. Kollcaku², F. Toti², V. Duraj²

¹Public Polyclinic Health Service, No. 3, ²University Hospital Center "Nene Tereza", Tirana, Albania

Objectives: To assess the prevalence of osteoporosis and rheumatoid arthritis in Albanian women study group and correlation of rheumatoid arthritis disease with low bone mass density.

Methods: A transversal (cross-sectional) study was conducted in Tirana city with enrollment of 2198 women during their routine visit in Rheumatology Department of polyclinics on period of two years, 2012–2013. Age of participants was women ≥ 30 years old, and mean-age 60.2 $\pm$ 9.7. Women enrolled in the study were asked for risk factors for osteoporosis by completing a specific questionnaire and BMD was assessed by simple method with ultrasound technique by definition as osteopenia for T-score < -1 and osteoporosis for T-score < -2.5 . Binary logistic regression was used to determine the relationship of low BMD and rheumatoid arthritis in this study population.

Results: prevalence of low BMD in this study population was 36.5% (N=803) and prevalence of rheumatoid arthritis was 19.9% (N=437); 298 (13.6%) of participants in the study were women ≤ 50 years old and 1900 (86.4%) over 50 years old. The prevalence of rheumatoid arthritis was significantly higher in women with low BMD (24%) than in women with normal BMD (17.5%) ($p < 0.001$).

Conclusions: This study offers useful evidence about the secondary osteopenia/osteoporosis. Women suffering from rheumatoid arthritis should follow up more carefully for development of osteoporosis.

P501

EFFECTS OF KINESIOTAPING ADDED TO A REHABILITATION PROGRAMME FOR PATIENTS WITH FACIAL PAIN

A. Barulin¹, O. Kurushina¹, B. Kalinchenko¹, A. Drushlyakova¹, V. Dumtsev¹, E. Chernovolenko¹, A. Puchkov¹

¹Volgograd State Medical University, Volgograd, Russia

Objective: To determine the effectiveness of kinesiotaping in patients with facial pain.

Methods: The study involved 74 patients with facial pain (mean age 39 $\pm$ 4.2). Patients were divided into two groups: group 1 received kinesiotaping and pharmacological treatment (36 patients) and group 2 received pharmacological and physiotherapy (38 patients). The following research methods were applied: clinical-neurological examination and musculoskeletal testing. The pain syndrome was assessed using a visual analog scale (VAS). Volume and symmetry of face borders regions were assessed by the method of visual-optical analysis (VOA). The kinesiotaping method was used for muscular imbalance correction, deactivation of trigger points (TP) and for reduces edema of tissues.

Results: The dynamics of pain syndrome, according to the VAS, initially was 7.6 $\pm$ 1.1. After the treatment: in the first group on day 3 it was 5.5 $\pm$ 1.3, on day 10 it was 3.4 $\pm$ 1.3, in the second group on day 3 it was 6.6 $\pm$ 1.2, on day 10 it was 5.8 $\pm$ 1.1. The dynamics of increase in the volume of lower jaw movement on the 10th day of treatment: in the first group, the volume increased by 38.9%; in the second group by 13.2%. Restoration of the symmetry of mouth opening: in the experimental group it was 26.3% and 10.5% in the control group. The flat palpation revealed that the number of active TP significantly decreased in the first group ($p \leq 0.05$).

Conclusions: The use of kinesiotherapy showed high therapeutic efficacy in facial pain treatment. This technique can be used for recovery of muscular symmetry.

P502

TREATMENT GAP AFTER FRACTURE IN OSTEOPOROSIS PATIENTS: RESULTS OF THE AUSTRIAN ARM OF THE INTERNATIONAL COSTS AND UTILITIES RELATED TO OSTEOPOROTIC FRACTURES STUDY (ICUROS)

O. Malle¹, F. Borgstroem², A. Svedbom³, A. Fahrleitner-Pammer⁴, S. V. Dimai⁵, H. P. Dimai⁶

¹Medical University of Graz, Division of Internal Medicine, Department of Endocrinology and Diabetology, Graz, Austria, ²Karolinska Institutet, Dept. of Learning, Informatics, Management and Ethics, Stockholm, Sweden, ³MAPI Group, Real World Strategy and Analytics, Stockholm, Sweden, ⁴Medical University of Graz, Department of Internal Medicine, Division of Endocrinology and Diabetology, Graz, Austria, ⁵Medical Faculty, Heinrich Heine University, Duesseldorf, Germany, ⁶Medical University of Graz, Dept. of Internal Medicine, Div. of Endocrinology & Metabolism, Graz, Austria

Objective: Despite availability of effective treatment options proven to prevent osteoporotic fractures, a huge gap in osteoporosis treatment exists. Reasons for this gap include underdiagnosis of osteoporosis, lack of adequate patient management, and concerns of adverse events. The aim of the present study was to evaluate the treatment rate after osteoporotic fracture in Austria, one of the 25 wealthiest countries worldwide by measure of gross domestic product at purchasing power parity (PPP) per capita.

Methods: ICUROS is a prospective observational study aimed to describe costs and quality of life (QoL) consequences of osteoporotic fractures. An amendment to the protocol of the Austrian arm of the ICUROS aimed at assessing the treatment rate after fracture without a concomitant awareness program, thus providing data from the “real world”. Patients who had sustained a major osteoporotic fracture were interviewed at the time of the index fracture, and 4, 12, and 18 months thereafter.

Results: A total of 915 patients with a recent fracture were recruited at 8 different trauma centers throughout Austria. 78.3% of these patients were female. Mean age at the time of fracture was 75.5 $\pm$ 10.2 yrs. Female and male patients were stratified into 2 groups, depending on whether she or he received an osteoporosis treatment at the time of fracture or not (Fig.). At the time of fracture, some 20% of the patients were receiving anti-osteoporotic treatment. In this group, follow-up analysis after 4, 12 and 18 months revealed a treatment rate of 65%, 54% and 60%, respectively, in female patients. Comparable results were detected in male patients. The treatment rate in the female group without osteoporosis medication at the time of the fracture was 18%, 16%, and 15%, after 4, 12, and 18 months, respectively, and the treatment rate in the respective male group was 8%, 12%, and 10%. Among the different fracture types, no significant differences were found in the treatment rate (data not shown).

Time of fracture	Sex	Months after fracture		
		4	12	18
Without osteoporosis treatment (n = 731; ♀ = 546, ♂ = 185)	Female	17.6%	16%	15.4%
	Male	8%	12.2%	10.3%
With osteoporosis treatment (n = 184; ♀ = 170, ♂ = 14)	Female	65.4%	54.2%	60.4%
	Male	66.7%	55.6%	55.6%

Treatment rate

Conclusion: Only 1 in 10 men, and less than 2 in 10 women who do not receive an osteoporosis treatment at the time of fracture is prescribed an adequate osteoporosis treatment in Austria. Even worse, roughly every second patient who receives an osteoporosis treatment at the time of fracture will be deprived of his/her treatment after the fracture.

P503

OBSTRUCTIVE SLEEP APNEA SYNDROME IN MALE: MINERAL BONE DENSITY AND VITAMIN D3 LEVELS IN BLOOD

M. P. Ahijado Guzmán¹, M. Cantalejo Moreira¹, R. Veiga Cabello², J. Ruiz Ruiz¹, A. Zapatero Gaviria¹

¹Htal de Fuenlabrada, Fuenlabrada, ²Htal Central de la Defensa, Madrid, Spain

Objective: It is considered that the prevalence of obstructive sleep apnea syndrome (OSAS) in the European population is 4%. A significant reduction in BMD has been described in patients with severe OSAS (apnea-hypopnea index >30 per hour). Definitions: Mild OSAS, between 10-20 episodes of night apnea per hour; Moderate OSAS, between 20-30 per hour; Severe OSAS, >30 episodes per hour; Normal values of vitamin D3: 30-80 ng/ml. We observe the variations in BMD and vitamin D3 levels in a sample of male patients diagnosed with OSAS by the Pneumology Service of Fuenlabrada's Hospital, comparing the data obtained with a control group of males of the same sociodemographic characteristics.

Method: A total of 48 male patients, diagnosed with OSAS by the Pneumology Service, were systematically collected, and they were divided according to the severity of the apnea-hypopnea index: 18 patients with severe OSAS, 12 patients with moderate OSAS and 18 patients with severe OSAS. Control group was composed of with 22 male patients. All patients were requested the vitamin D3 levels and DXA densitometry was performed

Results: The average age of the patients was: Severe OSAS group, 51 years; Moderate OSAS, 48 years old and Mild OSAS, 55 years old; control group, 46 years. Mean values of vitamin D3 in blood: Severe OSAS group, 12.6 ng/ml, Moderate OSAS, 17.5 ng/ml, Mild OSAS, 14.8 ng/ml, Control group, 21.6 ng/ml. The average DXA densitometry values: Severe OSAS group: T-score lumbar spine (C: L):<- 1.8, femoral neck (C: F):<-1.2; Moderate OSAS group: T-score C.L.<-1.2, T-score C.F.<-0.7; Mild OSAS group: T-score C.L.<-1.2, T-score C.F.<-0.8.

Conclusion: This study is a small sample, and therefore a low power. However, if it seems that OSAS has a negative impact on bone metabolism. Nevertheless, low levels of vitamin D3 are observed in all groups, including control. Given the prevalence of OSAS in the western population, which increases with age, it would be reasonable to influence the study of bone metabolism in these patients.

P504

PLATIESPONDILIA/COMPLICATED OSTEOPOROSIS

M. P. Ahijado Guzmán¹, R. Veiga Cabello², M. Cantalejo Moreira¹, J. Ruiz Ruiz¹, A. Zapatero Gaviria¹

¹Htal de Fuenlabrada, Fuenlabrada, ²Htal Central de la Defensa, Madrid, Spain

Objective: Defects in the type II collagen gene are described. These predispose humans to various phenotypic combinations in families with skeletal dysplasia, and/or disease by causing deposits of microcrystals and/or early osteoarthritis and/or synovial osteochondromatosis. Flat vertebra is defined as the vertebrae with flattening of the vertebral body, also with irregular surface or with nodules of Schmorl (flat vertebra), in isolation or two a maximum of two vertebral bodies, to distinguish it from Scheuermann's disease. On the other hand, vertebral size is an independent risk factor for osteoporotic vertebral fractures. Our aim was to show the possibility of "dorsal flat vertebra" in relation to associated pathologies alterations of type II collagen, and its possible relationship with osteoporosis.

Methods: Patients attending physician since 1994, for the suspicion of complicated dorsal osteoporosis, and in whom type II collagen disease or vertebral dysplasia was confirmed, and they were selected for the study. Their medical

history was taken. Also available radiographs, including dorsal lateral spine x-rays, were assessed for a flat vertebra, by triple-observer (two rheumatologists and one radiologist), according to the defined criteria. In all selected patients, a DXA osteoporosis screening was performed, being both densitometric osteoporosis and chest trauma exclusion criteria.

Results: The 84 patients assessed included 43 women and 41 men, with a mean age of 47.1 years, mean weight of 84.6 kg in men and 74.4 kg in women, and mean height 168.8 cm in men and 159 cm in women. None presented T-score suggestive of osteoporosis by DXA.

Conclusions: The association of dorsal flat vertebrae, according to the defined criteria, is observed as a form of vertebral dysplasia in the context of alterations of type II collagen. The patients who were referred to the rheumatology clinic for suspicion of complicated dorsal osteoporosis, these clinical radiological findings, helped us in the differential diagnosis. Therefore, in this genetic alteration, the vertebral size does not seem to be associated with an increased risk of vertebral fracture, although more detailed studies are necessary.

P505

APPLICATION OF VERTEBRAL FRACTURE ASSESSMENT IN ADDITION TO BMD MEASUREMENTS USING DXA IN PATIENTS WITH PSORIATIC ARTHRITIS

M. Punda¹, S. Grazio², F. Grubisic², K. P. Koopmans³, M. Mustapic⁴, Z. Kusic¹

¹UHC "Sisters of Mercy", Department of Oncology and Nuclear Medicine,

²UHC "Sisters of Mercy", Department of Rheumatology, Physical and Rehabilitation Medicine, Zagreb, Croatia, ³Martini Hospital, Department of Radiology and Nuclear Medicine, Groningen, The Netherlands, ⁴UHC "Sisters of Mercy", Department of Radiology, Zagreb, Croatia

Objective: To determine the contribution of vertebral fracture assessment (VFA) using DXA as well as the influence of degenerative changes in the lumbar spine in the interpretation of BMD among patients with psoriatic arthritis (PsA).

Methods: The study included 105 patients (52 women, 53 men; mean age 57.9±11.2 years) with PsA. BMD measurement and VFA from T4-L4 was performed using a DXA scanner. Diagnosis of vertebral fracture (VF) was based on the Genant semiquantitative classification system. After standard BMD L1-L4 analysis, selected lumbar vertebrae were excluded from the DXA scan according to the recommendations of the International Society of Clinical Densitometry (ISCD).

Results: A total of 74 vertebral fractures were detected in 45 (42.8%) patients: 58 grade 1 vertebral fractures, and 16 vertebral fractures of grades 2-3. A total of 64 vertebrae in 42 patients (23 without and 19 with VF) were excluded from the L1-L4 BMD analysis according to the ISCD criteria; 26 (40.6%) vertebrae at the L4 level. Osteoporosis according to the WHO classification (T-score ≤-2.5 SD) was observed in 11 (10.5%) patients. By the addition of grade 2-3 VFs and exclusion of selected lumbar vertebrae from DXA among patients without osteoporosis, the number of patients considered as osteoporotic increased to 23.8%. BMD values, T-scores, and Z-scores at all measured regions did not differ significantly between patients with (n=45) and without (n=60) VFs. There was neither a significant difference in disease duration nor in the usage of corticosteroids, methotrexate, and sulfasalazine among patients with and without VFs. The higher disability level assessed by the HAQ questionnaire in the group of patients with VFs was significantly associated with lower BMD in the femoral neck and total hip region (p 0.019 and 0.010, respectively).

Conclusion: According to our results in patients with PsA, BMD reports with consideration of both the results of VFA and vertebral exclusions from L1-L4 DXA applying the ISCD criteria should be included into the evaluation of the disease and thereby give a better insight into the real osteoporosis status.

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FRAX BASED KUWAITI OSTEOPOROSIS GUIDELINES FOR POSTMENOPAUSAL WOMEN AND OLDER MEN

T. Alessa¹, N. Al-Ali¹, F. Al-Jarki¹, F. Abutiban¹, A. Al-Obaid¹, S. Al-Kandari¹, S. Al-Enezi¹

¹Kuwait Osteoporosis Society, Kuwait

Objective: Identifying and treating postmenopausal women and men above age of 50 with high risk for osteoporotic fractures based on age-specific intervention and assessment thresholds in Kuwait which has moderate hip fracture rates¹.

Methods: The Kuwait Osteoporosis Society (KOPS) reassessed previous unpublished versions of national guidelines endorsed by KOPS in 2013 and 2014 and evaluated FRAX-based intervention threshold models used in the UK, USA, Canada and Lebanon. The proportions of subjects considered for therapy were based an intervention threshold (IT) that was set at a 10-year probability of a major osteoporotic fracture (MOF) equivalent to a woman with a prior fragility fracture and a BMI equal to 30.0 kg/m² without BMD or other clinical risk factors. The lower assessment threshold was set at a 10-year probability of a MOF in women with BMI equal to 30.0 kg/m², no previous fracture and no clinical risk factors. The upper assessment threshold was set at 1.2 times the IT.

Results: Since T-score based intervention is not country specific, it would indicate treating Kuwaiti patients with lower fracture risk than US patients² but the ones with fragility fracture at the hip or spine are indicated for therapy anyways. For others, the risk for MOF has to be higher than the age-specific IT which varied from 4.3-23% at the age of 50-90 years, respectively. Patients also require therapy if MOF risk is higher than the upper assessment threshold when BMD is unknown. Qualitatively comparable findings were observed in the case of hip fracture probability and in men.

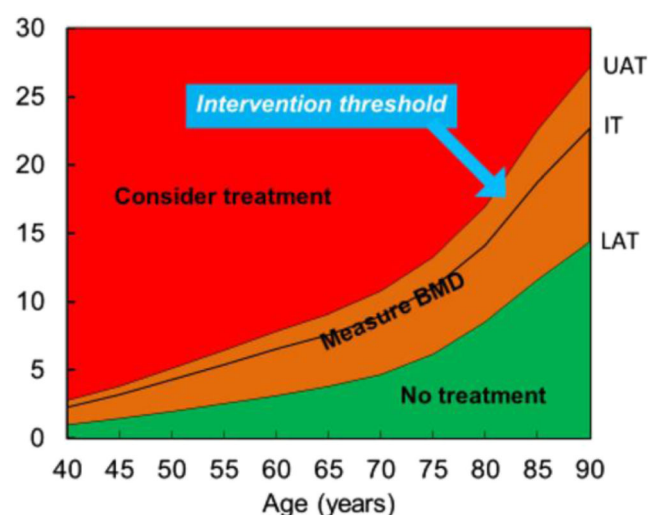
Conclusion: In Kuwait, FRAX-based IT based on fracture probabilities, offers a substantial advance for the detection of women and men at high fracture risk. Previous evidence indicates that country-specific FRAX models are appropriate rather than a global model³ and FRAX-based IT consistently target women at higher fracture risk, irrespective of age.

References:

1. Azizieh F. Arch Osteoporos 2015;10:40
2. Johansson H et al. Osteoporos Int 2017;28:3099
3. Kanis JA et al. Arch Osteoporos 2016;11:25

Disclosures: The first two authors disclose consultant/speaker's bureau/advisory activities for Amgen and Eli Lilly.

10-year probability (%)



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APPLICATION OF THE FRACTURE RISK THRESHOLD CURVE IN AN ECUADORIAN POPULATION

G. Maldonado¹, O. D. Messina², C. Rios³

¹Universidad Espíritu Santo, Guayaquil, Ecuador, ²Hospital Cosme Argerich, Buenos Aires, Argentina, ³Centro de Reumatología y Rehabilitación, Guayaquil, Ecuador

Objectives: Based on the proposed fracture risk curve according to FRAX Ecuador, the authors applied a specific group of Ecuadorian patients. Our aim was to apply and observe the reproducibility of the proposed fracture risk threshold curve according to FRAX Ecuador.

Methods: According to the fracture risk intervention curve made by the authors, there are two thresholds: No treatment needed and treatment needed. Patients who corresponded to a universal data base of a rheumatology center in the city of Guayaquil were applied to this curve, the data was analyzed and the risk of major osteoporotic fracture and hip fracture were obtained with the FRAX Ecuador calculator, once these values were obtained the points on the graph were plotted.

Results: We analyzed 1350 patients, mostly 88% female [1193] and 12% [157] male. The mean age was 61±11.50 [43-97] years; weight: 65.65±12.72 kg; height: 1.60±4.5 with a BMI of 27.82±4.89. 19% [257] of the study population corresponded to a normal diagnosis, 35% [474] osteopenia and 45% [619] osteoporosis. The mean of FRAX Ecuador for risk of osteoporotic fracture was 1.83±2.38 [0-27] and for hip of 0.41±1.2 [0-22]. When applying the intervention curve to all patients, we observed that approximately 75% [1018] needed treatment (Figure 1). Based on diagnosis, in patients with osteopenia according to the intervention curve based on FRAX Ecuador, 61% [289] require treatment (Figure 2); in the group with osteoporosis 65% [403] required treatment (Figure 3). The mean age for the osteopenic group was 59.9 ±10.5, BMI 28.1±4.8 and FRAX Ecuador of 1.21±1.18; in the osteoporotic group the mean age was 64.7±10.5, BMI 27.1±4.7 and FRAX Ecuador of 1.83±2.3.

Conclusions: It is evident that the application of the proposed curve contributes to the evaluation of fracture risk in Ecuadorian patients; the majority of patients with osteoporosis and osteopenia require treatment, being an initial contribution to the management of these patients.

Figure 1. Application of the Fracture Risk Proposal Curve according to FRAX Ecuador in all patients.

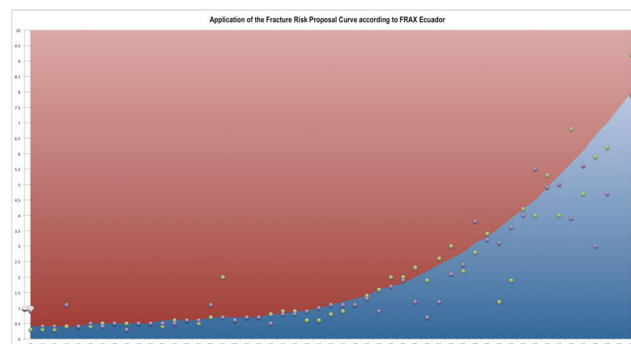


Figure 2. Application of the Fracture Risk Proposal Curve according to FRAX Ecuador in osteopenic patients.

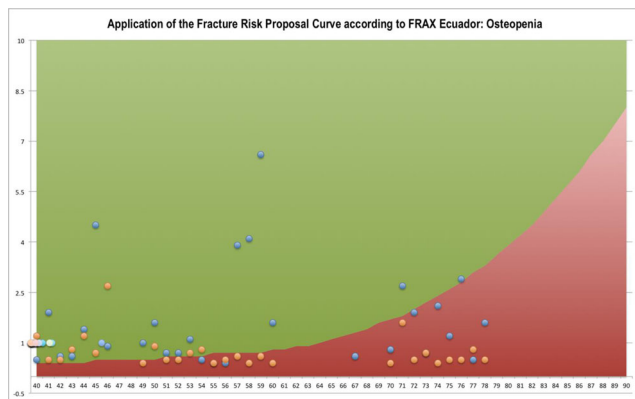
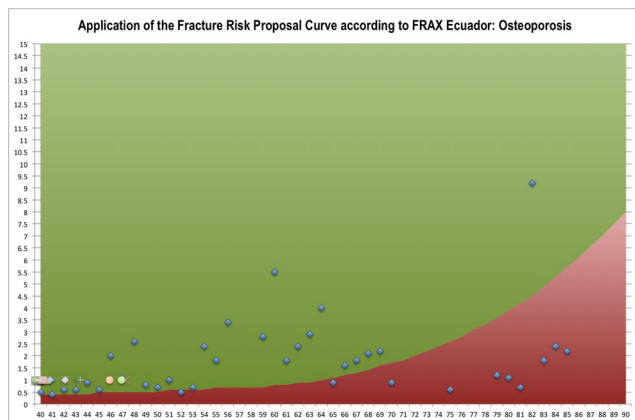


Figure 3. Application of the Fracture Risk Proposal Curve according to FRAX Ecuador in osteoporotic patients.



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CURVE OF FRACTURE THRESHOLDS IN AN ECUADORIAN POPULATION: A PROPOSAL

G. Maldonado¹, O. D. Messina², C. Rios³

¹Universidad Espíritu Santo, Guayaquil, Ecuador, ²Hospital Cosme Argerich, Buenos Aires, Argentina, ³Centro de Reumatología y Rehabilitación, Guayaquil, Ecuador

Objectives: The FRAX calculator is a tool that allows estimating the risk of fracture in 10 years and it has been validated and adapted to different countries, almost covering 80% of the world population [4]. In Ecuador, it was adapted in 2009. Our aim was to create evaluation and intervention thresholds for the assessment of fracture risk in the Ecuadorian population.

Methods: Using the FRAX Ecuador model, we calculated the probability of major osteoporotic and hip fracture in women with DXA -2.5 SD with an interval of 5 years from 40 years, and in those with -1.5 SD, to represent osteopenia. In order to compare the results, we calculated the fracture probabilities

(without inclusion of BMD) in women who had suffered a previous fracture, by age. Also, we calculated the probability of fracture in women without risk factors (without the inclusion of BMD). The fracture thresholds according to NOGG were applied.

Results: In a woman without risk factors and an average DXA for her age, the probability of osteoporotic fracture increased with age from 0.4% at age 40 to 8.4% at age 90 (Table 1). The intervention threshold was established in the probability of fracture in 10 years that was equivalent to that of a woman with a previous fracture (Figure 1). The lowest assessment threshold, below which densitometric tests are of limited value, was established on the age-specific probabilities in women without clinical risk factors, as seen in the NOGG guidelines. The upper evaluation was established at 1.2 times the intervention threshold. The three thresholds are represented in Table 2 and in Table 3 for hip fracture. Under this scheme, densitometries would be recommended for the probabilities that lie between the upper and lower evaluation threshold (Figure 2.3).

Conclusions: We present the curve of fracture thresholds in the Ecuadorian population, a more specific tool for the evaluation of fracture risk in the Ecuadorian population.

Table 1. Risk of major osteoporotic fracture at 10 years according to FRAX Ecuador. BMI 27 kg/m²

	Age										
	40	45	50	55	60	65	70	75	80	85	90
Major osteoporotic fracture											
No risk factors	0.4	0.5	0.6	0.7	0.8	1.1	1.8	2.8	4.2	6.1	8.4
BMD T-score -2.5 SD ^a	0.4	0.5	0.6	0.7	0.8	1.1	1.8	2.8	4.2	6.1	8.4
Previous fracture ^a	0.9	1.0	1.2	1.5	1.8	2.3	3.5	5.1	6.9	10	14
BMD T-score -1.5 SD ^a	0.4	0.5	0.6	0.7	0.8	1.1	1.8	2.8	4.2	6.1	8.4

^aNo other risk factor

Table 2. Risk of major osteoporotic fracture at 10 years in postmenopausal women by age: intervention threshold derived from FRAX Ecuador model

Age	Intervention threshold	Lower intervention threshold	Upper intervention threshold
40	0.9	0.4	1.08
45	1.0	0.5	1.2
50	1.2	0.6	1.44
55	1.5	0.7	1.8
60	1.8	0.8	2.16
65	2.3	1.1	2.76
70	3.5	1.8	4.2
75	5.1	2.8	6.12
80	6.9	4.2	8.28
85	10	6.1	12
90	14	8.4	16.8

Table 3. Risk of hip fracture at 10 years in postmenopausal women by age: intervention threshold derived from FRAX Ecuador model

Age	Intervention threshold	Lower intervention threshold	Upper intervention threshold
40	0.1	0.2	0.12
45	0.2	0	0.24
50	0.2	0.1	0.24
55	0.3	0.1	0.36
60	0.4	0.2	0.48
65	0.6	0.3	0.72
70	1.0	0.5	1.2
75	1.8	1.0	2.16
80	2.9	1.8	3.48
85	4.9	3.2	5.88
90	6.8	4.4	8.16

Figure 1. Risk of major osteoporotic fracture at 10 years. The shaded area represents the probability of fracture in women without risk factors.

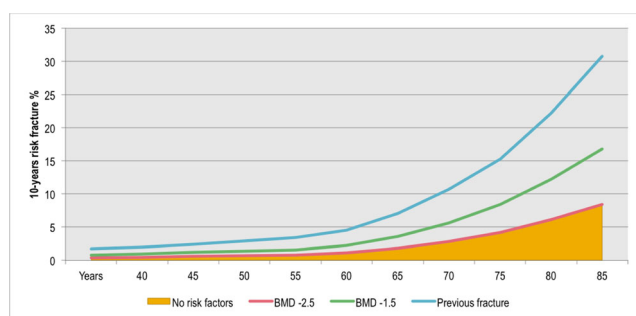


Figure 2. Proposed evaluation and intervention thresholds for major osteoporotic fracture.

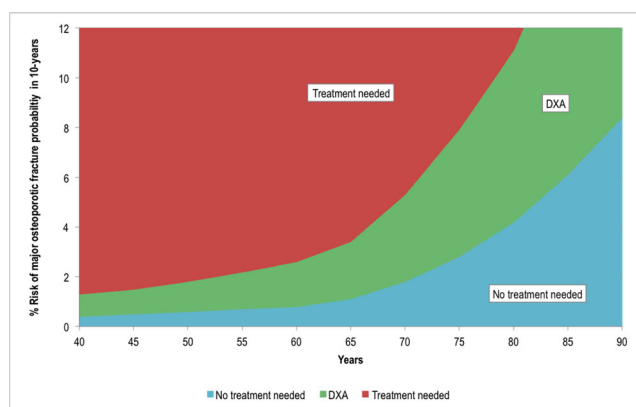
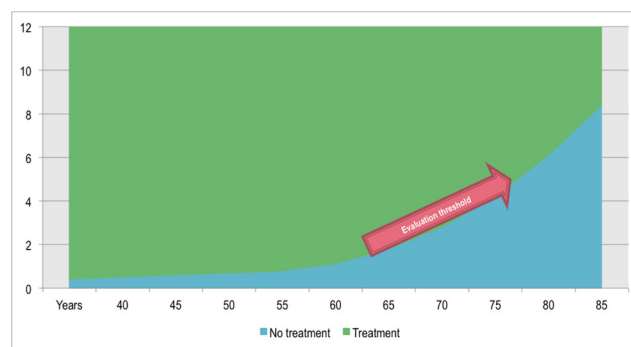


Figure 3. Proposed intervention threshold for major osteoporotic fracture.



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COMMON MISTAKES IN DXA SCANS IN IMAGING CENTERS IN ECUADOR

G. Maldonado¹, M. Intriago¹, M. S. Larroude², G. Aguilar², O. D. Messina³, M. Moreno⁴, J. González⁴, S. Vargas⁴, C. Vera⁴, R. Guerrero¹, K. Rios¹, C. Rios⁵

¹Universidad Espíritu Santo, Guayaquil, Ecuador, ²Centro de Diagnóstico Dr. Enrique Rossi, ³Hospital Cosme Argerich, Buenos Aires, Argentina, ⁴Sociedad Ecuatoriana de Reumatología, ⁵Centro de Reumatología y Rehabilitación, Guayaquil, Ecuador

Objective: DXA is recognized as the gold standard for measuring BMD with acceptable errors, good precision and reproducibility. However, the training of operators in different centers and countries is not standardized and the lack of knowledge can lead to errors both in the acquisition of information, as well as in its analysis and subsequent interpretation. Our aim was to determine the most common errors in the performance of bone densitometry from different imaging centers in Ecuador.

Method: Cross-sectional descriptive study. We collected DXA scans from different imaging centers in Ecuador. Demographic information from patients included age, sex, height, weight, BMI and main diagnosis. Data from the DXA scan included city of origin, type of specialist that requested it and densitometry diagnosis. The DXA images provided were analyzed double blind by experts in the field from Argentina, according to patient position, presence of artifacts and region of interest correctly placed we.

Results: From a total of 141 patients with a mean age of 62 years, 93.6% were women. 76.6% of the DXA scans came from private imaging centers and 23.4% from public centers, 95% of all came from the city of Guayaquil. The machines used were Hologic 49.6% and Lunar 50.4%. The densitometric diagnosis was 16.3% normal, 46.1% osteoporosis and 37.6% osteopenia. 112 left hip and 49 right hip scans were analyzed from which 31.1% and 22.4% had errors in patient positioning, respectively, mainly internal or external rotation. 140 lumbar scans were analyzed from which 21.4% had patient positioning errors (not centered or not straight). Also in 38.5% the vertebral area did not correspond to L1-L4. 3.5% had artefacts such as a metal bar or implant. The region of interest was misplaced in 24.1% of the lumbar scans and 19.9% of the femur.

Conclusion: Methods for measuring BMD have been in use for many years, but the operational protocols are still improving. Much of the responsibility of a DXA falls on the operator as he has to review the patient's health history, enter demographic data, perform the acquisition

of the image with a correct positioning and analyze it. When studies are performed incorrectly, it can lead to important errors in diagnosis and therapy. Physicians interested in the management of osteoporosis, although not directly involved in the performance and interpretation of DXA, should be familiar with the protocols to minimize errors and allow the proper use of bone densitometry.

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VITAMIN D STATUS IN ADOLESCENCE IS AN INDEPENDENT PREDICTOR OF BMD AND MICROARCHITECTURE IN EARLY ADULTHOOD: A 17-YR PROSPECTIVE COHORT STUDY

Y. Yang¹, F. T. Wu¹, T. Winzenberg¹, G. Jones¹

¹Menzies Institute for Medical Research, Hobart, Australia

Objectives: This prospective study aimed to describe the association of serum vitamin D levels at different stages of growth with bone measures in adolescence and early adulthood.

Methods: 415 participants were followed from age 8-16 and 201 of them followed to age 25. Areal BMD at the spine, hip and total body (by DXA) was measured at age of 16 and 25, and trabecular and cortical bone measures at radius and tibia measured at age 25 (by HR-pQCT). Serum 25-hydroxyvitamin D (25OHD) levels were measured at age 8, 16 and 25. Multivariable linear regression was used to analyse the association of 25OHD levels at age 8, 16 and 25 with bone measures at age 16 and 25.

Results: There were weak to moderate correlations between 25OHD levels at each age (correlation coefficients=0.32 to 0.45). Vitamin D at age 8 had no significant association with any bone measures at age 16 or 25 after adjustment for age, sex, body size and season but relatively few children were deficient. Serum 25OHD levels at age 16 were significantly associated with higher BMD at all sites at age 16 and 25 except for spine BMD at age 25. They were also associated with decreased radial porosity and better trabecular microarchitecture with higher density, increased trabecular number and reduced separation at radius and tibia at age 25. 25OHD at age 25 was only significantly associated with hip BMD and tibial trabecular number at age 25.

Conclusion: Vitamin D status in adolescence, to a limited extent at age 25 but not in earlier childhood has beneficial associations with BMD and bone microarchitecture in early adulthood. Optimising vitamin D status particularly during adolescence should be a priority.

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PREVALENCE OF GENERALIZED JOINT HYPERMOBILITY IN THE CHILDREN POPULATION OF ORDU: TURKISH STUDY

O. F. Barcak¹, S. S. Dedeoglu²

¹Physical Medicine and Rehabilitation, Özel Ünye Çakırtepe Hastanesi, Ordu, ²Orthopedics and Traumatology, Okmeydanı Training and Research Hospital, İstanbul, Turkey

Objectives: To evaluate the frequency of GJH in children aged 11-18 years in the province, Ordu.

Methods: This cross-sectional study was performed with 410 students aged 11-18 years who receive education in the province Ordu. The children, who reported to have any disease, were excluded from the study. GJH was diagnosed according to criteria of Beighton diagnosis.

Results: A total of 410 students, 210 of whom were girls (51.3%) and 200 (48.7%) of whom were boys, participated in the study. The subjects'

mean age was 13.7±1.7 years for girls and 13.1±1.79 years for boys. The BMI of the girls was 21.5±3.4 kg/m² and of the boys were 22±3.8 kg/m². The presentations of the students to the health institution due to any complaint in 1 year were examined. Accordingly, the number of participants who previously had a joint-related complaint was found to be 155 (37.8%). 40 (10.7%) of these participants had a joint-related complaint 3 months ago, 18 (4.3%) had it 6 months ago, 40 (9.7%) had it 1 year ago, and 47 (11.4%) had it more than one year ago. The frequency of GJH was 8.7%. 24 of 36 participants in whom GJH was detected and had a Beighton score of 5 and above consisted of girls; and this was 11.4% of the girls. The number of male participants in whom GJH was detected, was found to be 12; and this was 6% of the boys. There was a significant difference between female and male participants in terms of the frequency of GJH ($p=0.021$). A statistically significant and highly negative correlation was found between age and Beighton score ($r=-0.182$, $p<0.001$). A statistically significant and highly negative correlation was found between BMI and Beighton score ($r=-0.092$, $p<0.05$).

Conclusions: One of the most common complaints seen during the childhood is musculoskeletal system pain. As shown by various studies performed, one of the significant reasons of extremity pain is GJH (1). In our study, no significant correlation was found between GJH and joint pain. GJH is a disease that may cause musculoskeletal system pain during childhood. In our study which investigates the frequency of GJH in our region, we detected the GJH prevalence as 8.7.

Reference: Larsson LG et al. Arthritis Rheum 1987;30:1426

P512

EVALUATION OF RELATIONSHIP BETWEEN PAIN SCORE AND SERUM VITAMIN B12 AND FOLATE LEVELS IN FIBROMYALGIA PATIENTS

S. Hira¹, H. G. Karatas², I. Haskul¹, R. Gunduz², B. Ustun², M. Akyuz²

¹Department of Clinical Biochemistry, ²Department of Physical Medicine and Rehabilitation, Karabuk Training and Research Hospital, Karabuk, Turkey

Fibromyalgia syndrome (FMS) is a common rheumatologic disorder which is characterized by chronic widespread musculoskeletal pain and several additional symptoms including morning stiffness, fatigue, sleep disorder, low pain threshold, cognitive dysfunction, anxiety and depressive episodes. Folate and vitamin B12 are two metabolically and clinically related vitamins that share some important functions related to the one-carbon metabolism and related diseases. Studies have revealed that vitamin B12 and folate are associated with pain and pain-related disorders. The aim of this study was to compare serum vitamin B12 and folate levels between FMS patient group and the control group and to present a new evidence of pathogenesis FMS disease. 46 female outpatient FMS patients and 46 healthy individuals were enrolled in the study. Clinical information and biochemical markers including vitamin B12, folate, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) and visual analogue scale (VAS) scores were obtained from the patients' medical files. There were no significant differences in vitamin B12, folate and ESR levels between the two groups (all, $p>0.05$). Serum CRP levels was significantly increased in FMS group ($p=0.027$). There was no correlation between VAS scores and biochemical markers in patients group. The results of this study have indicated that vitamin B12

and folate levels are not involved in the pathogenesis of FMS. No relevant correlations between perception of pain and one carbon metabolism biomarkers were observed in FMS patients.

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SARCOPENIA DEFINED BY BIOELECTRICAL IMPEDANCE AND HANDGRIP STRENGTH ANALYSIS IN ELDERLY PATIENTS WITH LOW-ENERGY FEMORAL FRACTURES

D. M. Krutko¹, E. M. Gainutdinova¹, T. S. Maltseva¹, S. O. Mazurenko¹, K. S. Egorov²

¹Saint Petersburg State University, ²North-Western State Medical University named after I.I. Mechnikov, Saint Petersburg, Russia

Objective: The aim of the study was to assess body composition, muscle strength, and prevalence of pre-sarcopenia and sarcopenia in patients suffering from low-energy femoral fractures. The study group included patients with new low-energy femoral fractures hospitalized at the Injury Treatment and Orthopedics Center of St. George Hospital, Saint-Petersburg, Russia.

Methods: The study group consisted of 34 patients (28 women and 7 men) with new low-energy femoral fractures hospitalized at the Injury Treatment and Orthopedics Center of St. George Hospital, Saint-Petersburg, Russia. Women comprised 82% of the total study population. The average age of patients on admission was 76.3±11.9 years. We performed bioelectrical impedance analysis (BIA) for the evaluation of body composition. Diamant-AIST device (ZAO Diamant, Russia, St.-Petersburg) was used to measure BMI values. Skeletal muscle mass (SMM) was calculated by the following equation: SMM (kg)=0.566·FFM (fat free mass). Skeletal muscle mass index (SMMI) was calculated as skeletal muscle mass (kg)/height (m)². Muscle strength was measured using a Jamar hand dynamometer with three consequent measurements; the highest value was chosen for analysis.

Results: The cutoff values for skeletal muscle mass index to identify sarcopenia according to the European Working Group on Sarcopenia in Older People consensus were for moderate sarcopenia between 8.51 and 10.75 kg/m² in men or 5.76 and 6.75 kg/m² in women and for severe sarcopenia ≤8.50 kg/m² in men or ≤5.75 kg/m² in women. The cutoff for grip strength criterion for sarcopenia in men with various BMI values was: BMI ≤ 24 < 29 kg, BMI 24.1–26 < 30 kg, BMI 26.1–28 < 30 kg, BMI > 28 < 32 kg. The cutoff for grip strength criterion for sarcopenia in women with various BMI values was: BMI ≤ 23 < 17 kg, BMI 23.1–26 < 17.3 kg, BMI 26.1–29 < 18 kg, BMI > 29 < 21 kg. According to the study, the mean BMI was 24.7 (SD 3.6). 12 patients had BMI value > 25 and no one had BMI value > 34. The weight mean was 70.26 kg with SD 19.67 kg in men and 64.6 kg with SD 11.05 kg in women. The mean fat mass value was 15.4 kg with SD 6.98 kg. Fat free mass mean value was 36.96 kg with SD 9.14 kg.

Maximal handgrip strength in men was 33.13±14.58 kg. Maximal handgrip strength in women was 14.6±6.12 kg. According to the cutoff values for handgrip strength 18 out of 28 women (64%) had values lower than the cutoff value, but only two of 7 men (29%) had values lower than the cutoff value. Mean skeletal muscle mass in men was 31.05±7.19 kg, mean skeletal muscle mass in women was 27.68±4.43 kg. Accordingly, skeletal muscle mass index in men was 10.49±1.48 kg/m² and 10.6±1.24 kg/m² in women. Therefore, only two men from the total study population met EWGSOP criteria for sarcopenia diagnosis and one man met EWGSOP criteria for presarcopenia diagnosis. No one demonstrated presence of sarcopenic obesity according to NHANES III criteria.

Conclusion: Elderly patients with low-energy femoral fractures assessed with BMI and handgrip strength measurement did not demonstrate high prevalence of sarcopenia in our study. High prevalence of low handgrip strength was not associated with low skeletal muscle mass or low skeletal muscle mass index values.

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EFFECTS OF CHLOROGENIC ACID ON BMD AND PAIN SENSITIVITY THRESHOLD IN OVARECTOMIZED RATS

V. Kuzmanova¹, A. Kuzmanov¹, A. Georgieva², M. Eftimov², M. Todorova², K. Kuzmanov³, K. Temelkova⁴, M. Vlavkova⁵, S. Valcheva-Kuzmanova²

¹Medical University Prof. Dr. Paraskev Stoyanov, Varna, ²Department of Pharmacology and Clinical Pharmacology and Therapeutics, Medical University Prof. Dr. Paraskev Stoyanov, Varna, ³Vivarium, Medical University Prof. Dr. Paraskev Stoyanov, Varna, ⁴Specialized Hospital for Active Treatment of Children Diseases, Sofia, ⁵Department of Pharmacology and Toxicology, Medical University, Sofia, Bulgaria

Objective: Chlorogenic acid (CGA), one of the most abundant polyphenols in human diet, found in high concentrations in coffee, has been demonstrated to possess a potent antioxidant activity, important metabolic functions and an analgesic effect in hyperalgesic conditions in neuropathic and inflammatory pain. The aim of the present study was to investigate the effects of CGA on weight gain, BMD and osteoporotic hyperalgesia in an ovariectomized (OVX) rat model of postmenopausal osteoporosis.

Methods: Female Wistar rats were divided into 3 groups, each of 14 animals: SO (sham operated), OVX and OVX+CGA. The daily oral treatment started 2 weeks after the operation and lasted for 10 weeks. Groups SO and OVX were treated with distilled water (10 ml/kg). OVX+CGA group was treated with CGA (20 mg/kg as a 10 ml/kg solution). At the end of the treatment period, weight gain was calculated and femur BMD was measured by DXA using a computer program for small subjects. Hot plate test was performed to assess thermal pain sensitivity.

Results: OVX rats had a significantly higher ($p < 0.05$) weight gain than SO rats. The weight gain of OVX+CGA group was significantly lower ($p < 0.05$) than that of OVX group. Ovariectomy caused a reduction in femur BMD. BMD of OVX+CGA rats was significantly higher ($p < 0.05$) than that of OVX rats and did not differ from that of SO rats. In the hot plate test, the latent time of OVX rats was significantly shorter ($p < 0.05$) than that of SO rats. The latent time of OVX+CGA group was significantly longer ($p < 0.05$) than that of OVX rats and was not significantly different from that of SO group.

Conclusions: Treatment of OVX rats with CGA reduced body weight gain, antagonized OVX-induced decrease in BMD and prevented osteoporotic hyperalgesia to heat. Therefore, CGA and CGA-rich diets might be beneficial for postmenopausal osteoporosis prevention.

Acknowledgements: This research was funded by project 14016 of Science Fund of Medical University Prof. Dr. Paraskev Stoyanov, Varna, Bulgaria.

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STUDY DESIGN AND BASELINE CHARACTERISTICS OF THE POPULATION ENROLLED IN A MULTINATIONAL, OBSERVATIONAL STUDY OF TERIPARATIDE (ALAFOS)

C.-H. Chen¹, A. Alsalmawy², S. Ish-Shalom³, S.-J. Lim⁴, N. Al-Ali⁵, J. L. Cunha-Borges⁶, H. Yang⁷, N. Casas⁸, L. Altan⁹, T. Moll¹⁰, S. Gurbuz¹¹, A. J. M. Brnabic¹¹, F. Marin¹⁰

¹Kaohsiung Medical University, Kaohsiung City, Taiwan, ²Al Noor Specialized Hospital Makkah, Mecca, Saudi Arabia, ³Lin Endocrine

Research Center, Haifa, Israel, ⁴Sungkyunkwan University School of Medicine, Seoul, South Korea, ⁵Amiri Hospital, Kuwait, Kuwait, ⁶Universidade Católica de Brasília, Brasília, Brazil, ⁷The First Affiliated Hospital of Soochow University, Suzhou, China, ⁸Riesgo de Fractura CAYRE, Bogotá, Colombia, ⁹Uludağ University School of Medicine, Bursa, Turkey, ¹⁰Lilly Research Center, Windlesham, UK, ¹¹Lilly Research Laboratories, Indianapolis, USA

Objective: Prospective, observational studies have analyzed the use of teriparatide (TPTD) in real-world clinical practice in the USA, Europe and Japan. Equivalent data on patients treated in other geographies are lacking. We describe the study design and baseline characteristics of the patients included in the “Asia & Latin America Fracture Observational Study” (ALAFOS).

Methods: ALAFOS is a non-interventional, prospective, observational study in postmenopausal women with osteoporosis treated with TPTD during the course of normal clinical practice for up to 24 months, and with a post-TPTD follow-up of up to 12 months. Collected baseline characteristics included demographics, risk factors for osteoporosis and falls, physical function, back pain (11-point numeric rating scale [NRS]), osteoporosis disease knowledge, and health-related quality of life (HRQoL).

Results: 3031 patients were analyzed at 156 sites in 20 countries in Asia, Latin America, the Middle East and Russia. Most participants were White (47.4%) or Asian (42.7%). Mean (SD) age and BMI were 72.5 (10.4) yrs and 24.9 (5.0) kg/m², respectively. Early menopause was reported in 4.7% of subjects. Mean (SD) baseline lumbar spine, total hip and femoral neck T-scores were -3.06 (1.40), -2.43 (1.14), and -2.60 (1.05), respectively. Overall, 63.2% of subjects reported a history of fracture after age 40 (33.0% of patients with spinal, 14.2% hip), and 40.5% of patients had experienced ≥1 fall the year before enrollment. At entry, 43.7% of patients were osteoporosis-treatment naïve, and 2.9% were taking glucocorticoids. The most frequent prior osteoporosis drug category was bisphosphonates (27.6% of subjects). There was a high frequency of type II diabetes (12.7%) and rheumatologic disorders (9.1%). The mean (SD) NRS for worst back pain during the last 24-h was 4.6 (3.3). Mean (SD) EQ-5D-5L utility total score, EQ-5D-5L visual analog scale, and physical function score in OPAQ were 0.50 (0.36), 61.0 (21.8) mm, and 45.1 (30.6), respectively.

Conclusion: Baseline characteristics of the ALAFOS study cohort indicate that patients prescribed TPTD in the participant countries have severe osteoporosis with highly prevalent fractures, disabling back pain, and poor HRQoL. The frequency of prior osteoporosis drug therapy was lower than in other studies.

Disclosures: Sponsored by Lilly

P516

ALGOMETRIA AND WIND-UP PHENOMENA DATA INDICATE CENTRAL MECHANISM IN CHRONIC PAIN OSTEOARTHRITIS

E. Turovskaya¹, L. Alekseeva¹, E. Filatova², C. Chimienti³

¹V.A. Nasonova Research Institute of Rheumatology, Moscow, ²I.M. Sechenov First Moscow State Medical University, Moscow, Russia,

³IOOF Senior's Homes Inc, Barrie, Canada

Objective: Recent studies has shown that chronic pain in OA is a mixture of pathogenic mechanisms: peripheral mechanisms and central sensitization. There is no “gold standard” for the diagnosis central sensitization. There are only few studies dedicated to neurophysiological identification of central sensitization by several

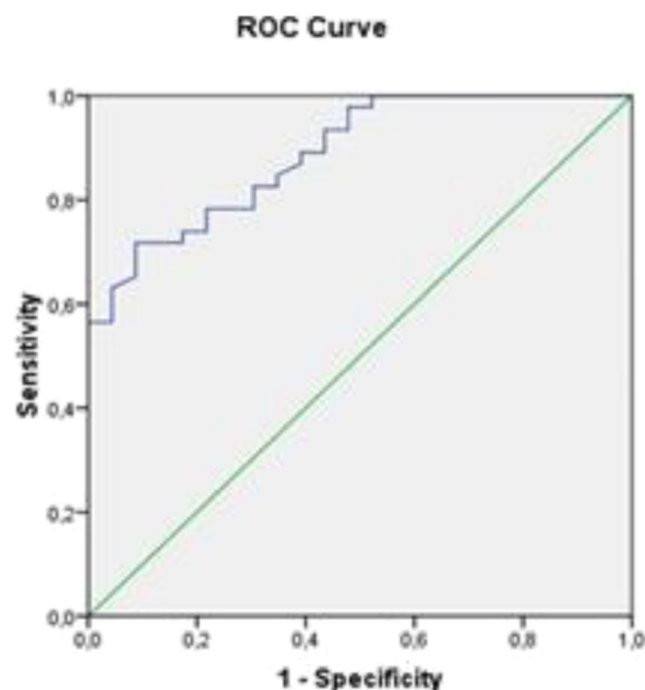
methods. Our aim was to explore chronic pain in OA with neurophysiological examination.

Methods: 46 women with chronic pain OA and 23 healthy women, aged 45-65, were recruited. Participants were examined by rheumatologic and neurological exploration, DN4 and Pain DETECT neuropathic pain scales. Neurophysiology included algometria with algometer and wind-up observed by Neuropen. Five test sites (V1-V5) in the peripatellar region and one control site (V6) on tibialis anterior were marked for examination

Results: Neurological examination revealed no somatosensory deficit. Examination of the sensitive sphere indicated hyperalgesia: primary and secondary hyperalgesia. Neuropathic scales data demonstrated neuropathic descriptors present in patients. Algometria revealed low pressure pain threshold (PPT) above injured knee and intact region compared with healthy group (Table).

PPT	Patients	Healthy gr	P
V1	7.04±2.9	15.13±5.08	0.00
V4	4.57±2.2	11.27±4.98	0.00
V6	7.34±3.7	15.18±5.07	0.00

PPT in intact region was compared between patients and control group by ROC-analysis. Max off PPT in intact region in patient was -14.70, min - 1.80, mean value - 7.34. Mean value of PPT in control group was 15.18. Area under curve was- 0.888. Sensitivity - 70%. Specificity - 83%. ROC- analysis demonstrated that low PPT in OA patients is a specific feature of central sensitization (Figure).



Wind-up in intact region revealed significant difference of data in patients with secondary hyperalgesia and control group (4.3 ± 2.1 vs. 2.4 ± 1.3 $p=0.003$) and patients without secondary hyperalgesia and control group (3.7 ± 1.4 vs. 2.4 ± 1.3 $p=0.011$).

Conclusion: Chronic OA is a complex of mechanisms: nociceptive and central sensitisation. Low PPT in damaged area and even intact region, wind-up were revealed in all OA patients and sign central sensitization. One of the main ways of controlling pain should also target CNS mechanisms, including anticonvulsants and antidepressants.

P517

AWARENESS OF OSTEOPOROSIS: ARE WE GETTING THE MESSAGE ACROSS?

T. C. Krappel¹, F. A. Krappel²

¹Collegium Spiritum Sanctum, ²Orthopädische Klinik, Spitalzentrum Oberwallis, Brig, Switzerland

Objectives: To measure awareness and treatment of osteoporosis within the population of the German half of a Swiss canton.

Methods: A semistructured questionnaire was handed out to all the patients above 50 years of age attending the local orthopaedic hospital within one month. This hospital is the only hospital of the German speaking half of this canton. Patients were asked what osteoporosis is, whether they can describe it and know anything about diagnosis and treatment.

Results: Within one month, 197 patients answered our questionnaire, only five refused despite informed consent. There were 100 women and 97 men, the average age was 67 and 65 years respectively. Of these women, 19 said they did not know whether they were past menopause, one of them was 48 years, all the others were 60 and older, so that it is highly unlikely that they are not. The majority said they have heard about osteoporosis, however when combining this question with a second, what they think osteoporosis is, only 27% passed the test as they could reasonably correctly describe it. When asking about DXA scan, 44% of the female and 5.3% of the male patients claimed they had had one and in 32% osteoporosis was diagnosed, of those 30% understood the treatment they received. A measurement of vitamin D level was performed in only 23%, 30% said they had lost height, 22% said they had frequent falls.

Conclusions: Awareness about osteoporosis, its cause and treatment still seems low although information is plenty around. Considering the ageing society, significant improvements need to be made to avoid the otherwise invariably threatening crisis of human suffering and extra costs.

P518

FRAX FOR FRACTURE PREDICTION OVER 10 YEARS VS. 5 YEARS: THE MANITOBA BMD REGISTRY

H. Johansson¹, D. Leslie², A. Odén³, N. Morin⁴, M. Lix², C. Harvey⁵, V. McCloskey³, A. Kanis¹

¹Institute for Health and Aging, Catholic University of Australia, Melbourne, Australia, ²University of Manitoba, Winnipeg, Canada, ³Centre for Metabolic Bone Diseases, University of Sheffield, Sheffield, UK, ⁴McGill University, Montreal, Canada, ⁵MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK

Objectives: FRAX[®] estimates 10-year probability of major osteoporotic fracture (MOF), by combining the risks of fracture and mortality. As a rule of thumb, one might assume that the probability of fracture over 5

years would be half that over 10 years, an assumption that we wished to test in a large population based cohort.

Methods: Using a population-based clinical registry for Manitoba, Canada, 58,858 women and 6659 men 40 years or older were identified with baseline femoral neck DXA BMD and data on FRAX clinical risk factors (CRFs). Baseline 5-year probability of MOF were calculated and compared with the respective FRAX 10-year probability. The ratio between the probabilities was studied with linear regression.

Results: Overall the ratio between 10-year and 5-year probability was 2.18 (95%CI: 2.18-2.18) for MOF. The ratio was somewhat lower with higher age, lower BMD, a greater number of CRFs and for men ($p<0.001$ for all). This was particularly marked with age: at 40-49 years the ratio was 2.48 (95%CI: 2.48-2.48) and at 90+ years it was 1.32 (95%CI: 1.31-1.33). Amongst men the ratio was 1.99 (95%CI: 1.98-2.00) for MOF while for women it was 2.21 (95%CI: 2.21-2.21). Comparing those individuals with no CRFs with those who had >3 CRFs, the 10-year:5-year MOF probability ratios were 2.21 (95%CI: 2.21-2.21) and 2.07 (95%CI: 2.04-2.10) respectively. Amongst those with femoral neck BMD T-score ≤ -3.0 SD the ratio was 1.91 (95%CI: 1.90-1.92) and for those with BMD >1.0 SD it was 2.28 (95%CI: 2.27-2.29).

Conclusions: Whilst in clinical practice it may be reasonable to halve FRAX 10-year probability to generate an estimate over 5 years, the ratio between 10-year and 5-year probability of MOF varies with age (especially in the oldest old), BMD, number of CRF and sex, all factors that also influence mortality risk. Caution should be exercised when using time frames other than 10 years for FRAX probability in research studies.

P519

WHAT WE ACHIEVED WITH PATIENTS WITH OSTEOARTHRITIS OF THE KNEES BY TREATING THEM WITH INTRA ARTICULAR APPLICATION OF 1% HYALURONATE

S. Kevic¹, S. Mikulic Gutman¹, S. Pantelinac¹, K. Boskovic¹, S. Tomasevic Todorovic¹

¹Clinic for Medical Rehabilitation, Clinical Center of Vojvodina, Serbia, Novi Sad, Serbia

Objective: Viscosupplementation is a method of treatment which is used in orthopedics and rheumatology, and has good results in reducing the symptoms of osteoarthritis (OA) and slows the progression of the ailment. Our goal was to determine the effects achieved in patients in whom 1% hyaluronic acid was administered intra-articularly (ia) by analyzing the degree of pain and the functional status of the knees and the activities of daily life.

Methods: Our work included 30 outpatients treated at our clinic in the period of January-July 2017, 26 women and 4 men, the average age of 68.2, with diagnosed OA according to the ACR criteria. The patients were processed according to a unique questionnaire, and evaluated by orthopedists and rheumatologists. In 16 patients, we treated the right knee, in 10 patients, the left knee, and in 4 patients, both knees. The patients had an amp of 1% hyaluronate applied to the diseased knees for 7 days, 3-5 applications. In 24 patients, we applied 3 intra articular applications, and in 6 patients, 5 applications to the knees. Radiological changes were assessed according to the Kellgren-Lawrence (KL) classification. The functional status was made according to the Oxford Knee Score (OKS). The degree of pain was assessed

according to the visual analogue scale, VAS (0–100 mm). The activities of daily life were estimated according to the T. Lysholm Knee Scale (TLKS). The assessments were carried out before the start of the treatment, a month after the last hyaluronate application (1st control), and three months after the last application (2nd control).

Results: 21 (70%) patients had the 3rd degree of radiological changes by KL, 9 (30%) patients had the 2nd degree of changes. After the treatment, the degree of pain in the knee joint was lowered at 1st control (VAS 90 vs. 45), and at 2nd control (VAS 90 vs. 40). The degree of pain was lower in patients who received ia hyaluronate applications 5 times. A statistically significant improvement in functional status was achieved at 1st control (OKS 22 vs. 38, $p<0.05$), and at 2nd control (OKS 22 vs. 40, $p<0.05$). The assessment of patient functioning in the activities of daily life increased after the treatment, at 1st control (TLKS 63 vs. 70), and at 2nd control (TLKS 63 vs. 84).

Conclusion: By applying 1% hyaluronate in patients with OA of the knees, we significantly reduced the degree of pain in the knees, improved their functional status and facilitated the activities of daily life.

P520

CALCIUM INTAKE AND FREQUENCY OF VITAMIN D DEFICIENCY IN POPULATION OF RUSSIAN FEDERATION

O. Nikitinskaya¹, E. Samarkina¹, N. Demin¹, N. Toroptsova¹

¹Nasonova Research Institute of Rheumatology, Moscow, Russia

Objectives: The optimal daily calcium intake for people aged 50 and older should be 1000–1200 mg, and the level of vitamin D should be at least 30 ng / ml. Low intake of calcium and reduced value of serum 25 (OH) D plays an important role in the development of osteoporosis and osteoporotic fractures. The purpose of this study was to assess the daily dietary calcium intake and level of vitamin D among population at the age of 50 years and older in Russia.

Methods: The recruitment of the population was carried out in various regions of the country for detecting risk factors associated with osteoporosis and low energy fracture. The estimation of the daily calcium intake was conducted using a food frequency questionnaire. The level of vitamin D in the blood serum was assessed among 10% of randomly selected participants in 4 cities of Russia.

Results: The population sample included 18 018 people (13 941 women and 4077 men, mean age 62±10 years) from various regions of Russia. The mean calcium intake with food was 680±245 mg/d. Women consumed calcium with food significantly more than men (683±231 mg and 635±276 mg, respectively, $p<0.01$). The calcium intake <500 mg/d was detected in 19% of women and 34% of men, 500–800 mg in 57% and 47%, 800–1000 mg in 15% and 11%, 1000 mg and above in 9% and 8%, respectively. Women did not have significant differences in calcium intake depending on age. In men, the lowest calcium consumption was found out at the age of 80 years and older, which was significantly less than among men of other ages. Vitamin D deficiency or insufficiency was detected in 82–95% of the research sample population without statistical differences between women and men, age groups and place of living.

Conclusions: A large percentage of population at the age of 50 years and over did not receive an adequate amount of calcium from the diet and had vitamin D deficiency or insufficiency regardless of age and place of residence.

P521

THE RELATION BETWEEN PREVALENCE OF AGE-RELATED VERTEBRAL FRAGILITY FRACTURE AND BMD

K. S. Song¹, G. W. Chang¹, H. Kang¹

¹Chung-Ang University Hospital, Department of Orthopaedic Surgery, Seoul, South Korea

Objective: To investigate the correlation between age-related prevalence of vertebral fragility fracture and BMD in lumbar and hip regions.

Methods: Between Jan. 2005 and Dec. 2016, patients over 50 years old who were diagnosed with vertebral compression fracture were evaluated in single tertiary institution. In total 4448 patients, 2216 patients were enrolled, excluding 2232 patients without BMD examination and no information for injury mechanism at the time of the fracture. The retrospective medical records review for age, sex, BMI, injury mechanism, and BMD. Patients were then divided into fragility fracture and non-fragility fracture group according to their injury mechanism. For subgroup analysis, the patients were divided into age groups of fifties, sixties, seventies, and older than 80 and the risk ratio were evaluated using the gender and age- matched Nagelkerke R-square regression analysis.

Results: Fragility group (n=1930) have significantly older age, more female proportion, lower BMI, and lower BMD scores (lumbar and hip regions) more than non-fragility group (n=286). In fragility group, the prevalence was significantly correlated with age and BMD and all age groups showed that significant percentages of fragility fracture were observed in even normal and osteopenia, WHO-BMD categories (31 and 61% in the 50s, 67 and 71% in the 60s, 75 and 86% in the 70s, and 100 and 97% in the over 80). In sex and age- matched Nagelkerke R-square regression analysis, the patients with osteopenia and osteoporosis were 1.57 times and 2.62 times more likely to suffer from vertebral fragility fracture than normal BMD and the risk ratio was more influenced by the change of T-score in total hip (1.48 in osteopenia and 2.43 in osteoporosis) rather than T-score of lumbar (1.38 and 2.00) or femur neck (1.46 and 2.15).

Conclusion: All age groups over the 50s demonstrated that significant percentages of vertebral fragility fractures in even osteopenia and normal BMD groups, so, proactive osteoporosis treatment may be needed for such age people and age itself might be the more important risk factor of it than BMD.

P522

THE FREQUENCY OF OSTEOPOROSIS AND LOW ENERGY FRACTURES IN PATIENTS WITH SYSTEMIC SCLEROSIS

O. Dobrovolskaya¹, N. Demin¹, D. Kudinsky¹, M. Starovoytova¹, N. Toroptsova¹

¹Nasonova Research Institute of Rheumatology, Moscow, Russia

Objectives: Several studies have revealed a possible association between systemic sclerosis (SSc), osteoporosis (OP) and low energy fractures (LEF). However, these were relatively small-scale, single-centre studies using cross-sectional or case-control designs. Our aim was to determine the frequency of OP, osteopenia and LEF in patients with SSc.

Methods: 128 patients were enrolled in the study: 115 women (mean age 53±12 yrs) and 13 men (mean age 55±13 yrs). BMD was measured in all patients at lumbar spine, proximal femur and distal forearm by DXA (Hologic 4500A). Osteoporosis was diagnosed in postmenopausal women and men 50 years old and over if the T-

score was -2.5 standard deviation (SD) or less. In premenopausal women and men younger 50 years old if the Z-score was -2.0 SD or less.

Results: OP was identified in 27 (32%), osteopenia in 46 (56%), normal BMD in 10 (12%) postmenopausal women. In premenopausal women low BMD was determined in 7 (22%) and normal BMD in 25 (78%) patients. In men OP was diagnosed in 4 (31%), osteopenia in 3 (23%) and normal BMD in 6 (46%) patients. In this cohort 30 (24%) patients had LEF. Frequency of LEF was 27% among postmenopausal women, 9% in women of reproductive age and 31% in men. 10% postmenopausal women and 8% men had two or more LEF. The mean age at which the fracture occurred was 54±11 yrs in women and 60±12 yrs in men. The most frequent localizations of the fracture were distal forearm and vertebrae: 10 (36%) and 7 (23%) patients, respectively.

Conclusion: High frequency of low BMD was found out in SSc patients regardless of age. The frequency of low energy fractures was three times more in postmenopausal women and men than in women of reproductive age.

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RELATIONSHIP BETWEEN N-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE, OSTEOCALCIN, OSTEOPOROSIS AND ABDOMINAL AORTIC CALCIFICATION IN CHRONIC KIDNEY DISEASE PATIENTS

P.-J. Chi¹, J.-P. Tsai², H.-H. Liou³

¹Division of Nephrology, Department of Medicine, E-DA Hospital, E-DA Cancer Hospital, I-Shou University, Kaohsiung, ²Division of Nephrology, Department of Internal Medicine, Dalin Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Chiayi, ³Division of Nephrology, Department of Medicine, Hsin-Jen Hospital, New Taipei City, Taiwan

Objectives: Recent study delineated a correlation between N-terminal pro-brain natriuretic peptide (NT-proBNP) and coronary artery calcification in hypertensive subjects. Osteocalcin, a bone formation marker, is associated with arteriosclerosis and osteoporosis. We aimed to investigate the relationships among serum NT-pro BNP, osteocalcin, abdominal aortic calcification (AAC), and BMD in CKD patients.

Methods: A total of 128 CKD patients, stage 1 to 5, were enrolled in our study. Serum NT-proBNP level was measured by enzyme-linked fluorescent assay and osteocalcin by electrochemiluminescence immunoassay. BMD was measured by DXA and AAC by lateral lumbar radiographs findings.

Results: 28.8% of CKD patients were found with osteoporosis and 42.3% with osteopenia. BMD was positively correlated with estimated glomerular filtration rate (eGFR) ($r=0.018$, $p=0.014$), and BMI ($r=0.08$, $p=0.033$); while, negatively with age ($r=-0.055$, $p<0.0001$), phosphate ($r=-0.554$, $p=0.035$), intact PTH (iPTH) ($r=-0.01$, $p=0.001$), log-transformed NT-proBNP ($r=-0.229$, $p=0.01$), osteocalcin ($r=-0.031$, $P=0.0001$), and calcification score ($r=-0.096$, $p=0.0001$). In stepwise multivariate regression, age ($\beta=-0.039$, $p=0.002$), osteocalcin ($\beta=-0.029$, $p=0.0001$), and calcification score ($\beta=-0.058$, $p=0.015$) were noted to be as independent determinants of BMD. AAC score was positively correlated with age ($r=0.195$, $p=0.0002$), log-transformed osteocalcin ($r=1.954$, $p=0.017$), and log-transformed NT-proBNP ($r=1.237$, $p=0.001$); while, negatively with eGFR ($r=-0.101$, $p=0.0013$), and BMD ($r=-1.557$, $p=0.0001$). After stepwise multivariate regression analysis, log-transformed NT-proBNP ($\beta=0.884$, $p=0.011$) and BMD ($\beta=1.247$, $p=0.001$) were independently associated with AAC.

Conclusion: We observed BMD was negatively correlated with AAC and osteocalcin in CKD patients. Moreover, NT-proBNP, but not osteocalcin, is an independent predictor of AAC in CKD patients.

P524

ANTI-OSTEOPOROSIS MEDICATION PRESCRIPTIONS AND INCIDENCE OF SECONDARY FRACTURE AMONGST HIP FRACTURE PATIENTS IN ENGLAND AND WALES: AN AGE STRATIFIED INTERRUPTED TIME SERIES ANALYSIS

S. Hawley¹, D. Prieto-Alhambra¹, A. Delmestri¹, N. K. Arden¹, C. Cooper¹, A. Judge¹, M. K. Javaid¹

¹NDORMS, University of Oxford, Oxford, UK

Objective: While the clinical effectiveness of anti-osteoporosis therapies in trial settings is well established, there is limited evidence for real-world effectiveness in the very aged, frail patient. Reduced life expectancy, other co-morbidities and potential differences in bone quality may attenuate benefits. We have recently demonstrated an association between increased prescribing of alendronate with reductions in re-fracture in the UK. We here investigate if the benefits of anti-osteoporosis prescribing were similar in elderly hip fracture patients.

Methods: UK primary care routine data (Clinical Practice Research Datalink (CPRD)) were used to identify incident hip fracture diagnoses (1999-2012). Changes in level and trend of incident anti-osteoporosis medication prescribing and secondary fracture following publication of NICE guidance and genericisation of alendronic acid (considered as a combined intervention spanning Oct 2004 – Sept 2005) were estimated using an interrupted time series analysis on 6-monthly aggregate data. Patients aged below or 85 years and older were analysed separately.

Results: We identified 10,873 primary hip fracture patients for the period 1st April 1999 to 30th Sept 2012. Median age was 83 years. Among patients aged ≥ 85 years ($n=4,601$; 80.8% female), the intervention period was associated with an immediate absolute increase of 15.6% (95% C.I. 8.0 to 18.9) in anti-osteoporosis medication prescriptions and a significant and clinically important reduction in subsequent major fracture: -0.18% (95% C.I. -0.34 to -0.08) per six months. These changes were similar to those aged <85 years. There was an approximate 14% (age ≥ 85 years) and 15% (age <85 years) relative reduction in subsequent major fracture at three years post-intervention compared to expected values based solely on pre-intervention level and trend.

Conclusions: Amongst primary hip fracture patients, publication of NICE guidance and first UK market authorisation of generic alendronic acid was temporally associated with increased prescribing of bisphosphonates and a significant decline in secondary fractures. This was the case for patients above and below the age of 85 years, indicating the clinical effectiveness of alendronate for secondary fracture prevention does not appear to be blunted in the very frail elderly patient.

Disclosures: M.K.J. reports honoraria, unrestricted research grants, travel and/or subsistence expenses from Amgen, Eli Lilly and UCB. D.P.A.'s department has received grants from UCB, Amgen and Servier; speaker fees from Amgen; and consultancy fees from UCB

P525

ELUCIDATION OF THE BONE METABOLISM DURING VISCERAL LEISHMANIASIS

S. Sinha¹

¹Centre of Biotechnology, University of Allahabad, Allahabad, India

Visceral leishmaniasis is a macrophage associated disorder for the treatment of which antimony based drugs like SAG and SSG were the first choice in the recent past. The clinical value of antimony therapy is now declined against VL because increasing cases of sodium antimony gluconate (SAG) resistance have reached outstanding proportion in Bihar,

India. The present study was aimed at determining bone metabolism related changes in SAG sensitive and SAG resistant BALB/c mice with experimental visceral leishmaniasis such as vitamin D, calcium, phosphate, GGT, LDH and ALP levels as compared to healthy ones. A total of 60 serums of BALB/c male mice were studied and 40 of which were evaluated as leishmania seropositive and 20 as leishmania seronegative by the IFA test, were included in this study. There was no any statistically significant difference between the serum 25-OH-D3 levels of Leishmania positive and negative SAG sensitive and resistant BALB/c mice ($p>0.001$). There was a statistically significant difference between the serum ALP ($p<0.001$), and P levels were observed to be higher in the seropositive SAG sensitive BALB/c mice than in the seronegative resistant BALB/c mice, while Ca level was low ($p<0.001$). There seemed no statistically significant difference between SAG resistant BALB/c mice. SAG may play an important role in regulating the levels of the compounds related to bone metabolism.

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DECREASED LEVELS OF CIRCULATING CARBOXYLATED OSTEOCALCIN IN CHILDREN WITH LOW ENERGY FRACTURES

J. P. Popko¹, M. K. Karpiński¹, S. C. Chojnowska², K. M. Maresz³, L. J. S. Schurgers⁴, V. B. Badamaev⁵

¹Department of Pediatric Orthopedics and Traumatology Medical University of Białystok Poland, Białystok, Poland, ²Faculty of Health Sciences, Łomża State University of Applied Sciences, Łomża, Poland, ³International Science & Health Foundation Krakow Poland, Kraków, Poland, ⁴Cardiovascular Research Institute Maastricht, Department of Biochemistry, University Maastricht, Maastricht, The Netherlands, ⁵American Medical Holdings Inc, New York, USA

Objective: In the past decades, an increased interest in the roles of vitamins D and K became evident. In particular, in relation to bone health and prevention of bone fractures. The aim of the current study was to evaluate vitamin D and K status in children with low-energy fractures and in children without fractures.

Methods: The study group of 20 children (14 boys, 6 girls) aged 5 to 15 years old, with radiologically confirmed low-energy fractures was compared with the control group of 19 healthy children (9 boys, 10 girls), aged 7 to 17 years old, without fractures. Total vitamin D [25(OH)D3 plus 25(OH)D2], calcium, BALP (bone alkaline phosphatase), NTx (N-terminal telopeptide), and uncarboxylated (ucOC) and carboxylated osteocalcin (cOC) serum concentrations were evaluated. Ratio of serum uncarboxylated osteocalcin to serum carboxylated osteocalcin ucOC:cOC (UCR) was used as an indicator of bone vitamin K status. Logistic regression models were created to establish UCR influence for odds ratio of low-energy fractures in both groups.

Results: There were no statistically significant differences in the serum calcium, NTx, BALP, or total vitamin D levels between the two groups. There was, however, a statistically significant difference in the UCR ratio. The median UCR in the fracture group was 0.471 compared with the control group value of 0.245 ($p<0.0001$). In the logistic regression analysis, odds ratio of low-energy fractures for UCR was calculated, with an increased risk of fractures by some 78.3 times.

Conclusions: In this pilot study, better vitamin K status expressed as the ratio of ucOC: cOC - UCR - have positively and statistically significantly correlated with lower rate of low-energy fracture incidence.

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ADHERENCE AND PERSISTENCE OF DENOSUMAB VS. WEEKLY BISPHOSPHONATE IN HEALTH-RELATED QUALITY OF LIFE FOR THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS

G. Carlino¹, R. Maggio², C. Rotondo¹

¹ASL LECCE - DSS Gallipoli e Casarano, Casarano, ²Department of Internal Medicine "Veris Delli Ponti" Hospital, Scorrano, Italy

Objective: Long term adherence and persistence in patients undergoing treatment for postmenopausal osteoporosis remains poor despite the proven efficacy of the therapy. In this study, we evaluated whether greater adherence and persistence in treatment can lead to an improvement in the quality of life.

Methods: A cohort of 268 patients, all women, in postmenopausal osteoporosis divided into two groups was evaluated: "DEN Group" (DEN) in treatment with denosumab (n=131) and "BIS Group" (BIS) in treatment with bisphosphonates (n=137). Table I shows demographic and clinical data. Patients were followed for 3 years with baseline, 6-month, 18-month, and 36-month evaluation. The evaluation criteria were the persistence in therapy and the self-related treatment compliance, as well as the quality of life assessed with the 41-item quality of life questionnaire for osteoporosis (QUALEFFO-41) performed at baseline, at 18 and at 36 months.

Table I- Baseline characteristics (Mean $\pm$ SD)

	BIS Group (N=137)	DEN Group (N=131)
Age (yr)	62 $\pm$ 6	63 $\pm$ 10
BMI(kg/m ²)	25.8 $\pm$ 3.5	25.1 $\pm$ 4.2
GFR (mL/min/1.73 m ²)	79 $\pm$ 16	77 $\pm$ 25
BMD Femoral neck (g/cm ²)	0.65 $\pm$ 0.08	0.70 $\pm$ 0.070
BMD Lumbar spine (g/cm ²)	0.75 $\pm$ 0.06	0.77 $\pm$ 0.11
History of fracture (#pts)	35	42
10 year Probability of Major Osteoporotic fracture (%)	6.2 $\pm$ 5.2	7.5 $\pm$ 5.0
10 year Probability of Hip fracture (%)	2.1 $\pm$ 3.3	2.5 $\pm$ 2.9
Total OC (ng/ml)	19.2 $\pm$ 7.8	15.9 $\pm$ 6.7
CTX (ng/ml)	0.48 $\pm$ 0.21	0.44 $\pm$ 0.13
PTH (pg/ml)	53 $\pm$ 17	44 $\pm$ 13
25OHD (ng/ml)	39 $\pm$ 12	49 $\pm$ 25

OC=Osteocalcin, CTX=C-terminal telopeptide, PTH=parathyroid hormone, 25OHD=25-hydroxyvitamin D

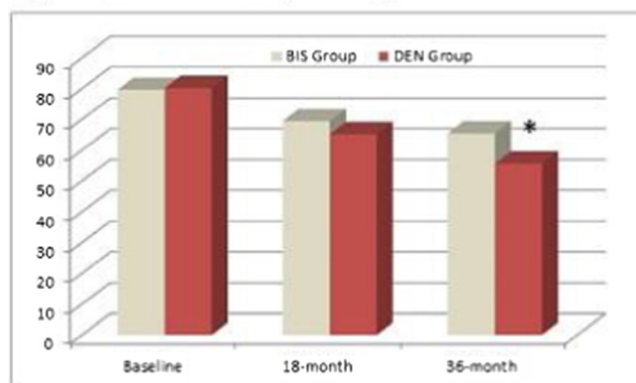
Results: Table II shows the percentage of patients who abandoned treatment at different times with a statistical significance towards both 18 and 36 months. In the BIS the main reason for abandonment were the adverse events (gastrointestinal, dental interventions, etc.), in the DEN the abandonment was due to drop-out. [In BIS, the most frequent reason for non-compliance with therapy was oversight, and most patients who continued treatment always used the drugs regularly on the recommended days and dosages.] In the period of time considered the majority of patients both BIS and DEN said they were satisfied with the treatment and wanted to continue it. The QUALEFFO scores (Figure 1) of patients from the baseline visit were significantly improved in the 36-month visit (BIS 79.6

± 25.4 vs. 65.4 ± 14.6 ; DEN 80.2 ± 18.5 vs. $55.6^* \pm 16.4$ (* $p < 0.001$); the difference was not significant between BIS and DEN groups at both baseline visit and 36-month visit, but in the DEN group there was significantly between baseline and 36-month visit.

Table II- Percentage of patients who abandoned

	Group BIS	Group DEN
6 mesi	44.3%	5, 30%
18 mesi	51.6%	6, 40%
36 mesi	54.9%	7, 20%

Fig. 1 - Qualeffo-41 Score (* see text)



Conclusions: The observation, although numerically limited, notes that the use of denosumab in patients with postmenopausal osteoporosis leads to a greater persistence in treatment and a statistically significant adherence to therapy, which allows to obtain the maximum therapeutic effect of the therapy, also determining in 36 months of treatment an improvement in the quality of life, which is not achieved in subjects treated with bisphosphonates.

P528

RECENT TREND IN THE INCIDENCE OF HIP FRACTURES IN TOTTORI, JAPAN

H. Hagino¹, O. Osaki¹, N. Nagashima¹

¹Tottori University, Yonago, Japan

Objective: It has been reported that up to 2006, the age-adjusted incidence of hip fractures in Japan has been increasing with time. The purpose of this study was to investigate the recent trends in the incidence of hip fractures in Tottori Prefecture, Japan.

Methods: Tottori Prefecture is located in mid-western Japan. It had a population of 569,579 in 2016, with 30.1% of the total population aged 65 years and over. A survey of all hip fractures in patients 35 years and over in 2013, 2014, and 2016 was performed in all Tottori Prefecture hospitals. Recorded data included gender, age, and date of fracture. Patients residing in other prefectures were excluded. Age- and gender-specific incidence (per 100,000 person-years) were calculated based on the population of Tottori Prefecture in each year and compared to the incidence observed from 1986–2012.

Results: In 2013, 2014, and 2016 respectively, there were 248, 242, and 281 registered male patients and 1,015, 876, and 943 registered female

patients. In women aged 75–79 years and 80–84 years, the incidence was lower than in 2010; however, the incidence in women aged 85–89 years did not change. The incidence in women aged 90 years and over was higher than in 2010. The incidence in men showed a slight increase in each age group from 2010 to 2016.

Conclusion: The incidence of hip fractures in women peaked in 2010, and showed a steady decrease thereafter in women aged 75–84 years. The incidence of hip fractures been increasing in Tottori Prefecture among women aged 90 years and over and men of all age groups.

P529

OSTEOGENICITY OF WALKING EXERCISE: GROUND REACTION FORCE OR MUSCLE CONTRACTION?

D. Tinduh¹, I. P. Alit Pawana¹, E. Retnowati²

¹Department of Physical Medicine and Rehabilitation Faculty of Medicine Universitas Airlangga, Dr. Soetomo Hospital, ²Department of Clinical Pathology Faculty of Medicine Universitas Airlangga, Dr. Soetomo Hospital, Surabaya, Indonesia

Objective: Walking exercise in postmenopausal women was aimed to prevent the negative uncoupling bone remodeling and reduced bone loss after menopause. Reduced estrogen level lead to mechano-insensitivity condition in postmenopausal women, and the overall effect of regular force within the body will be blunted. Walking exercise can be a simple but should be prescribed properly to get the osteogenic effects in the postmenopausal women. Our aim was to reveal the effect of kinetics and kinematics of walking exercise to bone quality in postmenopausal women

Method: One group pre-post study on 12 postmenopausal women (within 5 years after natural menopause onset). Inclusion criteria: serum E2<10 pg/mL, no cardiovascular, metabolic, musculoskeletal or neuromuscular diseases. Exclusion criteria: consumed foods and drugs which promote bone resorption regularly (> 3 times/week) in such number >3 months period. Initial evaluation: baseline cadence (step number per minutes) to obtain a baseline osteogenic index (OI) and walking speed individually. Intervention: Play Speed Walking Exercise with increased speed 25% from baseline cadence, 3x/week for 3 weeks. Pacing speed with metronome set individually. Independent variable was walking exercise (reflected by ground reaction force/GRF (1st peak, downslope and 2nd peak), anterior tibial (AT) and medial gastrocnemius (MG) muscle contraction; measured by gait analyzer and surface EMG machine). Dependent variables were measured by flow cytometry: percentage of circulated adipocyte derived mesenchymal stem cell (ADMSC), active cell (CD117+ cells) and homing cell (CD184+ cells); serum PTH and IL-6 measured by ECLIA.

Results: Increased cadence 25% from initial cadence increased OI from 25.7 ± 5.7 to 27.8 ± 1.8 . MG muscle contraction was correlated to serum IL-6 ($r=0.604$; $p=0.037$) and CD184+cells ($r=0.811$; $p=0.001$), but AT muscle contraction was correlated negatively to CD117+ cells ($r=-0.647$; $p=0.023$). Downslope of GRF was correlated to CD117+ cells ($r=0.596$; $p=0.041$). 1st and 2nd peaks of GRF were correlated to OI ($r=0.876$ and $r=0.920$ respectively; $p=0.000$). Serum PTH was correlated negatively to OI ($r=-0.726$; $p=0.007$). OI was correlated to ADMSC ($r=0.579$; $p=0.048$) and ADMSC was correlated to P1NP ($r=0.596$; $p=0.041$), but did not affected the CTx.

Conclusion: Increased cadence 25% from initial cadence with the play speed walk exercise for 3 weeks, affected the bone remodeling and cell activity via muscle contraction and GRF. The direct osteogenic effect was showed by GRF which affected the OI, and in turn OI affected the ADMSC and P1NP. But PTH gave blunting effect to OI directly.

Muscle contraction tend to support homing effects, reflected by their activities to IL-6, CD184+ cells and CD117+ cells. Increased walking speed 25% from initial cadence affected the bone remodeling and circulated cells to peripheral blood flow in postmenopausal women.

P530

APPLICATION OF AVOCADO/SOYBEAN UNSAPONIFIABLES IN OSTEOARTHRITIS IN REAL CLINICAL PRACTICE

Y. V. Polyakova¹, L. E. Sivordova¹, E. V. Papichev¹, Y. R. Akhverdyan¹, B. V. Zavodovsky¹, O. D. Korolik²

¹Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy", ²Volgograd State Medical University, Volgograd, Russia

Objective: The avocado/soybean unsaponifiables (ASU) are supposed to modulate pathogenesis of osteoarthritis (OA) and inhibit production of inflammatory cytokines (1). Our aim was to study the efficacy and safety of long-term ASU therapy depending on its adherence.

Methods: A total of 60 patients were selected from the clinical population of rheumatologists in 2011. The treatment with ASU, NSAIDs on demand and non-drug therapies was recommended for the patients. After 5 years we studied the adherence of patients to the recommended therapy and the difference in clinical indicators. Patients were divided into the following groups: with regularly intake of ASU 70-100% of the time (n=19), with usual intake of ASU (from 31-69% (n=25)) and with rare intake of ASU (from 10 to 30% (n=16)) of the recommended duration.

Results: The requirement for NSAIDs was evaluated for each group. High dependence on NSAIDs (constant intake of NSAIDs), n=19 (3; 6; 10), moderate dependence on NSAIDs (1-2 intake per week or short courses for 5-7 days each 2 months), n=34 (12; 17; 5), Does not intake NSAIDs for 2 years, n=7 (4; 2; 1). Chi-square=15.316; p=0.0041. Highest adherence to ASU therapy was among patients with nodular OA (7 patients - 36.84%), moderate adherence was among knee OA (7 patients - 28%) and generalized OA (9 patients - 36%), but differences in groups were insignificant (chi-square=9.853351, p=0.13097), probably due to the small number of patients in each group. According to the VAS questionnaire patients were divided into three groups: with low (<3.0), moderate (3-6.9) and high (>7) pain level. Patients with higher adherence to ASU therapy showed higher subjective evaluation of the effectiveness of ASU therapy (chi-square=44.288, p<0.0001).

Conclusions: Groups with higher adherence show lower dependence on NSAIDs. Highest adherence to ASU was in group with nodular OA.

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P531

CORRELATION OF MEASURES FOR PREVENTION IN OSTEOPOROSIS

T. Petrusic¹

¹Health Centre, Nis, Serbia

Objective: Osteoporosis is a serious health problem. Disease characterized by high morbidity, mortality and socio-economic costs. It is a disease characterized by a reduction in bone density. Bones become porous, crutches therefore, they are subject to fractures, which occur spontaneously or with a force less than needed to break the healthy bone. Our aim was to see the frequency of osteoporosis and the possibility of its prevention.

Method: The data from the healthy cartons and protocols for the physical medicine and rehabilitation of the Health Center Nis were analyzed after the screening of the examination of patients of both sexes and different years for four weeks (28 d), in October 2017, on the Sonost 3000 Densitometer.

Results: A total of 212 patients were examined (between 50-70 years old), 114 of them (53.77%) are women and 98 of them (46.23%) are men. The normal finding of T-score 0-1 had 110 (51.89%) patients, 51 of them are women and 59 are men. Osteopenia and T-score -1-2.5 had a total of 64 (30.19%), of which 33 are women and 31 are men. Osteoporosis T-score < -2.5 was diagnosed in 38 (17.92%) individuals, in 30 of the female population and 8 of the male population.

Conclusion: To prevent the occurrence of osteoporosis and to slow down its osteoporosis, proper nutrition is needed. This provides a recommended daily intake of calcium and vitamin D and adequate physical activity according to age and healthcare possibilities of patients. Certainly, for younger patients sport activity is recommended and for older generations long walks in the nature. It is necessary to remove harmful habits (consumption of cigarettes and alcohol) and timely measurement of bone density of people at risk. Ultrasound osteodensitometry is a fast, economical method without radiation. Measurement is done on the heel bone and this measurement can be used as a screening method in the prevention of osteoporosis.

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THE OSTEOPOROSIS ASSOCIATED WITH PREGNANCY IN THE NORTH DISTRICT OF CÁDIZ AND ITS MANAGEMENT: CLINICAL CASES REVIEW

A. Holub¹, J. Marante Fuertes², A. Pérez Alcántara³

¹Primary Care Center La Granja, Jerez de la Frontera, Cádiz, Spain,

²University of Cádiz, General Hospital in Jerez de la Frontera, ³General Hospital in Jerez de la Frontera, Cádiz, Spain

Objectives: Transient osteoporosis of pregnancy (TOP), is a rare yet perhaps under-reported skeletal disorder of unknown etiology and is affecting otherwise healthy pregnancies throughout the world. It presents in the third trimester of pregnancy and progressively immobilizes the mother. Radiographic studies detect drastic loss of bone mass, elevated rates of turnover in the bone, and oedema in the affected part of the bone. Weakness of the bone may lead to fractures during delivery and other complications for the mother. The particularity of that disorder in that within weeks of labour, symptoms and radiological findings resolve. The aim of our work is to present the cases of transient osteoporosis of pregnancy that were diagnosed in our hospital in the north district of Cádiz (Spain) between 2002-2017 and its different management.

Methods: Women that suffer from transient osteoporosis experience a sudden onset of pain that intensifies with walking or other weight-bearing activities symptoms that overlaps with the typical pregnancy conditions due to a physiological weight gain and uterus position complicating the diagnosis. We present 5 cases of TOP. All women were aged between 26-42, and diagnosed of TOP in the third trimester of pregnancy (4 cases) and one was diagnosed in postpartum. In three of five patients the TOP diagnosis was made in their third trimester of pregnancy and the rest two patients were diagnosed with TOP after suffering a hip fracture in their last weeks of pregnancy or just after delivery, respectively.

Results: All five patient received analgesic treatment with paracetamol and nonsteroidal anti-inflammatory drugs during reminder of the pregnancy and those with no fracture and were prescribed bed rest and avoid weight bearing. In all cases cesarean section was recommended. After delivery they were prescribed calcitriol 0.5 µg and calcium 1000 mg. In

all cases the symptoms and MRI findings regressed between 6 and 12 months following delivery. Both patient with fractures underwent surgical treatment: during the last term of pregnancy or in the postpartum. Both of them presented a favorable evolution during the first six months of follow-up.

Conclusions: Though uncommon, osteoporosis can occur in pregnancy or shortly after delivery. Although a painful symptoms gradually subside and usually end within 6–12 months it is crucial its early detection. Bone strength in the hip also returns to normal in the majority of women, however if not diagnosed on time may lead to bone fractures that is why it is important the prevention. The orthopedist and primary care physicians plays an essential role in monitoring the condition and its potential complications as well as ensuring satisfactory outcomes for both the mother and the newborn.

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P533

ABOUT A CASE, IDIOPATHIC JUVENILE OSTEOPOROSIS IN A 13-YEAR-OLD BOY

A. Holub¹, J. Marante Fuertes², A. Pérez Alcántara³

¹Primary Care Center La Granja, Jerez de la Frontera, ²University of Cádiz, General Hospital in Jerez de la Frontera, ³General Hospital in Jerez de la Frontera, Cádiz, Spain

Objectives: Idiopathic juvenile osteoporosis is a rare disease of children between the 2–14 years old with pain in bones, fractures and deformity of the axial and appendicular as a part of clinical evaluation skeleton after minimal traumatism. It is important to differentiate the diagnosis for conditions causing generalized osteoporosis in childhood. It is diagnosed once excluded the other causes. The aim of our work is to raise awareness about a possible association of persistent fractures with this rare metabolic disorder, idiopathic juvenile osteoporosis, which should be included in differential diagnosis of patients with persistent skeleton fractures.

Methods: A 13-year-old boy presents to his first care emergency unit with a bilateral wrist pain after fatal fall suffered while he was playing football. After practicing an X-ray he is diagnosed of bilateral distal radius fracture and is immobilized for 6 weeks. In his medical history we can find that at age 10, he fractured T6 while playing volleyball. He was evaluated by an orthopedist who instructed him to resume his regular activities, including sport practicing. At the age of 12 after a thoracic vertebral fractures suffered after another fall he was seen by a hematologist who performed a bone marrow biopsy of T5, which was normal. No other medical history was found. Review of systems was negative for other symptoms. The only complaint was back pain, treated with pain medications and muscle relaxants. Growth had been normal along the 95th percentile until the onset of the vertebral fractures. Hearing and vision are normal. A DXA scan was performed and revealed a decreased lumbar spine Z-score of −3.9.

Results: A 13-year-old patient underwent a great variety of tests including screening for rheumatologic disease, celiac disease, thyroid dysfunction, hypercalciuria, and vitamin D deficiency, all of which were normal. Markers of bone turnover were unremarkable, and no mutations in COL1A1/COL1A2 were detected. The patient was given a presumptive

diagnosis of idiopathic juvenile osteoporosis and started on vitamin D supplementation, physical therapy, weight-bearing exercise, and pamidronate infusions every 3 months. He was restricted from playing contact sports. Over the course of 12 months, he experienced a decrease in back pain. He did not experience any fractures during that time. A DXA scan after 12 months of therapy revealed an improved spine Z-score of −2.5.

Conclusions: Fractures are very common at the pediatric age, with an incidence of approximately 50% in boys and 40% in girls. Fracture rate appears to be increasing over time, particularly at the distal radius, which remains the most frequent site of fracture in children and adolescents. Fracture rate peaks between ages 11–15 years, corresponding to the period of maximum postnatal growth velocity. There is relative undermineralization of the adolescent skeleton, due to a delay of approximately 8 months between the period of peak growth velocity and peak bone mineral accrual. This leads to transient cortical weakness, particularly of the distal radius in adolescent boys, which may contribute to the increased incidence of metaphyseal forearm fractures. Increased participation in competitive youth sports has also led to a concurrent rise in pediatric overuse injuries, such as stress fractures.

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P534

OVERUSE HIP INJURY IN 33-YEAR -OLD FEMALE. THE IMPORTANCE OF CLINICAL SUSPICION AND EARLY DIAGNOSIS: A CASE REPORT

A. Holub¹, J. Marante Fuertes², A. Pérez Alcántara³

¹Primary Care Center La Granja, Jerez de la Frontera, ²University of Cádiz, General Hospital in Jerez de la Frontera, ³General Hospital in Jerez de la Frontera, Cádiz, Spain

Objectives: Stress fractures are common injuries in young physically active people, most common in female and often difficult to diagnose. A stress fracture is a fatigue-induced fracture of bone caused by repeated applications of stress over time. Stress fractures can be found in various female subgroups: military personnel, endurance athletes that perform repetitive weight-bearing sports such as distance running or adolescent athletes with amenorrhea, eating disorders, and osteopenia, otherwise known as the female athlete triad, however all physically active person can suffer from a stress fracture. Several locations in the lower extremity have a predisposition towards developing stress fractures, including the tibia, metatarsals, and fibula. Stress fractures to the femur are less common. Although clinicians will frequently screen population at risk and add a differential diagnosis of stress fracture it is still possible for healthy persons to sustain stress injuries or fractures that can easily be overlooked. The aim of our work is to raise an awareness that stress fractures can occur in any physically active person.

Case report: Presentation of one case of a stress fracture of the hip in a young physically active female. Patient: A 33-year-old female whose medical history includes migraines without aura and a 6-year history of oral contraceptive use. Nonsmoker. No history of food or drug allergy. Refers active and healthy lifestyle (gym and fitness several times a week). Presents to her primary medical doctor complaining of a persistent, progressive and gradually increasing unilateral hip pain exacerbated by activity with motion of the hip limited that had started a month ago. Review

of systems was negative for any other symptoms. X-rays of the pelvis and hips revealed no fracture. Treated with analgesics (paracetamol and NSAIDs) for the last two weeks that only partially alleviate her symptoms. Given her unrelenting pain, which had progressively worsened over time, an CT and MRI of the pelvis and hips was performed that revealed nondisplaced compression-side FNSFs that underwent a conservative treatment (following the acute treatment principles of protection, rest, ice, compression, elevation, medication, and modalities).

Results: The patient remains asymptomatic leading a fully active life during 1 year of follow-up.

Conclusion: Stress fractures commonly presents in a population at risk but the general practitioners must be aware that may occur in any physically active person. An early diagnosis and rapid treatment it's crucial for the full recovery.

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P535

THE EFFECT OF THE OESTROGEN RECEPTOR 1 GENE (ESR1) POLYMORPHISM ON BMD IN POLISH PATIENTS WITH INFLAMMATORY BOWEL DISEASE

I. Krela-Kaźmierczak¹, M. Skrzypczak-Zielińska², M. Kaczmarek-Rys², M. Michalak³, A. Szymczak-Tomczak¹, N. Drwęska-Matelska⁴, M. Szalata⁴, L. Łykowska-Szuber¹, P. Eder¹, R. Słomski⁵

¹Department of Gastroenterology, Human Nutrition and Internal Medicine, Poznań University of Medical Sciences, ²Institute of Human Genetics Polish Academy of Sciences, ³Department of Computer Sciences and Statistics, Poznań University of Medical Sciences, ⁴Department of Biochemistry and Biotechnology, Poznań University of Life Sciences, ⁵Department of Biochemistry and Biotechnology, Poznań University of Life Sciences, Institute of Human Genetics Polish Academy of Sciences, Poznań, Poland

Objectives: Osteoporosis is common in patients with inflammatory bowel disease (IBD). Numerous factors have been named as contributors, including inflammatory processes, malnutrition and genetic predisposition to osteoporosis in IBD. One of the genes that may potentially contribute to osteoporosis is the oestrogen receptor gene, ESR1.

Methods: This study investigates the impact of ESR1 polymorphisms on BMD in patients with IBD. The study included 97 patients with ulcerative colitis (UC), 100 patients with Crohn's disease (CD), and 41 controls group (CG). The patients (mean age: 37.48±13.85) included CD patients (age: 35.59±12.79), as well as UC patients: (39.46±14.69). The controls (mean age: 30.37±8.58). BMD was measured at the lumbar spine (L2–L4) and the femoral neck (DXA). Two polymorphisms, PvuII (c.397T>C, rs2234693) and XbaI (c.351A>G, rs9340799), of the ESR1 gene were studied. Genotyping was performed using the restriction fragment length polymorphism technique.

Results: In the groups CU and CD patients, BMD showed statistically significant differences compared to the healthy controls patients with CD had also a significantly lower L2–L4 lumbar spine BMD and T-score values than patients with CU. The studied PvuII (c.397T>C) polymorphism has presented higher frequency of c.397C allele in IBD patients than in controls (47.2% vs.

39%), but it has appeared statistically no significant (OR=1.40, CI=[0.86–2.27], P=0.175). However, we have observed relevantly higher frequency of C allele in UC patients comparing to CD patients (OR=1.68, CI=[1.12–2.52], P=0.012). We have noticed also higher frequency of CC homozygotes in IBD patients than in controls (20.7% vs. 9.8%), but without statistical significance (P=0.113). In CD patients homozygotes XbaI (c.351A>G) statistical analysis showed no significant differences between IBD patients and we observed genotypes frequencies differences. It is necessary to analyze these parameters separately for men and women.

Conclusions: In the studied group, three haplotypes for the PvuII and XbaI variants of *ESR1* were found: px, PX, and Px. In the studied population, the PvuII and XbaI polymorphisms of the estrogen receptor 1 (*ESR1*) gene were not significantly associated with BMD at the lumbar spine (L2–L4) or the femoral neck.

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THE ITALIAN RHEUMATOLOGY SOCIETY ADAPTATION OF RECOMMENDATIONS ON KNEE, HIP AND HAND OSTEOARTRITIS: THE OA SIR-ADAPTE PROJECT

A. Arian¹, M. Manara², N. Ughi³, I. Prevete⁴, S. Parisi⁵, A. Bortoluzzi⁶, G. Carrara⁷, F. Rumi⁷, A. Zanetti⁷, A. Fioravanti⁸, F. Iannone⁹, F. Salaffi¹⁰, C. A. Scirè⁶

¹Rheumatology Unit, Azienda Ospedaliero Universitaria di Parma, Parma, ²Department of Rheumatology, Gaetano Pini Institute, Milano, ³Epidemiology Unit, Italian Society for Rheumatology, Milano, ⁴Rheumatology Unit, Azienda Ospedaliera San Camillo-Forlanini, Roma, ⁵Rheumatology Unit, Azienda Ospedaliera Città della Salute e della Scienza di Torino, Torino, ⁶Rheumatology Unit, Department of Medical Sciences, University of Ferrara, Ferrara, ⁷Epidemiology Unit, Italian Society for Rheumatology, Milano, ⁸Rheumatology Unit, Department of Medicine, Surgery and Neurosciences, University of Siena, Siena, ⁹Interdisciplinary Department of Medicine-Rheumatology Unit, Policlinico, Università di Bari, Bari, ¹⁰Rheumatology Unit, Università Politecnica delle Marche, Jesi, Italy

Objective: Osteoarthritis (OA) requires a multidisciplinary and multi pharmacological approach. Many scientific societies have developed recommendations about knee, hip and hand OA management. These guidelines (GLs) are focused only on few aspects and they are not perfectly concordant. The main aim of this study is to combine the recommendations about OA management adapting them to the Italian context.

Methods: Two rheumatologists belonging to the Italian Rheumatology Society Research Unit (SIR-RU) draft a preliminary list of key clinical questions (KCQs). All members of SIR-RU agree upon the parameters for the literature systematic research (performed on Pubmed and Embase database) and upon the papers' selection criteria (all GLs endorsed by International League against Rheumatism, American Academy of Orthopedic Surgeons, Osteoarthritis Research Society International and SIR published between 2007 and 2017). The KCQs were reviewed by three Italian OA experts. The new recommendations, based on the selected GLs, were drafted by SIR-RU panel according to the ADAPTE procedure (www.adapte.org). The above mentioned OA experts and 15 members from SIR, other Italian medical societies (orthopedic, rehabilitation, geriatric and general

medicine), nursing and patients' associations, revised the adapted recommendations. Finally, the Steering Committee of the SIR endorsed the definitive version and agreed upon an implementation and dissemination plan.

Results: The KCQs were about general management (2), diagnosis strategies (5), analgesic, pharmacological and non pharmacological treatment (8) and surgical approach indications (1). The literature systematic research identified 2174 papers: only 11 met the selection criteria. The SIR-RU panel took into account these GLs, answering to each KCQ. The reviewers modified the preliminary recommendations and reached a consensus on the definitive version.

Conclusion: We have developed 16 adapted recommendations based on high quality GLs. The main aspects crucial in knee, hip and hand OA clinical management were included. The implementation and disseminations of these adapted recommendations among OA specialists will improve the clinical outcomes with an increase of the benefit-cost ratio.

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COMPLEX TREATMENT OF PATIENTS WITH GOUTY ARTHRITIS

N. Nikolov¹, M. Krastanova², B. Zhelezarova¹, M. Panchovska³

¹Medical University Pleven, Clinic of Rheumatology, Pleven, ²Medical University Pleven, Physical and Rehabilitation Medical Clinic, Pleven, ³Medical University Plovdiv, Department of Propedeutics of Internal Diseases, Plovdiv, Bulgaria

Objective: Gout is a type of arthritis, caused by the formation of uric acid crystals within or around the joints. For some patients, the leading symptoms are pain and stiffness in the joints, while others develop heavy joints deformations and permanent disabilities. Applying a complex rehabilitation approach with rheumatologic aid and a physio-rehabilitation program significantly improves the condition of the patients with gouty arthritis. The strength of their symptoms diminishes and becoming handicapped is avoided or significantly delayed. Our aim was to measure the effect of conducting a complex drug treatment combined with physio-rehabilitation program in patients with gouty arthritis in an acute or chronic stage that heavily affects the musculoskeletal system.

Methods: Complex treatment of 39 patients with gouty arthritis (26 male and 13 female), aged between 43–62 years in subacute or chronic stage (ESR, fibrinogen and CRP are at relevant values, AST and RF are negative). The rehabilitation program includes: applying of a magnetic field, mid-frequency currents, ultrasound therapy with NSAIDs, kinesiotherapy, therapeutic massages, cryotherapy.

Results: For the aim of the study, we took functional measurements at the beginning and the end of the treatment: VAS test for pain, daily activities of life (DAL) test, complex functional assessment (CFA) test. The ANOVA statistical analysis method was applied to the results of the VAS, DAL and CFA tests. For the VAS test results show a pain decrease by around 35%. DAL test show an improvement in functional capabilities of the joints. The results of CFA indicates an improvement of the patients' self-sufficiency and their quality of life.

Conclusions: The analysis of the results shows that the complex physio-rehabilitation and rheumatologic treatment is effective for patients with gouty arthritis in an acute or chronic stage, which heavily affects the musculoskeletal system, it affects them positively and leads to a significant improvement in their quality of life.

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OSTEOARTHRITIS OF TEMPOROMANDIBULAR JOINTS – IS A MULTIDISCIPLINARY APPROACH NECESSARY? CLINICAL CASE

N. Nikolov¹, M. Panchovska², G. Tomov³, N. Uzunov³, B. Zhelezarova¹

¹Medical University Pleven, Clinic of Rheumatology, Pleven, ²Medical University Plovdiv, Department of Propedeutics of Internal Diseases, Plovdiv, ³Medical University Plovdiv, Faculty of Dental medicine, Department of Maxillofacial surgery, Plovdiv, Bulgaria

Introduction: Osteoarthritis of the temporomandibular joints may occur isolated and this causes significant differential diagnosis problems. Early involvement of the temporomandibular joints in juvenile chronic arthritis is well known. At the age of 50 years, the degenerative and traumatic causes are mainly discussed. The dental specialists discover the occlusion of the joints as a reason of pain and limitation of movements. Isolated disability of the temporomandibular joints as an initial manifestation of psoriatic arthritis is not common.

Clinical case: Female, 51 year old, teacher, from 2 years suffers of pain, including at night, difficulty in movements and morning stiffness in the right temporomandibular joint. She was treated with non-steroidal anti-inflammatory drugs, prescribed by dentist. The X-ray of the affected joint shows degenerative changes and the dentist diagnosed osteoarthritis. Due to the progression and stiffness, as well as involvement of the left temporomandibular joint, the patient was consulted with rheumatologist. From the physical examination, there were discrete psoriasis-like lesions on the scalp. From the laboratory tests: ESR 38 mm, CRP-17, 4 mg/dl, biochemical samples were at normal rates. From the CT of TMS shown erosive changes in the right temporomandibular joint. HLA B 27 antigen is negative. From the family history, the patient stated that her mother's sister suffered from severe psoriasis. A consultation with a dermatologist was carried out for the lesions on the scalp and the absence of psoriatic changes over skin and nails. The patient was diagnosed with psoriatic arthritis and start treatment with salazopyrin. Clinical and laboratory results improvement was recorded after 6 months.

Conclusions: Affecting temporomandibular joints as a debut of arthritis in adults, should be seen not only as a manifestation of osteoarthritis but as a possible manifestation of an inflammatory joint disease. Good collaboration between dental practitioners, rheumatologists and other medical specialists, provides accurate diagnosis and an adequate treatment.

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TREATMENT OUTCOMES AFTER TERIPARATIDE USE IN GREECE: COUNTRY SUBANALYSIS OF THE EXFOS OBSERVATIONAL STUDY

K. Aloumanis¹, C. Mylonas², P. Athanasakopoulos³, M. Psarafi¹, G. Kapetanios⁴, V. Drossinos¹

¹Department of Medical Research, Pharmaserve Lilly SACI, Athens,

²Private Medical Office, Athens, ³Private Medical Office, Thessaloniki,

⁴3rd University Orthopedic Clinic, Thessaloniki General Hospital "Papageorgiou", Thessaloniki, Greece

Objectives: The ExFOS study was a multicenter, non-interventional, prospective, observational study for the effect of teriparatide (TPTD) on fractures and health related outcomes of patients treated for up to 24 months, with a post-treatment follow-up period of ≥18 months to assess post-TPTD treatment patterns and effectiveness in standard clinical practice. We report follow-up outcomes in Greek patients.

Methods: Patient-reported health outcomes via validated questionnaires like EQ-5D and bone density measurements (if captured) were analyzed for the post treatment period.

Results: Patients with back pain (BP) during the last month before visit were 86.4% at baseline and 55.1%, 53.1% and 49.4% at 24, 30 and 42 months, respectively. Other parameters remained improved during post-treatment visits (Table). Bone density T-score (lumbar spine) rose from -3.38 at baseline to -2.37 at 24 months and -2.25 at 42 months. Up to 92.2% of patients reported prior antiresorptive drug use. At 30 months, 90.6% and 97.2% used calcium and vitamin D, respectively, 34.7%, 22.5% and 2.2% used bisphosphonate, denosumab and strontium, respectively. At least 40.3% did not use any antiosteoporotic treatment after TPTD.

Conclusion(s). Post treatment QoL parameters remained at similar levels to those of treatment completion compared to baseline. Bone gain was preserved during follow-up. More than one in three patients did not use antiresorptives after TPTD. Results are interpreted in the context of an observational study.

	Baseline (N=434)	24 months (N=376)	30 months (N=360)	42 months (N=342)
<i>BP frequency*</i>	68.0%	13.6%	10.5%	7.7%
<i>Activity limitation**</i>	50.2%	7.7%	9.2%	6.6%
<i>BP VAS***</i>	52	17.8	17.9	17.3
<i>Anxiety & depression****</i>	32.7%	61.1%	59.5%	63.1%
<i>Mobility*****</i>	42.2%	81.0%	84.3%	87.8%
<i>Self-care*****</i>	59.0%	91.0%	93.7%	91.0%
<i>Usual activity*****</i>	37.5%	79.9%	80.7%	84.2%
<i>EQ-5D VAS*****</i>	57.0	78.7	79.9	80.9

*Patients reporting back pain (BP) often or daily during last month before visit

** Patients reporting moderate or severe limitation of activities during last month before visit

*** Back pain Visual Analogue Scale score (mm), excluding patients with rheumatoid arthritis

**** Patients reporting no problems in EQ5D parameters

***** EQ-5D Visual Analogue Scale score graded from 0 (worst imaginable health state) to 100 (best imaginable health state)

Acknowledgement: The abstract was first presented in the 25th Congress of the Hellenic Society for the Study of Bone Metabolism - Oct 20, 2017, in Greek.

Disclosure: KA, MP and VD are employed by Pharmaserve-Lilly SACI.

P541

FEAR: DOES IT EXPLAIN THE DIFFERENCES OF PERCEPTION OF BREAST CANCER AND OSTEOPOROSIS IN SOCIETY?

F. A. Krappel¹, T. C. Krappel²

¹Orthopädische Klinik, Spitalzentrum Oberwallis, ²Collegium Spiritum Sanctum, Brig, Switzerland

Objective: To evaluate the differences in perception of osteoporosis and breast cancer in the local community.

Methods: A simple questionnaire with a VAS scale was handed to female patients above 50 years of age attending the local orthopaedic hospital within one month. Patients were asked whether they know about mammography and BDM with a simple yes/no question. Then they were asked to grade the fear they have about dying, breast cancer and osteoporosis on a simple VAS scale of 0 (no fear) to no more than about other diseases (1-2) moderate (3-4) significant (5-7) and great to maximum fear (8-10).

Results: Within one month, 100 patients answered our questionnaire, the average age was 67 years. Of these women, 95 answered yes they know mammography but only 38 knew bone densitometry. Regarding breast cancer 19 answered they had great fear (8-10), 25 had significant (5-7), 17 moderate (4-3) and 39 answered they had no more fear than about other diseases. These figures correlated closely with the fear of dying from all causes. Osteoporosis in contrast caused great fear in 3, significant in 5, moderate fear in 32, and no fear in 60 patients.

Conclusions: Although there is a lot of information available to the lay public regarding osteoporosis, its consequences and suffering, the kind of perception of a disease seems to be more influenced by labelling it with death as seems the case with cancer. This might explain why the majority of women in our area will have a mammography but are unaware of osteoporosis. This may also play a role why society and insurances are prepared to readily pay for mammography but not to the same level for Bone densitometry, although this is beyond the scope of this study. Addressing the negative consequences of osteoporosis may play an important role in improving the level of information of the public.

P542

STATUS OF VITAMIN D: COMPUTERISED SIMULTANEOUS OBSERVATION OF VITAMIN 25(OH)D AND 1.25(OH)2D FOR GENERAL PRACTITIONERS PARTICIPATING IN THE PROGRAM OF SECONDARY PREVENTION OF OSTEOPOROSIS

M. D. Novosad¹, M. D. Hrdý¹

¹Osteology Academy Zlin, Zlin, Czech Republic

Objective: To evaluate a level of vitamin 25(OH)D in patients who are in the period of secondary prevention of osteoporosis seems to be insufficient. Most of these patients who have low threshold fracture, either after a surgery or not, need further evaluations. Thus we evaluate parallel

values of 25(OH)D and 1.25(OH)D. This is done in computer software, data placed in tables are evaluated with a time interval to determine the status of vitamin D. Due to our frequent cooperation with General Practitioners in this field we find this evaluation more informative, mainly pathophysiology of vitamin D ratio.

Methods: During the past two years we used the method DiaSorin, no change in methods.

25(OH)D in patients of average age 66.5 years shows values 61.235 nmol/l. The control group shows 57.43 nmol/l, concerning vitamin 1.25D the average age was 67.2 years and average value 119 pmol/l. The control group shows 128.21 pmol/l. We verified physiological norms for our patients from the first sampling, including the control group. The table is formed by values of 25 and 1.25 of vitamin D. Each field is bordered by both these figures. Individual fields are then verbally classified with use of traditional prefixes: deficit-insuf-normal-toxi-pathophysiol.

Results:

Table 1 represents a grid of individual fields and their status, with the verbal classification.

Status of VITAMIN D – 25(OH)D3/1.25(OH)2D3

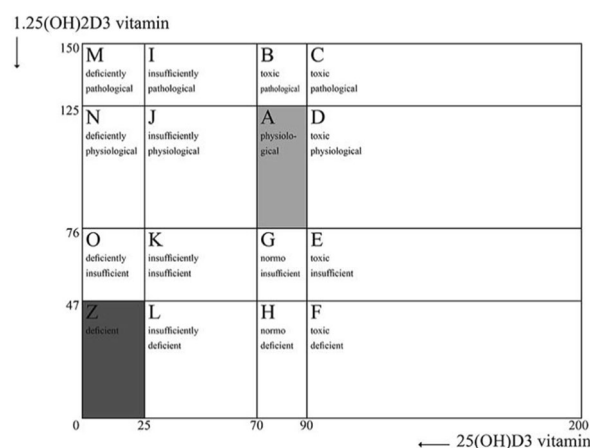
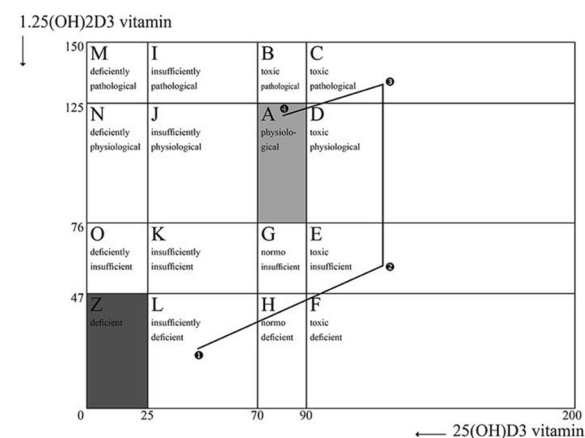


Table 2 shows five examinations with a time interval and an optimisation of medical treatment with the use of vitamin D.

Status of VITAMIN D – 25(OH)D3/1.25(OH)2D3



The computer software in use suggests a result that includes: verbal evaluation, automatically calculated difference in comparison to the last examination and differential diagnosis of vitamin D pathology. A specialist can suggest further therapeutic approach with the use of vitamin D pills.

Conclusion: The results received in this method are passed on graphically to our colleagues. The results also include differential diagnosis with a recommendation of further therapeutic procedure and laboratory monitoring. Considering our experience in this project, we find this way of passing information to be much more convenient for communication with General Practitioners during the period of secondary prevention of osteoporosis.

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PATIENT'S ENGAGEMENT IN THE IDENTIFICATION OF CRITICAL OUTCOMES IN SARCOPENIA

C. Beaudart¹, O. Bruyère¹, J.-Y. Reginster¹, J. Bauer², C. Cooper³, A. Cruz-Jentoft⁴, F. Landi⁵, M. Locquet¹, S. Maggi⁶, R. Rizzoli⁷, Y. Rolland⁸, N. Vaquero⁴, M. Hilgsmann⁹

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium, ²Center for Geriatric Medicine, University of Heidelberg, Heidelberg, Germany, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, ⁴Servicio de Geriatria, Hospital Universitario Ramón y Cajal (IRYCIS), Madrid, Spain, ⁵Department of Geriatrics, Neurosciences and Orthopedics, Catholic University of the Sacred Heart Rome, Milano, Italy, ⁶National Research Council, Neuroscience Institute, Padua, Italy, ⁷Service of Bone Diseases, Faculty of Medicine, Geneva University Hospitals, Genève, Switzerland, ⁸Gérontopôle de Toulouse, University of Toulouse III, Toulouse, France, ⁹Department of Health Services Research, CAPHRI Care and Public Health Research Institute, Maastricht University, Maastricht, The Netherlands

Objectives: Sarcopenia, defined by a progressive loss of muscle mass and function, has been showed to be associated with several individual and public health outcomes. Identifying hard clinical outcomes of patients with sarcopenia is an important step in designing valid and useful clinical trials and outcome studies. This study aims therefore first to identify which outcomes are important for patients with sarcopenia and second to assess the most importance ones.

Methods: The identification and prioritization of outcomes for patients with sarcopenia was conducted following a 4-step process: 1) a literature review to generate an initial list of outcomes of sarcopenia; 2) an expert consultation (n=11) to restructure initial outcomes and validate them; 3) three focus groups with participants suffering from sarcopenia (2 in Belgium, 1 in Spain) to validate these outcomes, to generate additional ones and to rank the most important outcomes; 4) an expert meeting (n=11), to identify of the 5 most important outcomes of sarcopenia based on the results of the focus group.

Results: In the first step, the initial list of outcomes comprised 6 different outcomes: mortality, functional decline, hospitalisation, falls, fracture and length of hospitalisation. With the second step, the list was extended to 9 outcomes including mortality, hospitalisation, falls, fractures, institutionalisation, quality of life, difficulties in self-care, difficulties in moving and difficulties in domestic duties. In the third step, the focus groups with sarcopenic subjects (n=19, 6 men and 13 women, mean age 78 years) identified a large number of additional outcomes such as fatigue, affected morale, physical and mental slowness, loss of balance, fear of walking, etc.; and each patient ranked the five most important ones. Based on the ranking of all the outcomes during the focus groups, experts

agreed on the 5 most important outcomes: “quality of life”, “mobility”, “domestic activities”, “fatigue” and “falls”.

Conclusions: This study identified and prioritized important outcomes for sarcopenia. The five important outcomes will be used in a discrete-choice experiment to further elicit the relative importance of these outcomes in a larger group of patients and experts.

Reference: ¹Beaudart et al. PLoS One 2017;12:e0169548

P544

PRIOR FRACTURE (FX) CASCADE AND INCIDENCE OF IMMINENT FX AFTER FRAGILITY FX IN A SWEDISH DATABASE STUDY

E. Toth¹, J. Banefelt², G. Ortsäter², C. Libanati¹

¹UCB Pharma, Brussels, Belgium, ²Quantify Research, Stockholm, Sweden

Objectives: a) to evaluate the prior Fx cascade in postmenopausal women with an incident fragility Fx to raise awareness of subsequent Fx prevention, and b) to report imminent (up to 12 and 24 months [m]) Fx incidence following a Fx to explore how the Fx type influences subsequent Fx risk.

Methods: Women aged 55-90 yrs, who suffered a fragility Fx in 2013 (index Fx) were identified from Swedish national registries. A history of prior Fx (earliest available date 2001) was used to describe Fx cascade patterns. The cumulative incidence of Fx within 24 m following index Fx was assessed by index Fx type to describe the association between index and subsequent Fx type.

Results: 35,111 women were included in the analysis (index Fx type: 7187 hip; 2827 clinical vertebral [clin vert]; 25,503 nonhip/nonvertebral [NHNV]). Mean age at index date was 74 yrs. The percentage of patients with a history of prior Fx by index Fx type were: hip, 40%; clin vert, 41%; NHNV, 27%. The proportion of fractured patients with history of a prior Fx increased with age (Table 1A) and >1 in 3 patients with index hip or clin vert Fx had already suffered one or more prior fragility Fx. Cumulative incidences of post-index Fx type over 24m are shown by index Fx type (Table 1B).

Table 1: A. Percentage of patients with prior Fx by index Fx type and age; B. Incidence of subsequent (post-index) Fx at 24 m by index Fx type.

A: Percentage of women with prior Fx

Index Fx type	Age, yrs				
	5-59	6-69	70-79	80-89	90
All	12.0	22.2	30.7	43.1	50.6
Hip	29.0	36.4	37.8	41.8	51.3
Clin vert	21.6	35.9	36.8	47.5	45.8
NHNV	11.0	20.2	27.9	43.1	50.9

B: Incidence (%) of post-index Fx

Index Fx type	Post-index Fx at 24 months					
	Any	Hip	Wrist / Humerus	Fore-arm	Vertebral	Other
Any	11.4	3.4	1.8	2.1	1.6	3.6
Hip	13.7	4.0	2.6	2.6	1.7	4.3

Humerus	11.4	4.0	0.6	2.7	1.5	3.7
Wrist / forearm	8.1	2.2	2.0	0.7	0.7	3.0
Clin vert	17.6	5.9	2.0	2.3	4.6	5.2
Other	11.1	3.1	1.5	2.9	1.5	3.2

Conclusions: Fx location influences the incidence and type of subsequent Fx during the 24 months following a fragility Fx. The imminent Fx risk is >10% for vertebral, hip and humerus Fx. The proportion of patients with a prior Fx increases with advancing age; >40% of hip and clinical vert Fx in women ≥ 70 yrs of age were subsequent Fxs. These Fx may have been prevented with the use of effective treatments at the time of the first Fx. These data highlight the importance, clinical impact and need for early effective treatment soon after any fragility Fx for subsequent Fx prevention.

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EVALUATION OF THE REPONSIVENESS OF THE SARQOL® QUESTIONNAIRE: RESULTS FROM THE SARCOPHAGE STUDY

A. Geerinck¹, O. Bruyère¹, M. Locquet¹, J.-Y. Reginster¹, C. Beaudart¹

¹Research Unit of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objective: The Sarcopenia Quality of Life (SarQoL®) questionnaire was developed to fill the need for a quality of life instrument specific to sarcopenic subjects. The psychometric properties of the SarQoL were evaluated in 2016 and the questionnaire was demonstrated to be a valid, consistent and reliable instrument. However, until now, its ability to detect change over time has not been examined. Therefore, the objective is to evaluate the responsiveness (also known as sensitivity to change) of the SarQoL questionnaire in a prospective, longitudinal cohort of community-dwelling, older, sarcopenic subjects.

Methods: Subjects from the SarcoPhAge (Sarcopenia and Physical impairment with advancing Age) study who were diagnosed as sarcopenic according to the EWGSOP criteria were included in the analysis. The responsiveness evaluation was approached in a manner similar to the evaluation of the questionnaire's construct validity, namely by the confirmation or rejection of pre-specified hypotheses on correlations with other questionnaires, a technique in accordance with the COSMIN guidelines. The evolution of the scores on the SarQoL® questionnaire after a 2-year interval was compared to the evolution of the scores on the SF-36 and the EQ-VAS through 9 pre-specified hypotheses on expected correlations between the different questionnaires and their strength.

Results: A total of 42 sarcopenic subjects were included. The median age of the sample was 72.9 (68.9-78.8) years, 59.5% were female, and the mean BMI was 23.28 $\pm$ 3.60 kg/m². A good responsiveness was obtained, as evidenced by the confirmation of 8 out of 9 hypotheses, well above the 75% confirmation threshold. Strong correlations ($r > 0.6$) were found for 3 hypotheses, moderate correlations ($0.412 < r < 0.467$) for 5 hypotheses and a low correlation ($r = 0.312$) for 1 hypothesis (all $p < 0.05$).

Conclusion: The first data available on the ability of the SarQoL questionnaire to detect change over time indicates that the questionnaire has good responsiveness. This, together with the previously established psychometric properties, confirms that the SarQoL questionnaire is a relevant instrument for the assessment of quality of life in sarcopenic populations.

Disclosure: CB, OB and J-YR are shareholders of SarQoL® sprl.

P546

THE EFFECT OF INTRAARTICULAR GLUCOCORTICOID AND HYALURONIC INJECTIONS AS THE COMBINATION STRATEGY WITH A WEEK FREE INTERVAL BETWEEN EACH OTHER IN KNEE OSTEOARTHRITIS

S. Sokolovic¹

¹Clinic for Heart, Blood Vessel and Rheumatic Diseases, University Clinical Center Sarajevo, Sarajevo, Bosnia-Herzegovina

Objective: Osteoarthritis affect joint cartilage and is associated with some local inflammation that result clinically in pain, stiffness, movement disability and periarticular tenderness with often some pseudo-uric fluid accumulation. The efficiency of intraarticular hyaluronic injections is controversial for knee and hip OA. The majority scientific evidence provided a nonsignificant superiority of hyaluronic acid over intraarticular placebo. The purpose of this paper was to investigate the combination treatment of intraarticular glucocorticoid injection followed by intraarticular hyaluronic application as a treatment for the knee osteoarthritis.

Method: The open outpatient clinically prospective controlled study was designed. Total of 36 patients were randomized in a two groups. The first group comprised of 21 patients receiving the first 40 mg of methylprednisolone and then a week later hyaluronic acid intraarticular injection. The other group received hyaluronic acid alone. The clinical parameters like pain, swelling, range of motion and patient daily activity and satisfaction were analyzed. The laboratory parameters like CRP and Rheumatoid factor were observed as well.

Results: The results showed significant improvement in a patients that received previously methylprednisolone and then hyaluronic acid compared to hyaluronic acid alone.

Conclusion: The knee osteoarthritis requires the first initiation of glucocorticoids in order to control the low grade joint inflammation and then hyaluronic acid intraarticular injection should be initiated. This regime provides better efficiency then monotreatment alone.

P547

RELIABLE CHANGE INDEX IN THE EVALUATION OF JOINT SPACE LOSS: A NOVEL METHOD FOR ASSESSING OSTEOARTHRITIS PROGRESSION

C. Parsons¹, A. Judge², K. Leyland², H. Inskip¹, C. Cooper¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ²University of Bristol, Bristol, UK

Objective: We aimed to assess the effectiveness of the reliable change index (RCI) as a novel approach to estimating osteoarthritis (OA) progression using longitudinal knee joint space width (JSW) measurements, while accounting for the presence of measurement error.

Methods: Data from 3,469 participants of the Osteoarthritis Initiative (OAI), an American multi-centre, longitudinal study, were obtained. Knee JSW measurements were taken from radiographic images at baseline, and at 12, 24, 36, 48, 72 and 96 months. The RCI allows for identification of whether observed change is statistically reliable in the presence of measurement error. An RCI score was calculated for each participant, using the version developed by Christensen and Mendoza.

Results: Between consecutive study visits, 53-64% of participants had a crude decrease in JSW between study visits. Implementation of the RCI indicated that considerable fewer participants had a statistically reliable decrease in JSW, e.g., 3.1% participants were identified between baseline and 12 month study visits compared to 53% crude decrease. Similar

proportions of statistically reliable decreases were observed between all other OAI study visits. Around 40% of participants had crude increase in JSW between the pairs of study visits under consideration. Use of the RCI dramatically reduced the number of participants that were identified as having an increase, e.g., between 72 and 96 month study visits only 1.4% were identified compared to 39% that were identified using crude differences. As increases in JSW are biologically extremely rare, this shows the impact of measurement error if crude differences are assessed without accounting for measurement error.

Conclusion: The RCI provides a useful method to identify change in JSW, removing many of the apparent changes that are likely to be due to measurement error. This method appears to be useful for assessing change in JSW clinical and research settings from radiographs.

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TO ELUCIDATE THE RADIOLOGICAL FEATURES OF A PHOSPHATURIC MESENCHYMAL TUMOUR

C. A. Peter¹, T. H. Heng²

¹Sengkang General Hospital, ²Singhealth, Ministry of Health Holdings, Singapore

This case report describes the unusual presentation of phosphaturic mesenchymal tumour (PMT) in a 65 year old male who presented with a lump in his left foot for duration of 8 years. Radiographs showed a soft tissue mass at the dorsum of the left foot without bone erosion or soft tissue calcification. T1-weighted and T2-weighted sequences on MRI demonstrated an avidly-enhancing, exophytic soft tissue mass centred in the 3rd web space extending to the dorsum of the foot. Internal susceptibility artefacts suggested calcifications. Bones of the left foot returned normal signal. Differential of a soft tissue sarcoma, Morton's neuroma and schwannoma were offered. Routine investigations revealed hypophosphataemia (0.69 mmol/L range: 0.94-1.5 mmol/L), minimally raised alkaline phosphatase (ALP 101 U/L range: 39-99 U/L). Calcium levels were normal. Excision biopsy findings were that of a myxomatous, friable mass measuring 5.0 x 4.0 cm, clear-white in colour with involvement of the adjacent neurovascular bundle. Punctum with keratinized tissue was seen on the overlying skin. Extensive dense myxoid stroma and scattered "grungy" calcifications on histopathology were in keeping with PMT. Phosphate and ALP levels normalized within 1 week of surgery (phosphate 1.31, ALP 76 U/L).

Conclusion: PMT is a diagnosis that should be considered in patients presenting with a lump even in the absence of osteomalacia or specific imaging findings. The classic symptoms of PMT are those of tumour-induced osteomalacia such as progressive generalized weakness, bone and muscle pain and multiple fractures. Though rare, these features may be absent in some patients, such as in this case, causing delay in diagnosis. Hypophosphataemia and elevated ALP followed by serum FGF-23 levels, 25-Hydroxyvitamin D levels, urine phosphate and bone density are more precise investigations that lead to an earlier diagnosis.

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IS THERE A RISK OF METABOLIC SIDE EFFECTS WITH BISPHOSPHONATES?

M. Zhelyazkova-Savova¹, S. Gancheva¹

¹Varna Medical University, Department of Pharmacology and Clinical Pharmacology and Therapeutics, Varna, Bulgaria

Objectives: Bisphosphonates are considered the mainstay in the treatment of osteoporosis with high benefit/risk ratio. Few adverse drug

reactions have been described. Currently osteocalcin has been described as a metabolically active bone derived gla-protein. It is endowed with hormonal role to increase insulin secretion and regulate blood sugar after being released from the skeleton during bone resorption in its glu-(undercarboxylated) form. It was of interest to check whether drugs interfering with inhibition of bone resorption would affect blood sugar homeostasis in norm and pathology. To test this hypothesis we underwent an experiment where we treated with alendronate intact rats and rats with metabolic syndrome.

Methods: Four groups of male Wistar rats (12 per group) were used: a control group (C), a metabolic syndrome group (MS), a group treated with alendronate (ALD) and a group with metabolic syndrome treated with alendronate (MS+ALD). To induce a metabolic syndrome, rats were fed a high fat high fructose diet. The duration of the study was 15 weeks. Alendronate was given by subcutaneous injections three times weekly at a dose of 50 µg/kg body weight. At the end of the experiment, fasting blood sugar was measured and insulin tolerance test (ITT) and glucose tolerance test (GTT) were performed. Livers and unilateral retroperitoneal fat pads were dissected after sacrifice and weighed. Liver and fat indices were calculated. Undercarboxylated osteocalcin (ucOC) was measured in serum by an ELISA kit.

Results: Blood sugar was elevated in all groups but the control, with ALD+MS group having higher levels than MS. Fat index was also increased in all experimental groups. In the ITT the area under the curve (AUC) was increased in the ALD and ALD+MS groups, while in the GTT, AUC was higher than the control in the MS and ALD+MS groups, the one in ALD being non-significantly increased. The serum levels of ucOC were significantly lower in the ALD and ALD+MS groups and only slightly reduced in the MS group.

Conclusion: Alendronate may be associated with metabolic side effects due to impaired release of ucOC, especially in the presence of already compromised glucose homeostasis.

P550

FRAILITY AND RISK OF FRAGILITY FRACTURES IN PARTICIPANTS WITH TYPE 2 DIABETES MELLITUS

G. Li¹, J. Prior², A. Papaioannou¹, L. Thabane¹, M. Levine¹, J. Adachi¹

¹McMaster University, Hamilton, ²University of British Columbia, Vancouver, Canada

Objective: Type 2 diabetes mellitus (T2DM) is an independent risk factor for fragility fractures. However T2DM is strongly associated with higher BMD that is typically a protective factor for fractures. Evidence has shown that increased frailty is significantly related to higher risks of fragility fracture. Therefore this study aimed to explore whether measuring frailty status could assist in understanding of the "diabetic paradox" in T2DM (high risk of fracture but normal or increased BMD).

Methods: We used the 10-year follow-up data from the Canadian Multicentre Osteoporosis Study (CaMos). We included the participants if they: 1) had a sample for fasting plasma glucose measure, 2) self-reported that they had T2DM, and 3) had a follow-up of ≥ one year. The primary outcome was survival time to clinical fragility fractures, where the incident fractures were indicated on annual mailed questionnaires and confirmed by medical documents. Frailty status was measured by a frailty index (FI) of deficit accumulation, where the FI included 29 deficits, ranging from 0 to 1 and with higher scores indicating greater frailty.

Results: We included 3149 (70% women) participants for analyses (mean follow-up: 9.2 years). They had a mean age of 65 (SD: 12) years and a baseline FI of 0.17 (SD: 0.10). Participants with T2DM (n=138) had

higher BMD and FIs than non-diabetic participants (p -values <0.001). During follow-up, 611 (19.4%) fragility fractures were observed: 35 (25.4%) in T2DM and 576 (19.1%) in controls. Compared with non-fractured, significantly higher FIs were found in those with incident fragility fractures in analyses conducted in all participants, in controls, and in participants with T2DM (all p -values <0.001). A higher FI was significantly related to risk for incident fragility fractures in the adjusted models: HR=1.02 (95%CI: 1.01–1.03), $p<0.001$ for per-0.01 increment of the FI; HR=1.21 (95%CI: 1.12–1.32), $p<0.001$ for per-0.10 FI increment.

Conclusion: Frailty is significantly related to increased risk for incident fragility fractures in T2DM despite their higher BMD values. Assessing frailty status may aid in the fracture risk evaluation and management of those with T2DM.

P551

NEW USEFUL MARKER FOR DIAGNOSIS OF OSTEOPOROSIS IN RHEUMATOID ARTHRITIS

L. Sivordova¹, J. Polyakova¹, Y. Akhverdyan¹, N. Fofanova¹, V. Kravtsov¹, B. Zavodovsky¹

¹Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovsky", Volgograd, Russia

Objective: In recent years, we have been studying the role of cytokines in the pathogenesis of osteoporosis (OP) in patients with rheumatic diseases (1,2). We studied the clinical and diagnostic value of serum Adiponectin determination in rheumatoid arthritis (RA) patients complicated by osteoporosis.

Methods: We examined 88 women with documented diagnosis of RA and mean disease duration of 6.56 ± 0.88 years and control group of 45 healthy females. Serum adiponectin levels ($\mu\text{g/ml}$) using human adiponectin ELISA commercial test systems (BioVendor). OP diagnosed using DXA with LUNAR DPX PRO (GE, USA).

Results and discussion: Serum adiponectin levels in the control group were $12.5 \pm 0.9 \mu\text{g/ml}$ ($M \pm m$). Adiponectin levels in healthy subjects measured as $M \pm 2d$, ranged between 0.44 and $24.56 \mu\text{g/ml}$. Patients with OP and RA had significantly higher levels of serum Adiponectin ($p<0.001$). Mean serum Adiponectin levels in RA patients who had normal bone density and had no OP were $35.21 \pm 0.6 \mu\text{g/ml}$. Mean serum Adiponectin levels in RA/OP patients with low BMD were $52.42 \pm 0.69 \mu\text{g/ml}$. Adiponectin levels of $44 \mu\text{g/ml}$ and higher were associated with osteoporosis. Adiponectin levels of $43.9 \mu\text{g/ml}$ and lower were associated with normal bone density. Thus, we revealed that adiponectin levels depend on osteoporosis presence in RA patients. We suppose that Adiponectin determination may be useful laboratory marker for osteoporosis diagnosis.

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P552

HEPCIDIN REGULATE BIOMINERALIZATION OF BONE BY BMP SIGNALING IN ZEBRAFISH

J. Yu¹

¹The Second Affiliated Hospital of Schoow University, Suzhou, China

Iron overload, as a risk factor for osteoporosis, can result in the upregulation of *Hepcidin*, and *Hepcidin* knockout mice display defects in their bone microarchitecture. However, the molecular and genetic mechanisms

underlying *Hepcidin* deficiency-derived bone loss remain unclear. Here, we used CRISPR-Cas9, a versatile genome-editing tool, to generate a zebrafish *hepcidin* mutant. Iron overload and a mineralization delay were observed in osteoblast cells in *hepcidin*^{-/-} zebrafish larvae, and these defects could be partially restored with a microinjection of *hepcidin* mRNA. Quantitative real-time PCR analyses revealed the downregulation of the osteoblast-specific genes *alp*, *runx2a*, *runx2b*, and *sp7* in homozygous *hepcidin* mutant zebrafish. Luciferase reporter assays further showed that bone morphogenetic protein 2a (*Bmp2a*) enhanced the expression of *runx2a*, while iron overload repressed its expression through *bmp2a* (independent of *hiv*). High-throughput transcriptome analysis of *hepcidin*^{-/-} zebrafish revealed multiple pathways involved in osteoblast metabolism. Together, these findings show that iron overload derived from *hepcidin* deficiency represses bone formation, possibly through the BMP pathway, and affects *runx2* in zebrafish.

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COST-EFFECTIVENESS OF SEQUENTIAL TREATMENT WITH ABALOPARATIDE VS. TERIPARATIDE FOR THE PREVENTION OF OSTEOPOROTIC FRACTURES IN POSTMENOPAUSAL US WOMEN AT INCREASED RISK OF FRACTURE

M. Hilgsmann¹, S. A. Williams², L. A. Fitzpatrick², S. Silverman³, R. Weiss², J.-Y. Reginster⁴

¹Maastricht University, Maastricht, The Netherlands, ²Radius Health, Inc., Waltham, USA, ³Cedar-Sinai Medical Center and UCLA School of Medicine, Los Angeles, USA, ⁴University of Liege, Liege, Belgium

Objective: To assess the cost-effectiveness of sequential treatment with abaloparatide (ABL) followed by alendronate (ABL/ALN) vs. teriparatide (TPTD) followed by ALN (TPTD/ALN) for the treatment of postmenopausal osteoporosis from the US payer perspective using a lifetime horizon.

Methods: A Markov microsimulation model was developed to estimate the cost-effectiveness of sequential ABL/ALN compared with sequential TPTD/ALN with a lifetime horizon from the US payer perspective. Patients were assumed to receive ABL or TPTD for 18 months followed by 5 years of ALN as per treatment guidelines. The effects of ABL on fracture risk was derived from the ACTIVEextend trial. The effects of TPTD was assumed to be maintained during subsequent ALN treatment, consistent with ACTIVEextend findings for ABL. Evaluation was completed for high-risk patients 50-80 years of age with a BMD T-score ≤ -3.5 or with a BMD T-score between -2.5 and -3.5 and a history of at least one osteoporotic fracture. Sensitivity analyses were performed to test the robustness and uncertainty of the model results.

Results: In all simulated populations, sequential ABL/ALN therapy was dominant (lower healthcare costs and higher QALYs) compared with sequential TPTD/ALN therapy. In patients aged 70 years with BMD T-score ≤ -3.5 , sequential ABL/ALN therapy reduced the expected number of fractures per patient by 0.125, increased lifetime QALY gained by 0.036 and saved \$33,381 over a patient's lifetime. Probabilistic sensitivity analyses suggested that ABL/ALN was dominant in about 90% of the simulations.

Conclusions: Sequential ABL/ALN therapy is a cost-effective (dominant) strategy compared with sequential TPTD/ALN therapy for the treatment of women at increased risk of fractures in the US.

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THE IMPACT OF DISC INJURY AND KYPHOTIC CHANGES OF THE FRACTURED VERTEBRAE ON ADJACENT VERTEBRAL COMPRESSION FRACTURE AFTER VERTEBROPLASTY

G. Chen¹, W. Y. Lin¹, J.-H. Lin¹, Y.-H. Chiang¹¹Department of Neurosurgery, Taipei Medical University Hospital, Taipei, Taiwan

Objective: Adjacent vertebral compression fracture (VCF) is not uncommon after vertebroplasty (VP) and it requires an additional VP once it is symptomatic. However, the risk factors for adjacent VCF after VP are still controversial. The injury of discs adjacent to the fracture level as well as the radiological changes of the fractured vertebrae may alter the local segmental biomechanics and increase the mechanical load on the adjacent vertebrae, accordingly increasing the risk of a new adjacent VCF. The study was conducted to see if the disc injury or the radiological features of the fractured vertebrae is associated with the adjacent VCF after VP. Our aim was to compare the disc injury and the radiological features of the fractured vertebrae in patients with symptomatic adjacent VCF to those in patients with symptomatic non-adjacent VCF or those in patients without a new VCF after VP.

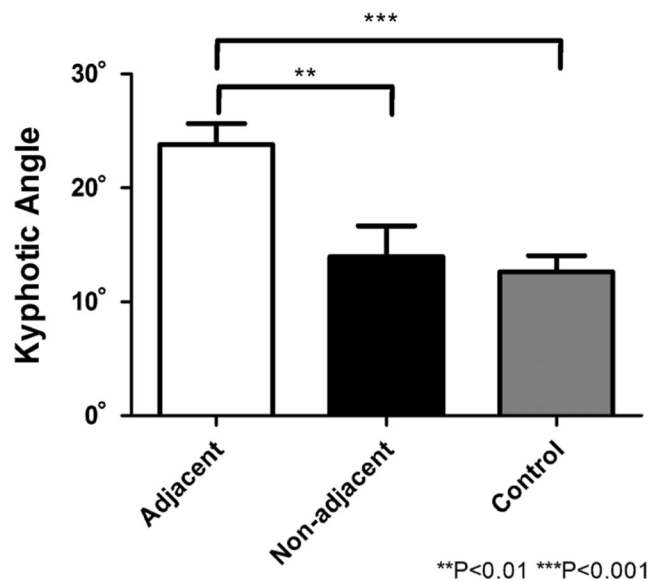
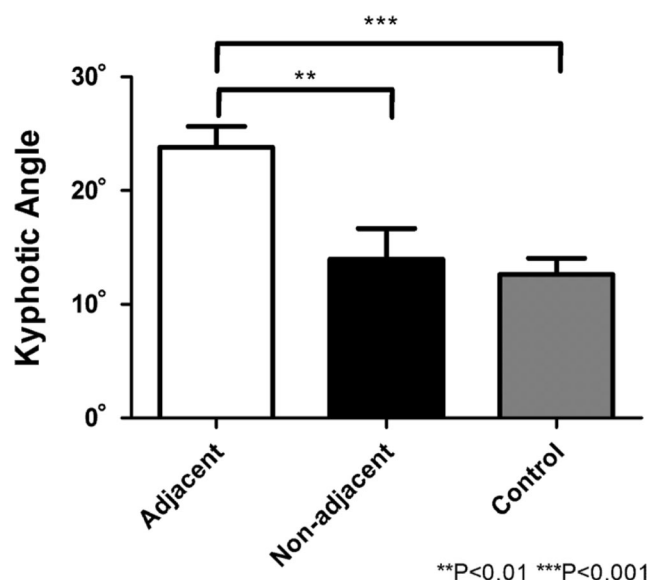
Methods: Study design: Retrospective comparative cohort study. Patient sample: Patients who received VP for osteoporotic VCF. Outcomes measurement: disc injury score, radiological features of the fractured vertebrae. 72 patients were included in this study and all of them had been observed for a new VCF at least 1 year after VP. There were 30 with symptomatic adjacent (adjacent group) and 11 with symptomatic non-adjacent VCF (non-adjacent group) and 30 without any new VCF (control group). The demographics and clinical information of the patients were recorded by chart reviews. The radiologic outcomes of the fractured vertebrae and its upper and lower adjacent disc were well studied. The vertebral body heights and kyphotic angle (KA) of the fractured vertebrae, the disc height, and discal cement leakage were measured pre- and postoperatively on X-ray. The disc injury score comprised 8 radiological features related to the disc injury on the lumbar spine MRI. The disc injury scores of the upper and lower discs adjacent the fractured vertebrae were assessed. One way ANOVA and Student t-test were used to assess the correlation among these three groups.

Results: Patients in three groups were similar in terms of age, gender, body material index, BMD, and vertebra level of fracture (Table 1). The median time to a new VCF in adjacent group was significantly shorter than that in non-adjacent group (50 ± 6.54 vs. 307 ± 107.40 days, $p < 0.05$). KA in adjacent group was significantly higher than non-adjacent fracture group or control group (23.85 ± 1.84 vs. 13.96 ± 2.70 vs. 12.63 ± 1.43 , respectively, $p < 0.05$), but KA was not different between non-adjacent fracture group and control group (Figure 1). The disc height, vertebral body height, and discal cement leakage were not different among three groups. The disc injury score of adjacent group was significantly higher than non-adjacent group or control group (4.17 ± 0.23 vs. 1.6 ± 0.43 vs. 2.04 ± 0.21 , respectively, $p < 0.05$) (Figure 2).

Conclusion: Disc injury score and KA in symptomatic adjacent VCF were significantly different from those with symptomatic non-adjacent VCF or those without a new VCF. It suggested that both the injury of discs adjacent to the fractured vertebrae and the kyphotic changes of the fractured vertebrae have a great impact on the development of a new adjacent VCF.

Table 1. Demographics of the patients

	Adjacent	Non-adjacent	Control	p
n	30	11	30	
Age	80.20 ± 1.35	76.36 ± 2.57	75.33 ± 2.01	0.12
Female	23 (76.6%)	8 (72.7%)	24 (80%)	0.88
Body Material Index	23.95 ± 0.69	25.61 ± 1.06	24.66 ± 0.65	0.42
Bone Mineral Density	-1.94 ± 0.25	-1.74 ± 0.56	-1.99 ± 0.25	0.89

Figure 1. Comparison of kyphotic angle. ** $P < 0.01$ *** $P < 0.001$ Figure 2. Comparison of disc injury score. ** $P < 0.001$ 

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THE IMPORTANCE OF REHABILITATION TO PATIENTS WITH LOW BACK PAIN

S. Patru¹, D. Matei¹, I. R. Marcu¹, A. C. Bighea¹¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objectives: special medical literature outlines the fact that around 80% people feel low back pain at least once in a lifetime and lumbar spine pathology gives the most important percentage of patients with pain for the practitioners. We want to demonstrate the important role of rehabilitation program, based on physical exercises, in obtaining the independence of each patient and a high quality of life index.

Methods: the study was developed in Emergency County Clinical Hospital, Physical Medicine and Rehabilitation Department and included 82 patients (40 women, 42 men), aged between 31-70 years, both clinical and functional evaluated, using a visual analogue scale (VAS) for pain, Schober Index and SF-36, a questionnaire for quality of life assessment. The subjects were randomly assigned in: control group (received only medication) and interventional group (education, diet, drugs, physical-kinetics for two weeks, continued home training with learned exercises for other four weeks).

Results: patients were evaluated at baseline, and after 2 and 6 weeks. The parameters indicated a good evolution especially in interventional group and the average scores got better both after 2 and 6 weeks, revealing the benefit of rehabilitation on pain, clinical status and activity of daily living.

Conclusions: the therapeutically approach using modalities such as different types of electrical currents, thermotherapy procedures, techniques of massage, depending the phase we diagnosed the disease, represents a real help in recovery of low back pain. Kinetic therapy is the most important part in rehabilitation management of low back pain.

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HIP DXA 3D MODELING SHOWS INCREASED CORTICAL BONE DENSITY AFTER TREATMENT WITH DENOSUMAB VS. BISPHOSPHONATES

M. Almohaya¹, N. Sami², D. Kendler³, A. Takher², S. Robertson⁴, R. Winzenrieth⁵

¹King Fahad Medical City, Riyadh, Saudi Arabia, ²Prohealth Clinical Research Center, Vancouver, Canada, ³University Of British Columbia, Vancouver, Canada, ⁴Prohealth Clinical Research Center, Vancouver, Canada, ⁵Galgo Medical, Barcelona, Spain

Denosumab has been shown to increase cortical BMD (cortical vBMD) at the distal radius and distal tibia using HR-pQCT¹. From DXA capture at the proximal femur, cortical vBMD can be evaluated using 3D-SHAPER software (v2.6, Galgo Medical S.L, Spain). 3D-SHAPER registers a 3D appearance model of the femoral shape and density onto the DXA projection to obtain a 3D subject-specific model of femur and can quantitate aspects of the cortical compartments².

To evaluate the cortical vBMD changes, we retrospectively reviewed 252 consecutive patients treated for osteoporosis at a tertiary referral centre in Vancouver, Canada. Patients were either treatment-naïve initiated on Denosumab (tnDmab) or bisphosphonates (tnBP) or were switched from

prior bisphosphonates to Denosumab (Switch). DXA hip (Hologic Discovery) at baseline and after one year of treatment were analyzed for BMD and 3D-SHAPER to determine cortical vBMD. Data analysis was conducted using paired t-test to compare between mean vBMD changes for each individual and ANOVA with Tukey correction for multiple comparisons to compare between the groups.

Participants (225 females, 27 males) with mean age 71±9 years had similar baseline characteristics. Both tnDmab and Switch groups showed a significant increase in cortical vBMD from baseline with mean increases of 13.8 mg/cm³ (1.9%) in tnDmab group (p=0.0002) and 11 mg/cm³ (1.5%) in Switch group (p=0.0005). In tnBP group, cortical vBMD was stable (-4.02 mg/cm³ (-0.5%), p=0.6). Cortical vBMD increased significantly more in the tnDmab than the tnBP group (p=0.02) with a trend to greater improvements in the Switch group than the tnBP group (p=0.06).

These data confirm prior observations with HR-pQCT at radius/tibia and support 3D-SHAPER estimates of cortical bone in postmenopausal women. The superior effects of Dmab on the cortical compartment of bone in patients initiating Dmab as compared to BP may help guide clinical decision-making in patients at risk of cortical (non-vertebral) fracture.

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EFFECTIVENESS OF FEBUXOSTAT IN PATIENTS WITH GOUT REFRACTORY OR INTOLERANT TO ALLOPURINOL IN CLINICAL PRACTICE

M. D. M. Muñoz Gómez¹, M. Pavo Blanco², D. Blázquez Martínez³

¹Torrecedenas University Hospital, Almería, ²Health Campus University Hospital, Rheumatology Department, Granada, ³Health Campus University Hospital, Hospital Pharmacy Department, Granada, Spain

Objective: To evaluate the effectiveness of febuxostat in patients suffering from gout nonresponders or intolerant to allopurinol.

Methods: An observational retrospective study was conducted. We recruited 18 patients on treatment with febuxostat attended in Rheumatology Department. Demographic characteristics, clinical variables, comorbidities, analytic parameters and drug toxicity were recovered from medical reports. We calculated the "gout attack rate" among these patients before and after febuxostat as the primary outcome of the study. Statistical analysis: A T-Student test for paired samples was performed. The incidence rate (IR) of new gout attack before and after febuxostat and the incidence rate odds (IRO) was calculated.

Results: 18 patients with gout treated with febuxostat were included, 12 of them with chronic gout with tophus. The demographic characteristics, comorbidities and analytic parameters analyzed are shown in Table 1. Febuxostat reduced 73% the rate of gout attacks in comparison with the pre-treatment group (IR [IC95%] 0.99 patients-year [0.59-1.39] vs. 3.74 patients-year [3.36-4.12]; IRO [IC95%]=0.27 [0.18-0.39]). In addition, 94.1% reached uric acid levels <7 mg/dl. No adverse effects were registered during febuxostat treatment.

Variables	Patient with Febuxostat
Demographics	
Age (years), media (SD)	55.9 (13.9)
Sex (male), n (%)	16 (94.1)

Race (Caucasian) n (%)	17 (100)
Comorbidities	
Alcohol intake, n (%)	5 (29.4)
Smoker, n (%)	4 (23.5)
Arterial hypertension, n (%)	11 (64.9)
High total cholesterol (>240mg/dL), n (%)	9 (52.9)
LDL-Cholesterol>160mg/dL, n (%)	3 (17.6)
HDL-Cholesterol<40mg/dL, n (%)	3 (17.6)
Triglycerides>200mg/dL,	10 (58.8)
Mellitus Diabetes, n (%)	2 (11.8)
Obesity (BMI>30), n (%)	6 (35.3)
Cardiovascular disease, n (%)	1 (5.9)
Comorbidities treatment	
Anti-hypertension drugs before febuxostat, n (%)	11 (64.6)
Diuretics drugs before febuxostat, n (%)	2 (11.8)
Acetylsalicylates before febuxostat, n (%)	2 (11.8)
Leflunomide before febuxostat, n (%)	2 (11.8)
Lipid-lowering drugs, n (%)	8 (47.1)
Gout characteristics	
Delay until gout diagnosis (months), media (SD)	104.1
Follow-up time with febuxostat (months), media (SD)	17.1 (12.4)
Tophi prevalence, n (%)	12 (70.6)

Conclusion: Febuxostat seems to be effective in clinical practice to reduce gout attacks rate in patients refractory or intolerant to other hypouricemic drugs, showing a hypouricemic effect moderate and a good security profile.

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THE LEVEL OF SATISFACTION OF PATIENTS WITH MUSCULOSKELETAL DISORDERS WITHIN AN EMERGENCY HOSPITAL

C. M. Daina¹, F. Cioara¹, D. Zaha¹, A. Venter¹, M. Bonta¹, L. Daina¹

¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objectives: Appreciating patient satisfaction is an important indicator of the level of quality of care that a health system offers. Evaluating patient satisfaction regarding medical services and the performance of medical personnel for the scope of this study stems from the people who were in a capacity to receive and assess these services at any given point in a hospital setting, for example while they were admitted. The satisfaction of patients can be defined as “a procedure that asks patients to offer a report on the services they receive from a health organization, hospital or medic.” The objective of this study is to assess the satisfaction of patients with musculoskeletal disorders which are admitted continuously to a hospital.

Methods: An observational, descriptive and retrospective study was undertaken on the basis of the patient satisfaction questionnaire administered to patients with musculoskeletal disorders which were admitted to the orthopedics ward of an emergency hospital throughout 2017. A number of 1862 questionnaires were analyzed and interpreted. The patient satisfaction questionnaire was comprised of the main socio-demographical data of the respondent and 15 specific items. Patients were asked about

hospital conditions and level of comfort during admittance (bedding, cleanliness, food, etc.), the personnel's behavior, the quality of medical care they received from medical staff as well as the kindness and availability of personnel. Another aspect which was observed was the level of information the patient received about prescribed medication. Other questions analyzed the general level of patient satisfaction upon being discharged and the level of respect shown towards patient rights.

Results: The average age of admitted patients was 61.63±2.13 years old, most of whom were women (54%). 76.5% of patients were admitted through the Emergency Ward, with 47.7% of them being admitted in under an hour and 8.9% of them in over 3 hours. 91% of patients state that they were informed of their rights as a patient whilst 91.5% of patients state that they were given information on their responsibilities and rules they have to obey as a patient. The hospital facilities (bedding, cleanliness, linen) were deemed unsatisfactory by 4-6% of patients. In regards to the quality of food within the hospital, the percentages were appreciated as follows: Good – 67.5%, Not Tasty – 21%, Not Enough – 14.5% and Very Good 5.5%. 79.5% of patients were satisfied and 4.5% were very unsatisfied with the attitude of medical personnel. The quality of medical care given by appropriate personnel was assessed as follows: doctors – very satisfied: 61.5%, unsatisfied: 5%; nurses – very satisfied: 54%, unsatisfied: 8.5%. The kindness and availability of medical personnel is appreciated as „very good” by 38.5% of respondents and unsatisfactory by 3.5% of patients. The prescribed medication was explained and administered under the supervision of a nurse: always in 58% of cases and sometimes in 33.5% of patients. The general impression on hospital discharge shows that 80.5% of patients were satisfied, 14% very satisfied and 5.5% unsatisfied. 94.5% of patients had their rights as a patient respected.

Conclusion: This study offers a general image of the level of satisfaction of patients with musculoskeletal disorders while they were admitted to hospital and allows for specific interventions in order to improve the services patients deem unsatisfactory (lowering of admittance time, informing the patient, room conditions, the quality of medical care given by personnel and supervising prescribed medication. The periodic but continuous analysis over time will allow for improvement in all the above mentioned hospital services and improve patient satisfaction.

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CHARCOT-MARIE-TOOTH DISEASE: A CASE REPORT

D. Pirici¹, A. M. Bumbea¹, O. C. Rogoveanu¹

¹UMF Craiova, Craiova, Romania

Charcot-Marie-Tooth disease (CMT) is an inherited peripheral neuropathy with autosomal dominant transmission characterized by muscular atrophy and progressive sensory neuropathy located at the extremities of the limbs. CMT is considered to be characteristic for the diseases grouped under the generic name of peroneal neurogenic amyotrophy and brings together several forms whose classification is in continuous dynamics due to new genetic evidence.

Case report: We present a case of a 28-year-old woman who presented to the physician for distal muscular weakness of the bilateral lower limbs, accompanied by insidious muscle cramps of about 3 years.

Results: Clinically, the patient presented amyotrophy of the leg muscles (the extensor hallucis and digitorum longus, intrinsic muscles and muscles of the calf), with “pes cavus” and hammertoes. Furthermore, there was a decrease of the patellar and Achilles reflexes, “foot drop” walking, disorders of superficial and deep sensitivity in the distal part of the lower limbs. At the upper limbs, the patient presented with discrete amyotrophy of the right thenar eminence. By assessing the family medical history, the

presence of a similar symptomatology was also found in the patient's mother, a symptomatology that started at the age of 32 years. Electromyography was performed, which showed a slow nerve conduction velocity (NCV) in the median nerve for both upper limbs (mean NCV was 28 m/s). Altogether, the clinical data and the result of the electromyography, pointed out to the demyelinating form of a type 1 CMT disease [1, 2].

Conclusions: Although there is no curative treatment for CMT disease, preventive measures are highly recommended. In patients with CMT and in their children, kinesiotherapy is thus a simple measure that can slow down the progression of amyotrophies and avoid possible muscle and bone-related complications.

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DEVELOPING INTERNAL/MANAGERIAL INSPECTIONS WITHIN THE ORTHOPEDICS & TRAUMATOLOGY WARDS

L. Daina¹, F. Cioara¹, D. Zaha¹, A. Venter¹, C. M. Daina¹, M. Bonta¹

¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objectives: The success of an organization can stem from the implementation and maintenance of a system of quality management, which is built to continuously improve performance taking into consideration the necessities of all involved parties. Internal inspections are an essential managerial function in order to achieve the goals of the hospital. Taking into account the legal framework they have to work within as well as the internal managerial inspection standards, each ward chief is responsible for implementing the necessary checks for the proper implementation and development of the internal managerial control system (IMCS). The objective of this study is to assess the internal/managerial inspections within the orthopedics and traumatology wards so that any deviation from objectives can be identified, the causes of it analyzed and the proper corrective or preventive measures applied.

Methods: A comparative study was undertaken between 2015-2017 based on Directive nr. 400/2015 for approval of the Internal Managerial Inspection Codes for Public Entities, annexes 3 and 4.1. The auto-evaluation questionnaire regarding the state of implementation of internal managerial inspection standards is comprised of 16 standards grouped within 5 elements: Inspection Environment, Performances & Risk Management, Inspection Activities, Informing & Communication and Evaluation & Audit. Each standard is structured on three components: describing the standard, general requirements and main references. These questionnaires were administered to the two ward chiefs from orthopedics and traumatology based on their activity between 2015-2017. Questionnaires from each year and each ward were then compared.

Results: Standard 1 – Ethics & Integrity, is implemented at the level of the two wards with the necessary ethical, personal and professional integrity values being promoted. In 2017 the Ethics and Deontology Code for Contracted Personnel was implemented. Standard 2 – Duties, Appointments, Tasks – the chiefs of the two wards ensure the creation and constant updating of internal rules (revised in 2015 and 2017) and work responsibility sheets (annually), which they communicate to employees. Standard 3 – Competence, Performance – the employment of competent personnel is assured through the ward chiefs (examinations for

employment held annually); these people are then given tasks according to their competences and the ward chiefs ensure the necessary framework for improving the continuous professional training of employees.

Standard 4 – Organizational Structure – the organizational structure, competences, responsibilities, tasks and chain of command for each ward are defined (lowering the number of beds in 2015 on one ward in order to comply with the necessary surface/bed laws). Standard 5 – Objectives – the objectives which are crucial to the purposes of the ward are defined together with the complementary ones regarding law conformity, flow of information, respect for internal rules and policies (administration contracts, 2016). Standard 6 – Planning – the ward chiefs come up with plans (budget containing income and expenses for each ward, investment lists, acquisition plan) through which the necessary activities for reaching the proposed objectives are undertaken using all the allocated resources. These plans are sent for approval to hospital management. Standard 7 – Performance Monitoring – ward chiefs ensure the monitoring of performances for each objective and activity through accepted performance indicators within their ward administration contracts. Standard 8 – Risk Management – ward chiefs have come up with and implemented a risk management process which would facilitate the efficient realization of objectives (informatics system, risk registry, registry for work-acquired diseases, registry for work-related accidents, forms for hospital-acquired infections). Standard 9 – Procedures – each ward has written procedures for every activity undertaken within it, which are then made known to involved personnel (increase in the number of procedures for each analyzed period). Standard 10 – Supervision – hierarchical inspections are undertaken in order to assess the activities and operations within a ward and help with their effectiveness. Standard 11 – Continuation of Activity – the main threats regarding continuation of processes and activities have been identified and appropriate measures have been taken so that ward activity can continue as normal in any moment (standardization of personnel, planification of holidays and leaves, maintenance contracts for equipment). Standard 12 – Informing & Communicating – the type, content, quality, frequency, source and receivers of different information are established within a hospital, along with an efficient system of internal and external communication so that the information reaches the necessary people on time and in full (internal IT system, private e-mail for each ward, work phone, fax machines, internal couriers, mail registry). Standard 13 – Management of Documents – each ward has specific procedures regarding organizing, storing, using, identifying and archiving internal and external documents (registries, forms, observation sheets). Standard 14 – Accounting and Financial Reporting – is not applied at ward level. Standard 15 – Evaluating the internal managerial control system – each ward chief has certain attributions in his work responsibility sheet in regards to exerting control over subordinate personnel's activities (respecting hospital hygiene standards, analysis on the level of patient satisfaction, respecting functional circuits, epidemiological control protocols). Standard 16 – Internal Audit – each ward has had annual audits as well as counselling activities.

Conclusion: This study offers a general image on developing internal/managerial control and inspections within the orthopedics and traumatology wards. From the undertaken analysis we can conclude the following: the ward-level risk registry is not updated yearly; elaborated operational procedures only at 25% of total number of procedure-based activities and are not updated yearly; the development programme for the internal/managerial control system contains professional improvement activities for chief personnel but was not updated yearly. From analyzing the reports on the internal/managerial control systems we gather that 81,25% (13) entities have conforming systems, 18,75% (3) entities have partially-conforming systems and there are no entities with nonconforming systems.

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THE ANALYSIS OF THE ELECTROPHYSIOLOGICAL CHANGES IN THE STRIATED MUSCLE SUBJECTED TO ISCHEMIC PRECONDITIONING

O. C. Rogoveanu¹, O. Taisescu¹, R. Traistaru¹, L. M. Florescu¹, A. Balseanu¹

¹UMF Craiova, Craiova, Romania

Introduction: The metabolic adjustments of the striated muscle fibers to a variable perfusion and multiple factors that influence it have a significant role in the athletes' recovery after various injuries. Multiple ischemic preconditioning and postconditioning instructional programs have been developed in order to adapt the muscle fibers to changes regarding oxygen intake [1].

Methods: The study included 20 volleyball players who were divided into two equal groups as follows: in the first group, also referred to as the control group, the recordings were performed after 10 min of physical exercise, with no prior warming up, while in the second group the recordings were completed in similar conditions, but with slight muscle training beforehand.

Results: Extreme and long-lasting ischemia with no prior training of the muscle fibers can lead to irreversible lesions due to an increase of the intracellular calcium ion concentration and the production of reactive oxygen species from extracellular sources [2]. The ischemic preconditioning through training protects the skeletal muscle by reducing the anaerobic production of ATP. The analysis of the EMG and MMG recordings revealed significant changes between the two groups regarding the waves that translate the muscle fatigue.

Conclusions: There is a tendency to increase the electrical stimulation resistance for the electrically pre-conditioned fibers. Under experimentally induced average hypoxia conditions, not all muscle fibers function simultaneously, thus suggesting the need to individualize the investigations and apply the recovery therapies locally on muscle groups. The most sensitive parameters that reflect muscle changes are the ones investigated electrophysiologically through EMG or MMG techniques.

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DIABETIC NEUROPATHY SEEN AS A RISK FACTOR IN THE RADIAL NERVE REGENERATION AFTER A SPIRAL SHAFT HUMERAL FRACTURE

E. Szigarto¹, D. Perju-Dumbravă¹, F. Cioara², C. C. Radu²

¹Institute of Legal Medicine Cluj-Napoca, Cluj-Napoca, ²University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: The recovery of the radial nerve can be affected by the diabetic neuropathy after a spiral shaft humeral fracture related to arm wrestling in a young person diagnosed with type I insulin-dependent diabetes.

Methods: We present a case report of a 31 years old male who suffered a spiral fracture of the distal one-third of the right humeral shaft, commonly known as Holstein-Lewis fracture. He has been diagnosed with insulin-dependent diabetes for 25 years, high blood pressure and with the complications of the diabetes (neuropathy, nephropathy, retinopathy).

Results: The patient had a surgical procedure consisting of open reduction and internal fixation with a plate and screws. The radial nerve was

exposed. The day after the surgery he complained of loss of sensibility on the radial side of the dorsum of the right upper limb and wrist drop on the same side. Electrodiagnostic testing showed neurotmesis of the right radial nerve and polyneuropathy of the lower limbs. After 7 months the chances of nerve regeneration were poor, so the physicians decided on performing tendon transfers for the radial nerve palsy. A radiographic examination presented "stained" demineralization at the distal epiphysis of the right radius and ulna which also extended to the I-V metacarpal bones. The patient was advised to engage in physiotherapy to improve his quality of life.

Conclusions: With the constant increase of the diabetes mellitus cases in Romania, the diabetic neuropathy becoming the most common peripheral neuropathy. The radial nerve paralysis due to neurotmesis in most cases cannot be completely recovered. The recovery process is very elaborate and nerve regenerative capacity is decreased in diabetic patients. The most frequent cause of radial nerve injury is the shaft fracture of the humerus. Altogether the loss of radial nerve function in the hand creates a significant disability, mainly when it interests the dominant one. From a medico-legal point of view and according to Romanian New Penal Code Art. 194, this case can be interpreted as a posttraumatic infirmity produced by bodily harm.

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THE EFFECTIVENESS OF SHOCKWAVE THERAPY IN PATIENTS WITH LATERAL EPICONDYLITIS

O. C. Rogoveanu¹, L. M. Florescu¹, R. Traistaru¹, E. Osiac¹, D. Tamita¹

¹UMF Craiova, Craiova, Romania

Objectives: The results of shockwave therapy were demonstrated by numerous clinical studies and case reports. Shockwave therapy is based on generating a very intense energy in a very short period of time. It creates a mechanical pressure over the affected tissues that leads to an increased cellular permeability, thus increasing the microcirculation and the cellular metabolism. Therefore, the healing process is accelerated. Lateral epicondylitis represents the inflammation of the arm muscles' tendon insertion and manifests with pain on elbow extension and forearm rotation. Our aim was to evaluate the effectiveness of the shockwave therapy in reducing pain in patients diagnosed with lateral epicondylitis.

Methods: The efficiency of this therapy was assessed in 25 patients with lateral epicondylitis. Five sessions were performed with five day breaks in-between them. Also, a control group was used and included 25 patients with the same condition but, in contrast to the other group, the treatment consisted of administration of nonsteroidal anti-inflammatory drugs and local topics associated with laser and ultrasound applications. The VAS scale was used for evaluating pain in patients included in both groups.

Results: A significant pain reduction was recorded in all the patients who benefited from this therapy. Furthermore, the shockwave therapy also increased the quality of life in these patients. Pain relief with at least 8 grades on the VAS scale was found in all 25 patients who received shockwave therapy compared to an average decrease of 3 grades encountered in patients treated with drugs and standard physiotherapy procedures.

Conclusions: The use of shockwave therapy in tendinous inflammatory diseases provides superior results compared to the classical physical therapies and allows the reduction of pain and temporary inability to work in these patients.

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FORENSIC IMPLICATIONS IN HIP ARTHROPLASTY: CASE REPORTA. V. Mate¹, D. Perju-Dumbravă¹, F. Cioara², C. C. Radu²¹Institute of Legal Medicine Cluj-Napoca, Cluj-Napoca, ²University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: The postoperative recovery after a hip replacement arthroplasty is variable due to facts like associated disease, age, sex, bone quality and type of prosthesis.

Methods: We present a case report of a 46 years old female that has undergone surgery for hip replacement type Birmingham hip resurfacing for coxarthrose secondary to congenital hip dysplasia. Also the patient was diagnosed with lumbar scoliosis.

Results: The patient has undergone a surgical procedure that consists in replacing the articulating surfaces of the patient's hip joint and removing very little bone compared to a total hip arthroplasty. In this case the surgery as a procedure went well, but the patient develops shortly afterwards symptoms of sciatic neuronal damage. Despite the correct treatment consisting in physiotherapy and neurotropic medication, indicated at the onset of early symptoms of neuropathy, the patient evolution went to a chronic state and the recovery was accomplished with the formation of an infirmity. According to the committee's medical expertise report on labor capacity, there is a 50% loss of work capacity corresponding to grade III of disability according to the laws and regulations in Romania.

Conclusions: In this case report prolonged recovery, >6 months, could be explained due to right sciatic nerve palsy that has been confirmed after the surgery. Despite appropriate therapeutic measures the recovery was accomplished with the formation of an infirmity. Invalidity is a forensic concept that expresses the particular status of a person insured in the public pension system and other social security rights, which benefit from the corresponding rights laws. Grade III disability, characterized by the loss of at least half of the capacity work, this status being compatible with the provision of a low level professional activity appropriate requirements.

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THE STUDY OF OSTEOPOROSIS IN PATIENTS WITH ALCOHOLIC LIVER DISEASEO. C. Rogoveanu¹, L. M. Florescu¹, R. Traistaru¹, I. Rogoveanu¹¹UMF Craiova, Craiova, Romania

Introduction: The harmful effects of excessive alcohol consumption on the liver, pancreas and nervous system are well known. Chronic consumption of alcohol in large amounts increases the risk of secondary osteoporosis, especially in men aged between 30-50 years who do not usually have any changes affecting the bone structure.

Methods: The current study included 80 patients aged between 30-50 years, diagnosed with alcoholic liver disease in the Gastroenterology Clinic of the Craiova Emergency County Clinical Hospital between the 1 January and 31 December 2017, subsequently monitored in the Medical Rehabilitation Clinic regarding the appearance and evolution of osteoporosis. Only patients with no risk factors or other potential causes of secondary osteoporosis were included in the study. Eighty male patients were equally divided in two groups as follows: the first group included patients affected by alcoholic liver disease, while the

second group consisted of patients diagnosed with liver diseases caused by viral etiology. The comparative analysis of both groups was based on biological, immunological and imaging explorations for evaluating the liver function. In addition, a DXA scan repeated at 0-6 months and 12 months was performed for the assessment of osteoporosis.

Results: Secondary osteoporosis was encountered in 36 out of 40 patients (90%) included in the first group compared to only 10 out of 40 patients (25%) in the second group where the T-score had significant values suggestive for osteoporosis. Additionally, in patients who continued alcohol consumption, the T-score values significantly altered during our study. This is due to the direct toxic effect of alcohol on osteoclasts and hepatic stellate cells, reduction of testosterone levels, nutrition disorders with lack of vitamins, minerals and proteins induced by alcohol consumption and deficitary absorption of calcium and vitamin D in these patients.

Conclusions: Chronic excessive alcohol consumption increases the risk of developing secondary osteoporosis in young men with direct repercussions on their health status and work capacity.

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THE STUDY OF RISK FACTORS INVOLVED IN DEVELOPING SECONDARY OSTEOPOROSIS AT A YOUNG AGEO. C. Rogoveanu¹, L. M. Florescu¹, R. Traistaru¹, A. M. Bumbea¹¹UMF Craiova, Craiova, Romania

Objective: Secondary osteoporosis is a relatively rare condition at young ages and may be caused by multiple factors that are encountered in everyday life [1]. Our study was intended to determine these factors and how they influence bone pathology with all the subsequent consequences.

Methods: Our study included 50 female patients aged between 20 and 40 who underwent medical examinations for various musculoskeletal disorders. Additionally, DXA scans were performed in order to detect osteoporotic changes.

Results: We discovered osteoporotic changes in 34 patients (68%) and tried to detect the possible causes of secondary osteoporosis considering that young age excludes hormone-induced osteoporosis. Furthermore, we could not identify a possible primary cause of osteoporosis in the patients' history. In 6 patients (12%), known with autoimmune diseases, we identified the consumption of steroidal anti-inflammatory drugs as the cause of secondary osteoporosis [2]. The chronic consumption of high-dose anxiolytic and sleeping pills was described as a risk factor in 18 patients (36%) who suffered from various forms of neurotic anxiety or depression. Smoking and excessive alcohol consumption were highlighted as risk factors for developing osteoporosis in 21 patients (42%). Finally, the use of contraceptives to prevent a possible pregnancy or treat polycystic ovary syndrome was identified as a risk factor for secondary osteoporosis in 14 patients (28%).

Conclusions: The occurrence of secondary osteoporosis in women of childbearing age is often the result of toxic or external drug factors. Identifying these factors and counselling young female patients with potential risk of developing this condition is an essential way to prevent pathologic bone fractures or other diseases induced by secondary osteoporosis.

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JOINT DISTRACTION FOR KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND QUANTITATIVE ANALYSISE. L. Goh¹, W. Lou¹, S. Chidambaram¹, S. Ma¹¹Imperial College London, London, UK

Objectives: To assess the short- and long-term outcomes of joint distraction for knee osteoarthritis and compare this with currently available treatment modalities.

Methods: The systematic review was conducted according to the PRISMA guidelines. MEDLINE and EMBASE databases were searched from date of inception to 27 December 2017. Clinical studies investigating joint distraction for knee osteoarthritis, which reported clinical and structural outcomes including Δ WOMAC index, Δ VAS pain score and Δ joint space width were included. Quality assessment of the studies was performed using the Modified Coleman Methodology Score.

Results: Six studies comprising a total of 367 patients were included. Three open prospective cohort studies evaluated the effects of knee joint distraction (KJD) at 1-, 2- and 5-years. One open prospective cohort study compared the outcomes following six- vs. eight-weeks of KJD at 1 year. There were two randomised controlled trials (RCTs) involving KJD with a follow-up of 1 year; one which compared KJD with high tibial osteotomy (HTO) and another with total knee arthroplasty (TKA). The mean Modified Coleman Methodology Score for all the studies was 84.2. The risk of bias was moderate in four studies and low in two studies. Overall, there were significant improvements in WOMAC index, VAS pain score and joint space width following KJD, which persisted up till five years. KJD also demonstrated comparable clinical outcomes with HTO and TKA.

Conclusions: There is moderate quality evidence supporting the beneficial outcomes of joint distraction for knee osteoarthritis. Larger RCTs with longer follow-up (>1 year) are necessary to establish the true effect size of this procedure.

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FOREARM DXA REALLY MATTERS IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISMP. Wisniewski¹, I. Karwacka¹, K. Sworczak¹¹Medical University of Gdansk, Gdansk, Poland

Objective: BMD is an important factor influencing the decision whether a patient with asymptomatic primary hyperparathyroidism (PHPT) should be surgically treated in favour of careful surveillance. Surgery is recommended in patients with osteoporosis, based on BMD measurement at hip, lumbar spine, or distal radius (T-score $\leq$ -2.5). Many PHPT patients, however, undergo BMD measurements in those two former skeletal sites only, but not in the forearm. It is possible that this results in osteoporosis underdiagnosis and suboptimal management of PHPT. The objective: to evaluate if PHPT patients lacking distal forearm BMD measurements might be suboptimally managed.

Methods: A total of 59 consecutive patients (52 women, 7 men) with biochemically confirmed PHPT (recently diagnosed) underwent BMD measurement in lumbar spine, hip and distal forearm using a DXA densitometer (Hologic Discovery Wi).

Results: The mean age of subjects was 61.0 ± 12.1 years. The mean serum calcium was 11.5 ± 1.2 , phosphate 2.4 ± 0.5 , median PTH 130 pg/ml, mean 25OHD 20.7 ± 9.7 ng/ml. The mean BMD in g/cm^2 was 0.864 ± 0.15 in lumbar spine, 0.686 ± 0.12 in femoral neck, 0.809 ± 0.16 in total hip and 0.573 ± 0.12 in distal radius. Based on hip and spine only, osteoporosis

was diagnosed in 20 patients. In 9 of the remaining 39 patients distal radius BMD was in osteoporotic range.

Conclusion: Distal radius BMD assessment increased the number of osteoporotic PHPT patients from 20 to 29 (by 45%). In PHPT patients lacking distal forearm BMD measurements osteoporosis may be significantly underdiagnosed and therefore suboptimally managed.

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EXTRACORPOREAL SHOCK WAVE THERAPY VS. CONSERVATIVE PHYSICAL THERAPY ON PATIENTS WITH CALCIFIC TENDINITIS OF THE SHOULDERI. R. Marcu¹, S. Patru¹, D. Matei¹, A. C. Bighea¹¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objective: The purpose of this study was to analyze the effect of extracorporeal shock wave therapy (ESWT) on calcific tendinitis of the shoulder through a long term follow up.

Methods: The study included 48 patients with calcific tendinitis of the shoulder, aged 38-67 years, who were hospitalized on Physical Medicine and Rehabilitation Clinic of Emergency County Hospital of Craiova between March and June 2017. The participants were randomly divided in two groups: the ESWT group (24 patients) and the control group (24 patients). However, 3 patients in the ESWT group and 4 in the control group wished to withdraw and finally 41 patients completed the study. The patients were diagnosed with calcific tendinitis of the shoulder by a specialist using ultrasonography or shoulder magnetic resonance imaging. The patients from the control group received conventional physical therapy: 20 min hot pack placements as basic physical therapy, 15 min transcutaneous electrical nerve stimulation and 5 min ultrasound therapy, 3 times per week for 12 weeks. The treatment group received ESWT 3 times a week until 6 weeks, but not from 6 to 12 weeks. Functional assessment of the patients was performed at 2, 6 and 12 weeks using Shoulder Pain and Disability Index (SPADI). The SPADI contains 13 items that assess two domains: a 5-item subscale that measures pain and an 8-item subscale that measures disability.

Results: The SPADI as a shoulder function evaluation method showed a significant difference in the interaction of the group 1 according to measurement period ($p < 0.05$). The treatment group showed a more significant decrease in pain at 2, 6 and 12 weeks compared to the control group.

Conclusions: Conservative physical treatment has shown a limited effect on patients with calcific tendinitis of the shoulder joint. ESWT is being discussed as a new treatment method of calcific tendinitis. This study showed that ESWT is an effective treatment method because the SPADI score more rapidly in the treatment group.

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ANALYSIS OF THE EXPRESSION IN ATHEROMATOUS PLAQUES OF THE TUMOR NECROSIS FACTOR ALPHA WITH ACUTE CORONARY SYNDROME IN RELATION TO THE PRESENCE OR ABSENCE OF INFLAMMATORY JOINT DISEASEV. Popova¹, Z. Vazhev², A. Batalov³, M. Geneva-Popova³, J. Peshev⁴, J. Peeva⁵, D. Paskaleva⁶, K. Kraev³, M. Jelyazkova⁷

¹Medical University Plovdiv, Medical Faculty, Department of Rheumatology, ²Medical University Plovdiv, Medical Faculty, Department of Cardiac and Vascular Surgery, University Hospital "St. Georgi" EAD, Clinic of Cardiac Surgery, ³Medical University Plovdiv, Medical Faculty, Department of Rheumatology, ⁴Medical University

Plovdiv, Medical Faculty, Department of General and Clinical Pathology, ⁵Medical University of Plovdiv, Faculty of Public Health, ⁶Department of Nursing Care, Medical University-Plovdiv, ⁷Medical University Plovdiv, Faculty of Medicine, Department of Propedeutics of Internal Diseases University Hospital "Kastella" EOOD, Clinic of Rheumatology, Plovdiv, Bulgaria

Objective: To explore possible associations between TNF- α expression and patients with ACS with and without inflammatory joint disease

Methods: The sample included 95 patients with ACS. Among them, 46 had inflammatory joint disease and 49 did not- 23 had rheumatoid arthritis (RA - mean age 67.39 ± 7.42) and 23 were with psoriatic arthritis (PsA - mean age 70.09 ± 6.37). TNF α was measured through immunohistochemical analysis of material containing atheromatous plaque from cardiac bypass surgery or other manipulation without a risk for the patient. Immunohistochemical analysis was performed on material containing atheromatous plaque from cardiac bypass surgery or other manipulation without a risk for the patient. The immunohistochemical analysis was performed according to the IHH protocol using the following kits to detect the presence of TNF- α : anti-TNF - (AA 180-230) -TNF- α -rabbit, polyclonal, IgG, 1: 100 Biosystems and Polymer Visualization System - CRF™ Anti-Polyvalent HRP Polymer (DAB) Stain Kit SPSS software package version 24 (SPSS, Chicago, Illinois, USA)

Results: The results show significantly elevated levels of TNF- α expression in patients with ACS and inflammatory joint disease as compared to patients with ACS, but without inflammatory joint disease. Extrapolating from this finding, it can be concluded that the presence of inflammatory joint disease in patients with ACS adds up to the production of TNF- α and further elevates its expression. However, when patients of two different types of inflammatory joint disease were compared, RA vs. PsA, the expression of TNF- α did not reveal significant differences, which leads to the conclusion that the type of joint disease does not have association with the levels of TNF- α expression. No significant relationship was found between disease activity level and TNF- α expression.

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ANEURYSMAL BONE CYSTS OF THE SPINE: 4 CASE REPORTS AND REVIEW OF LITERATURE

A. Romdhane¹, N. Karmani¹, I. Ben Said¹, J. Kallel¹, H. Jemel¹

¹National Institute of Neurology, Tunis, Tunisia

Objective: Aneurysmal bone cysts (ABC) are rare, benign, highly vascular pseudotumors of unknown cause. It most often affects individuals during their second decade of life. Our goal was to document the clinical characteristics, diagnostic modalities and treatment results of ABCs.

Methods: We reviewed our institution's database over a period of 15 years to identify patients diagnosed with aneurysmal bone cysts of the spine. Four patients underwent surgery in our department (2 men and 2 women). For those four patients, we tabulated the clinical characteristics, location, diagnostic modalities and treatment.

Results: The clinical manifestations were gait disturbance in 2 patients and leg pain in the other two. The tumor occurred in the dorsal spine in 2 cases and in the lumbar spine in the other two. All patients underwent surgical resection with total removal in only 2 patients. Postoperatively,

clinical signs improved in all patients. Only one case presented tumor recurrence requiring second intervention and instrumentation.

Conclusion: ABCs constitute approximately 1.5% of spinal bone tumors. They usually affect the posterior elements of the spine. MRI is the most useful modality for preoperative planning. It also helps to evaluate the fluid level, which is characteristic for ABC on MRI. The differential diagnosis is mainly with giant cell tumors and osteoblastomas. The primary option for treatment is surgery. Instrumentation is sometimes necessary because of the increased risk of postoperative instability, especially in cervical spine surgery. The recurrence rate is 20 to 30% in case of incomplete resection. ABCs are benign lesions. Surgical resection en bloc has the lowest recurrence rate. Instrumentation is sometimes necessary because of the increased risk of postoperative instability.

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C1 TUBERCULOSIS: DIAGNOSIS DIFFICULTIES AND CONSTRAINTS OF SURGICAL MANAGEMENT: A CASE REPORT

A. Romdhane¹, N. Karmani¹, I. Ben Said¹, J. Kallel¹, H. Jemel¹

¹National Institute of Neurology, Tunis, Tunisia

Objectives: Spinal tuberculosis is a destructive form of tuberculosis (TB). It accounts for approximately half of all cases of musculoskeletal TB. The spinal column is involved in <1% of all cases of TB but the increasing frequency of TB in both developed and developing countries has continued to make spinal TB a health problem. Although the thoracolumbar junction seems to be the most common site of the spinal column involvement in spinal TB, any part of the spine can be affected. Spinal TB is a very dangerous type of skeletal TB as it can be associated with neurologic deficit due to compression of adjacent neural structures and significant spinal deformity. Our aim was to discuss the diagnosis difficulties of C1 tuberculosis and determine constraints of surgical management.

Case report: A 63-year-old female presented with cervical pain for the past year, with trismus, torticollis and dysphagia with solids. Plain radiographs and computed tomographic (CT) scans of the cervical spine revealed an osteolytic lesion of the left anterior arch of C1. MRI showed a left para-vertebral lesion invading the anterior arch of C1.

Needle biopsy was impossible because of the invincible trismus. A surgical biopsy of the lesion was performed. Anatomopathological examination confirmed the tuberculosis. Progression under anti tubercular treatment was favorable.

Conclusions: TB localization in the upper cervical spine is very rare. It is estimated at only 1% of spinal locations. Neural deficit in this region is reported in between 24% and 64% of cases, and mainly takes the form of quadriplegia. For the diagnosis of spinal TB, magnetic resonance imaging is more sensitive imaging technique than x-ray and more specific than computed tomography. Magnetic resonance imaging frequently demonstrates involvement of the vertebral bodies on either side of the disk, disk destruction, cold abscess, vertebral collapse, and presence of vertebral column deformities. Neuroimaging-guided needle biopsy from the affected site in the center of the vertebral body is the gold standard technique for early histopathological diagnosis. Spinal TB is a medical disease and

antitubercular drugs have a main role in the recovery and response of patients. The prognosis of this location is generally favorable. The persistence of bone destruction with spinal instability is an indication for surgical treatment. Pott's disease of the superior cervical spine is very rare. The prognosis for spinal tuberculosis is improved by early diagnosis and rapid intervention. A high degree of clinical suspicion is required if patients present with chronic back pain, even in the absence of neurological symptoms and signs. Medical treatment is generally effective. Surgical intervention is necessary in advanced cases with marked bony involvement, abscess formation, or paraplegia. Spinal tuberculosis affects young people, so efforts should be made for its effective prevention. Controlling the spread of tuberculosis is the only way available to prevent spinal tuberculosis.

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COGNITIVE FUNCTION IN PATIENTS WITH OSTEOARTHRITIS

S. Tomasevic-Todorovic¹, L. Madacki¹, K. Boskovic¹, A. Knezevic¹, J. Ivacic², F. Hanna³

¹Faculty of medicine, Novi Sad, University of Novi Sad, Medical Rehabilitation Clinic, Clinical Centre of Vojvodina, ²Hospital, Senta, Ada, Novi Sad, Serbia, ³College of Health Sciences, University of Qatar, Doha, Qatar

Objective: Cognitive function may form an important indicator for assessment and monitoring as part of the overall management of patients with chronic pain. The aim of this study was to examine memory functions and their relations with level of depression and pain in patients with osteoarthritis.

Methods: Our cross-sectional study was included 30 patients with osteoarthritis and 30 matched healthy control for age, sex. The assessment of memory was conducted by standardized test WMS (Wechsler memory scale) and depression by BDI (Beck scale of depression), intensity of pain by VAS (visual analogue scale) in Medical Rehabilitation Clinic, Clinical Centre of Vojvodina.

Results: The average values of pain (VAS) in group of patients with osteoarthritis was 45.20±22.64, and average scores of BDI test was 12.72±8.4. The results showed the presence of statistically significant differences between patients with osteoarthritis and control group in memory scores and scores of depression ($p<0.001$). There are significant correlations between performance of memory and scores on questionnaires of pain severity in group of patients with osteoarthritis ($p<0.001$).

Conclusions: Patients with chronic OA pain and depression displayed worse cognitive performance than healthy control and they need the multimodal rehabilitation treatment.

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CERVICAL LAMINECTOMY IN OSSIFICATION OF THE POSTERIOR LONGITUDINAL LIGAMENT: TWO CASE REPORTS AND REVIEW OF LITERATURE

A. Romdhane¹, N. Karmani¹, I. Ben Said¹, J. Kallel¹, H. Jemel¹

¹National Institute of Neurology, Tunis, Tunisia

Objectives: Ossification of the posterior longitudinal ligament (OPLL) is a condition of abnormal calcification of the posterior longitudinal ligament. The most common location is at the cervical spine region. Compression of spinal cord caused by OPLL may lead to neurologic symptoms and in the cases with severe neurologic deficit, surgical treatments are required. We report two cases of cervical OPLL treated by laminectomy and through a review of the literature we discuss the advantages and limitations as well as the results of this method.

Case reports:

Case 1: A 63-year-old male with walking disorders for the past 20 years. Neuro-radiological investigations showed an extended OPLL from C1 to D2. The patient had a C3 to C7 cervical laminectomy with good results. Current imaging shows no signs of spinal instability.

Case 2: A 53-year-old female reporting C8-D1 right-sided cervical radiculopathy with walking disorders. The radiological explorations showed OPLL from C1 to C6. She had a decompressive cervical laminectomy. The surgical procedure did not improve neurological disorders despite functional rehabilitation.

Conclusions: OPLL is most commonly found in men, in the elderly, and in Asian patients. OPLL can start with mild or no symptoms, but some patients progress slowly to develop symptoms of myelopathy. An accurate diagnosis through the use plain radiograph, computed tomography, and magnetic resonance imaging findings is very important to monitor the development of symptoms and to make decisions regarding a treatment plan. Once symptoms of myelopathy are present and neurologic symptoms are progressive, the treatment of choice is surgery to relieve spinal cord compression. Surgical management of OPLL continues to be controversial. Each surgical technique has some advantages and disadvantages, and the choice of operation should be decided carefully with various considerations. Selection of surgical method for OPLL is still a highly controversial topic and accordingly, advantage and limitation of each method should be well understood. Cervical laminectomy in OPLL is a simple, rapid procedure with few immediate complications. The disadvantages of this procedure are the risk of the natural evolution of the OPLL and the deformation in kyphosis. The results of cervical laminectomy in the treatment of OPLL are therefore generally good.

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CERVICAL POTT'S DISEASE: 5 CASE REPORTS

A. Romdhane¹, N. Karmani¹, I. Ben Said¹, J. Kallel¹, H. Jemel¹

¹National Institute of Neurology, Tunis, Tunisia

Objectives: Spinal tuberculosis (Pott's disease) is the most common as well as one of the most dangerous forms of skeletal tuberculosis and accounts for 50% of all cases of skeletal tuberculosis. Pott's disease is still common in developing countries. Although the thoracolumbar junction seems to be the most common site of the spinal column involvement, cervical localization is scarce and accounts for 2 to 5% of spinal tuberculosis. Furthermore, the incidence of neurologic complications in spinal tuberculosis varies from 10-43%. The purpose of this study was to perform an updated review and present our experience with 5 cases of tuberculosis of cervical spine, including clinical characteristics, diagnostic modalities and management of spinal tuberculosis.

Methods: A review of 5 cases of cervical Pott's disease collected at the Department of Neurosurgery of National Institute of Neurology of Tunis

over a period of 2 years, between 2011 and 2012 and an updated literature review.

Results: The average age of our patients was 35 years old with extremes ranging from 16–63 years old. There is a slight male predominance. The diagnostic delay is on average 6 months. The clinical manifestations were dominated by cervical pain (4 cases) and progressive spinal cord compression syndrome (3 cases). The biological inflammatory syndrome is found in only one patient. The intradermal reaction to tuberculin is positive in 4 patients. X-ray of the cervical spine, CT scan and magnetic resonance imaging were performed in all patients. All patients underwent a surgical resection. The medical treatment was administered to all our patients. The evolution was favorable, clinically and biologically, under anti tubercular treatment.

Conclusions: Tuberculous spondylodiscitis remains a major global public health problem in endemic countries that affects mostly young adults in their most productive years. Thoracolumbar junction seems to be the most common site of the spinal column involvement in spinal tuberculosis (95%) and cervical spine is concerned in only 5% of cases. The delayed diagnosis, between 3 and 20 months, explains the frequency of neurological deficits which are found in proportions of 20 to 40%. For the diagnosis of spinal tuberculosis, magnetic resonance imaging is more sensitive imaging technique than x-ray and more specific than computed tomography. Antituberculous treatment remains the cornerstone of treatment. Surgery may be required in selected cases. With early diagnosis and early treatment, prognosis is generally good. Cervical Pott's disease is a rare localization. The diagnosis is easy in front of the cervical signs. The conservative management of cervical spine immobilization and antitubercular chemotherapy remains a sufficient attitude to healing. Surgery is reserved in case of neurological aggravation or spinal instability.

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SOLITARY OSTEOCHONDROMA OF THE POSTERIOR ARCH OF C1: A CASE REPORT AND REVIEW OF LITERATURE

A. Romdhane¹, N. Karmani¹, I. Ben Said¹, J. Kallel¹, H. Jemel¹

¹National Institute of Neurology, Tunis, Tunisia

Objectives: Solitary osteochondroma of the cervical spine is extremely rare. These tumors slowly enlarge, creating insidious but progressive symptoms of myelopathy or radiculopathy or both. Despite the benign histologic nature of osteochondromas, location in cervical spine in proximity to vital vascular and neurological structures should be treated surgically. We report a case of solitary osteochondroma of the posterior arch of C1 in a 13-year-old female, revealed by posterior cervical swelling. We discuss the main clinical, pathological and radiological features that were observed in this patient.

Case report: A 13-year-old female with no medical history had progressive left neck swelling for the past 5 months without associated neurological signs. A cervical computed tomography scan showed a mass at the inferior left edge of the posterior arch of C1 with a double component. MRI of the cervical spine showed an osseous lesion arising from the left posterior arch of C1 with significant canal compromise at the level of the C1 and C2 vertebrae. Surgery involved an incision on the dome of the swelling. We removed the tumor en bloc. Histological analysis confirmed

the diagnosis of osteochondroma. The patient's postoperative course was uneventful.

Conclusions: Solitary osteochondroma of the spine is very rare, though osteochondroma is the commonest benign tumor of the bone. Only about 1–4% of solitary osteochondromas occur in the spine. And solitary osteochondroma of spine causing cord compression is even rarer. Clinical histories, routine radiographs, CT studies, MRI studies and histopathological studies are the adjuncts for a definitive diagnosis. Surgical intervention can lead to functional and neurologic improvement with very little chance of recurrence. The high cervical spinal cord localization of osteochondroma is rare. Diagnosis is made easy by imaging. The treatment is always surgical performing a total excision of the lesion. The pathogenesis of these tumors is still hypothetical. The prognosis is generally favorable but complications, neurological and more rarely sarcomatous degeneration remain possible thus justifying the surgical treatment of asymptomatic forms.

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KNOWLEDGE ABOUT OSTEOPOROSIS AMONG CHINESE AT HIGH RISK FOR OSTEOPOROTIC FRACTURES

L. Si¹, J. Gu², L. Tu², Y. Xie², M. Hilgsmann³, T. Winzenberg⁴, J. Li², Q. Lv², J. Qi², Z. Lin², M. Chen⁵, A. J. Palmer⁴

¹Centre for the Health Economy, Macquarie University, Sydney, Australia, ²Department of Rheumatology, Third Affiliated Hospital of Sun Yat-sen University, Guangzhou, China, ³Department of Health Services Research, Maastricht University, Maastricht, The Netherlands, ⁴Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia, ⁵Department of Public Administration, School of Health Policy and Management, Nanjing Medical University, Nanjing, China

Objectives: To gauge the knowledge about osteoporosis (OP) in a Chinese population who were at high risk for osteoporotic fractures.

Methods: A survey was conducted in patients who were at high risk for osteoporotic fractures and attended the Rheumatology Department of the 3rd Hospital of Sun Yat-sen University. The validated Osteoporosis Knowledge Assessment Tool (OKAT) was used to assess patients' knowledge about OP. A correct answer in the OKAT-scored 1, otherwise the wrong or "Don't know" response scored 0. The score range of the OKAT was between 0 and 20. Demographic and socioeconomic characteristics were collected in the study and was analysed to assess their correlation with knowledge of OP. Data were analysed using Stata. A p-value<0.05 was considered statistically significant.

Results: A total of 112 patients were included in this study, with 81% females and mean age 62.2 (standard deviation (SD) 10.4) years. Mean T-score at the femoral neck was -2.1 (SD 0.9). OKAT-score ranged from 0–15 and the mean score was 7.2 (SD 3.8). Most participants correctly answered that OP leads to an increased risk for bone fractures (81.3%). The question "An adequate calcium intake can be achieved from two glasses of milk or soy milk a day" had the highest percentage (71.4%) of incorrect answers. In addition, most participants (75.0%) answered "Don't know" to the question regarding ethnic differences in the risk for OP fractures. There was no statistical difference in OP knowledge between age, sex, whether the patient has been diagnosed with OP and

a history of OP fracture. However, knowledge of OP was positively ($p < 0.05$) associated with per capita family income and education level.

Conclusion: Knowledge of OP among Chinese patients is low and lower than some other populations.^{1,2} Education programs are required in the Chinese population especially targeting those from lower socioeconomic class.

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PATIENT WILLINGNESS TO PAY FOR OSTEOPOROSIS MEDICATIONS: A DISCRETE CHOICE EXPERIMENT

L. Si¹, J. Gu², A. J. Palmer³, L. Tu², Y. Xie², Y. Gu¹, J. Li², Q. Lv², J. Qi², Z. Lin², M. Chen⁴, M. Hiligsmann⁵

¹Centre for the Health Economy, Macquarie University, Sydney, Australia, ²Department of Rheumatology, Third Affiliated Hospital of Sun Yat-sen University, Guangzhou, China, ³Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia, ⁴Department of Public Administration, School of Health Policy and Management, Nanjing Medical University, Nanjing, China, ⁵Department of Health Services Research, Maastricht University, Maastricht, The Netherlands

Objective: To gauge patients' willingness-to-pay (WTP) for osteoporosis (OP) medications in the Chinese population.

Methods: Face-to-face discrete choice experiment (DCE) interviews were conducted in patients who were at risk of OP fractures attending the Rheumatology Department of the 3rd Hospital of Sun Yat-sen University. Four medication attributes were included in the DCE: 1) treatment efficacy in reducing fracture risk; 2) out-of-pocket (OOP) payments; 3) side effects from the medication and; 4) mode of administration. WTP was analysed using a conditional logit model. OOP cost and treatment efficacy were treated as linear continuous variable in the analysis. A $p < 0.05$ was set as statistically significant. Costs were presented in 2017 RMB Yuan.

Results: A total of 112 patients participated the DCE and 110 patients completed the questionnaire. 80.9% of the participants were female and the mean age was 62.1 (standard deviation (SD) 10.4) years. Patients were willing to pay 104 (95%CI: 12-196) Yuan more per year on an OP medication for 1% increase in treatment efficacy in preventing fracture. Using flu-like symptoms as the reference side effect, patients were willing to pay 1,710 (95%CI: 528-2,891) Yuan more per year on an OP medication for skin reactions, but patients were willing to pay 2,229 (95%CI: 564-3,893) Yuan less per year for gastro-intestinal disorders. Using daily oral tablet as the reference mode of administration, patients were willing to pay 5,592 (95%CI: 3,768-7,417), 9,098 (95%CI: 6,528-11,668), 12,013 (95%CI: 9,780-14,245) and 7,999 (95%CI: 6,232-9,766) Yuan more per year if the OP medication was administered as daily nasal spray, 6-months subcutaneous injection, yearly intravenous infusion and weekly oral tablet respectively. All WTPs achieved the statistically significant level.

Conclusion: Chinese patients show their preference and willingness to accept trade-offs in OP treatments. The results are useful to understand Chinese patients' preferences for OP medications. In

addition, our study may be informative to clinicians when they prescribe OP medications and to manufacturers when they develop their OP medications.

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P579

WHAT IS CHINESE PATIENTS' PREFERENCE FOR OSTEOPOROSIS TREATMENT? A DISCRETE CHOICE EXPERIMENT

L. Si¹, J. Gu², A. J. Palmer³, L. Tu², Y. Xie², Y. Gu¹, J. Li², Q. Lv², J. Qi², Z. Lin², M. Chen⁴, M. Hiligsmann⁵

¹Centre for the Health Economy, Macquarie University, Sydney, Australia, ²Department of Rheumatology, Third Affiliated Hospital of Sun Yat-sen University, Guangzhou, China, ³Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia, ⁴Department of Public Administration, School of Health Policy and Management, Nanjing Medical University, Nanjing, China, ⁵Department of Health Services Research, Maastricht University, Maastricht, The Netherlands

Objective: To elicit patients' preference for osteoporosis (OP) medication treatment in a Chinese population.

Methods: A discrete choice experiment (DCE) was conducted in a convenience sample of Chinese patients who were at risk of OP fractures attending the Rheumatology Department of the 3rd Hospital of Sun Yat-sen University. Patients were asked repetitively about their preference between two hypothetical OP medications or no treatment. Their choice was made based on four attributes that were included in the DCE: 1) treatment efficacy in reducing fracture risk; 2) out-of-pocket (OOP) payment; 3) side effects from taking the medication and; 4) mode of medication administration. A conditional logit model was used to estimate patient's preferences. A $p < 0.05$ was considered statistically significant.

Results: A total of 110 patients were included in the analysis. Patients preferred treatment with higher efficacy in preventing fracture and lower OOP cost. The least preferred medication side effect was gastrointestinal disorders followed by flu like symptoms then skin reactions. The most preferred mode of administration was annual intravenous infusion, followed by 6-month subcutaneous injection, weekly oral tablet, daily nasal spray, with daily oral tablets ranked as the least preferred mode of administration. All variations in preferences across different attributes achieved the statistically significant level.

Conclusions: Chinese patients prefer an OP medication with higher likelihood of fracture prevention and lower OOP cost. In line with a similar study conducted in European countries,¹ gastrointestinal disorder is the least preferred side effect in both Chinese and European patients. However, Chinese patients prefer yearly intravenous infusion while 6-month subcutaneous injection is the most preferred mode of administration in several European populations.¹ In conclusion, patients' preference for OP treatment varies in different populations. A better understanding of patients' preference for OP medications and incorporating patients' preference in clinical decision-making is key to improve OP management in the real world setting.

Reference: 1. Hiligsmann M et al. *Rheumatology* 2017;56:1167

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P580

FACTORS ASSOCIATED WITH IN-HOSPITAL MORTALITY IN ELDERLY DUE TO FRAGILITY HIP FRACTURE: A 7-YEAR COHORT STUDY IN BRAZIL

V. C. U. Peterle¹, M. Novaes, F. F. Amorim², P. E. Bezerra Junior³, J. C. Geber Junior⁴, R. F. A. Assis⁵, J. M. Mosquera⁵, W. H. S. Martins⁵

¹University of Brasília, Faculty of Health Sciences, Postgraduation in Health Sciences, ²Department of Health of the Federal District, School of Health Sciences, Postgraduation and Extension, ³Department of Health of the Federal District, School of Health Sciences, Medical Residency, ⁴Department of Health of the Federal District, School of Health Sciences, ⁵University Center of Brasília, Faculty of Education and Health Sciences, Medicine Course, Brasília, D.C., Brazil

Objective: To identify the factors associated with in-hospital mortality in elderly with fragility hip fracture.

Methods: A retrospective cohort of 349 patients over 60 years of age with hip fracture by minimal trauma, admitted for 7 years (Jan 2010-17) at the Orthopedic Public Health Service at Brasília, D.C. The bivariate analysis was used to test the association between the variables with the outcome (mortality) and comparison between groups (death vs. survival) through the chi-squared test and Mann-Whitney. p -value<0.005. The impact of the variables on mortality and the odds ratio of the selected predictors, a logistic regression model was constructed using the stepwise method. The Nagelkerke's R^2 model=0.80. Adjusted for age and sex [95%CI p >0.005]. Survival was performed through logistic regression of COX and Kaplan-Meier curves.

Results: Overall, 76 patients (21.8%) had death as their outcome. Predominance of women ($n=229$) and higher mortality (52.68%) but no significant ($p=0.544$). Higher mortality ($p<0.005$) among the elderly (84.7 $\pm$ 1.0), Diabetes Mellitus ($n=48\%$) and Detsky(1997) III (68%). Dementia/Depression ($n=44.6\%$)[OR=1.9], Hypertension(SAH) (92%)[OR=4.05], Infection ($n=35\%$)[OR=5.7] e Respiratory Infection (64.5%)[OR=7.38] were risk of death, as also, in the group with the highest number of days of hospitalization (30.9 $\pm$ 2.5), postoperative (19.6 $\pm$ 3.4) and ICU (13.9 $\pm$ 2.4)[OR=1.10]. Surgery was associated with mortality (56.6%)[OR=2.10]. Considering only the patients who had surgery and the postoperative time, it was verified that survival was 39.2 days. [26.3-53.3]. Patients who underwent Osteosynthesis (56.4%) had a survival time (days) of less vs. Arthroplasty (43.6%) [HR=2.1 95%CI: 1.03-4.41].

Conclusion: Special attention should be given to elderly patients with frailty fracture with such risk factors and variables in-hospital treatment since the longer time of hospitalization is related to higher mortality.

P581

TIME WATCHING TELEVISION OR VIDEOS AND STRENUOUS PHYSICAL ACTIVITY IN YOUNGER WOMEN INTERACT WITH EACH OTHER TO PREDICT LOWER LIMB MUSCLE STRENGTH AND BALANCE BUT NOT BONE DENSITY IN MIDLIFE: A 12-YR PROSPECTIVE STUDY

F. Wu¹, G. Jones¹, T. Winzenberg¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia

Objectives: The effects of sedentary behaviour and physical activity on musculoskeletal health remain unclear in younger adults. This study aimed to describe independent associations and interactions of time spent watching television or videos (TTV) and strenuous physical activity

(SPA) in younger women with BMD, lower limb muscle strength (LMS) and balance in midlife.

Methods: Ten-year follow-up of a 2-yr osteoporosis education randomized controlled trial among 470 women aged 25-44 years. Associations of self-reported TTV and SPA at baseline with BMD at femoral neck and lumbar spine, LMS and balance (timed up and go test (TUG), step test (ST), functional reach test (FRT) and lateral reach test (LRT)) measured after 12 years were examined using linear regression.

Results: After adjustment for confounders, including SPA, TTV was detrimentally associated with LMS ($\beta=-6.8$, 95%confidence interval (CI) -12.6 to -1.1 and -3.8, -12.8 to 5.1 for 2-3 and ≥ 3 hours, respectively, vs. ≤ 1 hours) and TUG ($\beta=0.11$, 95%CI -0.04 to 0.26 and 0.17, -0.06 to 0.40) but not the FRT. Conversely, SPA was beneficially associated with LMS ($\beta=10.1$, 3.9 to 16.3 for ≥ 5 days, respectively, vs. <2 days), TUG (-0.17, -0.34 to -0.01) and FRT (1.53, -0.05 to 3.12). There were interactions between TTV and SPA for ST and LRT (Figure 1, $p=0.03$ for ST and 0.06 for LRT). Neither TTV nor SPA was associated with BMD.

Conclusions: Both TTV and SPA in younger women independently predicted LMS and TUG, and had synergistic effects to predict ST and LRT. This suggests there could greater benefits from both reducing TTV and increasing SPA in younger age for preventing reduced muscle strength and balance in later life than from addressing either sedentary behaviour or physical activity in isolation.

P582

TRACKING OF LOWER LIMB MUSCLE STRENGTH FROM YOUNG TO MIDDLE AGE AND DETERMINANTS OF DEVIATION FROM TRACKING: A 12-YR PROSPECTIVE STUDY

F. Wu¹, T. Winzenberg¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia

Objectives: Muscle strength starts to decline rapidly in middle age and muscle weakness is a major risk factor for falls in older adults. However, whether muscle strength tracks from young to middle age is unknown, so it is unclear whether early intervention to improve strength could have sustained benefits. This study aimed to describe tracking of lower limb muscle strength (LMS) in women from young to middle age and factors associated with deviation from tracking.

Methods: A population-based sample of 340 women aged 25-44 years (mean=38) were followed for 12 years. Outcome was LMS by dynamometer. Also measured were anthropometrics, demographics, smoking, history of breastfeeding and fractures, physical activity, use of corticosteroid, calcium intake, lean mass (LM) and fat mass (by DXA). Pearson's correlation coefficient of LMS between baseline and 12 years was calculated. Log-binomial regression was used to identify factors associated with a negative deviation from tracking (defined as decreased LMS tertile position or remained in the lowest or middle tertile from baseline to 12 years).

Result: There was moderate tracking of LMS (correlation coefficient=0.61, $p<0.001$). After 12 years, 57% of participants had negative deviation from tracking. In multivariable analyses, LM and history of breastfeeding in young adulthood protected against negative deviation from tracking (relative risk (RR)=0.85, 95%CI: 0.73 to 0.98 per 5 kg and 0.79, 0.59 to 1.04, respectively). In contrast, use of corticosteroid and history of fractures were associated with higher risk of negative deviation from tracking (RR=1.47, 1.12 to 1.93 and 1.20, 0.98 to 1.47, respectively).

Conclusion: LMS tracks from young to middle age in women. Increasing LM and reducing use of corticosteroid in young adulthood might be

effective strategies to prevent muscle weakness in midlife. Young women who have not breastfed or have a history of fracture might be suitable target groups for interventions to improve muscle strength.

P583

OSTEOBLASTIC SMURF1 INHIBITION PROMOTES BONE FORMATION IN DISTINCTIVE AGE-RELATED OSTEOPOROSIS

C. Liang¹, G. Zhang¹, A. Lu¹

¹Hong Kong Baptist University, Hong Kong, China

Bone morphogenetic protein (BMP) signaling plays a significant role in osteoblastic bone formation. However, recombinant human BMPs (rhBMPs) exhibit large inter-individual variations in local bone anabolic potential. Ubiquitin ligase Smurf1 ubiquitinates BMP transducers and acts as a suppressor in bone formation. Here, we found that age-related osteoporotic individuals could be classified into different subgroups based on distinct intraosseous BMP-2 levels and Smurf1 activity. Interestingly, one major subgroup had a normal BMP-2 level and elevated Smurf1 activity (termed as BMP-2ⁿ/Smurf1^e), whereas another major subgroup demonstrated a decreased BMP-2 level and normal Smurf1 activity (termed as BMP-2^d/Smurf1ⁿ). The both subgroups showed obviously reduced level of intraosseous p-Smad1, but with different reduction extents. Serum osteocalcin with consistent reduction pattern to intraosseous p-Smad1 was confirmed as a biomarker in stratifying the two subgroups. BMP-2ⁿ/Smurf1^e subgroup showed poor local bone anabolic response to rhBMP-2 during spinal fusion when compared to BMP-2^d/Smurf1ⁿ subgroup. All these results not only provided a new possible explanation underlying the large inter-individual variations in local bone anabolic potential of rhBMPs, but also demonstrated that traditional supplement of rhBMP-2 was not an efficient approach to promote local bone formation for the BMP-2ⁿ/Smurf1^e subgroup.

Further, we hypothesized that inhibition of osteoblastic Smurf1 could be a precision medicine strategy to promote bone formation in BMP-2ⁿ/Smurf1^e subgroup. By molecular docking, we identified a chalcone derivative, which effectively targeted Smurf1 for inhibition, increased BMP signaling and promoted *in vitro* osteogenic differentiation in osteoblasts from BMP-2ⁿ/Smurf1^e subgroup. Local administration of the chalcone derivative enhanced bone formation during spinal fusion in BMP-2ⁿ/Smurf1^e subgroup. To achieve osteoblast-specific accumulation of the chalcone derivative after systemic administration, we conjugated the chalcone derivative to our previously identified osteoblast-targeting oligopeptide (DSS)₆. Our *in vitro* data showed that (DSS)₆ facilitated the conjugated chalcone derivative entering osteoblasts, decreasing Smurf1 activity, increasing BMP signaling and promoting osteogenic differentiation in osteoblasts from BMP-2ⁿ/Smurf1^e subgroup. After the systemic administration, (DSS)₆ facilitated the conjugated chalcone derivative targeting osteoblasts, leading to remarkably decreased Smurf1 activity, increased BMP signaling, promoted bone formation and enhanced bone mass in BMP-2ⁿ/Smurf1^e subgroup of aged osteoporotic mice.

P584

BULLEYACONITINE A PREVENTS TI PARTICLE-INDUCED OSTEOLYSIS VIA SUPPRESSING NF-KB SIGNAL PATHWAY AND ROS GENERATION DURING OSTEOCLASTOGENESIS AND OSTEOBLASTOGENESIS

D. Hong¹, L. W. Zhang¹

¹Orthopaedic Department, Taizhou Hospital of Wenzhou Medical University, Linhai, China

Objectives: To explore the mechanism of bulleyaconitine A (BLA) in inhibiting osteoclast differentiation and promoting osteoblast mineralization.

Methods: In this study, the effects of BLA on osteoclast formation, bone resorption, osteoblast differentiation and mineralization were initially assessed *in vitro*, followed by further investigation on titanium-particle-induced osteolysis model and osteoporosis of ovariectomized rat model *in vivo*. To further explore the signaling pathways mediated by BLA during osteoclastogenesis, the effects of BLA on RANKL-activated NF-κB signaling pathway and ROS-related pathway were examined.

Results: (1) BLA inhibited RANKL-induced osteoclast differentiation, osteoclast-specific genes expression (CTSK, CTR, ACP5, V-ATPase-d2, V-ATPase-a3, NFATc1) and bone resorption in a concentration dependent manner without toxicity to BMMs, which was caused by suppressing the ROS generation and NF-κB signaling pathway. (2) BLA promoted osteoblast differentiation (alkaline phosphatase staining), mineralization (Alizarin red staining) and osteoblastic-specific genes expression (RUNX 2, COL, ALPI, Bglap, SPP1, Sparc) *in vitro*. (3) Ti particle-induced osteolysis and ovariectomy-induced osteoporosis were prevented by BLA *in vivo*.

Conclusions: These results demonstrated BLA effectively inhibited osteoclastogenesis and promoted osteoblast mineralization, prevented titanium-particle-induced osteolysis and ovariectomy-induced osteoporosis *in vivo*.

P585

TRABECULAR BONE SCORE (TBS) REFERENCE VALUES AMONG IRANIAN HEALTHY POPULATION

G. Shafiee¹, R. Heshmat¹, A. Ostovar², F. Sharifi³, I. Nabipour⁴, B. Larjani⁵

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, ⁵Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Trabecular bone score (TBS) is a recently-developed analytical tool that explores bone quality, independently of BMD. Low TBS is consistently associated with an increase in prevalent of fractures. Therefore, we need the normal range for TBS to evaluate of bone microarchitecture. The aim of this study was to estimate the reference values of TBS in both genders among the Iranian population to evaluate osteoporotic fracture in future.

Methods: A total of 691 Iranian adults aged 18-94 years participated in this cross-sectional, population-based study in Bushehr, Iran. The TBS of L1-L4 was assessed by means of TBS iNsight® software installed on our DXA machine (Discovery WI, Hologic Inc, USA). To estimate the relationship between the appendicular skeletal muscle mass (ASM) and age in both genders, we used the regression models. The best-fitted model was found using Adjusted R-squared and root MSE. After fitting the best models, the corresponding equations for the fitted curves or lines were constructed; the peak TBS and the age at which the peak TBS was observed, were estimated from the final model. Two standard deviations below the mean TBS of reference groups were as cutoff values of low TBS in Iranian population.

Results: The peak TBS scores were 1.44 ± 0.08 and 1.41 ± 0.06 , and the age at peak TBS were 18–22 years for men and women, respectively. Calculated cutoff values of low TBS among the Iranian population were 1.283 and 1.282 among men and women, respectively.

Conclusions: This is the first study that has been proposed the normal range for TBS values in both genders in the world. According to our results, $TBS < 1.28$ is considered to be degraded microarchitecture among both genders in Iranian population.

P586

ASSOCIATION OF SARCOPENIA COMPONENTS AND BONE PARAMETERS WITH RISK OF FALLING IN OLDER PEOPLE: THE BUSHEHR ELDERLY HEALTH PROGRAM

G. Shafiee¹, R. Heshmat¹, A. Ostovar², F. Sharifi³, I. Nabipour⁴, B. Larijani⁵

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, ⁵Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Aging is associated with a progressive loss of bone-muscle mass, strength and function. These geriatric conditions are named osteoporosis and sarcopenia. Osteoporosis and sarcopenia cause higher risk of falling, fractures and disability, and even death. The aim of this study was to investigate whether components of sarcopenia and bone parameters were associated with falling in older people.

Method: A total of 2426 Iranian adults aged ≥ 60 years, participating in the stage II of Bushehr Elderly Health program, a population-based prospective cohort study; were included in this study. Sarcopenia was defined as having low skeletal muscle index (< 7.0 in men and $< 5.4 \text{ kg/m}^2$ in women) with low handgrip strength ($< 26 \text{ kg}$ in men, $< 18 \text{ kg}$ in women) or low usual gait speed ($< 0.8 \text{ m/s}$). Body composition was measured by DXA. The BMD of the lumbar spine (L1–L4) and total hip are measured in a correct position.

Results: Twenty-one percent (42% men, 58% women) of total participants had at least once falling after 45 years old. The mean of skeletal muscle index (SMI) was significantly lower in fallers than non-fallers (6.14 ± 1.03 vs. $6.25 \pm 0.97 \text{ kg/m}^2$). Also, the means of usual gait speed and handgrip strength were lower in fallers than non-fallers. A significant decrease of lumbar trabecular bone score (LS-TBS) lumbar spine-BMD and femoral-BMD was observed in fallers (TBS mean: 1.28 ± 0.11 ; mean of lumbar spine-BMD: 0.88 ± 0.17 ; femoral-BMD mean: 0.83 ± 0.16). The prevalence of sarcopenia was higher in fallers than non-fallers (37% vs. 32.8%, $P=0.06$). The logistic regression models showed that with increasing of SMI, speed, strength, LS-BMD, LS-TBS and femoral-BMD, the ORs for falling reduce. The adjusted regression analysis for age, sex and BMI showed sarcopenia was a significant risk factor for falling [OR:1.315 (1.01–1.713)].

Conclusions: The present study suggested that low muscle mass, muscle function and therefore sarcopenia are risk factors for falling. Also, high bone quality and quantity can reduce risk falling in older adults.

P587

EFFECT OF UNLOADING TRACTION IN PATIENTS WITH KNEE OSTEOARTHRITIS

D. R. Khan¹

¹Rajshahi Medical College, Rajshahi, Bangladesh

Objective: Knee Osteoarthritis (OA) is the most common form of disability in comparatively elderly patient. Different modalities in physiotherapy have been shown to help improve clinical symptoms and functions of knee OA. Unloading knee traction is among those noninvasive therapies which can be applied as an adjunct to pharmacotherapy to treat osteoarthritis the patients with OA knee. Our aim was to evaluate the effectiveness of unloading traction on patients with knee osteoarthritis.

Method: A randomized prospective study was carried out in the Department of Physical Medicine & Rehabilitation, Dhaka Medical College Hospital, Dhaka, Bangladesh from January 2010 to June 2010. Patients with OA knee by ACR Criteria were selected. Two intervention groups were compared. Group-A (40 patients) in these group patients to be treated with NSAID + Short Wave Diathermy + Activities of Daily Living. Patients of Group-B were given (40 patients) Knee unloading traction along with above treatment. The change between six weeks post therapeutic and baseline WOMAC subscale and scores were calculated. Patients were followed up weekly for six weeks and in each visit, patients were assessed for pain, stiffness and physical function by WOMAC index.

Result: A total 80 patients with OA knee were included in this study. The mean age 49.72 ± 3.5 years. Male to female ratio 1.35:1. Comparison of mean pretreatment and 6th week post treatment WOMAC physical function subscale score in Group A (6.85 ± 0.92 vs. 2.15 ± 0.92) showed significant improvement and in Group B (6.45 ± 1.13 vs. 1.15 ± 0.92) which also shows significant improvement more than group A. The result was compared and student t-test was done to see the level of significance. Method was found significant after treatment ($p < 0.0001$).

Conclusion: Unloading knee traction in patients with OA knee is beneficial.

P588

ASSOCIATION OF SARCOPENIA AND ITS PARAMETERS WITH TYPE 2 DIABETES: THE BUSHEHR ELDERLY HEALTH PROGRAM

G. Shafiee¹, R. Heshmat¹, A. Ostovar², F. Sharifi³, F. Razi⁴, I. Nabipour⁵, B. Larijani⁴

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁵The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, Iran

Objective: Sarcopenia is a common problem in elderly with the adverse outcomes and characterized by progressive and generalized loss of skeletal muscle mass and muscle function. Furthermore, diabetes is a main risk factor of developing disability in elderly. It seems that metabolic diseases such as diabetes and sarcopenia have a common base and maybe

a similar pathway for the pathologic process in aging. Therefore, early detection of sarcopenia and its parameters in older adults with diabetes should be routine clinical practice to prevent adverse outcomes. The aim of this study was to associate the sarcopenia and its parameters with diabetes in older adults.

Methods: A total of 2426 Iranian adults aged ≥ 60 years, participating in the stage II of Bushehr Elderly Health program, a population-based prospective cohort study; were included in this study. According to European Working Group on Sarcopenia in Older People (EWGSOP) definition, a person who had low muscle mass as well as low muscle strength and/or low physical performance (usual walking speed) was identified as having sarcopenia. Skeletal muscle mass index (SMI) less than $<7.0 \text{ kg/m}^2$ and $<5.4 \text{ kg/m}^2$ were considered as low muscle mass among men and women, respectively. Low muscle strength was defined as grip strength $<26 \text{ kg}$ or $<18 \text{ kg}$ for men and women, respectively, and a usual walking speed $\leq 0.8 \text{ m/s}$ was defined as low physical performance for both genders. Body composition was measured by the DXA method. Logistic regression was used to calculate odds ratios and 95% CIs.

Results: The mean of hand grip was lower in subjects with diabetes than non-diabetic individuals (20.94 ± 8.51 vs. 22.77 ± 9.50 , $p < 0.001$), whereas SMI was higher in older people with diabetes 6.26 ± 0.97 vs. 6.22 ± 0.99 , $p = 0.4$). The prevalence sarcopenia was not different between diabetic and non-diabetic persons. Also, usual speed were lower in diabetes (+) than diabetes (-) ($p < 0.001$). In multivariate logistic regression analyses adjusting by age, sex, and BMI we found that elderly with diabetes exhibited significantly increased risks of sarcopenia (OR = 1.379, 95%CI = 1.105–1.720), low hand grip (OR = 1.527, 95%CI = 1.255–1.857) and low walking speed (OR = 1.465, 95%CI = 1.206–1.780) compared to non-diabetic individuals. Although diabetes alone reduces the risk of low SMI, but this effect disappears with other confounders.

Conclusions: This is the first study to evaluate the association of diabetes with the risk of sarcopenia and its parameters in Iran. Among a group of community-dwelling Iranian elderly, diabetes was significantly associated with increased risks of sarcopenia, low hand grip and low usual walking speed.

P589

IDENTIFICATION OF CANDIDATE GENES AND PROTEINS IN AGING SKELETAL MUSCLE (SARCOPENIA) USING GENE EXPRESSION AND STRUCTURAL ANALYSIS

G. Shafiee¹, Y. Asgari², R. Heshmat¹, B. Larijani³

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences,

²Department of Medical Biotechnology, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences,

³Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Sarcopenia is an age-related disease characterized by the loss of muscle mass and muscle function. Understanding of its pathogenesis and mechanisms may lead to new strategies for diagnosis and treatment of the disease. The aim of this study was to discover the underlying genes, proteins, and pathways associated with sarcopenia in both genders.

Methods: Integrated analysis of microarray datasets was performed to identify differentially expressed genes (DEGs) between old and young skeletal muscle. Gene Ontology (GO) enrichment analysis and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment analysis were then performed to uncover the functions of the DEGs.

Furthermore, the protein-protein interaction (PPI) network was constructed based on the DEGs.

Results: We have identified 41715 DEGs including 19 downregulated and 41696 upregulated DEGs in men. Among women, 3015 DEGs have been found with 2874 upregulated and 141 downregulated genes. Among the top up- and downregulated genes, the ribosome biogenesis genes and genes involved in lipid storage may be closely related to aging muscle in men and women, respectively. Also, the DEGs were enriched in pathways including those of ribosome and Peroxisome proliferator-activated receptor (PPAR) in men and women, respectively. In the PPI network, neurotrophic receptor tyrosine kinase 1 (NTRK1), Cullin 3 (CUL3) and P53 have been identified as significant hub proteins in both genders.

Conclusion: Using integrated analysis of multiple gene expression profiles, the ribosome biogenesis genes and genes involved in lipid storage would be the promising markers for sarcopenia in men and women, respectively. In the reconstructed PPI network, Neurotrophic factors expressed in skeletal muscle are essential to motoneuron survival and muscle fiber innervation during development. Cul3 is an important component of the ubiquitin-proteasome system which regulates the proteolysis. P53 is recognized as a central regulator of the cell cycle and apoptosis. These proteins which have been identified as the most significant hubs may be involved in aging muscle and sarcopenia.

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DEVELOPMENT AND VALIDATION OF SARCOPENIA SCREENING MODEL FOR OLDER PEOPLE: THE BUSHEHR ELDERLY HEALTH PROGRAM

G. Shafiee¹, R. Heshmat¹, A. Ostovar², A. Keshtkar³, I. Nabipour⁴, B. Larijani⁵

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Department of Health Sciences Education Development, School of Public Health, Tehran University of Medical Sciences, Tehran, ⁴The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, ⁵Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Sarcopenia is an important age-related disease with the loss of muscle mass and function. There is a need for screening and early detection of sarcopenia for intervention and prevention of adverse outcomes; however, current diagnostic methods for sarcopenia are not practical for clinical practice or screening usage. The aim of this study was to develop and validate a simple screening model to identify sarcopenia in older adults.

Methods: A total of 2211 Iranian adults aged ≥ 60 years, participating in the stage II of Bushehr Elderly Health program, a population-based prospective cohort study; were included in this study. According to European Working Group on Sarcopenia in Older People (EWGSOP) definition, usual gait speed, handgrip strength and appendicular skeletal muscle mass were assessed to determine sarcopenia. Body composition was measured by DXA. Anthropometric measurements were obtained using standard protocols. The study sample was randomized into development ($n=1499$) and validation ($n=712$) sets of models. Logistic regression analysis was performed on the development set and the scoring models were developed and tested in validation set in both genders.

Results: The prevalence of sarcopenia was 34.1% and 29.4% among men and women, respectively. After the parameter selection procedure, the

simple models named SarSA-Mod (Sarcopenia Scoring Assessment Models) were developed with area under curve (AUC) of 0.887 (95%CI: 0.859-0.914) and 0.852 (95%CI:0.823-0.881) in men and women, respectively. Using a cutoff of -75.00 for the men's model (age, weight, handgrip strength, and calf circumference), the sensitivity, and specificity were 81.15%, 83.33%, respectively. In women, the final model including weight, handgrip strength, and calf circumference, the sensitivity, specificity were 80.09% and 72.69%, respectively by using cut-off -64.00. The model performance was tested in the validation set. Accuracy of SarSA-Mod was 80.12% among men with sensitivity and specificity of 83.20% and 78.30%, respectively. Among women, the accuracy was 80.12% with sensitivity and specificity of 86.12% and 75.53%, respectively.

Conclusion: SarSA-Mod, as a simple screening test, could detect sarcopenia in older adults with acceptable accuracies among both genders. In addition, this model is feasible, Independent of doing DXA and cost-effective compared to other screening methods.

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ASSOCIATION BETWEEN LOW VITAMIN D LEVEL AND GLYCEMIC CONTROL

K. Aldossari¹, M. Aljowair, T. Alqahtani, S. Al-Shiprain¹, A. Alshehri¹, A. Gulpham¹

¹Prince Sattam Bin Abdulaziz University, Kharj, Saudi Arabia

Objective: Vitamin D is an essential micronutrient and have important role to human health. Low level of vitamin D is one of the major problem around the world as well as diabetes mellitus.

Our main aim in this study to assess the association between low level of vitamin D and glycemic control.

Methods: This cross-sectional study included patients with proven vitamin D deficiency who visited Prince Sattam Bin Abdulaziz University Hospital at Al-Kharj city between 1 Jan 2015 and 1 Dec 2015. We reviewed the patients files and include patients with diabetes. In all patients, vitamin D level, hemoglobin A1c level, fasting blood sugar, lipid profile, Ca, liver and renal functions and hemoglobin were measured.

Results: We identified 1200 patients with vitamin D deficiency, of those 200 patients (16.7%) were diabetic. More women had vitamin D deficiency and DM compared to males. HbA1c ranged between (5.02-15.71%) with mean of HbA1c for males was 7.16 ± 1.8 and for female was 6.98 ± 2.07 ($P=0.54$). Vitamin D levels ranged between (3.91-47.92 ng/ml) the mean of vitamin D for males was 20.54 ± 7.88 and for females was 20.08 ± 9.19 ($P=0.7$). A significant inverse correlation was detected between vitamin D and HbA1c.

Conclusion: Vitamin D deficiency is frequent among diabetic patients. In patients with diabetes whether controlled or not it is recommended to measure vitamin D levels and provide vitamin D supplementation.

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OSTEOPOROSIS CARE GAP FOLLOWING FRAGILITY FRACTURES

J. F. Leong¹, M. Unal², D. Khairon¹, M. A. Mohd-Arif¹, M. K. Yin², S. A. Mokhtar¹

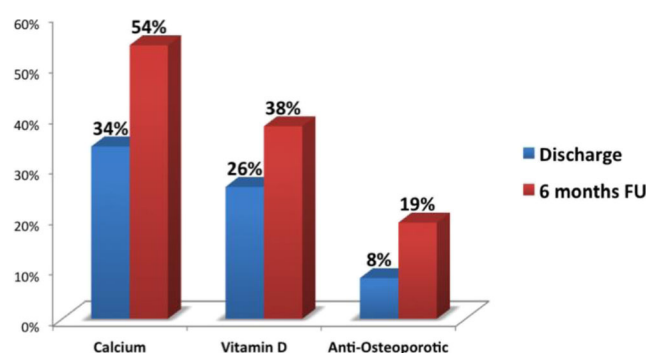
¹University Kebangsaan Malaysia Medical Centre, Orthopaedic and Traumatology Department, ²University Kebangsaan Malaysia Medical Centre, Pharmacy Department, Bandar Tun Razak, Malaysia

Objective: Fragility fracture is a growing public health issue that leads to high morbidity and mortality. Patients who sustain an osteoporotic

fracture are at increased risk of sustaining another fracture hence efforts are directed towards secondary fracture prevention. The aim of this study was to identify osteoporosis care gap in patients admitted with fragility fractures in a tertiary university hospital at Malaysia.

Methods: Patient admitted to a tertiary care hospital with fragility fractures were identified from the admission registry from January 2016 to December 2016. The demographic data and drug prescriptions related to osteoporosis treatment were obtained upon discharged and within 6 months since diagnosed with fragility fractures.

Results: A total of 207 patients (85 male and 122 female) were identified with fragility fracture. Majority sustained hip fractures ($n=141$, 68%), followed by vertebrae fractures ($n=43$, 20%) and wrist fracture ($n=23$, 11%). Patients were prescribed with calcium ($n=70$, 34%) and vitamin D ($n=53$, 26%). Only 17 (8%) patients were given anti-osteoporotic drugs upon discharge but this increases to 40 (19%) within 6 months as they were prescribed as outpatients.



Conclusion: Fragility fractures and osteoporosis care gap is an international phenomenon as described by Giangregorio L. et al (1). Many studies have shown, only about 20% of osteoporotic fracture patients receive an assessment and treatment for osteoporosis (2). This corresponds to our finding where only 19% of patients were treated with anti-osteoporotic drugs within 6 month since diagnosed with fragility fractures. A multidisciplinary team approach is recommended to manage patients suffering from fragility fracture for evaluation and intervention to prevent secondary fracture. Thus the implementation of fracture liaison service (FLS), which has shown better follow up of patients with osteoporosis and improved treatment, hence fracture risk reduction. International Osteoporosis Foundation believes this service is the most important thing that can be done directly to improve patient care and reduce spiraling fracture-related healthcare costs worldwide. Persistent care gap exists for people suffering fragility fractures caused by osteoporosis. Improvement in after fracture care can be achieved by implementing a FLS program in the hospital setting.

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PHYSICAL ACTIVITY AND QUALITY OF LIFE AMONG OLDER ADULTS WITH SEVERE KNEE OSTEOARTHRITIS

N. Saengthon¹, A. P. D. Aree-Ue², D. R. Youngcharoen²

¹Faculty of Medicine Ramathibodi Hospital, ²Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

Objective: To describe physical activities and quality of life among older adults with severe knee osteoarthritis.

Methods: Guided by International Classification of Functioning, Disability, and Health Framework, purposive sampling was used in this study. The 81 older adults (age 60 years old and over) with severe knee osteoarthritis scheduled for total knee replacement surgery were enrolled in this study. Before getting surgery, participants were asked to complete the demographic and health information questionnaire; the modified Barthel activities of daily index; and the osteoarthritis of knee hip quality of life questionnaire. Data were analyzed using descriptive statistic.

Results: The mean age of participants was 70 years old (range 60–89 years). Most of them (91.36%) have had comorbidities, including hypertension, diabetic mellitus, dyslipidemia and coronary artery disease. The mean of BMI was 27.74 (SD=3.87), indicating that they have had pre-obesity condition. For their physical activities, the mean score was 16.30 (SD=2.28), showing that they had good physical activities. In addition, participants' quality of life score was 58.67 (SD=11.77), which was moderate score on their quality of life.

Conclusion: Findings from this study sheds light on a need of physical activity and quality of life assessment among older adults prior to surgery. These information will provide healthcare personnel to understand the older adults' health who have faced with chronic pain and physical limitation and to plan for better improving their physical activity and quality of life after surgery.

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FACTORS INFLUENCING PAIN AND DISABILITY IN ELDERLY PATIENTS WITH KNEE OSTEOARTHRITIS

D. R. Youngcharoen¹, A. P. D. Aree-Ue¹, M. Saraboon²

¹Ramathibodi school of nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, ²Boromarajonani College of Nursing, Nakhon Panom, Nakhon Phanom University, Nakhon Phanom, Thailand

Objectives: Among osteoarthritis patients, pain catastrophizing, pain-related fear, social support, and self-efficacy, were associated with patients' pain and disability. However, there is no study examining direct and indirect effect of these factors on elderly patients with knee osteoarthritis health status. Understanding elderly people with knee osteoarthritis health status and its significant predictors were helpful to develop the interventions to improve health status for these patients. The aim of this study was to examine a causal model of health status (pain and disability) among Thai older adults with knee osteoarthritis.

Methods: A cross-sectional, correlational design was used with a convenience sample of 277 Thai elderly with knee osteoarthritis living in northeastern part of Thailand. Participants were asked to complete a demographic questionnaire, the Pain Catastrophizing Scale, the Tampa Scale of Kinesiophobia, The Medical Outcomes Study Social Support Survey, and the Arthritis Impact Measurement Scales 2-Short Form. Structural Equation Model was used to examine a hypothesized model.

Results: Using the chi-square, hypothesized model was statistically nonsignificant ($\chi^2=0.127$; $df=1$; $p=0.722$). A model of health status fitted with the empirical data and explained 11% of variance. For direct effect, pain catastrophizing and social support had negative direct effect on self-efficacy ($\beta=-0.149$, $p=0.008$; $\beta=-.354$, $p=0.000$, respectively). Self-efficacy and social support also had positive direct effect on health status ($\beta=0.180$, $p=0.003$; $\beta=0.227$, $p=0.000$, respectively). In addition, pain catastrophizing

had negative direct effect on health status ($\beta=-0.199$, $p=0.001$). For indirect effect, pain catastrophizing and social support had negative indirect effect on self-efficacy ($\beta=-0.027$, $p=0.049$; $\beta=-.063$, $p=0.010$, respectively). However, pain-related fear had no direct and indirect effect on health status.

Conclusions: Lower level of pain catastrophizing and social support can improve self-efficacy. Increasing of self-efficacy can then lead to improvement on health status. The nursing implication from this study is to develop a program to minimize pain catastrophizing and to promote self-efficacy to improve older adults with knee osteoarthritis' health status.

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BETWEEN-PERSON & WITHIN-PERSON ASSOCIATIONS OF PHYSICAL ACTIVITY AND LEG STRENGTH WITH KNEE CARTILAGE VOLUME LOSS OVER 10.7 YEARS IN OLDER ADULTS

I. P. Munugoda¹, S. Balogun¹, K. Wills¹, F. Cicuttini², G. Jones¹, M. L. Callisaya¹, D. Aitken¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart,

²Department of Epidemiology and Preventive Medicine, Monash University Medical School, Melbourne, Australia

Objective: The relationship between physical activity (PA) and osteoarthritis (OA) between individuals (between-person comparison) has been controversial. Yet, how the variability in PA and/or strength over time within the same individual (within-person comparison) is associated with OA has not been well studied. Therefore, this study aims to investigate the associations of between-person and within-person variability in PA and leg strength with knee cartilage volume loss over 10.7 years in older adults.

Methods: 479 community-dwelling older adults (50% female, mean age 61 ± 6 years) were studied at baseline, 2.7, 5.1, and 10.7 years. PA (measured objectively as steps/day) and leg strength (measured objectively in kg) were assessed at all four time-points. Knee cartilage volume was measured using MRI at baseline and 10.7 years. Linear mixed-effect regression models were used to estimate the association of between-person and within-person variability in PA and leg strength with cartilage volume loss over 10.7 years. Models were adjusted for age, sex, BMI and history of knee injury or surgery. To account for missing data, weighted estimating equation methods were used.

Results: Mean cartilage volume loss over 10.7 years was 460 ± 217 mm³. No between-person associations existed between PA and cartilage volume loss (β 19.3 per 1000 steps/day, 95%CI -5.6, 44.2). However, within-person variability in PA was protectively associated with cartilage volume change, such that having higher PA compared to an individual's average PA, minimized their cartilage volume loss over time (β 32.2 per 1000 steps/day, 95%CI 20.4, 43.9). Between-person effects showed that participants with greater leg strength lost less cartilage volume over time (β 5.4 per 1 kg, 95%CI 3.0, 7.7). Within-person variability in leg strength was also protectively associated with cartilage volume change, such that having higher leg strength compared to an individual's average strength minimized their cartilage volume loss over time (β 3.3 per 1 kg, 95%CI 2.1, 4.5).

Conclusions: The implication of this unique analysis method demonstrates that individuals can minimize cartilage volume loss by increasing their own PA and strength, which supports the clinical recommendations of promoting PA and strength to prevent and treat OA.

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SOCIOECONOMIC INEQUALITY OF SARCOPENIA IN IRAN: BUSHEHR ELDERLY HEALTH PROGRAMR. Heshmat¹, G. Shafiee¹, A. Ostovar², F. Sharifi³, I. Nabipour⁴, B. Larjani⁵

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, ⁵Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Sarcopenia is a common problem in elderly characterized by low muscle mass and function. The prevalence of sarcopenia increases rapidly and it is associated with the adverse outcomes. Although social inequalities in health have been recognized for centuries but it is unknown in sarcopenia. The aim of this study was to investigate the socioeconomic inequality of sarcopenia among the Iranian older people.

Methods: A total of 2426 adults aged ≥ 60 years, participating in the stage II of Bushehr Elderly Health program, a population-based prospective cohort study; were included in this study. Sarcopenia was defined as having low skeletal muscle index (<7.0 in men and <5.4 kg/m² in women) with low handgrip strength (<26 kg in men, <18 kg in women) or low usual gait speed (<0.8 m/s). Socioeconomic status was measured by an asset index, constructed using principal component analysis, income, education level, and employment status. The Concentration Index and the Lorenz curve were used to illustrate the levels of inequality for sarcopenia.

Results: The prevalence of sarcopenia was 794 (33.5%). The results of study showed that the sarcopenia are more prevalent among the poorer socioeconomic status. The overall concentration index for sarcopenia was -0.096 (95%CI=-0.134 -0.064, $P<0.001$). The largest contributions to inequality in sarcopenia were owing to age (51.1%) and economic status (45.2%).

Conclusions: It was concluded that socioeconomic status plays an important role in happening sarcopenia among Iranian older people. It seems to be necessary a focus on reducing the economic inequalities among sarcopenic people in Iran.

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CESSATION OF STATIN MEDICATION IS ASSOCIATED WITH INCREASED INTRA-MUSCULAR FAT AND DECREASED LEAN MUSCLE PERCENTAGE OVER 10.7 YEARS IN OLDER-ADULTSI. P. Munugoda¹, G. Jones¹, D. Scott², K. Wills¹, F. Abram³, J.-P. Pelletier⁴, J. Martel-Pelletier⁴, F. Cicuttini⁵, D. Aitken¹, M. L. Callisaya¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart, ²Department of Medicine, School of Clinical Sciences at Monash Health, Faculty of Medicine, Nursing and Health Sciences, Monash University, Clayton, Melbourne, Australia, ³Medical Imaging, ArthroLab Inc, Montreal, ⁴Osteoarthritis Research Unit, University of Montreal Hospital Research Centre (CRCHUM), Montreal, Quebec, Canada, ⁵Department of Epidemiology and Preventive Medicine, Monash University Medical School, Melbourne, Australia

Objective: The risks and benefits of statins have been debated due to mixed evidence of their effects on skeletal muscle. This study aimed to

examine longitudinal associations between statin use and change in the proportion of thigh intra-muscular fat, lean muscle, muscle cross-sectional area (CSA) and muscle strength in community-dwelling older adults over 10.7 years.

Methods: 733 older adults (49% women, mean age 62.6 ± 7.3 years) were included in this study. Using 1.5T machines, MRI scans were taken at baseline and 10.7 years and fat%, lean% and CSA of vastus medialis muscle were measured. Muscle strength of hip and knee extensors was assessed using a dynamometer at 4 time-points (baseline, 2.6, 5.1 and 10.7 years). Statin use was recorded at each time-point, and classified into four groups (no use; prior use – use at any of the first 3 time-points; recent use – use at the last time-point; and continuous use - use at all 4 time-points). Linear mixed-effects models were used to estimate the association between statin use and muscle measures, adjusting for age, sex, height, physical activity and socio-economic status. To account for missing data, multiple imputation and weighted estimating equation methods were used assuming that the data were ‘missing at random’.

Results: 222 (31%) participants were taking statins at baseline. Prior statin use, but not recent or continuous use, was associated with an increase in the proportion of intra-muscular fat% (β 1.09, 95%CI 0.09, 2.08; $p=0.032$) and a decrease in the proportion of lean muscle% (β -1.09, 95%CI -2.08, -0.09; $p=0.032$) over 10.7 years, compared to those who had never taken statins. Prior, recent or continuous use categories were not associated with CSA or muscle strength, compared to no use.

Conclusion: Our results do not support the suggestion that statin use has harmful effects on muscle composition or strength. Rather, cessation of statin medication was associated with detrimental effects on muscle including increased intra-muscular fat infiltration and decreased lean proportion.

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ASSOCIATION OF OSTEOSARCOPENIA WITH CARDIOMETABOLIC RISK FACTORS IN OLDER PEOPLE: BUSHEHR ELDERLY HEALTH PROGRAMR. Heshmat¹, G. Shafiee¹, A. Ostovar², F. Sharifi³, F. Razi⁴, I. Nabipour⁵, B. Larjani⁴

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, Tehran, Iran, ⁵The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, Iran

Objective: The combination of sarcopenia and osteopenia/osteoporosis show a high prevalence and further adverse outcomes in old age. However, the particular clinical characteristics, and risk factors of osteosarcopenia (OS) are still unknown. The aim of this study is to investigate the relationship between OS and cardiometabolic risk factors in the Iranian elderly.

Methods: A total of 2426 Iranian adults aged ≥ 60 years, participating in the stage II of Bushehr Elderly Health program, a population-based prospective cohort study; were included in this study. Sarcopenia was defined as having low muscle index (<7.0 in men and <5.4 kg/m² in women) with low handgrip strength (<26 kg in men, <18 kg in women) or low usual gait speed (<0.8 m/s). Body composition was measured by DXA.

Subjects were divided into 3 groups: 1) nonsarcopenia-nonosteopenia (normal), 2) sarcopenia /osteopenia (BMD<-1.0 SD or sarcopenia), 3) sarcopenia + osteopenia (OS). Metabolic syndrome (Mets) was defined based on the adult Treatment Panel III (ATP III) criteria. Moreover, high total cholesterol, high low-density lipoprotein cholesterol (LDL), hypertension (HTN), high total triglycerides (TG), abdominal obesity (high waist circumference), high fasting blood glucose (FBG), and low high-density lipoprotein cholesterol (HDL) were included as other cardiometabolic risk factors.

Results: High LDL significantly increased risks of sarcopenia /osteopenia and OS compared to normal individuals. Also, after adjusted by age, sex, fat mass, physical activity, smoking and education this association significantly remained [OR=1.28(1.01-1.62) for sarcopenia / osteopenia and OR=1.42(1.01-2.0) for OS. High total cholesterol and abdominal obesity significantly increased risks of sarcopenia / osteopenia and OS in crude models. However in full models these associations were not significant. High FBG, HTN, Mets and high TG had relatively strong inverse association with sarcopenia / osteopenia and OS in all models.]

Conclusions: This study provides evidence that high LDL, hypercholesterolemia and abdominal obesity increase risk of osteosarcopenia. However, hyperglycemia, hypertriglycerides and Mets are protective factors for osteosarcopenia.

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ASSOCIATION BETWEEN METABOLIC SYNDROME AND MUSCLE HEALTH, QUALITY AND QUANTITY OF BONE: THE BUSHEHR ELDERLY HEALTH PROGRAM

R. Heshmat¹, G. Shafiee¹, A. Ostovar², F. Sharifi³, F. Razi⁴, I. Nabipour⁵, B. Larjani⁴

¹Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁵The Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, Iran

Objective: Metabolic syndrome (MetS) is a multiplex risk factor consisting of central obesity, hyperglycemia, hypertension, and dyslipidemia, in which each acts on bone and muscle tissue in different ways. The trabecular bone score (TBS) is a recently introduced non-invasive tool which indirectly assesses bone quality and fracture risk independently of the BMD. The aim of this study was to associate BMD, TBS, and sarcopenic parameters with Mets in older adults.

Methods: A total of 2426 Iranian adults aged ≥ 60 years, participating in the stage II of Bushehr Elderly Health program, a population-based prospective cohort study, were included in this study. MetS was defined using the ATPIII criteria. According to European Working Group on Sarcopenia in Older People (EWG SOP) definition, a person who had low muscle mass as well as low muscle strength and/or low physical performance (usual walking speed) was identified as having sarcopenia. Skeletal muscle mass index (SMI) $< 7.0 \text{ kg/m}^2$ and $< 5.4 \text{ kg/m}^2$ were considered as low muscle mass among men and women, respectively. Low muscle strength was defined as grip strength $< 26 \text{ kg}$ or $< 18 \text{ kg}$ for men and women, respectively, and a usual walking speed $\leq 0.8 \text{ m/s}$ was defined as low physical performance for both genders. The BMD of

lumbar spine (L1-L4), femoral neck and body composition were measured by the DXA method. The quality of bone tissue (TBS L1-L4) was assessed by the TBS iNsight[®] software package installed on DXA machine. Logistic regression was used to calculate odds ratios and 95% CIs.

Results: Lumbar spine TBS (L2-L4) was lower in subjects with the Mets than non-Mets individuals (1.280 ± 0.11 vs. 1.32 ± 0.10 , $p < 0.001$), whereas lumbar spine T-score was higher in older people with the Mets (-1.43 ± 1.54 vs. -1.66 ± 1.58 , $p < 0.001$). Also, femoral neck T-score was different between the Mets (+) and the Mets (-) individuals. We found significantly more fat mass (28.56 ± 7.28 vs. 22.35 ± 7.52 , $p < 0.001$) and SMI (skeletal muscle mass/height²) [$6.29 \pm 0.10 \text{ kg/m}^2$ vs. $6.16 \pm 0.97 \text{ kg/m}^2$, $p = 0.001$] in individuals with Mets as compared to without Mets, respectively. Mean Hand grip and usual speed were also lower in the Mets (+) than the Mets (-) ($p < 0.001$). The logistic regression analysis showed that the presence of Mets and other confounders (sex, age,) was associated with an increase of OR for TBS (aOR=1.386, 95% CI=1.141-1.683, $p < 0.001$). The adjusted odds ratio (aOR) for abnormal BMD was significantly reduced in the Mets (+) (aOR=0.731, 95% CI=0.583-0.918). Also, ORs for low hand grip (1.248, 95% CI=1.062-1.465, $p = 0.0073$) and low physical performance (1.723, 95% CI=1.465-2.026, $p < 0.001$), two parameters of sarcopenia, were significantly different between Mets (+) and Mets (-). Similar to abnormal BMD, a reduction of OR for sarcopenia (OR=0.521, 95% CI=0.438-0.619, $p < 0.001$) and low SMI (OR=0.308, 95% CI=0.260-0.364,) were in people with the Mets.

Conclusion: The presence of the metabolic syndrome increases the risk of low TBS, Low HG and low physical performance even with other confounders. Mets may be a predictor for sarcopenia, low BMD and low SMI.

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ASSOCIATIONS OF HIP SHAPES WITH KNEE OSTEOARTHRITIS OUTCOMES OVER 10.7 YEARS IN OLDER-ADULTS

I. P. Munugoda¹, H. G. Ahedi¹, R. M. Aspden², K. Wills¹, S. E. Graves³, M. Lorimer⁴, F. Cicuttini⁵, J. S. Gregory², G. Jones¹, M. L. Callisaya¹, D. Aitken¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia, ²Aberdeen Centre for Arthritis and Musculoskeletal Health, Institute of Medical Sciences, University of Aberdeen, Forest hill, Aberdeen, UK, ³Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Adelaide, South Australia, ⁴South Australian Health and Medical Research Institute (SAHMRI), Adelaide, South Australia, ⁵Department of Epidemiology and Preventive Medicine, Monash University Medical School, Melbourne, Australia

Objective: To identify the relationship between hip morphology and MRI-based and clinical osteoarthritis outcomes in knee, over 10.7 years in older-adults.

Methods: 377 community-dwelling older-adults aged 50–80 years were studied. At baseline, DXA images of the left hip were obtained and hip shapes were described using mode scores from an 85-point statistical shape model. MRI scans were conducted at baseline and approximately 10.7 years later, to assess right knee tibial cartilage volume and bone-marrow lesions (BMLs). Knee pain was assessed using WOMAC Index. Knee replacement (KR) data were obtained by data linkage to the Australian Orthopaedic Association National Joint Replacement Registry. Linear mixed-effects, log-binomial models and survival analysis, were used to investigate associations between hip shape modes and change in cartilage volume, incident BMLs, worsening knee pain and left KR respectively, adjusting for potential confounders.

Results: Ten hip shape modes were selected, describing 78% of the total shape variance in descending order from mode 01 (31% variance) to mode 10 (1.82% variance). Hip shapes with larger greater trochanter (mode 07) were associated with a lower knee cartilage volume loss (β :2.14, 95%CI:0.07,4.21), while shorter and narrower femoral neck (mode 09) was related with an increased volume loss (β :-3.86, 95%CI:-6.16,-1.56). Nonspherical femoral head (mode 04) was associated with an increased risk of incident BMLs (RR:1.19, 95%CI:1.07,1.34). Those with longer, wider femoral neck and larger femoral head (mode 01) had an increased risk of worsening knee pain (RR:1.33, 95%CI:1.09,1.61), whereas those with a smooth curving upper femoral neck (mode 09) had a lower risk of knee pain (RR:0.78, 95%CI:0.67,0.90). Larger greater trochanter and wider femoral neck (mode 08) was associated with an increased risk of KR (RR:1.73, 95%CI:1.18,2.52), while minimum variations in these shapes (mode 10) were associated with a lower risk of KR (RR:0.54, 95%CI:0.36,0.8).

Conclusions: Hip shape variations were associated with significant MRI-based and clinical outcomes in knee over 10.7 years, possibly due to biomechanical, lifestyle or other factors related to both joints. These suggest that hip shapes may play an important role in the onset and progression of knee osteoarthritis over time.

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EVALUATION OF REASONS FOR REFERRAL OF OSTEOPOROSIS FROM PRIMARY TO SPECIALISED CARE

N. Galofre¹, C. Castaño¹, A. Ballesteros², J. C. Sahuquillo¹, R. Benitez², G. Tolchinsky², M. Castellanos², J. Vila²

¹Hospital Municipal Badalona, ²Hospital Municipal de Badalona, Badalona, Spain

Objective: Osteoporosis is a disease mainly detected and treated by GPs (primary care). The referral to a specialised unit depends on several criteria: secondary osteoporosis, bone fractures, unsatisfactory response to treatment (according to Spanish guides for GPs, SEMFYC 2014). However, new recommendations about the use of bisphosphonates may have modified those criteria. We analyse the reasons for referral to our osteoporosis unit belonging to the district hospital of Badalona, in charge of 120000 inhabitants distributed in seven primary care centers.

Methods: We reviewed 50 patient referrals due to osteoporosis for specialised advice, either to Rheumatologist appointment or to an specific osteoporosis consultation ruled by an Internist. The variables collected were: age; gender; primary care area; risk factors for bone fracture; densitometric parameters; FRAX score; reasons for referral (changes in DXA, treatment review, secondary osteoporosis, oncological protocol, other reasons); medical tests (DXA, DXA & vitamin D; DXA & vitamin D & PTH; DXA & Rx backbone); bone fractures, other reasons; delay until specialised visit.

Results: 27 patients (54%) were visited by the Internal Medicine expert and 23 (46%) by the Rheumatologist. The average age was 66.32 years (67.44 & 65, respectively). Women 92%. In 26% of cases any risk factor was found, 60% had 1, 12% had 2 and 2% had 3 risks factors. The most frequent risks were: have a previous fracture (38%), early menopause, history of parental femur fracture (18%), osteopenic drugs -none corticoids- (6%), BMI<20 (4%), smoking (4%), osteopenic diseases (2%). According to DXA: osteoporosis criteria in lumbar spine (75%) and in femoral neck (42%). The average FRAX in major fracture was 6.47% (40% with FRAX >10%) and the average for femur fracture 3.722% (36% with FRAX >3%). Most patients were referred for adjustment of their current treatment (64%), some others for evaluation of DXA results (16%). GPs asked only for DXA in 50% of patients, although in other

20% they added vitamin D & PTH. The delay until specialised visit was 100.06 days overall (64.22 for internal medicine expert, 142.13 for rheumatologist). Limitations: Data recovery came from medical reports, so some variables such as risks factors & FRAX score were difficult to reliably check.

Conclusions: 1) Adjustment of treatment was the main reason for referral. 2) DXA is the principal test use by GPs for the study of osteoporosis. 3) Fragility fractures shouldn't be disregarded (38%) in this group of age. 4) A high percentage of patients are eligible for specific osteoporosis treatment according FRAX (40% >10% in major fracture).

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CELIAC DISEASE IN THE PRACTICE OF A CENTER FOR OSTEOPOROSIS

S. Mazurenko¹, L. Ermolaeva²

¹Saint Petersburg State University, ²Saint Petersburg State University, Saint Petersburg, Russia

Celiac disease, or gluten-sensitive enteropathy, is a chronic disorder of the small intestine that results in an inability to tolerate gliadin, which is a component of gluten, a protein present in wheat and some cereal. It is not a rare disease, affecting up to the 1% of the population in some countries. Diagnosis is usually established early in the life of patients. We analyzed 5 cases of the patients older than 50 years with celiac disease first diagnosed in the center for osteoporosis. All patients were women with a history of weight loss, iron deficiency anemia and kyphoscoliosis due to multiple vertebrae fractures. BMD measurements at the lumbar spine showed a T-score lower than -5.0, one 62 year old woman had so low hip BMD that DXA with Hologic Discovery W could not analyse it. Two women had a history of cramps due to hypocalcemia and edema due to hypoalbuminemia. All analyzed women had secondary hyperparathyroidism, high alkaline phosphatase level and very low level of 25-hydroxyvitamin D. Only one 54 years old woman was bedridden due to muscle weakness and bone deformity. 4 women had serological test positive for antibodies against gliadin, endomysium, transglutaminase. One woman had negative serological tests. Diagnosis was confirmed by duodenal biopsy and positive effect of a gluten-free diet.

All described patients were followed for many years, by different specialists, however the correct diagnosis was established only when they were directed to the centre for osteoporosis. Only one woman had symptoms of irritable bowel syndrome. A late diagnosis of the disease has led to serious complications. Celiac disease must be suspected in every patient with a history of weight loss, iron deficiency anemia, hypocalcemia and very low BMD. Serological tests and duodenal biopsy must be performed if necessary.

P603

CONFLICT IN CARDIOVASCULAR AND BONE HEALTH INDICATORS IN POSTMENOPAUSAL WOMEN

C. Prado¹, D. Navarro², M. Díaz-Curiel³

¹University Autonoma of Madrid, Department of Biology, Sciences Faculty, Madrid, ²Facultad Fajardo, Universidad de Ciencias Médicas de La Habana, Havana, ³Hospital Jimenez-Díaz, Madrid, Spain

Objective: Whereas the BMI as an indicator of cardiovascular risk, seeks to examine situation of bone degeneration according with OMS weight categories in a cohort of postmenopausal women to know health situation according bought parameters.

Method: Cross-sectional study made with 800 women, residing in Madrid (Spain) with age equal or >65 years old, who had not received TSH for 5 years now. The study was conducted at Foundation Jimenez-Diaz in Madrid, following Helsinki bioethical guidelines. Anthropometric survey was made according with IBP recommendations and OMS categories of weight were used. The quality of bone was assessed by DXA at lumbar spine (L3-L4) (LS), trochanter and femur head (hip).

Results: The mean values of BMI was 26.92 ± 4.08 and mean fat percentage was 37.78 ± 6.04 . According with weight categories, women sample was: underweight 1.5%, normal weight (27.8%), overweight (48.5%) and obesity (22.2%). In relation with bone situation, the average of BMD was 0.7153 ± 0.12 , LS T-score was 2.5243 ± 1.08 and hip T-score was -2.0706 ± 0.84 . The bone situation in each of the weight categories is summarized in the following Table.

BMI categories	BMI <18.9	BMI 19-24.9	BMI 25-29.9	BMI ≥ 30
T-score LS	-4.2667	-2.7793	-2.4876	-2.4534
T-score Hip	-3.5000	-2.3225	-2.2438	-1.6989

Booth, BMI and fat percentage have statistical significant correlations with total BMD ($r=0.373$ and 0.298 ; $p<0.05$).

Conclusion: In postmenopausal women situations of overweight and obesity considered as not desirable at cardiovascular profile shows the highest quality of bones in special at hip level. Low weight at this women age constituted an important risk factor in bone structure and fracture with range values of osteoporosis.

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ASSOCIATION BETWEEN PROTEIN INTAKE WITH FRAILTY IN ELDERLY WOMEN: KUOPIO OSTPRE- FRACTURE PREVENTION STUDY

M. I. Isanejad¹, J. S. Sirola¹, T. R. Rikonen¹, J. M. Mursu², H. K. Kröger³, S. L. Q. Qazi Latif⁴, M. T. Tuppurainen⁴, A. E. Erkkilä⁵

¹Kuopio Musculoskeletal Research Unit, University of Eastern Finland,

²Institute of Public Health Nutrition, Kuopio, Finland, ³Department of Orthopaedics and Traumatology, Kuopio University Hospital,

⁴Department of Obstetrics and Gynaecology, Kuopio University Hospital, ⁵Institute of Public Health and Clinical Nutrition, University of Eastern Finland, Kuopio, Finland

Objectives: A protein intake ≥ 1.1 g/kg body weight (BW) is suggested to maintain physical capacity in the elderly in the Nordic Nutrition recommendation (NNR) (2012). However, no study has examined the effect of the protein intake ≥ 1.1 g/kg BW on frailty. We evaluated associations between protein intake, and sources of protein intake, animal protein (AP) and plant protein (PP) with frailty.

Methods: Participants were 440 women aged 65-72 years belonging to Osteoporosis Risk Factor and Prevention – Fracture Prevention Study. Protein intake g/kg BW was calculated using 3-day food record. Frailty phenotype was defined as the presence of at least three and prefrailty as the presence of one or two of the Fried criteria: low grip strength <22.2 kg, low walking speed <0.51 m/s, low physical activity <3 h/week, weight loss $>5\%$ of BW, and exhaustion. The association between protein intake, AP and PP with frailty and prefrailty was examined in multinomial regression models adjusting for demographics, chronic conditions, and total energy intake.

Results: Subjects with protein intake ≥ 1.1 g/kg BW had a lower risk of prefrailty ($n=206$) (OR=0.08 and 95%CI=0.01-0.73) and frailty ($n=36$)

(OR=0.08 and CI=0.01-0.72) compared to those with protein intake <1.1 g/kg BW. Women in the higher tertiles of AP (P for trend=0.040), but not PP had lower prevalence of frailty.

Conclusions: Recommended protein intake by NNR (2012) and higher intake of AP can be beneficial to prevent the onset of frailty in elderly women.

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MINERAL BONE DENSITY (BMD) AND CARDIOVASCULAR RISK DEPENDING ON THE BIOLOGY OF TELOMERES IN POSTMENOPAUSAL WOMEN

I. Skripnikova¹, N. Alikhanova¹, V. Novikov¹, L. Murashko¹, E. Abirova¹

¹National Medical Research Center for Preventive Medicine of the Ministry of Healthcare of the Russian Federation, Moscow, Russia

Objective: To study the association between BMD and cardiovascular risk (CVR) depending on telomere length (TL) and telomerase activity (TA).

Methods: 107 patients were included in a cross-sectional study - women 45-82 years who were observed outpatient and signed a written informed consent. The study excluded patients with any clinical manifestations of atherosclerosis, diseases causing secondary osteoporosis, malignant diseases, drugs affecting bone turnover consumption. The lumbar spine and hip BMD measured by DXA (Delphi W, Hologic, USA). Assessment of CVR performed using the electronic version of the scale SCORE for countries with a high risk. The telomere DNA in the genome was estimated in leukocytes by the real-time PCR. The highest tertile of TL distribution (≥ 0.0 kbs) was ranked as a "longest", the lowest tertile (<9.50 kbs) was regarded as "the shortest". Determination of TA was carried out on pure monocyte fraction isolated blood cells on the basis of telomerase polymerase reaction. TA median was -0.5% .

Results: An increased CVR (SCORE >2) was determined in 54% of patients. Osteoporosis was observed more frequently in women with higher CVR, while the normal BMD in women with lower CVR ($p<0.001$). The frequency of osteopenia in the groups was not significantly different. Short telomeres were founded 3 times more frequently in women with increased CVR (36.9% vs. 10.8, $p<0.001$), while long telomeres predominated in women with lower CVR (10.1% vs. 27.1, $p<0.05$). TL median in patients with 2 or more cardiovascular risk factors were less compared to the patients with 0 or 1 risk factors (9.5 ± 0.05 vs. 9.8 ± 0.05 , $p<0.001$). Shortest telomeres were revealed 2.45 times more frequently in patients with low bone mass. TA was higher in patients with increased CVR and low BMD, but no statistically significant differences were observed.

Conclusion: Low BMD in all measured areas of the skeleton was associated with higher CVR. Positive association was revealed between BMD and TL and at the same time between CVR and TL negative association was revealed. There was no correlation between CVR, BMD and TA.

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MEDICINAL METHODS OF KNEE OSTEOARTHRITIS TREATMENT AND INDICES OF T2-MAPPING OF THE CARTILAGE

E. Trofimov¹, V. Mazurov¹, A. Trofimova¹, E. Melnikov¹, I. Gaidukova¹

¹North-Western State Medical University named after I.I. Mechnikov, Saint-Petersburg, Russia

Objective: To study the influence of different groups of medicinal products on the clinical course of gonarthrosis (knee OA), as well as the development of an algorithm for choosing the tactics of treatment, depending on the clinical and radiation manifestations of this disease.

Methods: A single-center, comparative, randomized, prospective study. 122 patients with unilateral knee OA of the 1st and 2nd radiological stages at the age 30-70 years were examined. All participants were randomized into four groups: 1st (n=30) - oral administration of chondroitin sulfate (CS) and glucosamine sulfate (GS); 2nd (n=31) - oral administration of CS and GS in combination with oral administration of strontium ranelate; 3rd (n=30) - oral administration of CS and GS in combination with oral administration of diacerein; 4th (n=31) - oral administration of CS and GS in combination with intra-articular injection of sodium hyaluronate. All participants of the experiment were examined three times: before, after 6 and 12 months of treatment. They underwent MRI with color mapping of the cartilaginous tissue of the knee joint with determination of the time of T2 relaxation. Patients assessed severity of the pain syndrome and the course of the disease based on a 100-millimeter visual analog scale, and the functional activity of the joints was determined according to the WOMAC Index.

Results: In all groups, differences of WOMAC scores from baseline after 6 and 12 months of therapy and differences between values after 6 and 12 months of follow-up were statistically significant (for all cases, $p<0.05$) (Fig. 1). Radiation characteristics of OA of the knee joint in the group of CS and GS in combination with sodium hyaluronate were evaluated in the course of the study based on the MRI results. Initially synovitis was registered in 45.16%, and by the end of the 12th month of therapy - only in 16.13% of patients, which should be considered a significant result ($p=0.027$). Prior to treatment, osteophytes were diagnosed in 38.71% of participants in this group, and by the end of the 12th month the number of patients with such changes increased to 68.03%, but the increase was insignificant compared to the baseline ($p=0.067$). In other groups, by the 12th month of follow-up the number of patients with osteophytes increased significantly compared to the baseline. In addition, in the 4th group positive dynamics regression of osteitis incidence (from 38.71% to 22.58%) was revealed, but the change was insignificant ($p=0.138$).

As in all other groups, the time of T2 relaxation in color mapping of cartilaginous tissue in the 4th group increased statistically significantly at the end of the follow-up: 37.27 ± 5.84 ms vs. 33.32 ± 6.25 ms at baseline ($p<0.05$). However, according to questionnaires, it is the combination therapy with oral CS and GS in conjunction with intra-articular injection of sodium hyaluronate that results in the most significant clinical improvement, as well as slowing down the progression of chondrodegeneration.

Conclusion. For the first time, a study using MRI with color T2 cartilage mapping for verification in dynamics of structural changes in the cartilage of the knee joint at the early stages of osteoarthritis was performed. It was found that not only bone marrow edema (osteitis) plays a special role at this stage of the disease, but also a decrease in the number of bonds between collagen-proteoglycan complex and water molecules, reflected by such an important parameter as the change in the relaxation time of the T2 signal, which is determined using the T2-mapping technique.

By the 6th month of treatment, the greatest clinical and laboratory effect was observed when using a combination therapy with traditional preparations for the oral administration of CS and GS in conjunction with oral administration of diacerein or intra-articular injection of sodium hyaluronate. With a longer treatment (within 12 months) of the early stages of the knee joint osteoarthritis, the combination of CS and GS in conjunction with intra-articular injection of sodium hyaluronate provided not only the best clinical and laboratory effect, but also slowed down chondrodegenerative processes.

Table 1. Dynamics of the WOMAC index in patients with OA of the knee joint

Parameter	Initially	6 months	12 months	p*
1	2	3		
Group 1 (CS and GS)	537.27 ± 21.82	426.07 ± 12.25	283.23 ± 9.31	1-2 $p<0.05$ 2-3 $p<0.05$ 1-3 $p<0.05$
Group 2 (CS and GS)	540.13 ± 25.69	456.45 ± 22.31	336.90 ± 11.52	1-2 $p<0.05$ 2-3 $p<0.05$ 1-3 $p<0.05$
Group 3 (CS and GS in combination with diacerein)	541.97 ± 23.76	362.83 ± 16.27	227.63 ± 13.93	1-2 $p<0.05$ 2-3 $p<0.05$ 1-3 $p<0.05$
Group 4 (CS and GS in combination with sodium hyaluronate)	541.13 ± 27.67	356.61 ± 12.76	203.06 ± 11.11	1-2 $p<0.05$ 2-3 $p<0.05$ 1-3 $p<0.05$

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REASSESSMENT OF THE SAFETY OF ANTI-OSTEOARTHRITIS MEDICATIONS

O. Bruyère¹, E. Curtis², G. Honvo¹, N. Fuggle², J.-Y. Reginster¹, C. Cooper²

¹University of Liège, Research Unit of Public Health, Epidemiology and Health Economics, Liège, Belgium, ²MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK

Objective: To assess the risks of adverse events (AEs) associated with treatments commonly used for osteoarthritis (OA): topical NSAIDs, oral cyclo-oxygenase-2 (COX-2) inhibitors, symptomatic slow-acting drugs for osteoarthritis (SYSADOAs), intra-articular hyaluronic acid (IAHA), and opioids.

Methods: A comprehensive literature search was undertaken in MEDLINE, CENTRAL, Scopus, and clinical trial registries. Studies included in the meta-analyses were placebo-controlled, randomized controlled trials (RCTs) of patients with diagnosed OA, reporting AE data. Outcomes of interest were MedDRA SOC related AEs: gastrointestinal (GI), cardiac, vascular, nervous system, renal and urinary disorders. For all studies, the number of patients with any AEs were compared, along with severe and serious AEs, and withdrawal due to AEs.

Results: Topical NSAIDs were not associated with an increased risk of AEs; in fact, a lower risk for nervous system disorders (mostly headache) was found with topical ketoprofen compared with placebo (odds ratio [OR] 0.60; 95%CI 0.41, 0.88). COX-2 inhibitors were associated with an increased risk of abdominal pain (relative risk [RR] 1.40; 95%CI 1.08, 1.80), hypertension (RR 1.45; 95%CI 1.01, 2.10), and oedema-related AEs (RR 1.68; 95%CI 1.22, 2.31) compared with placebo. Among SYSADOAs, glucosamine sulfate and avocado soybean unsaponifiables were not associated with an increased risk of AEs, and a lower risk of AEs was found with chondroitin sulfate compared with placebo (OR 0.70; 95%CI 0.51, 0.98). Conversely, an increased risk of GI disorders was found with diacerein (OR 2.53; 95%CI 1.43, 4.46). For IAHA, a significantly increased risk of serious AEs was found when concomitant OA treatment was allowed (OR 1.78; 95%CI 1.10, 2.89), which did not reach significance without concomitant treatment. Opioids were associated with an increased risk of GI, central nervous system, and dermatological

AEs compared with placebo, for both the immediate-release and extended-release formulations.

Conclusion: Our findings on the safety of anti-OA medications will help inform evidence-based clinical decisions and recommendations, which should consider the balance of relative benefits and harms of treatment alongside patients' values and preferences.

ESCEO Working Group participants:

Nigel Arden: MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton General Hospital, UK; and Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis, University of Oxford, Oxford, UK

Bernard Avouac: Rheumatologist, Paris, France

Roland Chapurlat: INSERM UMR 1033, Université de Lyon, Hôpital E Herriot, Lyon, France

Philip Conaghan: Leeds Institute of Rheumatic and Musculoskeletal Medicine, University of Leeds and NIHR Leeds Biomedical Research Centre, UK

Elaine Dennison: MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton General Hospital, UK

Gabriel Herrero-Baumont: Rheumatology Service, Joint and Bone Research Unit, Autonomous University of Madrid, Fundación Jiménez Díaz, Madrid, Spain

Margreet Kloppenburg: Department of Rheumatology, Clinical Epidemiology, Leiden University Medical Center (LUMC), Leiden, The Netherlands

Tim McAlindon: Division of Rheumatology, Tufts Medical Center, Boston, USA

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THE RELATIONSHIP BETWEEN TRABECULAR BONE SCORE/BMD AND BMI IN IRANIAN ELDERLY PEOPLE: BUSHEHR ELDERLY HEALTH PROGRAM

F. Amini Nezhad¹, F. Sharifi², M. Ebrahimpur¹, M. Bagherzadeh¹, A. Ostovar³, G. Shafiee⁴, R. Heshmat⁵, N. Mehrdad⁶, I. Nabipour⁷, B. Larijani⁸

¹Endocrinology & Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ³Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁵Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁶Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁷The Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, ⁸Endocrinology & Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Obesity and osteoporosis are two major health problems with increasing prevalence worldwide. The effect of body weight on bone quality and fracture risk is complex. The aim of this study is to determine impact of obesity on bone health parameters; Trabecular bone score (TBS) and BMD in a sample of Iranian elderly population.

Methods: The data of 2242 people (1159 women and 1083 men) aged >60 years were completed and analyzed who are took part in the second phase of Bushehr Elderly Health program, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran. Weight and height of participants were measured and BMI was calculated by divided of weight to square of height. Obesity was defined as BMI ≥ 30 kg/m². The BMD of lumbar spine (L1-L4) and femur were measured by DXA (Discovery WI, Hologic, USA) and TBS of L1-L4 was calculated using TBS iNsightTM software (Medimaps group).

Results: The mean BMD value of lumbar spine were 0.91 ± 0.17 and 0.81 ± 0.18 g/cm² ($P < 0.001$) and of neck of femur area was 0.666 ± 0.130 and 0.654 ± 0.147 g/cm² in obese and non-obese group, respectively ($P = 0.055$). Whereas the mean TBS was lower in obese (1.21 ± 0.10) than non-obese people (1.31 ± 0.10) ($P < 0.001$). In multivariable linear regression after adjusting for age and sex there was a negative significant relationship between obesity and TBS ($\beta = -0.166$, $P < 0.001$).

Conclusion: We found that subjects with obesity have significantly higher BMD in both areas of femur and spine, whereas TBS was significantly lower in obese compared with non-obese group. Accordingly it is advocated adding TBS to BMD as a new complementary tool for better evaluation of the bone quality in elderly subjects.

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THE ASSOCIATION OF TYPE 2 DIABETES MELLITUS (T2DM) AND TRABECULAR BONE SCORE IN IRAN: BUSHEHR ELDERLY HEALTH PROGRAM

M. Ebrahimpur¹, F. Sharifi², F. Amini Nezhad¹, M. Bagherzadeh¹, A. Ostovar¹, G. Shafiee², R. Heshmat², N. Mehrdad², I. Nabipour³, B. Larijani¹

¹Endocrinology and Metabolism Clinical Sciences Institute, Tehran,

²Endocrinology and Metabolism Population Sciences Institute, Tehran,

³The Persian Gulf Biomedical Sciences Research Institute, Bushehr, Iran

Objective: Considering a high prevalence of diabetes and population aging and its effect on bone status, also the lack of complete identification of bone quality with the available routine methods such as BMD, it is reasonable to assess bone quality through others new methods. The aim of this study was determining the association of trabecular bone score (TBS) in aged population with and without diabetes in a community-based study.

Methods: This study a cross-sectional analysis of Bushehr Elderly Health Program data, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran. A total of 2423 older people were eligible to participate in this analysis. Overnight 8-h fasting blood sample was taken and blood glucose and hemoglobin A1C (Hb A1C) was measured using auto-analyzer and CERA-STAT system, respectively. Lumbar spine BMD and TBS were measured by DXA (Discovery WI, Hologic, USA) and iNsight TM software (Medimaps group) respectively. Anthropometric indices were measured using standard methods. Blood pressures were measured based on JNC8 protocol. Diabetes mellitus was defined as FBS ≥ 126 and Hb A1C $> 6.4\%$ or history of diabetes diagnosis. The analysis was used univariable and multivariable linear regression models.

Results: Data from 1166 men and 1257 women with the mean age of 69 ± 6 years were analyzed. A total of 786 (32.4%) participants, 332 (28.5%) of males and 454 (36.1%) of females, were diabetic. The TBS was lower in subjects with diabetes than non-diabetes (1.288 ± 0.115 vs. 1.299 ± 0.101 , $P = 0.023$). The TBS had a borderline association with diabetes ($\beta = -0.04$ and $P = 0.05$). The relationship was removed when adjusted for age, sex, and BMI ($\beta = -0.01$ and $P = 0.47$).

Conclusion: Our findings suggest that diabetic patients have worse bone microarchitecture and bone quality which may be associated with a higher fracture risk in spite of normal or even high BMD values. In the univariate linear model, there was an association between diabetes and TBS values that removed when adjusted. Adding the TBS to the BMD may be more informative for assessing of fracture risk in diabetic subjects

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EFFECTS OF ANTIOXIDANTS FROM ARONIA MELANOCARPA AND APIUM GRAVEOLENS ON EXPERIMENTAL MODEL OF OSTEOPOROSIS

S. Marchev¹, K. Temelkova², M. Todorova³, M. Eftimov³, A. Georgieva³, V. Kuzmanova⁴, A. Kuzmanov⁴, V. Bankova⁵, S. Surcheva¹, M. Vlaskovska¹, S. Valcheva-Kuzmanova³

¹Department of Pharmacology and Toxicology, Medical University, Sofia, ²Specialized Hospital for Active Treatment of Children Diseases, Sofia, ³Department of Pharmacology and Clinical Pharmacology and Therapeutics, Medical University Prof. Dr. Paraskev Stoyanov, Varna, ⁴Medical University Prof. Dr. Paraskev Stoyanov, Varna, ⁵Institute of Organic Chemistry with Centre of Phytochemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria

Objective: Treatment of osteoporosis remains a therapeutic challenge. Various mechanism-directed medicines have been introduced, bearing as well adverse effects. The aim of present study was to use natural plant/fruit extracts as a part of everyday lifestyle to postpone development of osteoporosis.

Methods: Female Wister rats were used. Control animals were sham operated and the rest were ovariectomized. After ovariectomy, rats were randomized and received for 12 weeks: distilled water, HPLC-standardized *Aronia melanocarpa* fruit juice (10 ml/kg) or *Apium graveolens* extract (equal to 2.4 mg/kg quercetin). Femur BMD was measured 3 months after ovariectomy by DXA (Hologic Discovery A, version 13.2.3), using a computer program for small subjects (Small Animal Rat WB). The heat pain sensitivity was measured by the hot plate test (Ugo Basile, Italy).

Results: The in vivo osteoporotic changes in femur appearing due to the continuous estrogen deficit (ED) in ovariectomized rats proved a reliable model of experimental osteoporosis/osteopenia. The results showed that ED decreased the BMD in femur by 11%. *Aronia melanocarpa* fruit juice treatment was able to counteract the osteoporotic changes. The BMD values in the group receiving *Aronia melanocarpa* fruit juice were 13% higher ($p < 0.05$) than the respective values of ovariectomized animals treated with distilled water. Similar was the effect of *Apium graveolens* extract treatment. Behavioral results showed that the nociceptive threshold in ovariectomized rats decreased by 13% measured by the hot plate test ($p < 0.05$ vs. sham operated animals). Treatment with *Aronia melanocarpa* or *Apium graveolens* prevented the pro-nociceptive effect of osteoporosis.

Conclusion: The results suggest that natural antioxidants from *Aronia melanocarpa* and *Apium graveolens* could be an alternative management for postponing postmenopausal osteopenia/osteoporosis.

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POTENTIAL ROLE OF THE HYALURONIDASE SPAM1 IN THE PATHOGENESIS OF OSTEOARTHRITIS: EVALUATION IN SPAM1^{-/-} MICE

S. Lafont¹, M. Cardinal², T. Roels², J.-P. Devogelaer³, B. Behets², D. Manicourt³

¹IREC/MORF/Université Catholique de Louvain, ²IREC/MORF/UCL, Bruxelles, Belgium, ³IREC/RUMA/UCL, Bruxelles, Belgium

Objectives: In osteoarthritis (OA), stress- and inflammation-induced signaling pathways contribute to subchondral bone loss and articular cartilage degradation. Hyaluronidases 1 and 2 cleave native hyaluronan (HA) into small fragments that increase osteoclastic differentiation and trigger inflammatory signaling. Preliminary data suggest that hyaluronidase SPAM1 is upregulated in human OA chondrocytes. Therefore, we assessed the effect of spam1 deficiency in vivo on the development of knee OA in Spam1^{-/-} mice and in vitro on the expression of collagen- and aggrecan-degrading enzymes in chondrocytes cultured in the presence of IL-1 β and TNF- α .

Methods: OA was induced by resection of medial meniscus and anterior cruciate ligament transection in the right knee joint of 10-week-old Spam1^{-/-} and wild type (WT) mice. The mice were euthanatized at day 0, 3 and 7 post-surgery. The right knees were analyzed by μ CT (BV/TV) and histology. Chondrocytes from 5-day-old Spam1^{-/-} and WT mice were cultured with IL-1 β and TNF- α for 24h and 48h before sampling to study the expression of HA synthase 2 (Has2), collagenase-3 (Mmp13), and aggrecanase-2 (Adamts5) by western blotting.

Results: The subchondral bone fraction (BV/TV) of tibial plateau was significantly lower in non-operated Spam1^{-/-} than WT mice at all ages from 10 to 20 weeks. Three days after surgery Spam1^{-/-} mice presented significant increase in bone fraction (+13%), contrary to wild type mice which showed a significant loss in bone fraction (-10%), as expected in this OA model. At day 7 after surgery, BV/TV data were similar to preoperative data in both groups. Histology highlighted no lesion in articular cartilage from day 0 to day 7 in operated knees. Treated murine Spam1^{-/-} chondrocytes expressed significantly less Adamts5 and Mmp13 and more Has2 than WT chondrocytes exposed to same conditions.

Conclusion: Our data suggest that Spam1 might influence the expression of enzymes degrading HA and other joint components in OA. Spam1 could contribute to the crosstalk between cartilage and bone and, thereby, to OA pathogenesis.

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TESTING A PATH MODEL OF PSYCHOSOCIAL FACTORS, PHYSICAL FUNCTION, AND HEALTH-RELATED QUALITY OF LIFE AMONG OLDER ADULTS WITH SELF-REPORTED KNEE OSTEOARTHRITIS

S. Aree-Ue¹, P. Youngcharoen¹, U. Kongsombun²

¹Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, ²Sirindhorn Hospital, Bangkok, Thailand

Objective: Knee osteoarthritis (OA) is a prominent health problem for older adults in Thailand and worldwide and increases with advanced age. Knee OA generally causes significant chronic pain and increasing difficulty in performing daily activities necessary to maintain independence which then leads to disability and frailty. Pain not only impacts disability, but also impacts ones psychological status such as increasing fatigue and depressive symptoms or depression leading causes of a reduction in quality of life. The objectives of this study were to determine the relationships

of pain, depression, fatigue, and physical function and their direct and indirect effects on health-related quality of life among Thai older adults with self-reported knee osteoarthritis.

Methods: A cross-sectional study was employed. The sample consisted of 200 Thai older adults with self-reported knee osteoarthritis recruited from six senior citizen clubs in Bangkok, Thailand. Data on demographics, pain, depression, fatigue, and health-related quality of life were assessed by using standardized measures, while physical function was investigated by time up and go test (TUGT). A path analysis was employed to determine the pathways linking among pain, depression, fatigue, and physical function to health-related quality of life.

Results: There were significant negative direct paths from pain ($\beta=-0.20$, $p<0.001$), depression ($\beta=-0.19$, $p<0.001$), fatigue ($\beta=-0.45$, $p<0.001$), and TUGT ($\beta=-0.25$, $p<0.001$) to health-related quality of life. Pain, fatigue, and TUGT had an indirect effect on health-related quality of life ($\beta=-0.20$, $\beta=-0.17$, $\beta=-0.03$ respectively), while depression had no indirect effect on health-related quality of life. Additionally, the model explained 61% of the variability in health-related quality of life.

Conclusion: Increasing pain, depression, fatigue, and TUGT were associated with a reduction of quality of life. A complex relationship among these variables should take into account for designing an appropriate intervention to promote quality of life among older adults with knee osteoarthritis.

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THE FREQUENCY AND ASSOCIATION OF KNEE, HIP, HAND AND SPINE OSTEOARTHRITIS IN TURKISH POPULATION: A PRELIMINARY REPORT OF MULTICENTER LONGITUDINAL STUDY

T. Tuncer¹, S. Ugur², H. Nur¹, C. Kacar¹, U. Akarimcik³, L. Altan⁴, F. Ayhan⁵, A. Bal⁶, S. Basaran⁷, M. Bilgiliyoy⁸, G. Bozbas⁹, L. Cerrahoglu¹⁰, R. Cevik¹¹, N. Coskun⁷, Z. Dagli¹², B. Durmaz¹³, T. Duruozi¹⁴, D. Dulgeroglu⁶, G. Gurer⁹, S. Gursoy¹⁵, S. Hepguler¹³, S. Hizmetli¹⁶, E. Kaptanoglu¹⁶, T. Kaya¹⁷, H. Kocabas¹⁸, B. Kuran¹⁹, M. Melikoglu²⁰, K. Nas²¹, J. Oncu¹⁹, S. Ozcakir⁴, S. Ozdolap²², M. Saridogan³, S. Sarikaya²², D. Sindel³, O. Sahin¹⁶, O. F. Sendur⁹, C. Tikiz¹⁰, H. Ugurlu¹⁸, F. Yilmaz¹⁹

¹Akdeniz University, Antalya, ²Balikesir City Hospital, Balikesir, ³Istanbul University, Istanbul, ⁴Uludag University, Bursa, ⁵University of Health Sciences Ankara Training and Research Hospital, Ankara, ⁶University of Health Sciences Diskapi Yildirim Beyazit Training and Research Hospital, Ankara, ⁷Çukurova University, Adana, ⁸University of Health Sciences Antalya Training and Research Hospital, Antalya, ⁹Adnan Menderes University, Aydin, ¹⁰Celal Bayar University, Manisa, ¹¹Dicle University, Diyarbakir, ¹²Bitlis State Hospital, Bitlis, ¹³Ege University, Izmir, ¹⁴Marmara University, Istanbul, ¹⁵Gaziantep University, Gaziantep, ¹⁶Cumhuriyet University, Sivas, ¹⁷University of Health Sciences İzmir Bozyaka Training and Research Hospital, Izmir, ¹⁸Necmettin Erbakan University, Konya, ¹⁹University of Health Sciences Sisli Hamidiye Etfal Training and Research Hospital, Istanbul, ²⁰Ataturk University, Erzurum, ²¹Sakarya University, Sakarya, ²²Bülent Ecevit University, Zonguldak, Turkey

Objective: Osteoarthritis(OA) is the most common chronic joint disorder and it can affect any joint and mostly occurs in knees, hands, hips and spine. Turkish League Against Rheumatism (TLAR) Osteoarthritis Study

Group planned to perform a multicenter, longitudinal project to investigate the subgroups of OA, their relationship, risk factors, prognostic factors, clinical course and functional status in knee, hip, hand and spine OA, starting in 2016 with a follow up period of 5 years. In this report, preliminary data related to OA subgroups and their associations is presented.

Method: The patients with the diagnosis of KneeOA, HipOA, HandOA and SpineOA who were enrolled to the study conducted by TLAR-OA study group, were included. Each patient had undergone a clinical and radiologic investigation for the diagnosis of any other osteoarthritic joint involvement. Sociodemographic, clinical, radiologic and functional characteristics were recorded. Descriptive tests were performed using SPSS 23.0.

Results: A total of 1601 patients (1310 women, 291 men, mean age 61,76 $\pm$ 10,65) were included. Mean BMI was 30.99 $\pm$ 5.31 and was found significantly high in women and in all subgroups except HipOA. The most frequent subgroup in women and men was KneeOA (65.7%, 63.5% respectively). Men showed predominance only in HipOA as expected. In 733 patients (45,8%), there was only one joint involvement (KneeOA-22,5%, HipOA-4,1%, HandOA-12,1%, NeckOA-2,3% and LowbackOA-4,8%). On the other hand, more than half of the patients (54,2%) had multiple OA subgroups. The most frequent and significant association was KneeOA and HandOA(8%). HandOA was detected in 52.7% of the patients with KneeOA. HipOA and SpineOA with HandOA were both rare associations, but the latter was significant. In 26 patients (1,6%) all subgroups were associated.

Conclusion: In this preliminary report of the multicenter, 5 years follow-up longitudinal study, we may state that there is an association of at least two OA subgroups in the majority of the OA patients. Any other OA subgroup should be investigated in every OA patient since association of subgroups may contribute to worsening of pain and functional symptoms.

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PREVALENCE OF FEMOROACETABULAR IMPINGEMENT SYNDROME (FAIS): A POPULATION-BASED STUDY

J. Kopec¹, H. Qian², H. Wong¹, C. Zhang³, C. Ratzlaff⁴, J. Cibere⁵, L. Li⁶, H. Pric⁷, B. Forster⁸, J. Esdaile⁵

¹University of British Columbia, School of Population and Public Health, Vancouver, ²St. Paul's Hospital, Centre for Health Evaluation and Outcome Sciences, Vancouver, ³University of Calgary, Department of Family Medicine, Calgary, Canada, ⁴University of Arizona, Arthritis Centre and College of Medicine, Tucson, USA, ⁵University of British Columbia, Department of Medicine, Vancouver, ⁶University of British Columbia, Department of Physical Therapy, Vancouver, ⁷Arthritis Research Canada, Vancouver, ⁸University of British Columbia, Department of Radiology, Vancouver, Canada

Objectives: Femoroacetabular impingement syndrome (FAIS) has been defined as a combination of hip symptoms, physical signs, and radiological findings of cam or pincer morphology (Warwick Agreement). The purpose of the study was to determine the prevalence of FAIS in the general population.

Methods: Participants were Caucasian men and women aged 20-49, recruited through random digit dialing from the population of Metro Vancouver, Canada. A stratified sample of persons with and without hip pain was obtained. Participants were considered to have FAIS if they had all of the following on the same side: a) persistent or recurrent pain, stiffness or discomfort in the groin or upper thigh; b) positive FADIR impingement test (pain on adduction and internal rotation of the hip in 90° flexion); and c) cam (α angle $>60^\circ$) or pincer (lateral centre edge

angle $>40^\circ$) morphology on x-ray. All analyses were weighted to reflect the population from which the sample was drawn.

Results: Data were obtained for 500 participants. In the study population, 48.9% were males, age distribution was 32.2%, 31.4% and 36.4% in the groups 20–29, 30–39 and 40–49 years, respectively. Any hip pain on either side was present in 28.1%, positive FADIR test in 34.3%, and cam or pincer morphology in 25.3%. FAIS on either side was found in 3.01% (95%CI 1.52–4.51) of the population, 1.90% (0.63–3.17) on the left and 2.14% (0.80–3.49) on the right side. FAIS was not significantly related to sex (OR 1.34, 0.48–3.77) and was borderline related to age (OR 1.76 per decade, 0.98–3.14).

Conclusion: We found FAIS in 3% of the population ages 20–49. However, neither symptoms nor signs correlated with imaging findings, which limits clinical and epidemiological applications of the current definition of FAIS.

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RALOXIFENE HAS NO EFFICACY IN REDUCING THE HIGH BONE TURNOVER AND THE RISK OF SPONTANEOUS VERTEBRAL FRACTURES AFTER DENOSUMAB DISCONTINUATION

E. Gonzalez-Rodriguez¹, D. Stoll¹, O. Lamy¹

¹Bone Unit, Lausanne University Hospital, Lausanne, Switzerland

Objective: Denosumab reduces bone resorption, increases BMD, and reduces fracture risk. Denosumab discontinuation (DD) induces an increase of B-CrossLaps above baseline values for two years, and a decrease of BMD values. This rebound effect is associated with spontaneous clinical vertebral fractures (SCVF) in close to 15% of patients considering a follow-up of 2 years without taking another osteoporosis treatment. Prescribing a bisphosphonate or SERMs at DD would prevent the rebound effect and the risk of SCVF.

Case report: A breast cancer was diagnosed in this 60-year-old woman. BMD T-scores were -2.9 DS at the lumbar spine and -1.9 DS at the total hip. The 10-year probability of major osteoporotic fractures assessed by FRAX[®] was 13%. Letrozole and denosumab were given for 5 years. At the end of the treatment, lumbar spine and total hip BMD increase significantly (+ 18% and + 8%, respectively). Vertebral morphometry confirmed the absence of fractures. Raloxifene 60 mg daily was started 7 months after DD. B-CrossLaps were measured at 33 ng/l (normal range: 25–573 ng/l). Four months later, she experienced spontaneous low back pain. MRI revealed D11 and L5 fractures. B-CrossLaps were measured at 2070 ng/l.

Conclusion: Raloxifene has not been effective, neither in reducing the high bone turnover, nor in preventing SCVF. In addition, follow-up of B-CrossLaps was too much apart. To minimize the high bone turnover at DD, it seems preferable to prescribe a potent bisphosphonate, alendronate or zoledronate. However, frequent measurements of bone turnover should make it possible: 1) to detect the beginning of the rebound effect; 2) to evaluate the effectiveness of the given antiresorptive treatment; and, if necessary, 3) to replace it or to adjust its dosage. However, the threshold value that determines the need for an intervention is unknown. Furthermore, a significant decrease in the high bone turnover after DD is not a guarantee to prevent bone loss and to avoid the risk of SCVF. Studies are urgently needed to assess the efficacy of bisphosphonates and their optimal doses in such situations.

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STATINS AND INCIDENT KNEE OSTEOARTHRITIS: RESULTS FROM THE OSTEOARTHRITIS INITIATIVE

N. Veronese¹, S. Maggi¹, C. Cooper², J.-Y. Reginster³

¹National Council Research, Padova, Italy, ²University of Southampton, Southampton, UK, ³University of Liège, Liège, Belgium

Objective: Statins are commonly used for the prevention of cardiovascular diseases. It is known that statins might have other pleiotropic effects, but the literature regarding the possible effect on the progression and onset of knee osteoarthritis (OA) is limited to a few studies. We therefore aimed to investigate whether the use of statins was associated with lower risk of radiographic (ROA), radiographic symptomatic knee OA (SxOA) and pain worsening in a large cohort of North American people.

Methods: A total of 4448 community-dwelling participants from the Osteoarthritis Initiative were identified. Statins use was defined through self-report in the past 30 days, confirmed by a trained interviewer. OA outcomes of interest included incident (1) ROA, (2) SxOA, as the new onset of a combination of a painful knee and ROA and (3) knee pain worsening, i.e., a WOMAC pain score difference of a knee between baseline and each annual exam $\geq 14\%$. The strength of association between statins use at baseline and incident knee OA outcomes was investigated through a logistic regression analysis, adjusted for potential confounders and for the propensity score. The results were reported as odds ratios (ORs) with 95% CIs.

Results: At baseline, 1127 participants ($\approx 25.3\%$) used statins. Using a logistic regression analysis, adjusting for 11 potential confounders at baseline and the use of statins during follow-up, participants using statins reported a significant lower risk of pain worsening (OR=0.88; 95%CI: 0.78–0.98; $p=0.03$), whilst no significant differences emerged for incident ROA (OR=1.30; 95%CI: 0.79–2.14; $p=0.31$) or for SxOA (OR=0.93; 95%CI: 0.74–1.18; $p=0.55$). The adjustment for the propensity score substantially confirmed these findings (OR for pain worsening=0.91; 95%CI: 0.82–0.99; $p=0.048$).

Conclusions: Statins' use was associated with a lower risk of pain worsening due to knee OA in this large cohort of North American people.

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REDUCING THE RISK OF FALLS IN OSTEOPOROTIC PATIENTS WITH NEUROLOGICAL DEFICITS USING MODERN MEDICAL REHABILITATION TECHNIQUES

A. M. Bumbea¹, R. Traistaru¹, O. Rogoveanu¹, B. Bumbea², R. Dumitrascu³, C. Albu⁴

¹University of Medicine and Pharmacy, Department of Medical Rehabilitation, Craiova, ²Emergency Teaching Hospital, Department of Orthopedics, Craiova, ³Emergency Teaching Hospital, Department of Medical Rehabilitation, Craiova, ⁴University of Medicine and Pharmacy, Craiova, Romania

Objectives: To highlight the value of new rehabilitation techniques in reducing the risk of falls in patients with osteoporotic and neurological deficits.

Method: We have enrolled a cohort of 144 osteoporotic patients with neurological deficits of different causes: stroke, diabetic polyneuropathy and paraparesis. We applied peripheral repetitive magnetic stimulation at the level of hip stabilizers in a group of 74 patients - rehabilitation group (RG), compared with 70 patients who did not have rehabilitation therapies - nonrehabilitation group (nRG). We evaluated patients by specific methods: Tinetti falls efficacy scale TTFT (10 the best value-100), and

four square step test FSST (15 s), and also we quantified the number of falls and traumatic events by falling.

Results: RG obtained an improvement of the results after two phases of physical treatment, the TTFT score was reduced by an average of 34.5 points ($p=0.001$), compared to nRG with an increase of 12.2. Time to FSST was reduced by 4.3 seconds to RG, and nRG was maintained the same (± 1.2 sec). The traumatic fall events in RG during one year were 14 with one single fragility fracture, and at nRG there were 32 falls with 7 fractures of fragility.

Conclusions: The bone structure is affected by immobilization, even in diabetic patients with a high body mass that would cause an increase in BMD. The risk of falling is the same, due to neurological deficits. Increasing muscle strength, tonus and muscle mass at the hip, besides protecting bone structures from traumas, also contribute to increasing balance and decreasing the risk of falling.

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P618

EFFECTS OF A PHYSICAL EXERCISE PROGRAM ON PATIENTS WITH RECENT KNEE ARTHROPLASTY

I. R. Marcu¹, S. Patru¹, D. Matei¹, A. C. Bighea¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objective: To assess the effect of an exercise program on patients with total knee replacement right after knee arthroplasty.

Methods: The present study was conducted between January and November 2017 at the Clinical Emergency Hospital of Craiova and included 48 patients who were transferred from Orthopedics and Traumatology Clinic to the Physical Medicine and Rehabilitation Clinic between 7-12 days after total knee replacement for knee osteoarthritis. The patients were most of them women (72%), aged between 62-76 years and were included in a rehabilitation program that consisted in daily physical exercise for 30-45 min. The purposes of the kinetic program were to increase mobility, muscular strength and gait rehabilitation. The patients were assessed at baseline (T_0), after 12 days of treatment (T_1) and eight weeks after discharge (T_2). For the assessment of the effects of the kinetic program we used the following indicators: joint mobility (improvement of knee flexion), muscular strength, pain evaluation on a visual analogue scale (VAS) and functional status using the WOMAC Index.

Results: 89% of the patients presented an improvement of knee flexion over 90°; joint mobility increased from 15% at T_0 to 59% at T_2 . At T_0 , most of the patients (53%) had a 3 value for the muscular strength of the quadriceps muscle, 42% of the patients had a 4 value and none of the patients had normal muscular strength. At T_2 , 59% of the patients had a 4 value for the quadriceps muscular strength and 17% had a normal muscular strength. At T_0 , 66% of the patients had a score for pain on a visual analogue scale over 5, at T_1 their number decreased at 50% and at the final evaluation was of 8% of the patients. The functional status on WOMAC improved at T_1 for 60.3% of the patients and for 90% after 8 weeks.

Conclusion: The kinetic program had a positive effect on patients with knee arthroplasty and improved joint mobility, muscular strength and functional status.

P619

THE IMPACT OF LATE MENOPAUSE ON BONE MINERALIZATION

T. Tomic¹, Z. Grujic¹, V. Tomic²

¹Specialized Hospital for Rehabilitation Banja Koviljaca, Banja Koviljaca, ²Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia

Objective: To check how the late menopause affects bone mineralization.

Methods: This study included 184 postmenopausal women who had bone densitometry done and we used the values of DXA findings: T-score and BMD at the lumbar spine and femur. The respondents were divided into 2 groups depending on the length of the fertile period.

Results: The average age of women when the menopause started was 42.6 years in the first group and 55.8 years in the second group. The average value of BMI was 28.7 in the first and 30.2 in the second group. A normal DXA finding was registered in 11 women in the first and in 23 women in the second group; findings on the level of osteopenia were found in 45 women in the first and in 34 women in the second group; while 64 women in the first and 7 women in the second group had osteoporosis. The average BMD value measured on the hip is 0.84 among women in the first group and 0.96 in the second group, and there is no statistically significant differences. BMD measured on lumbar spine is 0.9 in the first group and it is statistically significantly lower than the value of BMD measured on lumbar spine in the second group that is 1.05 ($p<0.05$). The average values of T-scores on the hip are -1.4 SD in the first group and -0.64 SD in the second group and there is no statistically significant difference between them. The average value of T-score on lumbar spine is -2.2 SD in the first group and it is statistically significantly higher than the T-score on lumbar spine of -0.86 SD in the second group ($p<0.05$).

Conclusion: Among women who entered menopause after the age of 55 years, normal DXA findings are more represented than the pathological. The women with late menopause have statistically significantly lower BMD value and T-score on lumbar spine than women with early menopause, while there is no difference in these scores on hip between those two groups of respondents.

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BILATERAL ILIAC STRESS FRACTURE IN A YOUNG MALE MILITARY CADET: A CASE REPORT OF AN UNUSUAL PRESENTATION

K. Raptis¹, A. Mari¹, T. Koureta¹, P. Makras¹

¹251 HAF - VA Hospital, Athens, Greece

Objective: Stress fractures are common in military population and related to significant morbidity, fiscal costs, and time lost from training. Diagnosis of this pathology is difficult as the symptoms are non-specific and radiographic signs are often absent or subtle, so they are often recognized as muscle strains or tendinopathies. Stress fractures are common in highly active people, like military population. Virtually, any bone can be affected, but bilateral presentation is rare and especially bilateral iliac bone stress fracture has never been described in the current literature so far. We present a case of a young Air Force cadet with bilateral hip pain, while participating in routine military education exercises.

Methods: A 18-year-old male Air Force cadet presented complaining of persistent pain in both hips after a 3 weeks period he started basic combat training in the Academy, not responding to medical treatment or rest. No acute trauma at that region was noted, but symptoms worsened during

intense physical exercise. Radiological investigation with plain radiographs of pelvis and bilateral hips revealed a radiolucent line in the right iliac bone, whereas pelvic MRI revealed bilateral bone marrow edema and stress fractures in both iliac bones. The biochemical markers of bone turnover and DXA scan in lumbar spine (Z – score: -0.8) and left hip (Z – score: -0.8) were normal.

Results: Based on the clinical and imaging findings, the diagnosis of bilateral iliac bone stress fracture was established. The patient followed conservative treatment with ambulation with crutches for a 6 week period and progressive returning to physical exercise. At the latest follow-up 3 months after the diagnosis, the patient was free of pain and has returned to his previous level of activity in Academy without major restrictions.

Conclusion: Lower extremity stress fractures among military recruits are common, whereas the iliac bone is a rare site, as well as the bilateral location in this patient makes this case unique in the literature. Their insidious onset and the usually negative signs in the initial radiological examination make their diagnosis challenging. MRI is thought to be the imaging modality of choice for early diagnosis. The treatment of iliac stress fractures is usually conservative, like in our patient, with activity modification and progressive comeback to training activities.

P621

CONSERVATIVE TREATMENT OF HUMERAL FRACTURE IN A PATIENT WITH PAGET'S DISEASE OF BONE: A CASE REPORT

K. Raptis¹, A. Mari¹, P. Makras¹, S. Tournis²

¹251 HAF - VA Hospital, ²Laboratory of Research of the Musculoskeletal System - KAT Hospital, Athens, Greece

Aim: To present the diagnosis and clinical results of conservative treatment in a pagetic patient with pathologic humerus fracture.

Method: A 60-year-old man presented to the Emergency Department after sustaining a closed injury of his right, dominant arm caused by a fall from a standing height. Upon physical examination local tenderness and swelling of the affected humerus were evident. Plain radiographs revealed a displaced transverse fracture of the humeral diaphysis, abnormal bone architecture with mixed lytic and sclerotic lesions, areas of decreased bone density, cystic lesions and bone enlargement with cortical thickening. Due to the abnormal radiological findings ordered specific blood investigations and whole body radionuclide bone scan. Based on the clinical and imaging findings the predominant diagnosis was that of pathological humerus fracture secondary to polyostotic Paget's disease. The patient underwent manual closed reduction of the fracture and a coaptation splint applied for the first 10 days followed by a functional brace. He was under radiological follow-up weekly for the first month and monthly for the next 6 months.

Results: Four months after the initial injury, clinical and radiological union was obtained. When last reviewed eight months after the fracture the patient was free of pain, had full elbow motion and 90° abduction of the shoulder and has returned to his previous activities.

Conclusions: The humerus is involved only in 2% of patients with Paget's disease, and is rarely the site of a pathological fracture. Conservative treatment offers good results with fracture healing in the majority of cases, avoiding main difficulties of operative treatment due to bone enlargement, deformity, hard bone and increased vascularity.

P622

OSTEOPOROSIS AND ITS RELATIONSHIP WITH MINIMAL TRAUMA FRACTURES IN MALE ALBANIAN PATIENTS

V. Duraj¹, M. Jordhani¹, D. Ruci¹, A. Kollcaku¹, E. Memlika¹

¹UHC Mother Teresa, Tirana, Albania

Objectives: To evaluate the relationship between minimal trauma fractures and osteoporosis in male patients presented at our University Clinic in UHC Mother Teresa, Tirana, Albania.

Methods: This is a case-control study which included 414 male subjects divided into 2 groups: the fracture group included 33 patients and the normal group included 381 patients. DXA was evaluated in all patients and all results were analysed according to statistical methods. Patients included in this study were males, from 25-75 years of age, of Albanian nationality, without any pre-existing condition which could apparently favour fractures.

Results: It was found that of 33 patients who had suffered minimal trauma fractures, 14 (42.4%) had osteoporosis in their DXA results and 19 (57.5%) had a normal DXA result. Of 381 patients without fractures, only one subject had osteoporosis in his DXA meanwhile 380 individuals had normal results on their DXA. Analysing the data, was found that there is an important statistical relationship between minimal trauma fractures and osteoporosis in males ($p < 0.01$) (odds ratio 95%CI).

	With fractures	No fractures	Total
Osteoporosis	14 (42.4%)	1 (3.5%)	15
Normal	19 (57.5%)	380 (36.5%)	399
Total	33 (100%)	381 (100%)	414

Conclusions: After analysing the results obtained from the study, it was found that exists a very significant relationship between osteoporosis and minimal trauma fractures in male Albanian patients. Therefore, osteoporosis should be treated with the same commitment in male patients, in order to prevent fractures and other consequences.

P623

SHOULD FIBROMYALGIA BE INCLUDED AS A RISK FACTOR FOR BONE LOSS?

A. M. Bumbea¹, R. Traistaru¹, R. Dumitrascu², B. Bumbea³, M. Borcan⁴, A. Musetescu⁵, O. Rogoveanu¹

¹University of Medicine and Pharmacy, Department of Medical Rehabilitation, Craiova, ²Emergency Teaching Hospital, Department of Medical Rehabilitation, Craiova, ³Emergency Teaching Hospital, Department of Orthopedics, Craiova, ⁴Neuropsychiatry Teaching Hospital, Department of Medical Rehabilitation, Craiova, ⁵University of Medicine and Pharmacy, Craiova, Romania

Objectives: To demonstrate that patients with fibromyalgia have a higher prevalence of osteoporosis than a healthy population of the same age.

Method: We studied a cohort of 93 female patients: 53 with fibromyalgia (FG), compared with a group of 40 healthy patients (HG), main age of 54.3 ± 5.3 years. We performed BMD in the lumbar spine and the hip in both groups. FG was divided into 3 subgroups according to the dominant symptoms: subgroup A, with painful symptoms, subgroup B, with digestive phenomena as irritable colon, and C, with depressive disorders. We evaluated the groups at baseline and every year for three years. Patients

with antidepressant therapy were excluded from the study considering bone loss due to therapy.

Results: We note that subgroups A and B showed a decrease in bone mass with an average annual rate of -0.22, respectively -0.27, compared to group C where the BMD decrease rate was -0.18. In summary, FG presented a bone loss estimated at an average annual rate of -0.22 ($p=0.0002$), compared to the HG group, which recorded a loss with an annual average of ± 0.12 per year.

Conclusions: Pain, depressive and digestive disorders affect the intake and absorption of calcium and vitamin D, generated by FM and facilitate bone loss. The sedentary tendency of these patients modify the bone mass status. This study highlights the need to evaluate bone loss in patients with fibromyalgia

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P624

OSTEOPOROSIS IN MALE PATIENTS WITH POSITIVE FAMILY HISTORY

V. Duraj¹, M. Jordhani¹, D. Ruci¹, A. Kollcaku¹, E. Memlika¹

¹UHC Mother Teresa, Tirana, Albania

Objectives: To evaluate Osteoporosis in male individuals with osteoporosis positive family history.

Methods: This is a case-control study which included 414 male subjects divided into 2 groups: males with positive family for osteoporosis and males with no family history for the disease. Positive family history meant osteoporosis in subject's mother. Then, every patient was evaluated for osteoporosis, by performing DXA. Patients included in this study were males, from 25-75 years of age, of Albanian nationality. All data obtained from the study were analysed according to statistical methods.

Results: It was found that of 111 patients included in the group with positive family history, 10 individuals (9%) were diagnosed with osteoporosis. On the other group, the one without family history for osteoporosis, of 303 individuals, 5 patients (1.6%) were found with osteoporosis. After analysing the data, was found that there is a significant relationship between positive family history and osteoporosis in male individuals ($p<0.01$) odds ratio (95%CI) 5.9 (1.9-17.6).

Conclusions: There seems to be a significant statistical relationship between positive family history and osteoporosis in male subjects. There seems that patients whose mothers were diagnosed with osteoporosis in their lives, are more at risk for developing osteoporosis.

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BONE MATERIAL STRENGTH IN MEN WITH DYSGLYCAEMIA

K. Holloway¹, P. Rufus¹, A. Diez-Perez², L. De Abreu¹, M. Kotowicz¹, M. Sajjad¹, J. Pasco¹

¹Deakin University, Geelong, Australia, ²Autonomous University of Barcelona, Barcelona, Spain

Objective: Despite higher BMD, individuals with diabetes have increased fracture risk. This paradox may be due to compromised bone material properties. The OsteoProbe[®] measures bone

microindentation distances, expressed as bone material strength index (BMSi). Postmenopausal women with diabetes have lower BMSi compared to healthy peers¹, but comparable data are not available in men or in individuals with impaired fasting glucose (IFG). This study describes the relationship between BMSi and dysglycaemia in men.

Methods: For 193 men aged 33-92 yr from the Geelong Osteoporosis Study, IFG was defined as fasting plasma glucose (FPG) ≥ 5.5 mmol/L and diabetes as FPG ≥ 7.0 mmol/L, use of antihyperglycaemic medication and/or self-report. BMSi was measured following international standardised procedure². Linear regression techniques were used to determine the relationship between dysglycaemia and BMSi, adjusting for age, BMI, smoking, alcohol, physical activity, medication use and prior fracture.

Results: There were 127 (65.8%) men with normoglycaemia, 34 (17.6%) with IFG and 32 (16.6%) with diabetes. Duration of diabetes ranged from 2.8-25.8 yr (mean 12.4 yr) and age of onset 42-91 yr (mean 64.2 yr). Compared to normoglycaemia, BMSi values for men with IFG were not different (mean 83.3(95%CI 82.3-84.4) vs. 83.2(81.2-85.3); $p=0.926$), however, men with diabetes had a lower BMSi (80.9(78.8-83.1); $p=0.048$). The difference for diabetes was attenuated after adjustment for prior fracture (83.3(82.2-84.3) vs. 80.9(78.8-83.0); $p=0.052$). No other confounders were identified.

Conclusions: Compared to normoglycaemia, no differences in BMSi were detected for men with IFG, however men with diabetes had lower BMSi. Diabetes may be associated with compromised bone material strength, and intervention may be possible in IFG before the effects of hyperglycaemia affect the skeleton.

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P626

CLINICAL AND RADIOLOGICAL OUTCOME OF ANATOMICAL ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH PARTIAL MENISCECTOMY (MEDIAL VS. LATERAL)

K. V. Acharya¹, M. S. Mudabbir¹, V. Pandey¹

¹KMC Manipal, Manipal Academy of Higher Education, Manipal, India

Objectives: 1. To evaluate clinical outcome between Anatomical Anterior cruciate ligament (ACL) Reconstruction with partial medial meniscectomy and Anatomical ACL Reconstruction with partial lateral meniscectomy by means of a) Pain. b) Stability of joint. c) Activity. 2. To evaluate radiological outcome between two groups.

Method: 80 patients who underwent anatomical ACL reconstruction with partial medial meniscectomy (42) or lateral meniscectomy(38) from January 2011 to September 2016 with minimum follow-up of 1 year at a tertiary care center were included retro-prospectively and were clinico-radiologically evaluated by means of pain (visual analogue score), activity (International Knee Documentation Committee & modified Lysholm score), laxity (Anterior drawer and Lachmans test) and osteoarthritis (x-rays and graded by Kellgren-Lawrence scale).

Results: Pain, instability, activity level & radiological changes were higher in later meniscus group when compared to medial meniscal group except the laxity which was higher in the medial meniscus group but the results were statistically insignificant.

Conclusion: There is no significant difference with respect to clinical and radiological outcome of arthroscopic anatomical ACL reconstruction with partial meniscectomy of medial or lateral meniscus.

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RISK OF FALLS ACCORDING TO SARCOPENIA AND FRAILTY COMPONENTS IN AMBULATORY WOMEN FROM BUENOS AIRES

A. G. Diaz¹, S. P. Lucas¹, E. Genovesi¹, M. Pelayo¹, S. Miguel¹, N. Deligiannis¹, V. Del Rio¹, A. Smulever¹, S. Sosa¹, Y. Mocarbel¹, B. Oliveri²

¹Universidad de Buenos Aires, Endocrinología, Hospital de Clínicas,

²Laboratorio Osteoporosis y Enfermedades Metabólicas Óseas (INIGEM, UBA-CONICET), Buenos Aires, Argentina

Objective: To analyze the association of risk of falls with sarcopenia and frailty components in ambulatory postmenopausal women ≥ 60 years from Argentina.

Methods: A total of 320 women (69.9 ± 7.23 yo) attended a community activity to evaluate osteoporotic risk and muscle health were included. A questionnaire about history of falls, spontaneous loss of weight >4.5 kg, weekly physical activity, use of drugs for anxiety or depressant disorders and use of cane due to imbalance status or fear of falling, in the last year, was performed. Hand-grip strength (by dynamometry) and physical performance (gait speed) were evaluated. Body composition including appendicular lean mass (ALM) (by DXA, Lunar DPX) was performed in 144 participants. Sarcopenia was determined by 2 criteria: according to European Working Group on Sarcopenia in Older People (EWGSOP): $ALM/ht^2 \leq 5.67$ kg/m² and gait speed: <0.8 m/s or grip strength <20 kg, and the Foundation for the National Institutes of Health Sarcopenia Project (FNIH) criteria: $ALMBMI <0.512$ and grip strength <16 kg. Statistical analysis by SPSS20.0.

Results: Eighty-seven women (27.2%) reported falls in the last year. Falls were independently associated with loss of weight ($p=0.001$, OR: 3.045 CI: 1.501-6.178), use of cane ($p=0.022$, OR: 2.67 (CI: 1.100-6.504) gait speed test altered ($p=0.005$, OR: 1.99 (CI: 1.210-3.288) and hand grip test altered ($p=0.017$, OR: 1.67 (CI: 1.063-2.628), whereas physical activity (≥ 20 min, three times weekly) represented a protective factor ($p=0.027$, OR: 0.629 (CI: 0.402-0.982). No association with use of cane or drugs for anxiety or depressant disorders were found. Twenty-five participants had low ALM/ht^2 and 54 women showed low $ALMBMI$. The prevalence of sarcopenia was 7.68% (11/144) and 16.78% (24/144) according to the EWGSOP and the FNIH criteria, respectively. Despite, 54.5% and 45.8% of them suffered falls in the last year, respectively, no difference in muscle mass or sarcopenic status between fallers and non-fallers were found.

Conclusion: Sarcopenia and physical frailty are closely associated and partly overlap, especially on parameters of impaired physical function. However, assessing the frailty component allow detecting individuals at risk of falls.

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PROGNOSTIC FACTORS FOR RADIOGRAPHIC DAMAGE IN PATIENTS WITH SERONEGATIVE RHEUMATOID ARTHRITIS

J. Kim¹, M. Cho², W. Jeong¹

¹Jeju National University School of Medicine, Internal Medicine, Jeju National University Hospital, ²Jeju National University School of Medicine, Biochemistry, Jeju, South Korea

Objectives: Long since it have been suggested that seronegative rheumatoid arthritis (RA) represents a clinical entity quite distinct from that of seropositive RA. However, analytical studies dedicated to clinical outcomes regarding radiographic progression and risk factors for that are scarce. The aim of this study is to evaluate radiographic outcome and prognostic factors for radiographic damage in patients with seronegative RA.

Methods: RA patients reportedly seronegative for both rheumatoid factor and anti-cyclic citrullinated peptide antibody who were seen at Jeju National University Hospital in South Korea between August 2003 and December 2016, and followed-up at least 2 years were included. Medical records, laboratory and radiographic data was retrospectively analyzed and multivariate analysis was performed to evaluate prognostic factors for radiographic damage in patients with seronegative RA.

Results: 116 patients with seronegative RA were observed and 14 (12.1%) patients demonstrated newly-developed joint damage during follow-up period. Age at diagnosis was 48.0 years and 86 (74.1%) patients were female. Symptom duration at diagnosis was 1.3 years and follow-up duration was 5.2 years. Baseline characteristics including sex, symptom duration, smoking status, number of active joints, acute phase reactant were not significantly different in patients with joint damage compared to those without joint damage. Disease duration, joint erosion at diagnosis and Sharp van der Heijde Score (SHS) at diagnosis were statistically significant difference between the two groups. The mean annual SHS change in patients with radiographic damage was 5.53. Radiographic damage occurred in multiple joints in 91.7% of patients, and 68.8% occurred in both small and large joints. Analyzed by annual SHS change, joint erosion at diagnosis and SHS at diagnosis were the predictors of radiographic progression adjusting sex, age, symptom duration, smoking, morning stiffness at diagnosis, number of active synovitis and CRP values at diagnosis (B 6.50 ± 1.84 ; $p=0.001$ and 0.12 ± 0.02 ; $p<0.001$).

Conclusions: Our study demonstrated a rate of joint damage in patients with seronegative RA comparable to recent studies. Joint erosions at diagnosis and SHS at diagnosis are predictive factors of radiographic progression in patients with seronegative RA. A large comparative study dedicated to this issue in seronegative RA is required.

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P629

OPPORTUNITIES FOR IMPROVING MUSCULOSKELETAL HEALTH AMONG PRETIREES

J. A. Pasco¹, K. L. Holloway¹, N. K. Hyde¹, M. C. Tembo¹, P. G. Rufus¹, S. X. Sui¹, M. Berk¹, M. A. Kotowicz¹

¹Deakin University, Geelong, Australia

Objectives: We aimed to profile musculoskeletal health and life-style behaviours for early-elderly ‘pretirees’ interposed between later stages of work and retirement in old age. What happens in this period has the potential to influence the divergent paths of healthy or unhealthy ageing.

Methods: For 482 participants (54.8% men) aged 55-69 yr from the Geelong Osteoporosis Study, we measured DXA-derived relative appendicular lean mass ($rALM$, kg/m²), BMD at the femoral neck and body fat expressed as a percentage of body weight (%BF). Low- $rALM$ and low-BMD referred to sex-specific T-scores <-1.0 and high %BF as $>25\%$ for

men and >35% for women. Associations between exposures and the likelihood of low-rALM, low-BMD or both, were evaluated using multivariable logistic regression techniques.

Results: 368 (76.4%) participants had high %BF, 98 (20.3%) had low-rALM, 202 (41.9%) had low-BMD and 63 (13.1%) had both low-rALM and low-BMD. There were 97 (20.1%) participants involved in recreational activities of middle or high intensity and performed for ≥ 2 h/wk. Most [416(87.8%)] met the RDI for dietary protein, 119(25.1%) met the RDI for dietary calcium. There were 44 (9.1%) smokers, but 149 (31.4%) exceeded recommended alcohol intakes (>20 g/d). Independent of age, weight and sex, greater %BF and sedentary behaviour increased the likelihood of low-rALM; high alcohol consumption increased the likelihood of low-BMD; and greater %BF increased the likelihood of low-rALM and low-BMD combined.

Conclusions: Adiposity, high alcohol intakes and physical inactivity were potentially modifiable factors associated with increased likelihood for poor musculoskeletal health. Only half of the participants had both lean mass and bone mass in the normal range (T-scores>-1). There is an opportunity for targeting health promotion to retirees who would likely benefit from adopting lifestyle behaviours that reduce the likelihood of progressing to sarcopenia and/or osteoporosis.

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DIGITAL X-RAY METACARPAL RADIOGRAMMETRY AND THEIR CORRELATION WITH DXA IN MEXICAN CHILDREN AND ADOLESCENTS

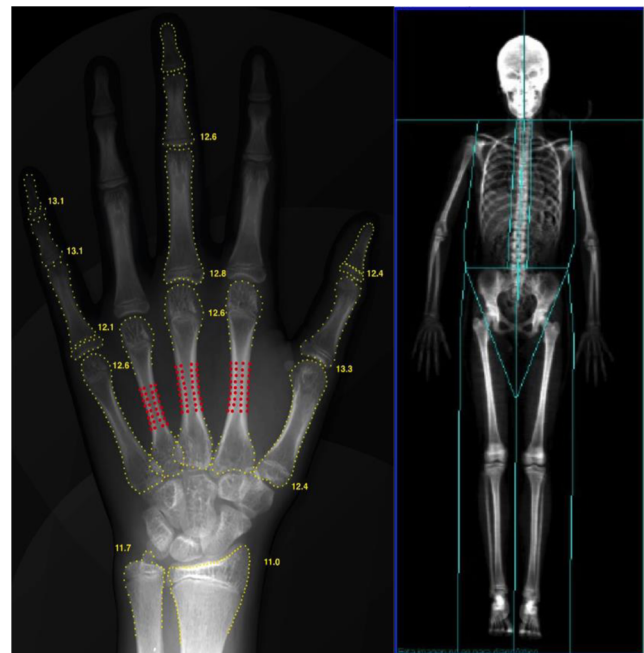
D. Lopez-Gonzalez¹, A. Miranda-Lora¹, P. Clark¹, M. Sanchez-Curiel¹, M. Espinosa-Espindola¹, P. Dies-Suarez¹, M. Klünder-Klünder¹

¹Hospital Infantil de Mexico Federico Gomez, Mexico, Mexico

Objective: DXA is the most widely accepted and used technique to assess BMD. However, in our country availability of this equipment is limited, and most of them does not have pediatric software. The BoneXpert® software provides an automated radiogrammetric method to assess skeletal age. The program calculates the bone health index (BHI), a measure of cortical thickness and mineralization, which is obtained from indices of three metacarpal bones. Our aim was to evaluate the correlation and concordance between BHI and DXA in children and adolescents.

Method: A cross-sectional study was conducted. We included 409 participants between 5-18 years, recruited from schools in Mexico City. We obtained an anteroposterior radiography of the non-dominant hand for all participants. The images were analyzed using the BoneXpert to obtain the BHI. In addition, we obtained a DXA of total body and lumbar spine using a pediatric iDXA GE V.15. We analyzed the correlations (Pearson) and the concordance (Bland-Altman plots) between BHI and DXA. Local Committee approval HIM2015-055/HIM2017-058.

Results: The BHI showed a positive correlations with the DXA readings for BMD ($r=0.658$ to $r=0.803$; $p<0.001$); with similar results between boys ($r=0.614$ to $r=0.817$; $p<0.001$) and girls ($r=0.711$ to 0.815 ; $p<0.001$). We also observe positive correlations between BHI and bone mineral content by DXA, although with less magnitude ($r=0.657$ to $r=0.753$; $p<0.001$). The Bland-Altman plots showed good agreement between BHI Z-score and BMD Z-score by DXA in boys (mean difference of -0.414, limits of agreement -2.683 to 1.855, Pitman test $p=0.338$) and girls (mean difference 0.126, limits of agreement -2.190 to 2.442, Pitman test $p=0.455$).



Conclusions: The digital X-ray metacarpal radiogrammetry has a good correlation and adequate concordance with DXA in children. However, it's necessary to evaluate their utility in diseases that affect bone density before considering it as a diagnostic method of bone health in children.

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INFLUENCE OF BMI ON LOW BACK PAIN

D. Chowdhury¹, S. Sarkar², M. H. Rashid¹, A. Rahaman¹, S. K. Sarkar³, R. Roy⁴

¹Department of Neurosurgery, Bangabandhu Sheikh Mujib, Medical University, Shahbag, Dhaka, Bangladesh, ²Department of Neurosurgery, Mymensingh Medical College, Mymensingh, Bangladesh, ³Department of Neurosurgery, Sahid Ziaur Rahman Medical College, Bogra, Bangladesh, ⁴Department of Neurosurgery, Rangpur Medical College, Rangpur, Bangladesh

Objective: Low back pain (LBP) is a common problem affecting 70% of the population in the developed countries and prevalence is also increasing in the developing countries. Our aim was to assess the influence of BMI on low back pain.

Methods: We conducted a clinic based cross-sectional study in the city of Dhaka and Chittagong during the period of January 2009 to December 2011. Participants (n=357) were interviewed and examined through a structured questionnaire after a purposive sampling to explore the influence of BMI on LBP.

Results: Among 357 patients the incidence of LBP was common in the age group between 40-59 years and it was 172 (48.17%) followed by 60-79, 20-39 and >80 years group with 21.29%, 17.65% and 12.89% respectively. Female presented more with LBP, i.e., 196 (54.91%) than the male 161 (45.09%). The more study population was found to have BMI within normal range, i.e., 167 (46.78%). This was followed by overweight group which amounted 137 (38.37%) while the obese group was the least, i.e., 53 (14.85%). Maximum study population presented with severe LBP which amounted 140 (39.22%) while others presented with moderate and mild LBP and amounting 118 (33.05%) and 99 (27.73%)

respectively. Among the normal BMI group most patient presented with mild pain (n=82) followed by moderate (n=55) and severe (n=30) pain. Participants with overweight presents with severe pain mostly (n=58) but obese participants presented with severe low back pain (n=25). Statistically the association of LBP with BMI was found to be highly significant ($p<0.0001$). In this study, 137 (46.78%) participants of normal BMI presented with LBP but majorities (n=82) presented with mild LBP and overweight and obese participants mostly presented with severe LBP.

Conclusion: On the basis of these findings, careful evaluation of risk factors and deliberate assessment of the therapeutic as well as preventive measure for the management of patient of LBP is highly recommended.

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OPTIMAL DOSE OF VITAMIN D SUPPLEMENTATION IN OSTEOPOROSIS PATIENTS WITH RHEUMATOID ARTHRITIS

O. C. Kwon¹, J. S. Oh¹, Y. -G. Kim¹, C. -K. Lee¹, B. Yoo¹, S. Hong¹

¹Division of Rheumatology, Department of Medicine, University of Ulsan, College of Medicine, Asian Medical Center, Seoul, South Korea

Objective: Vitamin D deficiency is prevalent in patients with rheumatoid arthritis (RA). In the 2017 ACR guideline for the prevention and treatment of glucocorticoid-induced osteoporosis, vitamin D intake of 600-800 IU/d is recommended. Considering that RA

is prone to vitamin D deficiency, required dose of vitamin D might be higher in osteoporosis patients with RA. However, the optimal dose of vitamin D supplementation in osteoporosis patients with RA is not well known. Thus, we aimed to assess the optimal dose of vitamin D supplementation in this patient group.

Methods: Patients with RA, who was diagnosed as osteoporosis (T-score ≤ -2.5) between January 2013 and December 2016 were included. We classified patients in to four groups according to the dose of vitamin D supplementation (0 IU/d, 400 IU/d, 800 IU/d, ≥ 1000 IU/d). Clinical characteristics, dose of vitamin D supplementation and change in T-score during one year were reviewed and compared among these groups. Kruskal-Wallis test and Fisher's exact test were used for comparison of continuous and categorical variables, respectively.

Results: In total, 116 osteoporosis patients with RA were included. Mean age was 63.8 (± 8.7) years and 107 (92.2%) were female. None of the patients had thyroid disease or parathyroid disease. All patients received bisphosphonate for treatment of osteoporosis. In comparison among patients with different doses of vitamin D supplementation, age, sex, prevalence of hypertension, diabetes mellitus, hyperlipidemia, RA disease activity, RA medication, BMI, and initial T-score did not significantly differ among groups. However, change of T-score in one year was greatest in the ≥ 1000 IU/d group ($p=0.003$).

Conclusion: In osteoporosis patients with RA, vitamin D supplementation of >1000 IU/day may be beneficial in terms of BMD.

Table. Change of T-score according to dose of vitamin D supplementation

	Dose of vitamin D supplementation				P value
	0 IU/d (N=36)	400 IU/d (N=15)	800 IU/d (N=49)	≥ 1000 IU/d (N=16)	
Age	66.0 (56.8-70.8)	60.0 (56.0-69.0)	61.0 (56.5-70.0)	63.0 (59.3-74.3)	0.632
Female	35 (97.2%)	15 (100.0%)	42 (85.7%)	15 (93.8%)	0.179
HTN	8 (22.2%)	2 (13.3%)	7 (14.3%)	3 (18.8%)	0.816
DM	1 (2.8%)	1 (6.7%)	7 (14.3%)	1 (6.2%)	0.303
Hyperlipidemia	7 (19.4%)	3 (20.0%)	9 (18.4%)	6 (37.5%)	0.446
RF	23 (63.9%)	11 (73.3%)	40 (81.6%)	12 (75.0%)	0.338
Anti-CCP Ab	23 (63.9%)	11 (73.3%)	42 (85.7%)	10 (62.5%)	0.075
DAS-28	3.55 (2.50-4.47)	2.99 (2.81-3.81)	3.20 (2.57-4.20)	2.99 (2.23-3.48)	0.397
MTX	32 (88.9%)	13 (86.7%)	44 (89.8%)	10 (62.5%)	0.072
HCQ	19 (52.8%)	6 (40.0%)	23 (46.9%)	8 (50.0%)	0.860
SSZ	11 (30.6%)	7 (46.7%)	15 (30.6%)	5 (31.2%)	0.679
LEF	5 (13.9%)	2 (13.3%)	5 (10.2%)	2 (12.5%)	0.928
TAC	2 (5.6%)	1 (6.7%)	3 (6.1%)	2 (12.5%)	0.826
bDMARDs	2 (5.6%)	0 (0.0%)	5 (10.2%)	1 (6.2%)	0.762
NSAIDs	32 (88.9%)	13 (86.7%)	40 (81.6%)	10 (62.5%)	0.177
GFR	93.5 (84.0-101.0)	95.0 (86.0-106.0)	94.0 (85.0-98.5)	90.5 (84.3-99.3)	0.827
BMI	23.96 (20.41-26.12)	21.85 (20.09-24.29)	22.76 (20.49-25.27)	22.37 (20.24-26.00)	0.443
Cumulative steroid dose	1035.63 (572.81-1880.63)	1057.50 (406.25-1428.75)	896.25 (346.25-1442.50)	1230.00 (782.50-1724.38)	0.484
Initial T-score	-2.95 (-3.38 - -2.70)	-2.80 (-3.70 - -2.60)	-2.90 (-3.40 - -2.60)	-2.85 (-3.18 - -2.63)	0.757
Change of T-score	0.10 (-0.08 - 0.28)	0.10 (0.00 - 0.40)	0.30 (0.10 - 0.40)	0.45 (0.20-0.68)	0.003

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PREDICTORS OF FATIGUE IN PATIENTS WITH RHEUMATOID ARTHRITISJ. Jovanovic¹, V. Jovanovic², S. Bozilov¹, M. Karadzic³¹Institute for Treatment and Rehabilitation "Niska Banja", Niska Banja,²Clinic for Orthopedic, Nis, ³Institute for Treatment and Rehabilitation "Niska Banja", Niska Banja, Serbia**Objective:** To determine predictors of fatigue in patients with RA compared to the tested parameters.**Methods:** The study included 121 patients with RA. The intensity of fatigue was measured by visual analogue scale VAS. Functional disability was presented HAQ questionnaire, a disease activity index of disease activity DAS-28SE. Fatigue was assessed in relation to sex, age and duration of disease.**Results:** The high disease activity $p < 0.001$, severe functional disability $p < 0.001$ and the duration of the disease > 10 years, $p < 0.05$ are associated with the greater intensity of fatigue. Age and gender did not significantly influence the fatigue.**Conclusion:** Fatigue is significantly present in patients with RA. The high activity of the disease, the severity of the HAQ functional disability, and the longer duration of the disease are predictors of fatigue, while the age and gender did not affect fatigue significantly in patients with RA in our research.

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INCIDENCE OF MORPHOMETRIC VERTEBRAL FRACTURES IN OSTEOPOROTIC PATIENTS OF THE GENERAL POPULATION IN GREECE: THE VERTEBRAL INTEGRITY ASSESSMENT (VERTINAS) STUDYK. D. Stathopoulos¹, E. Kaskani¹, E. Chronopoulos², M. Tsekoura³, T. Drakopoulou³, E. Ibro³, C. Kosmidis¹¹Hellenic Society for the Study of Bone Metabolism, ²2nd Department of Orthopaedics, National and Kapodistrian University of Athens, School of Medicine, Greece, ³"Butterfly" Bone Health Society, Athens, Greece**Objective:** We assessed the incidence of morphometric vertebral fractures in osteoporotic patients of the general population in Greece.**Methods:** Patients receiving medication for osteoporosis were recruited via announcements by the Greek national media. Inclusion criteria: 1) age > 50 y 2) postmenopausal status > 2 y (women) 3) current (> 1 y) use of medication for osteoporosis 4) lack of radiological vertebral assessment for > 1 y. Exclusion criteria: 1) bone metabolic diseases other than osteoporosis 2) secondary osteoporosis 3) inability to stand/walk 4) previous high-energy vertebral fractures. All patients completed short-form questionnaires including age, sex, current pharmaceutical treatment for osteoporosis including calcium/vitamin D supplementation, history of previous vertebral fractures, and signed informed consent to perform lateral x-rays of the thoracic and lumbar spine. Radiographs were evaluated according to the Genant method locally by radiologists and centrally through a specifically designed web database system by 3 orthopedic consultants, blinded for the patients' data. Statistical analysis was performed by a trained statistician.**Results:** We report results of 1628 patients (1494 females, mean age 70.0 ± 8.2 y and 134 males 74.6 ± 8.1 y, all Caucasian). 85.9% of patients reported receiving bisphosphonates, 11.4% denosumab and 2.7% other agents. 38.8% and 41% of patients reported additional daily use of calcium and cholecalciferol supplements respectively. 11.1% of patients (N=181) reported previous vertebral fractures. Of the remaining 88.9%of patients (N=1447), 301 (20.8%) were diagnosed by the orthopedists as having ≥ 1 morphometric fracture (522 fractures in total, 392 thoracic-130 lumbar). 177/301 patients (157 females, 72.01 ± 8.3 y and 20 males, 77 ± 9.0 y) were diagnosed with a single fracture. Most common single fractures (females) were Grade 1 T12 (N=25), T11 (N=19) and L1 (N=17). 124/301 patients (16 males 75.6 ± 7.4 y and 108 females 73.6 ± 7.8 y) had > 1 fracture. 66/124 had multiple thoracic, 14/124 multiple lumbar and 44/124 both thoracic and lumbar fractures and most common were T12 (N=54), T11 (N=53) and L1 (N=36).**Conclusions:** Our study indicated that $\geq 20\%$ of patients under osteoporosis medication had already suffered ≥ 1 morphometric and previously undiagnosed vertebral fractures, and highlights the importance of performing lateral x-rays especially in those > 60 y.**Disclosures:** This study was funded by the "Butterfly" Bone Health Society. K.D. Stathopoulos has received honoraria/lecture fees/advisory board fees from Amgen Hellas and Specifar- a TEVA company (not related to this study). E. Kaskani has received honoraria/lecture fees from Amgen Hellas (not related to this study). C. Kosmidis has received honoraria/lecture fees/advisory board fees from VIANEX S.A., Amgen Hellas and GALENICA S.A. (not related to this study).

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CORRELATIONS OF SERUM CALCIUM, PHOSPHATES AND 25(OH) VITAMIN D LEVELS WITH THE CORRECTED QT-INTERVALS FROM ECGS OF TYPE 2 DIABETES PATIENTS ON ORAL ANTIDIABETIC DRUGSD. Bakalov¹, M. Boyanov¹, R. Mekova¹, A. Tsakova²¹Medical University Sofia, Department Internal Medicine, University Hospital Alexandrovska, Clinic of Endocrinology and Metabolic Diseases, ²Medical University Sofia, Department Clinical Laboratory and Clinical Immunology, University Hospital Alexandrovska, Central Clinical Laboratory, Sofia, Bulgaria**Objectives:** The QT-interval is known to be influenced by serum calcium. As calcium is in turn influenced by vitamin D, our hypothesis was that there might be a direct relationship of serum 25(OH) vitamin D with the corrected QT-intervals from ECGs. Our aim was to describe the correlations of serum 25(OH)D as the independent variable with the QT- and QTc intervals as dependent variables in type 2 diabetes patients on oral antidiabetic drugs.**Methods:** 140 type 2 diabetes patients on oral antidiabetic drugs participated – 66 men and 74 women with a mean age of 62.9 ± 9.8 years and a mean diabetes duration of 8.9 years. Serum levels of 25(OH)D were measured by electro-hemi-luminescence (Elecsys 2010, Roche Diagnostics). Total serum calcium and phosphates, creatinine, blood glucose and lipids were measured routinely on a Cobas Integra analyzer. 12-lead standard ECGs with automated analysis were performed on an Autocardiner FCP-2155 device (Fukuda-Denshi Corp., Japan). Curve estimation (10 curves) and regression analysis were performed on an IBM SPSS 19.0 for Windows platform (SPSS Corp., Chicago, IL).**Results:** The mean serum calcium was 2.12 ± 0.52 mmol/l, the phosphates – 1.08 ± 0.30 mmol/l, 25(OH)D – 32.51 ± 18.52 nmol/l. Serum 25(OH)D was correlated with the QT-interval only in a quadratic model ($R=0.216$; $p=0.039$) while there were multiple significant regression models for the QT-corrected interval (the compound, growth and exponential models produced $R=0.206$ with $p=0.015$). Serum calcium was also correlated with the QT-interval in multiple models – linear, logarithmic, inverse, compound, S, growth and exponential with $R=0.175$ – 0.178 and $p=0.038$ – 0.041 . Surprisingly serum calcium did not correlate to the corrected QT. The same trend was observed with serum

phosphates which were related to the QT-interval in multiple models – linear, compound, growth ($R=0.271$; $p=0.001$), but not to the QT-corrected ones.

Conclusions: In type 2 diabetes serum calcium and phosphates might be related to the QT-, but not to the QTc-intervals. The correlation of both intervals with vitamin D might be weaker and possibly not direct.

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CORRELATIONS OF SERUM CALCIUM, PHOSPHATES AND 25(OH) VITAMIN D LEVELS WITH NT-PROBNP, ASSYMMETRIC DIMETHYLARGININE, PLACENTAL GROWTH FACTOR 1 IN TYPE 2 DIABETES PATIENTS ON ORAL ANTIDIABETIC TREATMENT

A. Markova¹, D. Bakalov¹, M. Boyanov¹, A. Tsakova²

¹Medical University Sofia, Department Internal Medicine, University Hospital Alexandrovska, Clinic of Endocrinology and Metabolic Diseases, ²Medical University Sofia, Department Clinical Laboratory and Clinical Immunology, University Hospital Alexandrovska, Central Clinical Laboratory, Sofia, Bulgaria

Objectives: Serum levels of vitamin D have been associated with the cardiovascular risk. New serum markers such as N-terminal pro B-type natriuretic peptide (NT-proBNP), asymmetric dimethylarginine (ADMA) and placental growth factor 1 (PIGF-1) might better quantify cardiovascular risk. Our aim was to describe the correlations of serum 25(OH)vitamin D (independent variable) with the serum levels of NT-proBNP, ADMA and PIGF-1 in type 2 diabetes (DM) patients on oral antidiabetic treatment.

Methods: 97 type 2 DM patients participated - 60 women and 37 men; mean age was 63.2 ± 9.3 years and diabetes duration - 9.0 ± 7.2 years. Total serum calcium and phosphates, creatinine, blood glucose and lipids were measured on a Cobas Integra analyzer. Serum levels of NT-proBNP and PIGF-1 were measured by electro-hemi-luminescence (Elecsys 2010, Roche Diagnostics) and ADMA by an enzymatic immunoassay (BioVendor). Curve estimation (10 curves) and regression analysis were performed on an IBM SPSS 19.0 for Windows platform (SPSS Corp., Chicago, IL).

Results: Mean levels of NT-proBNP, ADMA and PIGF-1 were 32.85 ± 55.35 pmol/l, 0.62 ± 0.19 μ mol/l; and 16.41 ± 5.06 pg/ml. The mean 25(OH)D level was 37.1 ± 19.9 nmol/l. It was not correlated to the levels of ADMA and was only borderline related to NT-proBNP ($p=0.068$, $r=0.176 - 0.187$ in the compound, growth and exponential models) and PIGF-1 ($p=0.052$, $r=0.199$ in the compound, growth and power models). Serum total calcium was significantly correlated with NT-proBNP in all models ($p<0.001$, $r=0.522 - 0.533$ in the linear, quadratic, cubic ones) as well as with PIGF-1 - in all models ($p<0.001$, $r=0.380 - 0.437$ in the inverse, quadratic and cubic models). The correlation with ADMA was of borderline significance and only exponential ($p=0.058$, $r=0.194$). Serum phosphates were not correlated to any of the markers.

Conclusions: There is a significant relationship of serum calcium with NT-proBNP and PIGF-1 while their relationship with vitamin D is of borderline significance. Serum calcium and not vitamin D seems to play a more important role in the increased levels of NT-proBNP and PIGF-1.

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THIRTY-ONE MEN AND WOMEN WITH 145 SPONTANEOUS VERTEBRAL FRACTURES AFTER DENOSUMAB DISCONTINUATION: A SINGLE CENTER OBSERVATIONAL STUDY

E. Gonzalez-Rodriguez¹, D. Stoll¹, B. Aubry-Rozier¹, O. Lamy¹

¹Bone Unit, Lausanne University Hospital, Lausanne, Switzerland

Objective: Denosumab discontinuation (DD) induces an increase of B-CrossLaps above baseline values for two years, and a decrease of BMD values. This rebound effect is associated with spontaneous clinical vertebral fractures (SCVF) in close to 15% of patients considering a follow-up of 2 years without taking another osteoporosis treatment. We report the clinical characteristics of 31 patients evaluated at our center from July 2015 to January 2018.

Results: Thirty women and one man, 62.8 ± 10.1 years, experienced 145 SCVF (median 5) in the 11.7 ± 3.0 months (median 11; min 7, max 20) following the last denosumab injection. They received 6.4 ± 2.7 denosumab injection (min 2; max 11). Ten women had vertebroplasties with 22 new SCVF in the following days. Nine women received aromatase-inhibitors (AI) with denosumab. Eight women had prevalent VF, five received bisphosphonate before denosumab. The mean β -CrossLaps value at the time of SCVF was 1511 ± 573 ng/l; β -CrossLaps values increase with the number of denosumab doses ($p=0.05$) and decrease with age ($p<0.01$). The number of SCVF was inversely associated with age ($p<0.004$). Before the vertebroplasty, the mean number of SCVF was 5.1 ± 3.0 vs. 2.3 ± 1.5 in women <65 vs. >65 years. The delay between DD and the occurrence of SCVF increases with age: 10.6 ± 1.6 vs. 13.3 ± 3.8 months, before vs. after 65 years ($p<0.01$). The mean reasons for DD were: end of AI or no more osteoporosis (15), omission (7), patient's wish (5), AFF or dental intervention (4).

Conclusion: The SCVF are a very severe and frequent clinical complication occurring after DD. A close follow-up during 2 years post DD is necessary. Studies are urgently needed to better define: 1) the place of denosumab in osteoporosis treatment; and 2) the strategies to avoid these side effects.

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A SCOPING REVIEW OF PREOPERATIVE INTERVENTION IN PATIENTS WAITING FOR TOTAL KNEE ARTHROPLASTY

J. Rittharomya¹, S. Aree-Ue¹

¹Mahidol University, Bangkok, Thailand

Objective: Alleviation of suffering from waiting for total knee arthroplasty (TKA) is essential for patients with osteoarthritis (OA). Longer waiting time for TKA, patients have faced with severity of knee OA progression, pain, and disability. These symptoms lead to limitation of daily activity and social engagement, resulting in decreasing quality of life. This scoped review aims to identify and synthesize the published research regarding the effects of preoperative intervention in patients waiting for TKA including many types of intervention and specific health outcomes.

Methods: A comprehensive review, from 2004 to June 2016, was applied to the electronic databases (CINAHL, PubMed, PsycINFO, Web of Science, Cochrane Library, and Embase). MESH term and essential keywords used were: “preoperative intervention”, “exercise”, “health education”, and “waiting for TKA”. Eligible articles were: publishing in full-

text, using English language, focusing on patients with knee osteoarthritis waiting for TKA and receiving preoperative intervention such as exercises or health education, or combination.

Results: Based on inclusion and exclusion criteria, the twenty articles were reviewed. Of those, mostly were randomized controlled trial (RCTs) ($n=18$), while two studies were quasi-experimental design. Exercise intervention was most robust in reducing knee OA symptoms, improving physical function, and enhancing quality of life. Sixteen studies (80%) employed the combination of strengthening exercise intervention and health education. All studies evaluated physical function; findings showed significant improvement (60%, $n=12$). Eight of sixteen studies showed significant decrease in pain (50%). Quadriceps muscle strength was examined by nine studies of which seven (78%) showed significant improvement. However, few studies (10%, $n=2$) were rated as having a high risk of bias assessment.

Conclusions: This scoped review reveals significance of exercise training intervention in increasing quadriceps muscle strength, improving physical ability, reducing disease severity, and enhancing quality of life. Further research is needed to examine the effects of interventions on depression and satisfaction since few studies were found in this review. Additionally, practical duration and exact exercise position leading to enhancing compliance are required to investigate in large sample size.

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MULTIPLE SECONDARY OSTEOPOROSIS CAUSES: GREATER RISK OF FRACTURE?

R. C. Pascu¹, I. Soare², L. D. Mazalu¹, A. E. Sirbu², S. Fica²

¹Elias University Hospital, Endocrinology, Diabetes and Nutrition Diseases Department, ²Carol Davila University of Medicine and Pharmacy, Elias' Endocrinology Department, Bucharest, Romania

Osteoporosis is characterized by low bone mass and altered bone microarchitecture, leading to increased risk of fractures. Age, weight, gender, parental fracture, smoking status, alcohol intake, glucocorticoids and secondary osteoporosis are thought to increase the risk of fracture. Hyperthyroidism and hyperparathyroidism are important known risk factors for secondary osteoporosis and fragility fractures, by increasing bone resorption. However, little is known whether the impact on bone density and fracture risk is greater when these diseases co-exist.

Case report: We report the case of an 82-year-old female patient, non-smoker, known with multinodular goiter for 10 years, who was admitted to our department with heart palpitations, weight loss. Patient medical history included hypertension, chronic heart failure NYHA Class II and atrophic gastritis. Clinical examination showed low BMI, high blood pressure, accelerated heart rate. Blood tests depicted hyperglycemia and high glycated hemoglobin (7.7%), hypercalcemia (11.8 mg/dl), normal creatinine (0.67 mg/dl), elevated PTH (168.2 pg/ml), insufficient level of 25-OH-Vitamin D (15.73 ng/ml), suppressed TSH, elevated thyroid hormones and negative thyrotropin receptor antibodies. Thyroid ultrasonography revealed multiple macro-nodules with macro-calcification. Thus, the diagnoses were toxic multinodular goiter, primary hyperparathyroidism and type 2 diabetes mellitus. We performed bone densitometry, which indicated osteoporosis: L1-L4 bone mass density (BMD)=0.71 g/cm² and T-score=-3.9 SD; total left femur BMD=0.49 g/cm² and T-score=-4.1 SD, and the lowest BMD (0.24 g/cm²) and T-score (-7.2 SD) in the distal radius. Trabecular bone score (TBS) in L1-L4 was 1.11 and T-score=-3.7. The Fracture Risk Assessment Tool showed a 10-year risk of 8.1 for

hip fracture and 13 for major fracture. Spine X-ray did not show any fragility fractures. Treatment was initiated with anti-thyroid drugs (methimazole 20 mg/d) and β -blocker. Regarding osteoporosis and hypercalcemia, we opted for conservative treatment with antiresorptive therapy - bisphosphonates IV (zoledronate) and with vitamin D 2000 UI/d.

Conclusion: Despite the multiple risk factors for fragility fracture (age, gender, weight), the co-existence of two causes of secondary osteoporosis (hyperthyroidism and primary hyperparathyroidism) and the very low BMD and TBS values, the patient had no fracture. Considering the high risk surgery factors and patient's will, conservative treatment and long-term follow-up were elected.

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HIGH POSTURAL SWAY PREDICTS FRACTURES IN ELDERLY WOMEN

S. L. Qazi¹, J. Sirola², H. Kröger^{1,2}, R. Honkanen¹, M. Isanejad¹, O. Airaksinen³, T. Rikonen¹

¹ Kuopio Musculoskeletal Research Unit (KMRU), University of Eastern Finland, Kuopio Finland, ² Department of Orthopaedics, Traumatology and Hand Surgery, Kuopio University Hospital, Kuopio, Finland, ³ Department of Physical and Rehabilitation Medicine, Kuopio University Hospital, Kuopio Finland

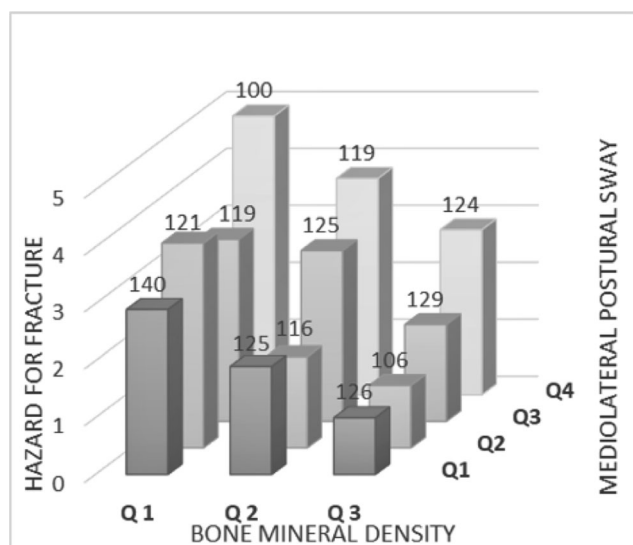
Objectives: To investigate the effect of postural sway on fracture risk in elderly women after controlling for FRAX (fracture risk assessment tool) fracture risk factors. Also, to study the risk of fracture in women with simultaneous high postural sway and low bone density (BMD).

Methods: The study sample was based on OSTPRE cohort (14220) which was established in 1989 and consists of elderly women born between 1932-1941, residing in Kuopio Province. Using static posturography, postural sway was recorded for 1568 women at the fifth year follow-up. Mediolateral, anteroposterior and total sway parameters were used for analysis. BMD was measured at the femoral neck using DXA. Fracture data was obtained through study questionnaires and was verified through hospital records. Mortality data was verified through national registry. Mean follow-up time was 10.7 years for fractures and 17.5 years for mortality.

Results: At the end follow-up, subjects in the highest quartile of mediolateral sway (HR 2.0; 95%CI 1.5-2.7), anteroposterior sway (HR 1.4; 95%CI 1.0-1.9) and total sway (HR 1.6; 95%CI 1.2-2.2) were found to be at a higher risk of overall fracture when compared with subjects of the first quartile. The risk persisted even after adjustment for FRAX fracture risk factors. Further, subjects having low BMD and high postural sway simultaneously, were at a 4.9 times higher risk of fracture (95%CI 2.6 - 9.5) when compared with subjects having high BMD along with low postural sway (Figure 1). There was a significantly increased risk of death in subjects with a high postural sway, but the risk was statistically nonsignificant after adjusting for covariates.

Conclusions: High postural sway is an independent predictor of increased fracture risk in elderly women. A combination of low bone density and high postural sway pose a higher risk of fracture than either of the risk factors alone.

Figure 1. Hazard ratio for fracture in subjects grouped according to BMD tertiles and mediolateral sway quartiles (numbers on tops of bars represent number of subjects in each group)



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LOWER LIMBS ACUTE NEUROMUSCULAR RESPONSES OF LUPUS PATIENTS WITH CHRONIC GLUCOCORTICOID USE TO WHOLE BODY VIBRATION: A RANDOMIZED CLINICAL TRIAL

C. F. Dionello¹, P. L. Souza¹, E. Moreira-Marconi¹, D. S. Morel¹, A. Ferreira¹, M. Crivelli¹, P. J. Marín², E. M. Klumb¹, M. Bernardo-Filho¹

¹Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brazil,

²Check your motion Institute, Valladolid, Spain

Objectives: Glucocorticoid induced osteoporosis (GIOP) is one of the most important causes of morbidity in lupus patients. Whole body vibration exercises (WBVE) may be a safe alternative to prevent and amend bone damage, and may decrease muscle related risk factors for falls, especially in a group of patients that should not be sun exposed. It is possible to evaluate neuromuscular responses to mechanical vibrations through surface electromyography of the muscles (sEMG), and this way define the best protocol of exercises since the beginning. Our aim was to analyze and compare the acute responses on sEMG of lower limbs of female lupus patients with and without bone impairments and chronic glucocorticoid use and healthy controls while being submitted to mechanical vibrations.

Methods: All the patients had DXA scans for body composition, that evaluated right hip, lumbar segment and whole body. After DXA they were divided in three groups. Twenty-seven women (SLEOP, SLE and control group) were submitted to WBVE, on different frequencies and same amplitude. The experiment was performed in two days, 48 h apart. The patients stood on half squat position on a vertical vibrating platform at different exposure frequencies (30, 40 and 50 Hz), and same amplitude ("low") in both days. The peak acceleration (a_{peak}) was measured with an accelerometer. It was obtained vastus lateralis (VL), gastrocnemius medialis (GM) and tibialis anterioris (TA) sEMG analysis simultaneously while performing the exercises, in a randomized manner.

Results: All the patients were able to perform the protocol, which was proven to be safe. It was demonstrated that most patients were overweight or obese in body composition evaluation. There was no differences between sarcopenia index among groups, despite the bone impairment of the SLEOP group. The greatest muscle activation occurred in the lower

frequency applied for VL. It was found group x frequency difference only for GM ($p=0.034$; $\eta^2=0.272$).

Conclusions: WBVE is a safe and viable physical exercise for lupus patients with chronic glucocorticoid. The results of this study suggest that these patients may have similar neuromuscular activity to healthy controls, so the protocols may be similar to same age and sex patients.

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THE EFFECT OF ORAL BISPHOSPHONATES ON ACUTE KIDNEY INJURY, GASTROINTESTINAL EVENTS AND HYPOCALCAEMIA IN PATIENTS WITH CHRONIC KIDNEY DISEASE

D. E. Robinson¹, M. S. Ali¹, N. Pallares², C. Tebe², C. Cooper³, B. Abrahamsen⁴, F. Caskey⁵, Y. Ben-Shlomo⁶, A. Judge⁷, M. K. Javaid¹, A. Díez-Pérez⁸, D. Prieto-Alhambra¹

¹Oxford NIHR Biomedical Research Centre, Nuffield Department of Orthopaedics, Rheumatology, and Musculoskeletal Sciences, University of Oxford, Oxford, UK, ²Statistical Assessment Service at Bellvitge Biomedical Research Institute (IDIBELL), L'Hospitalet de Llobregat, Barcelona, Spain, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, ⁴Odense Patient Data Explorative Network, Institute of Clinical Research, University of Southern Denmark, Odense, Denmark, ⁵UK Renal Registry, Southmead Hospital, Bristol, UK, ⁶Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK, ⁷Translational Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK, ⁸Hospital del Mar Institute of Medical Investigation, UAB, CIBERFES, Barcelona, Spain

Objective: Oral bisphosphonates (oBP) are contraindicated in patients with severe chronic kidney disease (CKD), but there is a lack of data on safety in this area. We aimed to study the association between oBP use and risk of acute kidney injury (AKI), gastrointestinal events (GIE) and hypocalcaemia (HC) in patients with moderate-severe CKD.

Methods: Patients with stage 3B+ CKD (eGFR<45) were identified in two primary care records databases from the UK (CPRD) and Spain (SIDIAP) linked to hospital inpatient data. Patients with CKD exposed to oBP were identified and matched to up to 5 patients from the same database using propensity score matching. Confounders included a priori defined variables: age, gender, concomitant diseases and medications. Missing data within covariates (creatinine (SIDIAP), BMI, alcohol use, and smoking) were imputed using multiple imputation. First AKI, GIE and HC events were identified for each patient as the outcomes of interest. Analyses were undertaken for each outcome and each database separately. Patients were censored at the event, death, end of study or database, or 210 days after the final prescription whichever came first. Cox regression models were used. Absolute rates were calculated per 10,000 person years.

Results: In CPRD there were 9988 exposed patients matched to 40,068 unexposed patients. In SIDIAP the numbers were 4143 and 20,165. For AKI there were 1668 events in CPRD and 1456 in SIDIAP; HR (95%CI) were 1.17 (1.04, 1.31) in CPRD and 1.08 (0.93, 1.25) in SIDIAP with absolute event rates of 132.8, 103.2, 166.2 and 153.1 for exposed and unexposed in CPRD and SIDIAP, respectively. This gave a pooled HR (95%CI) of 1.14 (1.04, 1.24). For GIE there were 832 events in CPRD and 178 events in SIDIAP, with HRs of 1.03 (0.83, 1.24) and 1.53 (1.01, 2.32), respectively, with absolute event rates of 52.1, 61.0, 25.2 and 17.3. This gave a pooled HR (95%CI) of 1.11 (0.93, 1.33). Finally, 137 HC events were identified in CPRD, and 6 in SIDIAP; HRs were 0.94 (0.57,

1.54) in CPRD, but not calculated in SIDIAP due to low HC events. Absolute event rates were 9.7, 8.4, 1.4 and 0.5.

Conclusion: oBP use may increase the risk of AKI by about 15% in patients with moderate-severe CKD. A 50% excess risk of GIE is seen in one of the databases but not in the other. HC was extremely rare and not related to oBP use.

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PHYSICAL PERFORMANCE IS ASSOCIATED WITH SELF-REPORTED AND CLINICAL OSTEOARTHRITIS, BUT NOT RADIOGRAPHIC OSTEOARTHRITIS IN BOTH SEXES

M. A. Clynes¹, K. A. Jameson², M. H. Edwards², C. Cooper³, E. M. Dennison¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ²MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ³MRC Lifecourse Epidemiology Unit, University of Southampton and NIHR Musculoskeletal Biomedical Research Unit, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Southampton and Oxford, UK

Objectives: We have previously demonstrated relationships between self-reported and clinical hip and knee osteoarthritis (OA) and physical performance (PP) but not for a radiographic definition of OA. Here we extended this analysis to consider whether the relationships are the same in both sexes, and are similar for other comorbidities.

Methods: Data were available for 222 men and 221 women who participated in the UK component of the European Project on Osteoarthritis (EPOSA). Participants completed a questionnaire detailing past medical history including self-reported OA and other comorbidities. Hip and knee radiographs were taken and graded for overall Kellgren and Lawrence (K & L) score, a positive definition reflecting a score of 2 or above. PP was determined from assessments of walking speed, chair stands and balance to create a composition score (0-12); low PP was defined as ≤ 9 .

Results: The mean (standard deviation (SD)) age of study participants was 75.5 (2.5) and 75.8 (2.6) years in men and women respectively. Self-reported hip or knee OA was associated with poor PP in men (OR 2.39, 95%CI 1.17, 4.87 $p=0.016$) and women (OR 2.66, 95%CI 1.24, 5.72 $p=0.012$). Similarly, a significant association was found between a clinical diagnosis of hip or knee OA and low PP in both men (OR 3.78, 95%CI 1.36, 10.49 $p=0.011$) and women (OR 4.08, 95%CI 1.37, 12.15 $p=0.012$). No significant relationships were observed between radiographic hip or knee OA and PP. Significant associations were also observed between low PP and hypertension in both men (OR 1.78, 95%CI 1.01, 3.11 $p=0.044$) and women (OR 2.09, 95%CI 1.10, 3.97 $p=0.025$). An association was found between low PP and heart disease (OR 2.39, 95%CI 1.17, 4.87 $p=0.016$) and diabetes (OR 2.47, 95%CI 1.05, 5.83 $p=0.039$) but in men only. Considering relationships with other comorbidities, no significant association was observed between low PP and osteoporosis, thyroid disease, depression, cancer, lung disease and stroke in both men and women.

Conclusions: We have demonstrated a relationship between low PP and self-reported and clinical OA, but not radiological OA, in both men and women. Equivalent relationships were not observed with most other common comorbidities, suggesting mechanical joint factors may drive this association.

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CONSEQUENCES OF RELEVANT MUSCLE FUNCTION DECLINE OVER 1 YEAR IN OLDER INDIVIDUALS LIVING IN THE COMMUNITY: RESULTS FROM THE SARCOPHAGE STUDY

M. Locquet¹, C. Beaudart¹, J.-Y. Reginster¹, O. Bruyère¹

¹Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objectives: Studies exploring the impact of a short-term muscle function decline are lacking. Our aim was to characterize the muscle function decline of older adults over one year and its association with adverse outcomes, observed over the 2 following years.

Methods: The SarcoPhAge cohort was developed in 2012 to assess the long-term adverse consequences of sarcopenia. Annually, an assessment of muscle mass (DXA), muscle strength (handheld dynamometer) and physical performance (SPPB) is performed. A clinical assistant collects data on falls, fractures, hospitalizations and physical disabilities. For participants not able to attend the visit, information about these outcomes plus institutionalization and death are collected by phone call. Relevant decline in muscle mass and strength over one year is evaluated using the Edwards-Nunnally method. For the SPPB, a clinically relevant decline in physical performance corresponds to a loss of 1 unit in 1 year.

Results: Out of the 534 subjects were recruited in this study (73.5±6.2 years, 60.5% women), 248 had completed data for the 3 years of follow-up. The incidence of relevant decline after one year of follow-up was 21.0% for muscle mass, 38.7% for muscle strength and 8.5% for physical performance. Older individuals experiencing a relevant decline in physical performance were no more subject to falls, fractures, institutionalizations and death nor for subjects presenting a relevant muscle mass and strength decline (all $p>0.05$). Individuals with a relevant decline in physical performance were more likely to be hospitalized within the 2 following years (61.9% vs. 36.5%, adjusted $p=0.04$). Individuals with a relevant decline in muscle strength or muscle mass were more often hospitalized than those without: respectively, 2.2±1.5 vs. 1.6±1.0 (adjusted $p=0.04$) and 2.5±1.7 vs. 1.7±1.0 (adjusted $p=0.04$). Subjects with a relevant decline in muscle mass were hospitalized for a longer duration than those without: 8.8±4.6 days vs. 4.6±4.5 (adjusted $p=0.02$).

Conclusion: A clinically relevant decline in muscle function over 1 year was associated with an increased number of hospitalizations and length of stay but not with other major outcomes.

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DETERMINANTS OF RAPID MUSCLE FUNCTION DECLINES OVER 1 YEAR IN COMMUNITY-DWELLING OLDER ADULTS: THE SARCOPHAGE STUDY

M. Locquet¹, C. Beaudart¹, J.-Y. Reginster¹, O. Bruyère¹

¹Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objectives: Reduced muscle function has been associated with lots of adverse events. However, determinants of the loss of muscle function remain under-explored. Our aim was to explore determinants affecting the rapid decline of muscle function in older subjects over 1 year.

Methods: Data were collected from the SarcoPhAge cohort, a study following 534 community-dwelling older adults (aged minimum 65). An assessment of muscle mass (DXA), muscle strength (handheld dynamometer) and physical performance test (SPPB) are performed annually. Numerous clinical data are annually collected: age, sex, BMI, nutritional

status using Mini Nutritional Assessment and cognitive status using the Mini Mental State Examination (MMSE). A relevant decline between baseline measurements of muscle mass and strength and those after 1-year was evaluated using the Edwards-Nunnally method. A clinically relevant decline in physical performance was considered to be a loss of 1 unit in the SPPB test, over 1 year.

Results: 534 subjects were involved at baseline (73.5±6.2 years, 60.5% women) but 248 older subjects presented sufficient data for the analysis after the 3rd year of follow-up. The incidence of muscle mass decline over 1 year was 21.0%. Compared to subjects without muscle mass decline, those with a relevant change were more often male (29.1% vs. 92.3%, $p<0.001$), had a lower BMI (27.8±4.2 vs. 26.3±4.3, $p=0.02$), a poorer nutritional status (84.6% of malnutrition vs. 28.1%, $p<0.001$) and a weaker cognitive status (27.9±2.3 at MMSE vs. 28.6±1.5, $p=0.02$). The incidence of muscle strength decline over 1 year reached 38.7% and no difference in between baseline characteristics of subject with or without relevant change was found (all $p>0.05$). The incidence of physical performance decline over 1 year reached 8.5%, being associated with age and cognitive status: respectively, 75.3±6.1 years in subjects with physical decline vs. 71.9±5.4 years ($p=0.01$) and 26.7±3.9 at MMSE for subjects with functional decline vs. 28.6±1.4 ($p<0.001$).

Conclusion: 21% of our older subjects presented a rapid decline in muscle mass and 8.5% a physical function decline which could be influenced by age, sex, BMI, nutritional status and cognitive status.

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LOW BMD AND RISK OF FALLS ARE INCREASED AMONG INDIVIDUALS WITH RHEUMATOID ARTHRITIS: FINDINGS FROM UK BIOBANK

M. A. Clynes¹, K. A. Jameson¹, D. Prieto-Alhambra², N. C. Harvey¹, C. Cooper³, E. M. Dennison¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, ²Centre for Statistics in Medicine, University of Oxford, Oxford, ³MRC Lifecourse Epidemiology Unit, University of Southampton and NIHR Musculoskeletal Biomedical Research Unit, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Southampton and Oxford, UK

Objectives: Rheumatoid arthritis (RA) has previously been associated with adverse musculoskeletal outcomes. The current study aimed to explore if RA is a predictor of reduced BMD and falls, using baseline data from the UK Biobank cohort.

Methods: The study population comprised 500,954 people aged 37-73 years. A diagnosis of RA was identified in participants from the UK Biobank using Hospital Episode Statistics using ICD-10 codes M05 and M06. Multivariable logistic and linear regressions were used to assess the relationships with estimated BMD (eBMD) as assessed by heel ultrasound, and with falls (occurring in the year prior to baseline interview, and recorded by self-report).

Results: Of 500,954 participants (median age 58 years (IQR 50-63)), 5476 (1.1%) were found to have a diagnosis of RA. 321,904 participants had heel ultrasound measurements performed generating a mean eBMD T-score of -0.32. Data were available for self-reported falls in 499,956 participants, of which a total of 99120 (19.8%) had fallen in last year, with 65968 (13.2%) having had just one fall and 33152 (6.6%) having had more than one fall. A diagnosis of RA was positively associated with having a lower eBMD (mean diff. T-score -0.346, 95%CI -0.386, -0.306 $p<0.01$, adjusted for sex). Furthermore, individuals with a diagnosis of RA were also significantly more likely to report a fall in the last year

than those without (OR 2.01, 95%CI 1.90, 2.13 $p<0.01$, adjusted for sex). These observations remained significant after adjustment for potential confounders (age, ethnicity, BMI, smoker status and activity).

Conclusions: In this cross-sectional analysis, RA was associated with lower eBMD and an increased likelihood of falls. As both low eBMD and falls are independent risk factors for fracture, these data may help inform future strategies for reducing fracture risk in individuals with RA. This research has been conducted using the UK Biobank Resource.

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RISK FACTORS OF VITAMIN D DEFICIENCY AMONG UKRAINIAN WOMEN IN CARPATHIAN REGION

I. Pankiv¹

¹Bukovinian State Medical University, Department of Endocrinology, Chernivtsi, Ukraine

Objective: Vitamin D deficiency is present in over half of population worldwide. It has been long known that vitamin D deficiency contributes to development of osteopenia and osteoporosis. The aim of the study was to assess some risk factors of vitamin D deficiency among Ukrainian women in Carpathian region.

Methods: 495 women aged 18-82 years were entered in this cross-sectional study from 2014-2016. Serum 25-hydroxyvitamin D levels were measured in all participants after recruiting their demographic and anthropometric data and past medical histories.

Results: The prevalence of vitamin D deficiency and insufficiency was 93.1%. Analysis of logistic regression shows that age (OR: 0.98, CI: 0.94-0.99) and menopause (OR: 0.42, CI: 0.23-0.97) were independent predictive factors for vitamin D deficiency.

Conclusions: This study showed a high prevalence of vitamin D deficiency among Ukrainian women especially in reproductive age.

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BMD, TRABECULAR BONE SCORE AND FRAX® IN POSTMENOPAUSAL WOMEN WITH PREVIOUS FRACTURES WITHOUT OSTEOPOROSIS

N. Grygorieva¹, V. Povoroznyuk¹

¹D.F. Chebotarev Institute of Gerontology NAMS of Ukraine, Kyiv, Ukraine

Objective: BMD and trabecular bone score (TBS) are independent parameters of bone which are measured by DXA and effective parameters that predict osteoporotic fractures risk. Fracture Risk Assessment Tool (FRAX®) and adjusted FRAX by TBS are simple calculators which integrate clinical information regardless of BMD and assess the 10-years probability of osteoporotic fractures for major osteoporotic fractures (MOFs) and hip fracture (HF). Significance of these parameters were confirmed in various studies, however, data in patients without osteoporosis with previous fractures is limited. The purpose was to study indices of BMD, TBS, FRAX® and adjusted FRAX by TBS in postmenopausal women without osteoporosis with different types of low-energy fractures.

Methods: We examined 259 postmenopausal women aged 50 years and older without osteoporosis confirmed by DXA. Patients were divided into two groups depending on previous fractures. In addition, women with fractures were divided according to fracture localization: vertebral fractures (VF; n=64), humerus fractures (HF; n=28), wrist fractures (WF; n=35), combine vertebral and peripheral fractures (CVPF; n=34) and combine peripheral fractures (CPF; n=28). BMD and TBS were

measured by DXA (Lunar, Prodigy), assessment of 10-years probability of osteoporotic fractures was performed by FRAX[®] and adjusted FRAX by TBS. FRAX scores with BMD (FRAX/BMD) and BMI (FRAX/BMI) were calculated.

Results: We found out that indices of total mean and lumbar spine BMDs were lower only in women with VF, WF of CVPF compare to results of patients without fractures. TBS was lower only in group with CVPF compared to results in women without fractures. FRAX/BMI-MOF indices were significantly higher for women independently from type of fractures, however, FRAX/BMI-HF were reliably higher only in women with VF and CVPF compared to parameters of the group without previous fractures (WPF). Similar differences were observed in parameters of adjusted FRAX by TBS. In addition these indices in women with CVPF were significantly higher comparing with the same parameters in women with HF and WF, though they did not differ in comparison with indices in women with VF. Indices of FRAX/BMD-MOF were significantly higher in women independently from type of fractures, except for patients with HF, which did not differ from patients WPF. In addition, parameters of FRAX/BMD-HF were higher than same in patient's WPF only for women with VF and CVPF.

Conclusion: FRAX[®] and adjusted FRAX by TBS are important indices for fractures risk assessment in postmenopausal women without osteoporosis with previous fractures which propose additional information without BMD measurement.

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INDICES OF HIP STRUCTURAL ANALYSIS IN UKRAINIAN WOMEN

N. Grygorieva¹, V. Povoroznyuk¹, V. Povoroznjuk¹, O. Zubach¹

¹D.F. Chebotarev Institute of Gerontology NAMS of Ukraine, Kyiv, Ukraine

Objective: Nowadays, a comprehensive assessment of osteoporosis and the risk of osteoporotic fractures involves the combine use of BMD, 10-year probability of major osteoporotic fractures (FRAX, Fracture Risk Assessment Tool), trabecular bone score (TBS), and parameters of hip structural analysis (HSA). In recent years reference data on the three above-mentioned methods have been developed for the Ukrainian population, but there are no data on the latest methodology. The purpose of the study was to assess the age characteristics of hip structural analysis parameters in Ukrainian women and to offer their reference indices for use in clinical practice.

Methods: Using the DXA method, we examined 690 healthy women aged 20-89 years without osteoporosis and other clinically significant diseases and conditions affecting the bone metabolism, without other accompanying pathology of hip joint.

Results: The results of the study showed a significant effect of age on FSI, CSMI, CSA, d1, d2, d3, y, α and HAL indices, but not on parameters of θ . A significant decrease of FSI with age was established on the background of increase of CSMI, CSA and HAL parameters. Indices of height and body weight were reliably related with parameters of CSMI, CSA and HAL. Femoral strength index (FSI) was significant related to body weight, but not to height. In addition, it reliably correlated with BMD measured at femoral neck and less at total hip and lumbar spine. The hip axis length (HAL) did not significant correlate with any of the measured BMD, which confirms its independent role in prediction of hip fractures risk.

Conclusions: The obtained normative indices of the hip structural analysis in healthy Ukrainian women can be used for a comprehensive assessment of bone status and hip fractures risk.

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BILATERAL FEMORAL SHAFT FRACTURES AFTER INTERRUPTION OF LONG TERM ALENDRONATE THERAPY AND ONE YEAR TREATMENT WITH DENOSUMAB. 2 YEAR FOLLOW UP AFTER IM NAILING AND ANABOLIC BONE TREATMENT

G. A. Skarpas¹, G. Karaliotas¹, N. Barbounakis¹, T. Piperos², K. Tsiavos¹, T. Mariolis-Sapsakos²

¹Evgenideio University Clinic, Orthopaedic Dept., ²University of Athens, Nursing Dept., Athens, Greece

The use of bisphosphonates as first-line treatment for postmenopausal osteoporosis is well documented. Although therapy with alendronate is generally safe and effective, several concerns have been raised about potential oversuppression of bone turnover and the occurrence of atypical subtrochanteric and femoral shaft fractures during long-term use. Several cases and reviews have reported the high incidence of such fractures, in terms of evidence—base medicine the aspect is not yet proven. We present a series of 7 women that sustained spontaneous femoral shaft fractures, 2 bilateral, in a period of 12 months after the interruption of long term alendronate therapy and the onset of treatment with Denosumab. After analyzing the characteristics and clinical evolution of these fractures and the possible correlation between long-term alendronate therapy and femoral fractures, we suggest and recommend possible measures for prophylaxis and treatment, both surgical and pharmacological.

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PROPRIOCEPTIVE CHANGES AND FUNCTIONAL OUTCOME IN TOTAL KNEE ARTHROPLASTY DUE TO ARTHRITIS

G. A. Skarpas¹, K. Karzis², N. Barbounakis¹, K. Tsiavos¹, G. Karaliotas¹

¹Evgenideio University Clinic, Orthopaedic Dept., ²Asclepieion Voulas General Hospital, Physiotherapy Dept., Athens, Greece

Objective: The role of the posterior cruciate ligament (PCL) remains controversial in total knee arthroplasty (TKA). It is recognized that awareness of joint position in the knee deteriorates because of aging, anterior cruciate injury, or osteoarthritis. Proprioception was studied after TKA, in both PCL-retaining and posterior stabilizing (PS) prosthetic designs.

Method: In a clinical prospective study, proprioception was measured in two groups of patients following successful TKA) In one group (15 pts), the posterior cruciate ligament was retained and an unconstrained cruciate-retaining total knee component was used; in the other group (15 pts), the posterior cruciate ligament was excised and a cruciate-substituting design was implanted. All measurements obtained with the use of the electronic dynamometer Con-Trex MJ (Con-Trex, Zurich, Switzerland). All pts followed a specialized and supervised rehabilitation program. For the proprioceptive assessment, reproduction of joint position (JPS) in predetermined angles (30° και 60°) as well as sense of joint movement were measured, together with threshold to detection of passive motion in flexion and extension. Also concentric quadriceps and hamstrings strength at 600/sec and 1200/sec was evaluated. The degree of preoperative arthritis was objectively classified according to Resnick and Niwoyama. Each patient completed a self-administered, validated Total Knee Function Questionnaire (TKFQ) as well as the SF-36. Knee functional capacity was evaluated with the use of KSSTA/IKDC scores. The statistical analysis was performed using T-test for independent samples. The statistical level was set at p<0.05.

Results: At 12 months post-op, statistically significant differences were detected between the 2 groups in all proprioceptive tests of function following total knee replacement, including overall satisfaction with operation. Moreover, the TKFQ revealed that patients with PS knees reported greater functional limitations in squatting, kneeling, and gardening. Better stair climbing ability was attributed to cruciate retaining knees. Also they demonstrated quicker recovery of sense of joint movement and significantly lower threshold to detection of passive motion in flexion mainly as well as wider ROM. In patients with a moderate grade of arthritis before surgery, the postoperative scores were virtually identical. When the grade of preoperative arthritis was severe, patients with cruciate-retaining TKAs performed significantly better than those with PS-TKAs.

Conclusion: Our preliminary results demonstrate controversial findings. There are significant differences concerning satisfaction after surgery and better and quicker functional outcome seem to be present in favour of PCR-TKAs. After a minimum duration of follow-up of 12 months, there was significant difference in clinical but not in radiographic results of the two methods. Longer follow-up is needed in order to verify the findings.

P652

PATIENTS' KNOWLEDGE AND OPINIONS REGARDING OSTEOPOROSIS, OSTEOPOROTIC TREATMENTS AND ORAL HEALTH

P. Rotman-Pikielny¹, M. Leonenko², L. Barzilai¹, D. Nabriski¹, O. Twito¹, R. Kagan³

¹Metabolic Bone Diseases Service, Endocrine Institute, Meir Medical Center, affiliated with the Sackler Faculty of Medicine, Tel Aviv University, ²Department of Nursing Management, Meir Medical Center, ³Oral and maxillofacial Surgery Unit, Meir Medical Center, affiliated with the Sackler Faculty of Medicine, Tel Aviv University, Kfar Saba, Israel

Objective: Osteonecrosis of the jaw is a rare side effect of antiresorptive treatment for osteoporosis, occurring in <0.001% of patients, especially those undergoing invasive dental procedures. Despite lack of conclusive evidence, professional societies recommend suspending antiresorptive treatment before invasive dental procedures. Lack of knowledge/misbeliefs might lead patients to discontinue antiresorptive treatment prematurely or avoid necessary dental procedures. This study assessed patients' knowledge and opinions regarding the association between osteoporosis, osteoporosis treatments and oral health.

Methods: In this observational study, conducted in Israel, outpatients with osteopenia/osteoporosis completed questionnaires, including sociodemographics, internet use, osteoporosis and oral hygiene status, and knowledge regarding the effect of osteoporosis and osteoporotic treatments on oral health and procedures.

Results: Among 258 patients (68.5±9.3 years, 93% female), 66.5% had <12 years of education, 62.5% were native Hebrew speakers and 53.7% were exposed to the internet daily. 83.9% had osteoporosis, one-third had a previous osteoporotic fracture and 66.8% were on antiresorptives, including oral bisphosphonates, zoledronic acid and denosumab. 79.9% saw a dentist during the last year and 29.0% had an invasive dental procedure. Yet, 70% of the dentists did not inquire about the type or duration of osteoporosis treatment. Participants had minimal knowledge regarding associations among osteoporosis, its pharmacotherapy and oral health: 57% thought osteoporosis had no long-term complications, one-third thought it could damage existing crowns or implants and 70% it might increase gum disease. 70% thought one should stop osteoporosis treatment before having an implant, and 30% before cavity

repair. 60% acquired information from professional staff and 90% wanted to learn more about the subject.

Conclusions: Outpatients with osteoporosis and osteopenia have minimal knowledge about associations between osteoporosis, osteoporotic treatments and oral health. The medical community should provide balanced, accurate information to help patients prioritize healthcare and avoid unnecessary osteoporosis treatment interruptions.

P653

MACROELEMENTAL COMPOSITION OF BONE REGENERATE IN RATS AFTER 60-DAY APPLICATION OF SODIUM BENZOATE

O. Fastova¹, V. Luzin¹, V. Morozov², H. Morozova², N. Mosyagina¹

¹LPR SE "St. Luke State Medical University of Lugansk", Lugansk, Ukraine, ²Belgorod National Research University, Belgorod, Russia

Objectives: To examine chemical composition features of bone regenerate in rats after 60-day sodium benzoate (SB) intake in various concentrations.

Methods: The experiment involved 210 male thoroughbred rats with initial body weight of 200-210 grams. The 1st group (K) comprised animals that received daily *per os* 1 ml of 0.9% solution of NaCl, the 2nd and the 3rd groups (SB1 and SB2) received *per os* 1 ml of SB in dosage of 500 or 1000 mg per kg of body weight daily, the 4th group (D) comprised animals with defect in both tibiae made when in groups 2 and 3 SB was discontinued. The 5th and the 6th groups (DSB1 and DSB2) comprised the rats who received SB and had defects in tibiae also made after SB discontinuation. Observation terms constituted 3, 10, 15, 24, and 45 days after discontinuation of experimental influences. Upon expiration of observation terms bone regenerate samples were prepared for chemical analysis and atomic absorption spectrometry.

Results: In DSB1 group, mineral share in bone regenerate was higher than that of D group on the 3th and the 15th days by 5.03% and 5.30%, and the organic content on the 15th and the 24th days and Ca/P ratio from the 15th to the 45th days were lower than those of the control group by 4.36%, 4.95%, 6.61%, 6.53% and 7.55% respectively (here and below $p < 0.05$ in all cases). In DSB2 group, mineral share in bone regenerate was higher than that of D group in the 19th day by 3.98%, and Mg content on the 3th, 10th, 24th, and the 45th days – by 5.35%, 4.97%, 6.10%, and 5.26% respectively. Organic substances share, Ca share and Ca/P ratio were lower than those of the control group in the period from the 15th to the 45th days of observation by 6.19%, 6.92% and 4.43%, by 7.82%, 5.37% and 5.11% and by 12.71%, 9.49% and 10.43% respectively.

Conclusions: SB intake thus slows down formation of macroelemental composition of tibia regenerate in the period from 3th to 45th days of observation. Intensity and duration of alterations depend directly on dosage of SB.

P654

TRIAL IN PROGRESS: A MULTICENTER PROSPECTIVE STUDY ON THE EFFICACY AND SAFETY OF DENOSUMAB IN GASTROINTESTINAL CANCER PATIENTS RECEIVING SHORT-TERM PERIODIC STEROID PREMEDICATION FOR PREVENTION OF CHEMOTHERAPY-INDUCED NAUSEA AND VOMITING (ESPRESSO-02)

T. Muranaka¹, M. Nakamura², M. Yagisawa¹, Y. Kobayashi³, K. Harada³, S. Sogabe⁴, M. Dazai⁵, O. Okamura⁶, S. Yuki⁷, A. Ishiguro⁸, Y. Tsuji⁶, K. Ono⁹, N. Sakamoto⁷, Y. Komatsu¹

¹Department of Cancer Center, Hokkaido University Hospital, Sapporo, ²Department of Gastroenterology, Sapporo City General Hospital, Sapporo, ³Department of Medical Oncology, Kushiro Rosai Hospital, Kushiro, ⁴Department of Gastroenterology, KKR Sapporo Medical Center, Sapporo, ⁵Department of Gastroenterology, Sapporo Medical Center NTT EC, Sapporo, ⁶Department of Medical Oncology, KKR Sapporo Medical Center Tonan Hospital, Sapporo, ⁷Department of Gastroenterology and Hepatology, Hokkaido University Graduate School of Medicine, Sapporo, ⁸Department of Medical Oncology, Teine Keijinkai Hospital, Sapporo, ⁹Hokkaido University Hospital Clinical Research and Medical Innovation Center, Sapporo, Japan

Objective: We previously reported that short-term periodic premedication of glucocorticoids (GCs) used with chemotherapy for gastrointestinal cancer (GIC) caused the reduction of BMDs and the increase of serum bone alkaline phosphatase (BAP) (ESPRESSO-01 study; Oncologist 2017;22:592). Surprisingly, it seems that the BMD decreasing levels due to only the 16-week GC usage in GIC chemotherapy were comparable to that of the 12-month adjuvant aromatase inhibitor therapy for early stage breast cancer patients or the 12-month androgen deprivation therapy for nonmetastatic prostate cancer patients. So we conducted this study to evaluate the efficacy and safety of denosumab for prevention of chemotherapy-induced BMD decreasing.

Trial design: This is a multicenter single-arm prospective study to evaluate the efficacy and safety of denosumab in GIC patients receiving the short-term periodic steroid premedication. The key eligibility criteria are as follows: 1) Histologically confirmed adenocarcinoma in GIC, including esophageal, gastric, pancreatic, and biliary cancer.; 2) A schedules of periodical intravenous steroid administration as premedication that was weekly, biweekly, and triweekly, and in which >4-week steroid-free intervals were not allowed.; 3) High risk patient with steroid induced secondary osteoporosis.; 4) No prior treatment for osteoporosis. The dose of denosumab is 60 mg administered as a single subcutaneous injection within a week before the induction of chemotherapy. All participants should receive adequate calcium and vitamin D supplementation. The primary endpoint is to investigate the BMD change and bone turnover markers (serum NTX and BAP levels) between baseline and 16 weeks after induction of chemotherapy. And the secondary endpoints are to compare and evaluate the difference of primary site, treatment regimen, dose intensity of steroids, newly bone fractures, and the FRAX output.

Acknowledgement: This study is sponsored by Hokkaido Gastrointestinal Cancer Study Group and registered as UMIN000023855.

P655

LOW LEVEL OF PTH IN ELDERLY PATIENTS WITH LOW-ENERGY FRACTURES AND VITAMIN D DEFICIENCY

D. Rizina¹, G. Runova², V. Fadeyev², L. Farba¹

¹City Hospital No. 13, ²Sechenov University, Moscow, Russia

Objectives: The osteoanabolic treatment, teriparatide, especially recommended for patients with severe osteoporosis, after low-energy fractures. However, the appointment of teriparatide in cases of undiagnosed primary hyperparathyroidism (pHPT) can worsen the course of the disease. Patients with vitamin D deficiency, especially elderly persons have an elevated PTH. Nevertheless, elderly patients with low-energy fractures and bed rest can have an atypically low level of PTH. Our aim was to study PTH response to vitamin D deficiency in elderly patients with low-energy fractures.

Methods: 90 women, median age 73 years (range 47-95), were included between November 2016 and December 2017. All patients had low-

energy fractures and undergoing treatment in the City Clinical Hospital N13. All patients underwent evaluation the level of 25(OH)D, PTH, creatinine, calcium in the blood. The level of calcium intake with food was assessed using special questionnaires.

Results: 66 patients (73%) had a vitamin D deficiency. The average values of dietary calcium intake were 650 mg per day. However, an increase in PTH levels was observed in only 15 patients (16%). In the age group of 45-59 years, vitamin D deficiency was 88%, in the 60-74-year group in 51%, over 75 years old- 86.9%. In the same groups, an increase in the level of PTH was found in 11%, 11% and 22% cases respectively. The Pearson correlation coefficient between the vitamin D and PTH levels, for the age group 45-59 years: $R=-0.493$, 60-74 years $R=-0.359$, over 75 years $R=0.096$.

Conclusions: Most patients with low-energy fractures have vitamin D deficiency and low calcium intake with food. PTH, nevertheless, often remains normal. With an increase in the patient's age, a negative correlation between the level of vitamin D and PTH is completely lost. Thus, for the early diagnostics of pHPT, including normocalcemic forms, the clinical significance of PTH levels is limited. This should be especially considered while prescribing teriparatide to severe patients.

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SERUM CTX PREDICTS HIP FRACTURE RISK INDEPENDENTLY OF FRAX (WITHOUT BMD) BUT NOT OF BMD: A POST HOC ANALYSIS FROM THE SHEFFIELD HIP FRACTURE STUDY

E. McCloskey¹, H. Johansson², A. Oden¹, N. Harvey³, R. Eastell⁴, F. Gossiel⁴, J. A. Kanis²

¹University of Sheffield, Sheffield, UK, ²Australian Catholic University, Melbourne, Australia, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, ⁴Mellanby Centre for Bone Research, University of Sheffield, Sheffield, UK

Objectives: Uncertainties remain over the use of bone turnover markers in assessing fracture risk in clinical practice, and their independence of other risk factors. We have examined the predictive value of serum C-terminal telopeptide (CTX) of type I collagen for incident fractures in the Sheffield Hip Fracture study.

Methods: The study was a double-blind, prospective, randomised, placebo-controlled trial of a bisphosphonate, clodronate, in elderly community-dwelling women aged 75 years or more. The current analysis was conducted in a cohort comprising 1788 out of the 2606 women (70%) recruited to the main part of the study and assigned to the placebo arm. Morning fasting serum samples were analysed using the Cobas e411 automated immunoassay analyser, (Roche Diagnostics). The primary analysis excluded women with serum CTX values above the upper limit of the reference range (1.018), possibly indicating underlying undiagnosed metabolic bone disease, but were included in a sensitivity analysis. CTX values were normalized prior to analysis. Poisson regression models were adjusted for age and time since baseline, with additional adjustment for FRAX probabilities (calculated without BMD) and femoral neck BMD.

Results: During a maximum follow-up of 5.8 years (mean 3.8 years), 11% sustained one or more osteoporotic fractures, and 3% suffered one or more hip fractures. Serum CTX did not predict incident osteoporotic fractures but showed a significant association with future hip fractures (HR per SD increase, CTX 1.34, 95%CI 1.03-1.75), with a similar association observed when a further 26 values were included in the sensitivity analysis. Serum CTX remained a significant predictor for hip fracture risk following adjustment for FRAX hip fracture probability, calculated

without BMD, (CTX 1.32, 1.01-1.71) but the effect was lost when adjusted for BMD (CTX 1.16, 0.89-1.51).

Conclusion: Serum CTX may have added value for hip fracture prediction in older women where access to BMD measurement is limited. These findings require confirmation in other cohorts.

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BMD AND TRABECULAR BONE SCORE IN GAUCHER DISEASE PATIENTS TREATED WITH IMIGLUCERASE

M. S. L. Larroude¹, A. G. Aguilar¹, R. I. Rossi¹, B. L. Brun², S. C. Soares da Silva¹, F. E. N. Fernandez Escobar³, S. B. Soberon³, D. G. Drelichman³

¹Centro de Diagnostico Rossi, Buenos Aires Argentina, ²Laboratorio de Biología Ósea. Univ. Nacional de Rosario, Rosario, ³Hospital Ricardo Gutierrez, Buenos Aires, Argentina

Objective: Osteoporosis (OP) and vertebral fracture (VF) have been described in patients with Gaucher disease (GD). In a previous study we found that 76.7% GD patients had normal BMD with significant bone involvement such as medullar infiltration, bone necrosis and bone infarcts. DXA measures the amount of bone but does not provide information about bone quality. Our aim was to evaluate the use of trabecular bone score (TBS) as a complementary approach to DXA in GD patients treated with imiglucerase.

Methods: We conducted an observational and descriptive study in 151 GD adults patients receiving imiglucerase (mean dose 59±14 U/kg). The lumbar spine BMD was measured by DXA (Lunar Prodigy) and the TBS by TBS iNsight (Medimaps). Data are expressed as mean±SD and differences were considered significant if $p < 0.05$.

Results: 88 women (58.3%) and 63 men (41.76%) were included, mean age 36±13 years (98% had splenomegaly, 49% hepatomegaly and 8% were splenectomized). The age at diagnosis was 194±168 months and the mean age of initiation of treatment was 280±172 months. BMD was normal in 74.8%. Patients with OP (1297±121) showed lower TBS values than the group without OP (1394±105) (Mann Whitney test, $p = 0.004$). Higher percentage of altered bone quality (TBS value < 1350) was found in patients with OP (65%) compared with patients with normal BMD (38%) (χ^2 ; $p = 0.0106$). No differences in TBS was observed between patients with (1370±114) and without (1342±119) vertebral fractures. A positive correlation was found between lumbar spine BMD and TBS ($r = 0.54$, $p < 0.0001$). Therefore a significant increase in the lumbar spine BMD and TBS were found throughout the 2 years of follow-up compared with basal (Wilcoxon test, BDM: $p = 0.0392$ and $p = 0.0218$ first and second years respectively; TBS: $p = 0.0283$ and $p = 0.0095$ respectively).

Conclusion: The TBS could detect patients with alteration of the bone quality which was not detected by BMD.

P658

ALCOHOL INTAKE AND BONE HEALTH IN NEW ZEALAND YOUNG ADULTS: REASON FOR CONCERN?

H. Patel¹, L. Woods¹, P. Teesdale-Spittle¹, E. Dennison¹

¹Victoria University of Wellington, Wellington, New Zealand

Objective: Peak bone mass (PBM) is a major determinant of risk of fragility fracture. Many lifestyle factors may be important to attain PBM. While excessive alcohol consumption is considered a risk factor for poor bone health in later life, fewer data are available regarding its prevalence, and association with bone health around the time of PBM

acquisition. We considered these issues in a New Zealand student population.

Methods: A lifestyle questionnaire was administered to 337 young adults. This detailed: age; height; weight; ethnicity; cigarette smoking; alcohol history; sporting physical activity. Heel ultrasound was performed using an Achilles ultrasonometer to provide estimates of Stiffness Index, broadband ultrasound attenuation and speed of sound to assess bone health.

Results: Of the 337 participants (124 males; 213 females), the mean age was 23.6 (SD 4.4) and 22.8 (SD 4.3) years, the mean BMI was 24.5 (SD 8.6) and 24.1 (SD 4.7) in males and females respectively. Represented ethnicities were Caucasian (62.9%), Māori/Pacific peoples (8.9%), and other ethnicities (28.2%). Three quarters of the sample reported regular weekly physical activity. More males (20.3%) than females (9.5%) were current smokers; 291 (92.1%) of participants reported drinking alcohol, with a mean weekly alcohol consumption of 6.1 (SD 4.3) and 4.8 (SD 3.2) units in males and females respectively, though 4.2% males and 4.8% females drank more than the recommended number of units weekly. Of this group 31.3% reported binge drinking (consumption of >6 drinks at one time) at least monthly. Reports of exposure to alcohol under the legal age of alcohol consumption were common (80% by 18 years). Individuals consuming more than the recommended units of alcohol per week were more likely to smoke ($p < 0.001$). Clear associations between alcohol intake and heel ultrasound were not observed.

Conclusion: These data highlight the high rate of binge and underage drinking in young people. Further work in a larger study is now underway to understand the impact of these factors on bone health.

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LOW ACTIVITY OF ANTIOXIDANT ENZYMES ASSOCIATED WITH THE LOSS OF BMD IN WOMEN

L. Castrejón-Delgado¹, M. A. Sánchez-Rodríguez¹, M. Zacarías-Flores², P. Clark³, V. M. Mendoza-Núñez¹

¹Unidad de Investigación en Gerontología, Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México (UNAM), ²División de Ginecología y Obstetricia, Hospital General Dr. Gustavo Baz Prada, Instituto de Salud del Estado de México, ³Unidad de Epidemiología Clínica, Hospital Infantil de México Federico Gómez-Facultad de Medicina (UNAM), Mexico, Mexico

Objective: To determine the relationship between antioxidant enzymes, as oxidative stress markers, and BMD in women.

Methods: We conducted a cross-sectional study with 149 Mexican community-dwelling women (45-79 years) in two groups: 77 under 60 years old and 72 older than 60 years old. We measured plasma lipoperoxides and serum uric acid levels, erythrocyte superoxide dismutase [SOD] and glutathione peroxidase [GPx] activities, and total antioxidant status, as oxidative stress markers. The SOD/GPx ratio was calculated also as oxidative stress marker. BMD was measured in the hip by DXA, and we used T-score as bone marker. Those women with a T-score below -1.0 standard deviations of the mean value for young adults was considered as low BMD.

Results: The prevalence of low BMD in women older than 60 years old was 71% (95%CI: 60-81%) and 17% (95%CI: 9-25%) in women under 60 years old. The activity of SOD and GPx enzymes was statistically lower in participants older than 60 years old compared to those under 60 years old (1.15 vs. 1.21 U/gHb, $p < 0.01$) and (39.6 vs. 62.6 U/gHb,

$p < 0.01$) respectively; in addition, the SOD/GPx ratio was higher in women over 60 years old (0.034 vs. 0.022, $p < 0.01$). A positive correlation was observed between GPx activity and the T-score ($r = 0.496$, $p < 0.0001$) and negative between the SOD/GPx ratio ($r = -0.484$, $p < 0.0001$) and the score. Multiple linear regression analysis revealed that average T-score decrease by 0.03 units for every 1 U/gHb decrease in GPx activity ($p < 0.05$), and by 0.09 units for every 1-year increase in age ($p < 0.0001$), after adjusted for all oxidative stress markers, age and BMI.

Conclusion: Our findings suggest an association between low activity of antioxidant enzymes and the loss of BMD in women, independent of age.

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EPIDEMIOLOGY OF HIP FRACTURES IN TALDYKORGAN, REPUBLIC OF KAZAKHSTAN

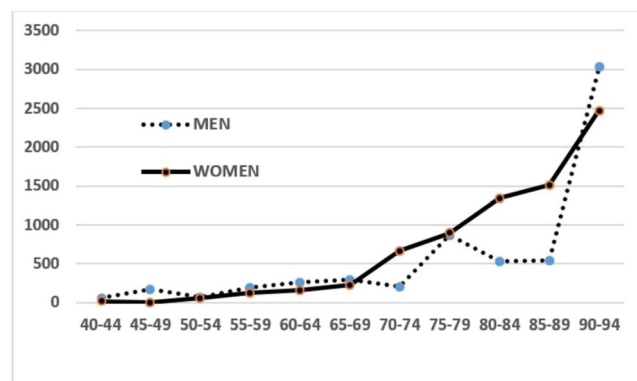
S. Issayeva¹, B. Issayeva¹, D. Dilmanova¹, O. Lesnyak²

¹Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan, ²North-Western State Medical University named after I.I. Mechnikov, St. Petersburg, Russia

Objective: to determine the incidence of hip fractures (HF) in Taldykorgan, Kazakhstan, in 2015.

Methods: the study was conducted within a multicenter epidemiological study of osteoporotic fractures in Eurasia (EVA), initiated by the Russian Association on osteoporosis. The total population of the city Taldykorgan at the beginning of 2016 amounted to 165 296 people, residents 40 years and older 60 198 people (36.42%), men – 25 347 and women – 34 851. Ethnic composition are mainly Kazakhs (71.77%) and Russians (21.39%), which corresponds to the average indicators in the Republic of Kazakhstan (66.48% and 20.62%, respectively). Data collection was performed retrospectively from 1 January to 31 December 2015. Registration journals of hospitalization and refusal of hospitalization, data of electronic register of patients of a hospital providing trauma care and the trauma consultation journals of trauma office were examined. To prevent double registration of the same fracture the data from different sources were verified, and cases of double registration of the same patient from the database were removed. We identified all outpatient and inpatient cases of HF (ICD S72.0, S72.1, S72.2), in men and women 40 years and older, residents of Taldykorgan. Exclusion criteria were pathological fractures.

Results: In 2015, in total 121 cases of HF were registered: among men - 49 (40.5%) and 72 (59.5%) - among women. Among the population of 40 years and older the overall annual incidence was 201.00 per 100 000 people, among men – 193.32 and incidence for women 206.59. The incidence was higher in older age groups and in females (Figure 1).



Conclusion: This is the first study of epidemiology of hip fracture in Kazakhstan. The present study allowed to confirm the general epidemiological patterns of osteoporotic fractures on the basis of determination of the incidence of osteoporotic HF among residents 40 years and older in Taldykorgan and the relevance of the problem of osteoporosis in the region.

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THE POLYMORPHISMS OF C-REACTIVE PROTEIN GENE IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS AND IHD

S. Tsarenok¹, V. Gorbunov¹, T. Aksenova¹, S. Verkhoturova¹, A. Dutova¹

¹Chita State Medical Academy, Chita, Russia

Objective: to study the frequency of alleles and genotypes of polymorphisms of the C-reactive protein gene (C1444T, C1846T, C3872T, A717G) in women with postmenopausal osteoporosis and IHD.

Methods: 205 women aged from 60-76 of Russian nationality living in the Trans-Baikal Territory were examined. 162 women have been diagnosed with IHD, 76 of them had postmenopausal osteoporosis (the 1st group). 86 women with IHD without osteoporosis were included in the 2nd group. 43 women without any risk factors of osteoporosis and cardiovascular diseases with normal BMD were in the control group. Genomic DNA isolated from whole blood leukocytes was analyzed. For statistical analyzes we used Statistica 10.0. The criterion χ^2 was used, the differences were considered reliable at $p < 0.05$. The risk of the development of events is calculated by the method of assessing the chances.

Results: Statistically significant differences were revealed for two polymorphisms: C3872T, C1444T when comparing 1 group with a control. Higher frequency of C allele (59% vs. 44%, OR=1.24, 95%CI: 1.02-1.52) and low T allele (41% vs. 56%, OR=0.84, 95%CI: 0.65-0.92) of the polymorphism C3872T was established in the group of patients with osteoporosis and ischemic heart disease. A homozygous genotype of TT (32.6% vs. 13.2%, OR=0.59, 95%CI: 0.67-0.97) was more often detected in the group of healthy individuals, the presence of which was associated with a reduced risk of developing the disease. It was found out that the carriage of the T allele of the polymorphism of C1444T (42% vs. 16% OR=1.48, 95%CI: 1.24-1.76, and TT-genotype (15.8% vs. 2.3%, OR=1.52, 95%CI: 1.22-1.9) was more frequent in the clinical group and associated with a 1.5 fold increase in the risk of the disease. When comparing 2 groups of patients with healthy people, similar results were obtained. To establish the association of studied polymorphisms with the development of postmenopausal osteoporosis, we compared the frequency of the occurrence of alleles and genotypes between groups of patients with combined pathology and isolated ischemic heart disease. But there were no statistically significant differences in the distribution of alleles and genotypes in this case. Then we analyzed the frequency of alleles and genotypes of the polymorphisms of the CRP gene, depending on the localization of osteoporotic fractures. We identified an association between C1444T polymorphism and distal radius fractures in patients with a CT-genotype, the risk of fracture was 1.5 times higher (OR=1.49, 95%CI 1.2-1.85). The relationship between vertebral fractures and polymorphism C1846T was established: in women with CT

genotype, the risk increased by 4.5 times (OR=4.45, 95%CI 1.05-18.73).

Conclusion: C3872T and C1444T polymorphisms of the CRP gene are associated with IHD. In carriers of T allele and CT genotype of C1444T polymorphism, the risk of IHD increased by 1.5 times. We did not find any differences in the distribution of alleles and genotypes of the studied polymorphisms when comparing women who had a combination of IHD and osteoporosis with women with IHD. The risk of the development of fractures of the radial bone was associated with polymorphism C1444T. For women with CC genotype, the risk increased by 1.5 times. The risk of vertebral fractures was associated with polymorphism C1846T. The number of carriers of CT genotype risk increased by 4.5 times.

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“IT’S NOT ALWAYS THE BISPHTHONATES”: A CASE OF SUBTROCHANTERIC “ATYPICAL” FRACTURE IN A NON-BISPHTHONATE EXPOSED MALE PATIENT

L. U. Gani¹, K. S. Karpageshwary¹, A. Yeo², T. F. King¹

¹Changi General Hospital Department of Endocrinology,

²Changi General Hospital Department of Orthopaedic Surgery, Singapore

Objective: Bisphosphonates (BP) induce osteoclast apoptosis, inhibit bone resorption, suppressing bone turnover. Prolonged BP use is thought to cause accumulation of microdamage resulting in atypical fractures. The absolute risk is 3.2 in 100,000 person years increasing to 50 per 100,000 with prolonged use. Media coverage and fear of this potential adverse effect has led to a decline in osteoporosis treatment rate. Here we discuss a case of a sub trochanteric atypical fracture in the absence of osteoporosis or bisphosphonate use.

Case Description: A 58 year old gentleman was admitted for right hip pain after playing badminton. He was a non-smoker, non-drinker with no history of steroid use or previous fractures. Of note he had been increasing the intensity of his badminton games and was playing up to 3 times a week for 3 h at a time in the last 6 months. Right femur X-ray revealed a displaced subtrochanteric fracture with the radiologist comment suggesting that it may be a bisphosphonate related complication (Figure 1). He underwent fixation with intramedullary nailing with good postoperative recovery and full weight bearing 9 weeks after. Osteoporosis work up including BMD revealed T-scores of -0.7 femoral neck and 1.6 at lumbar spine. Bone turnover markers were normal; ALP 57 (32-103 U/L), C-telopeptide 0.362 (0.154-0.885 ug/L). Testosterone was 14.8nmol/L, Calcium 2.11 (2.10-2.60 mmol/L), iPTH 1.54 (1.30- 7.60 pmol/L), vitamin D 24.4 (30-100 µg/L). Cholecalciferol was initiated. His neck shaft angle was 134°, hip axis length 126 mm, center edge angel 47°, which is in keeping with normal low risk geometry for atypical fracture.

Conclusion: This case highlights the likely underlying mechanism of subtrochanteric atypical fracture as stress fractures sustained secondary to repetitive injury to the same site. Radiological features may mimic bisphosphonate related atypical fractures. Thus, a detailed activity and drug history is important.

Figure 1: X-Ray of R subtrochanteric fracture with "atypical" fracture features



P663

THE BURDEN OF RECURRENT FRAGILITY FRACTURES IN A REGIONAL HOSPITAL IN SINGAPORE

L. U. Gani¹, N. Tan¹, V. Tan¹, J. Khoo¹, T. F. King¹

¹Changi General Hospital Department of Endocrinology, Singapore

Objective: There remains a significant treatment gap in osteoporosis management globally. Following an initial fragility fracture, the risk of subsequent fracture increases by 1.6- to 4.3-fold at any given age. We aim to assess the burden of recurrent fractures in our Asian population in the Eastern Region of Singapore.

Methods: Retrospective analysis of patients presenting to Changi General Hospital, Singapore with fragility fracture. Data were extracted from all admissions during the period of 2009-2015 using ICD 10 codes. Patient demographics, frequency and location of prior fractures, calcium, vitamin D and antiresorptive treatment initiation status 1-year postadmission, and BMD evaluation were recorded. Patients were divided into first-onset or recurrent fractures.

Results: During the period of 2009-2015, there were 8771 admissions for fragility fractures, median age 73.0 (50-105) years, 65% female. Of these,

1686 (19.2%) admissions were recurrent fractures. Average time to 2nd fracture was 696 days. The most frequent sites of the 783 2nd fractures were hip and vertebrae at 37.9% (n=297) and 16.2% (n=127) respectively. Of the 297 2nd hip fracture, 52.1% (n=153) patients had initially presented with a 1st hip fracture. Initiation of antiresorptive treatment was low in both first and recurrent fracture population at 2.6% and 6.6%; as was BMD testing at 18.8% and 16.2% respectively in both populations.

Conclusion: Nearly one-fifth of all fragility fracture admissions in the eastern region of Singapore were recurrent fractures with an average time to next fracture of less than two years. The majority of 2nd fractures were hip fractures and more than half had initially presented with a first hip fracture. Diagnosing osteoporosis with a first fragility fracture is critical to prevent recurrent fractures. A fracture liaison service may reduce fracture recurrence by timely initiation of antiresorptive therapy and BMD testing.

P664

TERIPARATIDE REDUCED REFRACTURE IN THE CEMENTED VERTEBRAE AFTER VERTEBROPLASTY

J.-C. Weng¹, Y.-H. Chiang¹, Y.-S. Yang¹, J.-H. Lin¹

¹Department of Neurosurgery, Taipei Medical University Hospital, Taipei City, Taiwan

Objective: Refracture of the cemented vertebrae occurred in almost 60% of patients with osteoporotic vertebral compression fracture (OVCF) after vertebroplasty (VP), it can result in severe pain or even neurological deficit requiring surgical intervention, and spinal alignment abnormalities after refracture would further impair functional outcomes. However, there is no a solution to prevent refracture. Teriparatide (TP) is the first approved anabolic medication stimulating bone formation. The purpose of this study is to see whether TP can reduce refracture after VP. This study compared the radiological outcomes of the cemented vertebrae with TP to those without TP in patients who received VP for OVCF.

Methods: Study design: a retrospective comparative cohort study. Patient sample: patients who received VP for OVCF with or without TP. Outcome measures: kyphotic angle (KA), KA difference, maintenance ratio (MR) and refracture rate of vertebral anterior body height (ABH) and vertebral middle body height (MBH). 238 levels of OVCF in 166 patients who received VP during 2013-2016 in Taipei Medical University Hospital with at least 6-month-follow-up were included. There were 167 OVCFs in 133 patients without TP (VP group) and 54 in 29 patients with TP (TP group). TP was started within the duration 1 month before VP and 6 months after VP, and used continually at least for 3 months. The ABH and MBH were measured preoperatively and, at postoperative 1 week, 3 months, 6 months, and 1 year. The refracture was defined as a 15% decrease of height in ABH or MBH and 8 degree decrease of KA compared with those at postoperative 1 week. MR was defined as the ratio of ABH or MBH compared with those at postoperative 1 week. The KA difference was calculated by KA at 3 or 6 or 12 months minus that at 1w. Student's unpaired two-tailed *t*-test or chi-square test was used for the comparison of continuous or non-continuous parameters, respectively.

Results: No significant differences in age, gender, fractured level, and BMI were found between TP and VP group, except BMD (BMD; TP vs. VP: -2.75 ± 1.01 vs. -1.9 ± 1.32 , $p < 0.01$) (Table 1). The KA and its difference at 12 months in TP group were significantly favorable than VP group (KA: -1.73 ± 12.88 vs. -6.78 ± 11.63 , $p < 0.05$; KA difference: -1.71 ± 4.05 vs. -4.88 ± 5.77 , $p < 0.001$) (Figure 1A). MR of ABH in TP group was significantly higher than that in VP group at each time point (ABHMR at 3 months: 0.95 ± 0.08 vs. 0.91 ± 0.08 , $p < 0.05$; 6 months: 0.91 ± 0.08 vs. 0.85 ± 0.10 , $p < 0.05$; 12 months: 0.89 ± 0.09 vs. 0.81 ± 0.09 , $p < 0.001$) (Figure 1B). MR of MBH in TP group was significantly higher than that in VP group at 3 months and 12 months.

(MBHMR at 3 months: 0.98 ± 0.10 vs. 0.89 ± 0.07 , $p < 0.001$; 12 months: 0.89 ± 0.09 vs. 0.81 ± 0.12 , $p < 0.001$) (Figure 1C). The refracture rate of at 12 months in TP group was significantly lower than that in VP group for KA, ABH and MBH (KA: 10.87 vs. 34.35%, $p < 0.01$; ABH: 30.43 vs. 61.18%, $p < 0.001$; MBH: 26.09 vs. 61.83%, $p < 0.001$) (Table 2).

Conclusion: TP was associated with better MR of ABH and MBH, less KA difference, and lower incidence of refracture 12 months after VP for patients with OVCFs.

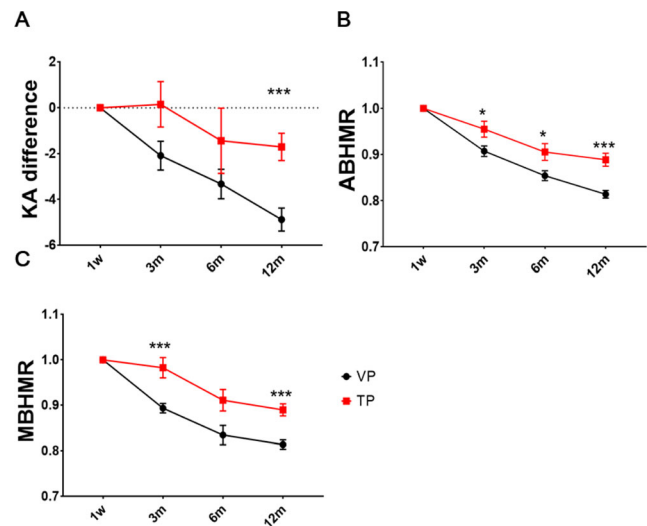


Figure 1. Differences of KA and maintenance ratio of vertebral body heights in TP and VP groups. (A) Differences of KA was significantly higher in TP group than VP group at 12 months. Maintenance ratio of (B) ABH were significantly higher in TP group than VP group at each time point and (C) MBH were significantly higher in TP group than VP group at 3 months and 12 months. (* $p < 0.05$, *** $p < 0.001$)

Table 1. Patient characteristics

	VP	TP	p-value
Number	133	29	
Age	75.67±9.11	78.93±7.68	0.0512
Gender	18.05% Male	20.69% Male	0.4673
BMI	24.44±3.90	23.59±5.17	0.4097
BMD	-1.91±1.32	-2.66±0.95	0.0010
Level			0.3112
T6	1	0	
T7	4	1	
T8	4	5	
T9	7	3	
T10	6	2	
T11	17	1	
T12	42	10	
L1	42	12	
L2	18	11	
L3	15	5	
L4	7	3	
L5	4	1	

Table 2. Refracture rates

	3m	6m	12m
KA			
TP	0% (0/20)	17.65% (3/17)	10.87% (5/46)
VP	10% (5/50)	21.52% (17/79)	34.35% (45/131)
<i>p</i> -value	0.3117	>0.9999	0.0021
ABH			
TP	0% (0/20)	11.76% (2/17)	30.43% (14/46)
VP	22.00% (11/50)	43.04% (34/79)	61.18% (88/131)
<i>p</i> -value	0.0268	0.0249	<0.001
MBH			
TP	5.00% (1/20)	29.41% (5/17)	26.09% (12/46)
VP	26.00% (13/50)	35.44% (28/79)	61.83% (81/131)
<i>p</i> -value	0.054	0.7812	<0.001

P665**AGEING OF BONE STRUCTURE AND THE RISK OF OSTEOPOROSIS IN THE MENOPAUSAL TRANSITION**A. Zsakai¹, D. Annar¹, P. Feher¹, E. Bodzsar¹¹Department of Biological Anthropology, Eotvos Lorand University, Budapest, Hungary

Objective: Age at the final menstrual period is of clinical and public health interest because the age at which natural menopause occurs may be a marker of aging and health, and the menopausal transition increases the risk of many diseases including the diseases and abnormalities of the musculoskeletal system. The purpose of the research was to study the relationship between menopausal status and bone structure during the menopausal transition.

Methods: A random sample of 1932 Hungarian women (aged 35+) was enrolled in the study. Bone mass was estimated by Drinkwater-Ross method. Bone structure parameters were assessed by a quantitative ultrasound (QUS) device. High and very high risk of osteoporosis were identified by using the thresholds of QUS parameters. In a subsample free estradiol levels in saliva were quantified. Subjects were divided into menopausal status subgroups on the basis of the occurrence of irregular periods and age of last menstrual period. Women who had any diseases known to affect body composition, or who were hysterectomized or ovariectomized, were not included in the analysis.

Results: By considering the changes in QUS parameters and bone mass by age an intensive, menopause-related change from the late 40s and then another significant change from the beginning of the 70s were observed in bone. Bone mass decreased while the porosity of the bone component of the female body increased by age and by menopausal status. Bone quality related to estradiol level in women. On average 15-17% of women are at very high risk of developing osteoporosis in the premenopausal status and after the menopausal transition the decreased level of female sex hormone production doubles this risk of osteoporosis from the beginning of the postreproductive period, triples this risk for women in the seventies.

Conclusion: The results emphasize the importance of menopausal status assessment in screening for age-related increase risk of osteoporosis.

P666**THE RELATIONSHIP BETWEEN BONE QUALITY AND ENDOGENOUS OESTROGEN LEVEL IN GIRLS AND YOUNG ADULT WOMEN**P. Feher¹, D. Annar¹, A. Zsakai¹, E. Bodzsar¹¹Department of Biological Anthropology, Eotvos Lorand University, Budapest, Hungary

Objective: The obvious relationship between the bone structure and oestrogen level is well-proved. Around the two most important hormonal milestones - namely the puberty and the menopause - remarkable alterations of the bone mass and structure can be found. Oestrogen plays the main role in this process by protecting the balance between the bone formation and bone resorption during the reproductive period. The main aim of present analysis was to examine the effect of the oestrogen on bone mass and bone structure in adolescent girls and in young adult women and to identify those factors of lifestyle which can have impact on either the oestrogen level or the bone metabolism in the two sub-groups.

Methods: Adolescents who have regular menstruation (n: 80, 14-18 y) and healthy adult women with natural, regular cycle (n: 100, 19-30 y) were enrolled to the present analysis. Girls and women taking oral contraceptives or having chronic metabolic diseases were excluded. Bone structure was measured by ultrasound osteometer (DTU-One Osteometer). Bone age of subadults was estimated by ultrasound Sunlight BoneAge device. Absolute bone mass was estimated by Drinkwater-Ross anthropometric four component model. Oestrogen level was estimated from saliva samples, which were collected in the early follicular phase of the menstrual cycle.

Results: The age changes in oestrogen level and bone structural parameters were analysed in girls and young adult women. Moderate relationship was revealed between bone mass, quantitative ultrasound bone structural parameters and the salivary oestrogen level among adolescents, while a stronger relationship was identified between the bone structural parameters and oestrogen level among women. The higher the level of salivary oestrogen, the better bone indicators were found in women in the reproductive period.

Conclusion: The early monitoring of bone structure and endocrine status is of high importance, especially in women, even in young adults.

P667**MODERN APPROACHES TO DIAGNOSTICS, TREATMENT AND REHABILITATION OF PATIENTS WITH OSTEOPAROTIC FRACTURES**S. Ivanov¹, A. Kochish²¹L.G. Sokolov Memorial Hospital No.122, ²Scientific Research Institute of Traumatology and Orthopaedics named after R.R. Vreden, St. Petersburg, Russia

Objective: Now in Russia standards program IOF "Capture the Fracture" is implemented in large hospitals. Very rarely patients are offered a comprehensive approach to treatment: drug therapy + rehabilitation after a fracture. On the basis of a critical analysis of profile scientific publications and own clinical material, to formulate modern approaches to diagnosis, treatment and rehabilitation of patients with osteoporotic fractures.

Methods: In 2017, in the L.G Sokolov Memorial Hospital No. 122 in St. Petersburg in the program "Capture the Fracture" included 200 patients. Of these, 87% were women. The average age of the patients was 57 years ($\sigma=16$). Localization of fractures was dominated vertebral fractures (51%) and fractures of distal forearm (30%). The age of the revealed

fractures ranged from one day to two years. All patients were examined on an X-ray densitometer and they calculated FRAX. In 78% of patients, BMD values corresponded to osteoporosis (<2.5 SD). Deficiency of vitamin D was detected in 87% of patients.

Results: All patients underwent correction of the vitamin D level with a total saturating dose to 200,000 IU with a further transition to a maintenance dose of 800 to 1000 IU per day, one of the first line drugs (zoledronate, ibandronate, alendronate, denosumab, teriparatide) and calcium preparations in a dose not <1000 mg per day. Patients with compression fractures of the vertebral fractures used dynamic orthosis posture correctors. All patients were recommended to undergo rehabilitation therapy courses at the physiotherapy unit of the clinic or at the place of residence. Currently, there is a dynamic observation of patients with intervals between examinations of no >6 months.

Conclusion: In our clinic in 2017, the program "Capture the Fracture" includes 200 patients with osteoporotic fractures. They are included in the database, they are prescribed medication for osteoporosis, provide methodological literature on the problem of osteoporosis, carry out a set of rehabilitation measures, monitor the treatment and evaluate the effectiveness of the treatment.

P668

EVALUATION OF THE RELATIONSHIP BETWEEN MAJOR DIETARY PATTERNS WITH BONE LOSS RATE AND BONE BIOMARKERS IN POSTMENOPAUSAL WOMEN

K. H. Mirzaei¹, L. Khorraminezhad¹, E. Aghaei¹, S. Moradi², Z. H. Maghbooli³

¹Department of Community Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences (TUMS), Tehran, ²School of Nutritional Sciences and Dietetics, Esfahan University of Medical Sciences, Esfahan, ³Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Regarding population aging, osteoporosis is an important health issue. Bone tissue is an active metabolized and is constantly being restored. About 20% of bone tissue is replaced annually. Recent studies found an association between dietary pattern intake and osteoporosis. Therefore, current study conducted to determine the relationship between bone loss rate and dietary pattern intake.

Method: The study included a group of 265 postmenopausal women (46-78 years old) through random sampling method. BMD was measured by DXA method. Blood samples were taken for measurement of blood parameters. Dietary patterns were determined by using factor analysis and by valid and reliable, 147-item semiquantitative food frequency questionnaire (FFQ).

Result: Our results showed the mean of BMD, T-score and Z-score of the participants at the lumbar vertebrae were 1.033 g/cm², 2.21 g/cm² and -0.44 g/cm², respectively. The mean of BMD at the hip were 0.926, -0.65 and -0.05, respectively. DASH, traditional and western dietary patterns (% of variance=16.33%, 15.94%, 8.28%) were extracted (KMO=0.825, Factor=3). By using regression analyses, after adjustment by age, menopause duration, physical activity and weight, we found a marginal significant relationship between the highest level of β -CTX and first quartile of DASH dietary pattern (β =-1.49, p =0.08). No significant relationship was found between osteocalcin and dietary patterns. Our analyses showed those participants who had the lowest following up with DASH diet had the highest rate of bone loss (p =0.006, β =1.3). The relationship was maintained after adjusting for age, menopause duration, weight and physical activity (p =0.015, β =1.248).

Conclusion: This study provides evidence that the lowest following up with the DASH dietary pattern was related to the highest of bone loss rate.

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SYNTHESIS AND VALIDATION OF DM-22, A NOVEL H₂S-RELEASING AMINO-BISPHOSPHONATE WHICH STIMULATES OSTEOBLAST DIFFERENTIATION

F. Grassi¹, L. Gambari¹, G. Lisignoli², B. Grigolo¹, S. Rapposelli³

¹Ramses Lab, Rizzoli Orthopaedic Institute, Bologna, ²Lab of Immunorheumatology and Tissue Regeneration, Rizzoli Orthopaedic Institute, Bologna, ³University of Pisa, Department of Pharmacy, Pisa, Italy

Objective: Hydrogen sulfide (H₂S) is a gasotransmitter recently shown to regulate bone metabolism by inhibiting osteoclast development *in vitro* and inducing the differentiation of osteoprogenitor cells both *in vitro* and *in vivo*. Moreover, endogenous levels of serum H₂S are significantly decreased in estrogen-deficient mice, suggesting that H₂S-replacement therapy could be a novel therapeutic approach for osteoporosis. Based on the dual action exerted by H₂S, we developed a H₂S-releasing bisphosphonate compound, named DM-22, prototype of a novel family of hybrid molecules aiming at treating bone loss.

Methods: DM-22 was derived from alendronate (AL), hybridized with an aryl-isothiocyanate-based H₂S-releasing moiety; H₂S release was assessed by amperometry and the effects of DM-22 or AL (1-33 μ M) were investigated *in vitro* on human osteoclasts (OCs) and mesenchymal stromal cells (MSC) differentiation and function. Gene expression of osteogenic markers was analyzed by RT-PCR and LDH assay was used to assess cytotoxicity.

Results: The incubation of DM22 at 1 mM in aqueous solution lead to a long-lasting release of H₂S (peak concentration: 42 μ M of H₂S). LDH assay revealed that, contrary to AL, DM-22 is devoid of cytotoxicity on OCs and MSC even at the high dose of 33 μ M. DM-22 dose-dependently inhibited OCs differentiation reaching up to 40% relative inhibition in the total number of TRAP+ OC at 33 μ M. DM-22 dose-dependently increased mineral apposition, as revealed by Alizarin Red staining, compared to unstimulated MSC; moreover, DM-22 at the high concentration of 33 μ M lead to a 3-fold increase in the mRNA expression of Collagen I and BSP.

Conclusions: This work describes the synthesis of a new H₂S-hybrid N-BPs able to induce osteogenic differentiation of h-MSCs and, while retaining an anti-osteoclastogenic activity *in vitro*.

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P670

THE RELATION BETWEEN SKELETAL MUSCLE INDEX AND BONE VARIABLES IN A GROUP OF YOUNG ADULTS

A. Khawaja¹, A. J. Berro¹, G. Maalouf², M. Rizkallah², J. Prioux³, R. El Hage¹

¹Department of Physical Education, Faculty of Arts and Social Sciences, University of Balamand, El-Koura, Kelhat, Lebanon, ²Bellevue University Medical Center, Faculty of Medicine, Saint Joseph University, Mansourieh, Lebanon, ³Movement, Sport, and Health Sciences Laboratory, University of Rennes 2, Rennes, France

Objective: To explore the relationships between skeletal muscle index (SMI) and bone variables in a group of young adults.

Methods: 173 young adults (18–32 years old) participated in this study. They were divided into two groups: 117 young men (47 obese, 48 overweight and 22 normal-weighted) and 56 young women (15 obese, 35 overweight and 6 normal-weighted). Weight and height were measured, and BMI was calculated. Body composition, bone mineral content (BMC) and BMD were measured by DXA. Appendicular skeletal mass (ASM, in kg) was calculated by summing the muscle masses of the four limbs, assuming that all non-fat and non-bone mass is skeletal muscle. SMI was defined as ASM/height². Lumbar spine trabecular bone score (TBS), femoral neck cross-sectional area (FN CSA) and femoral neck cross-sectional moment of inertia (FN CSMI) were also measured by DXA.

Results: In men, SMI was positively correlated to WB BMC, WB BMD, TBS, TH BMD, FN BMD, FN CSA and FN CSMI. In women, SMI was positively correlated to WB BMD, TH BMD and FN CSA.

Conclusion: This study suggests that SMI is a positive determinant of bone strength parameters in young adults. Optimizing SMI in young adults may help to prevent osteoporosis later in life.

P671

ASSOCIATION OF SERUM LEPTIN, WITH BONE MASS DENSITY AND BONE BIOCHEMICAL MARKERS IN POSTMENOPAUSAL OSTEOPOROTIC PAKISTANI FEMALES

M. Lateef¹, M. Baig², A. Azhar³, N. Baig⁴, M. R. Ahsan¹

¹Multidisciplinary Research Lab, Bahria University Medical & Dental College, Karachi, Pakistan, ²Faculty of Medicine, Rabigh, King Abdulaziz University, Jeddah, Saudi Arabia, ³The Karachi Institute of Biotechnology and Genetic Engineering, University of Karachi, ⁴Orthopedic Department, Jinnah Postgraduate Medical Center, Karachi, Pakistan

Objective: Osteoporosis is a global problem with profound socioeconomic impacts and significant morbidity and mortality with a high prevalence. The objective of present study was to evaluate the relationship of serum leptin, bone mass density, and bone biochemical markers in postmenopausal osteoporotic Pakistani females.

Methods: One hundred and fifty females were divided into three groups (50 in each group): premenopausal (age: 31.06±1.09 yrs), postmenopausal (age: 54.52±0.51 yrs) and osteoporotic (age: 59.92±0.68 yrs). BMD assessment was done on calcaneus by peripheral ultrasound bone densitometry and T-scores were calculated. Serum leptin, osteocalcin, telopeptide-C, and estradiol levels were determined by using ELISA kits.

Results: In postmenopausal osteoporotic and non-osteoporotic women, the BMD value was significantly lowered compared to premenopausal women ($p<0.001$; $p<0.001$ respectively). No considerable change in serum leptin levels was found in the three groups. Telopeptide-C was significantly higher in postmenopausal females ($p<0.001$) and osteoporotic patients ($p<0.001$). Moreover, it was remarkably high in osteoporotic patients as compared to postmenopausal females ($p<0.001$). Serum leptin level was considerably associated with BMD in postmenopausal women with and without osteoporosis ($r=0.465$, $p<0.001$; $r=0.535$, $p<0.001$ respectively), however, no relationship was observed with osteocalcin and telopeptide-C. Leptin level was correlated with BMI in premenopausal ($r=0.859$, $p<0.001$), postmenopausal ($r=0.797$, $p<0.001$), and osteoporotic females ($r=0.945$, $p<0.001$).

Conclusion: It seems that leptin has some protective result on bone metabolism in postmenopausal females by affecting the BMD but actual mechanism is still not clear.

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NEGATIVE ASSOCIATION OF 25OHD WITH SERUM LEPTIN LEVELS: FINDINGS OF A CROSS-SECTIONAL STUDY FROM PAKISTAN

L. Jafri¹, S. Fatima¹, R. Iqbal¹, A. Raheem¹, A. Habib¹

¹Aga Khan University, Karachi, Pakistan

Objective: Role of vitamin D in obesity has been proposed by several indirect and direct (genetic) lines of evidences. Our aim was to investigate the association of indicators of obesity with 25-hydroxyvitamin D (25OHD) in adults.

Methods: A cross-sectional study was conducted from June 2014 till January 2016, in the Departments of Pathology and Laboratory Medicine and Biological and Biomedical Sciences, Aga Khan University Karachi, Pakistan. Healthy adults were invited to participate in the study after informed consent. Demographics, clinical details were recorded, body fat measurement and bioelectrical impedance analysis was done. Serum leptin was measured using DIALsource ELISA kit and 25OHD on ADVIA-Centaur by Siemens. Total and HDL cholesterol were quantified using enzymatic endpoint method and cholesterol oxidase-phenol aminophenazone method respectively.

Results: A total of 167 subjects were enrolled; with F: M ratio of 93:74. Median age was 20 years (IQR 27–20). As per South Asian Classification of weight status, 14.4% ($n=24$) of subjects were underweight (<18.5 kg/m²), 40.1% ($n=67$) normal (18.5 – 22.9 kg/m²), 22.2% ($n=37$) overweight (23 – 25 kg/m²) and 23.4% ($n=39$) obese (>25 kg/m²). 89% of the subjects had 25OHD <20 ng/ml. Overall 10.1% study subjects had elevated leptin. Females, had higher median leptin (2.71 (4.76–1.66 ng/ml)) compared to their counterparts (1.3 (3.60–0.54 ng/ml), $p<0.001$). A highly significant, positive correlation was noted between log leptin and BMI, waist circumference and with total body fat% in females (p -value <0.001). In males log leptin showed positive association with BMI, waist circumference and body fat% (p -value <0.05) and negative associations with muscle mass and log 25OHD (p -value <0.001). Multiple regression analysis suggested that BMR, muscle mass, body fat%, bone mass, serum 25OHD and gender were the most contributing factors to leptin. Bone mass, muscle mass and 25OHD bore a negative correlation with leptin. However no association was found between 25OHD and other indicators of obesity besides leptin.

Conclusion: Serum 25OHD, gender and body composition were the determinants of leptin levels in the subjects studied. 25OHD did not vary between obese and non-obese. This probably could be because $>80\%$ of the study group was D deficient.

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THERMOGENIC STRESS ENHANCES BDNF, OSTEOCALCIN AND OXYTOCIN MRNA IN BONE AND BRAIN AND REGULATES NGF MRNA LEVEL IN BROWN FAT AND TESTIS OF MICE

C. Camerino¹, E. Conte¹, A. Fonzino¹, D. Tricarico¹

¹University of Bari, Bari, Italy

Energy metabolism regulates bone turnover while BAT activity is anabolic to bone. A significant correlation between NGF/BDNF/osteocalcin(OST) and oxytocin(OXY) expression levels and their receptors was found in brain, BAT, bone and testis suggesting an homeostatic relation between them (Camerino et al., Front Physiol. 2016). We challenged this previous system investigating NGF and its receptors *p75ntr/Ntrk1*, BDNF, OST and its receptor *Gprc6a* and OXY and its receptor OXTR mRNA levels in 3

months old mice after cold-stress (CS). Uncoupling protein-1 (UCP-1) was used as positive control. Control mice were maintained at room temperature $T=25^{\circ}\text{C}$, CS mice at $T=4^{\circ}\text{C}$ for 6 h and 5 days. RT-PCR experiments showed that UCP-1 and NGF genes were upregulated after 6 h CS in brown adipose tissues (BAT), respectively, by 2- and 1.5-fold; UCP-1 was upregulated also after 5 days, while *p75ntr* and *Ntrk1* genes were downregulated after CS in BAT. NGF and *P75NTR* were upregulated in bone and testis following 5 days, and *P75NTR* in testis after 6 h CS. BDNF was instead upregulated in brain at 6 h and in bone following 5 days CS and downregulated in testis. OST was upregulated by 16- and 3-fold in bone and BAT, respectively, following 5 days CS. *Gprc6a* was upregulated after 6 h in brain, while OST gene was downregulated. OXY gene was upregulated by 5-fold following 5 days CS in bone. OXTR was upregulated by 0.5- and 0.3-fold, respectively, following 6 h and 5 days CS in brain. OXTR and OXY were downregulated in testis and in BAT. The changes in the expression levels of control genes vs. genes following 6 h and 5 days CS were correlated in all tissues, but not in BAT. Correlation in BAT was improved eliminating *p75ntr* data. The correlation in brain was lost eliminating OXTR data. In sum, UCP-1 potentiation in BAT after cold stress is associated with early NGF-response in the same tissue and in bone and testis. In contrast, BDNF exerts bone and neuroprotective effects. OST signaling is enhanced in bone and BAT while it may exert neuroprotective effects through its receptor. *p75ntr* regulates the adaptation to CS through a feedback loop in BAT. OXTR regulates the gene response to CS through a feed-forward loop in brain. These studies could be useful to develop a therapeutic strategy to counterbalance states of increased energy demand following pathophysiological conditions.

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REPERCUSSION OF A NATIONAL INTERVENTION ON PATIENT OUTCOMES OF PRIMARY KNEE ARTHROPLASTY TO ENHANCE THE RECOVERY PATHWAY: 2008-2016 ENGLAND TRENDS

C. Garriga¹, A. Prats-Urbe¹, A. Price¹, D. Prieto-Alhambra¹, A. Carr¹, N. K. Arden¹, J. Leal², R. Gooberman-Hill³, G. Peat⁴, A. Rangan⁵, R. Fitzpatrick², K. Barker¹, C. Cooper⁶, A. Judge⁷

¹University of Oxford, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS)/Botnar Institute of Musculoskeletal Sciences, Oxford, ²University of Oxford/Nuffield Department of Population Health, Oxford, ³University of Bristol, Bristol Medical School, Bristol, ⁴Keele University, Primary Care Sciences, Keele, ⁵University of York, Department of Health Sciences, York, ⁶University of Southampton, MRC Lifecourse Epidemiology Unit, Southampton General Hospital, Southampton, ⁷University of Bristol, Musculoskeletal Research Unit Translational Health Sciences, Bristol Medical School, Bristol, UK

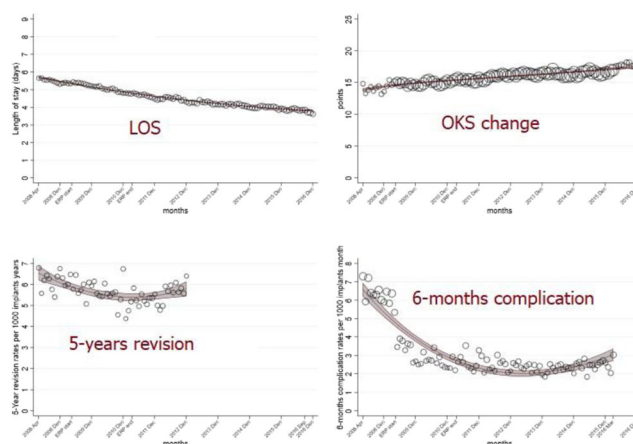
Objective: We aimed to verify whether the Enhanced Recovery Programme (ERP) in knee arthroplasty has varied patient reported outcomes, complications, revisions and length of stay (LOS) for primary total or unicompartmental arthroplasty (TKA/UKA).

Methods: We utilised the UK National Joint Registry, which contains data on knee arthroplasties. Primary operations were linked with Hospital Episode Statistics data which has records of all inpatient episodes undertaken in National Health Service (NHS) trusts in England, and Patient Reported Outcome Measures (PROMs). Primary elective TKA/UKA in people aged 18 years or over between April 2008 and December 2016 were identified. The intervention of interest was the period of time ERP was implemented (April 2009 to March 2011). The ERP promoted patient care: pre-operatively (ensuring people are in the best condition for

surgery); peri-operatively (best handling during and after operation); post-operatively (best rehabilitation following surgery). Outcomes assessed were: length of stay (LOS), change in Oxford knee score (OKS) 6-months after surgery, 5-year revision surgery rates, and 6-month complications rates. Monthly means, rates and proportions in outcomes described trend evolution before, during and after ERP implementation.

Results: 525,622 primary TKAs/UKAs were identified. 57% of patients were women, with an average age 70 years ($\text{SD}\pm 9$ years). Overall LOS decreased from 5.7 days in April 2008 to 3.6 in December 2016. Although older patients had a longer LOS, the trend in declining LOS was present across all age groups (e.g., 4.9 days to 3.1 days in those age <60 and 7.7 days to 5.4 days in age ≥ 85). The trend in reducing LOS was observed in people with and without pre-existing co-morbidity. During the study span there was a progress in OKS PROMs, the mean absolute change in OKS 6 months after surgery increased from 14.9 points in April 2008, to 17.1 points in December 2016. This trend was observed in patients with and without co-morbidities, and in all age groups. 5-Year revision rates changed marginally from a rate of 6.6 per 1000 implants years at risk in April 2008 to 6.1 in December 2012. Overall complication rates at 6-months lessened over the study span from a rate of 7.4 per 1000 implants months at risk in April 2008 to 3.0 in March 2016.

Conclusions: This study indicates that outcomes are superior for patients having TKA/UKA now than it was 10 years ago. LOS has dropped substantially over the study span, consistent across all age groups and in individuals with and without co-morbidity. Patient reported outcomes with regard of pain and function have increased, revision rates remain stable and complication rates are steady after declined before and during ERP.



P675

SELF-PERCEPTION OF FRACTURE RISK IS ASSOCIATED WITH RADIAL BONE MICROARCHITECTURE IN THE GLOW STUDY

L. D. Westbury¹, A. E. Litwic¹, K. A. Ward¹, C. Cooper¹, E. M. Dennison¹

¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK

Objective: Self-perception of fracture risk (SPR) is associated with fracture risk, independent of FRAX. This study examined whether

SPR is related to bone microarchitecture of the radius among participants of the Global Longitudinal study of Osteoporosis in Women (GLOW).

Methods: GLOW involves 723 physicians across 10 countries. Overall, 60393 women aged 55 years and over completed annual questionnaires detailing medical history, comorbidities and fractures; SPR was ascertained at the 5-year follow-up. UK participants underwent HR-pQCT scans of the radius and DXA scans of the hip (median follow-up time since SPR ascertainment: 2.8 years [inter-quartile range 2.3-3.7]). Linear regression was used to examine the relationship between SPR in relation to HR-pQCT parameters and hip areal BMD (aBMD) with and without adjustment for anthropometric and lifestyle characteristics, and use of anti-osteoporotic medications. Associations additionally adjusted for hip aBMD were also explored.

Results: Analyses were restricted to 279 women with complete data on all predictors and outcomes of interest. Mean (SD) age at time of scan was 70.4 (5.2) years. Overall, 139 (49.8%) women reported a similar self-perceived fracture risk compared to other women of the same age; 100 (35.8%) reported a lower risk; and 40 (14.3%) reported a higher risk. At the radius, higher SPR was associated with lower trabecular number ($p<0.02$) and higher trabecular separation ($p<0.03$) in unadjusted and adjusted analyses, and when additionally adjusted for hip aBMD. Higher SPR was associated with lower total area ($p<0.04$) in unadjusted analyses and associations were similar ($p<0.06$) in adjusted analyses and when additionally adjusted for hip aBMD. In unadjusted analyses only, higher SPR was associated ($p<0.04$) with lower cortical porosity and lower hip aBMD.

Conclusion: These results suggest that SPR is associated with bone microarchitecture and that some relationships remain after adjustment for hip aBMD. Further studies are required to delineate these associations.

P676

PREDICTIVE FACTORS FOR A CERTAIN TYPE FRACTURES OF DISTAL RADIAL BONE

K. Markovic¹, R. Filipov¹, S. Bacevic²

¹Institute for Treatment and Rehabilitation "Niska Banja", ²General Hospital, Prokuplje, Nis, Serbia

Objective: Fractures of distal radial bone, make up >10% of all human skeletal fractures. A typical break (fractura radii loco typico) is localized to 1.5-2.5 cm above the wrist. There is a Colles-type fracture (where the proximal fragment goes forward and medially and distal backward and dorsal) and Smith's fracture (the proximal fragment moves backward and dorsally and the distal forward and the medial). Our aim was to examine the correlation of parameters: sex, age, BMI, osteoporosis and physical activity, with certain types fracture of distal radial bone

Methods: 68 patients were tested, in the age between 21-79 years – average 62.8, SD±12.2. All were clinically and radiographically processed, of which 48 (70.5%) were women and 20 (29.5%) men. The left wrist was injured in 42 (62.4%) patients and right at 26 (37.6%). The importance of individual parameters in the development of a certain type of distal radial bone fracture was determined

Results: The proportion of elderly females, was a significantly higher ($p<0.001$), (58.3 years, SD±13.1) than to males ($p<0.0001$), (43.7 years, SD±11.2). Smith's fractures was more frequently in younger patients (36.4 years, SD±5.6) and in patients with increased physical activity ($p=0.016$). At Colles' fractures the risk factor was osteoporosis ($p<0.001$), while in the case of cominutive fractures on several fragments, often associated with fractur of the styloid extension of the lactic

processus styloideus ulnae, significant weight ($p=0.020$) and osteoporosis ($p=0.004$)

Conclusion: Based on statistical analysis, it can be concluded that there are certain parameters that are significant predictive risk factors for the development of a certain type of distal radial bone fracture

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THE ASSOCIATION OF ALKALINE PHOSPHATASE WITH BONE HEALTH PARAMETERS IN TURKISH POSTMENOPAUSAL WOMEN

S. Tuzun¹, U. Akarimak¹, S. Sager², M. N. Alcicek¹, K. Sonmezoglu², S. Enisa³, D. Hans³

¹Istanbul University Cerrahpaşa School of Medicine, Department of Physical Medicine and Rehabilitation, ²Istanbul University Cerrahpaşa School of Medicine, Department of Nuclear Medicine, Istanbul, Turkey, ³Lausanne University Hospital, Bone & Joint Department, Center of Bone diseases, Lausanne, Switzerland

Alkaline phosphatase (ALP) is synthesized by the osteoblasts and is assumed to be an index for the rate of overall bone turnover. Postmenopausal woman has been shown to exhibit elevated ALP. Nevertheless, its role in the formation process is unknown and its relationship with bone health parameters is not well-established. The aim of this study was to investigate the association of ALP with BMD, bone microarchitecture as assessed by trabecular bone score (TBS), and the probability of fracture in the postmenopausal women.

ALP level was measured in the Research Laboratory of İstanbul University Cerrahpaşa Medical Faculty using Roche Cobas 8000 (Reference range 35-105 U/L). Lumbar spine (LS), total hip and femoral neck (FN) BMD were measured at the LS and hip by DXA (Hologic). TBS was measured in the LS DXA scans using the TBS calculator 3.0 (Medimaps, Merignac, France). The 10-year probability of hip or major osteoporotic fracture (MOF) was assessed using the Turkish FRAX tool. Linear regressions adjusted for age and BMI were performed to study the relationship between FN, LS, hip BMD T-score or TBS with ALP. Additionally, adjustment for prevalent fracture or glucocorticoid use was performed. The association of ALP with hip or MOF FRAX was assessed from univariate linear regressions.

One-hundred thirteen Turkish postmenopausal women (mean age 59.5±8.3 y and mean BMI 29.4±4.5 kg/m²) were included in this study. ALP increased per each standard deviation decrease in FN ($B=-0.01$, $p<0.01$), LS ($B=-0.01$, $p=0.07$), or hip ($B=-0.01$, $p<0.01$) BMD T-score. No significant association was observed between ALP and TBS ($B=-0.001$, $p=0.69$). The results did not change even after adjusting for prevalent osteoporotic fracture or glucocorticoid use. Moreover, we observed that higher values of ALP were associated with a higher probability of having a hip fracture: FRAX ($B=0.02$, $p=0.046$), and TBS-adjusted FRAX ($B=0.02$, $p=0.02$); whereas for the MOF FRAX, the relationship did not reach the significance level (although borderline): MOF FRAX ($B=0.03$, $p=0.09$), and TBS-adjusted MOF FRAX ($B=0.04$, $p=0.07$).

Our study shows that ALP is associated with the quantity of bone as assessed by BMD, but apparently not with the bone quality as assessed by TBS. In overall hip was found to be a region of more significance than LS regarding the ALP association with bone health parameters. The elevation of ALP in postmenopausal women suggests that ALP might be a proxy of bone healing processes in that population. However, further understanding of the underlying mechanisms and investigation in larger settings is needed.

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GENETIC VARIABILITY IN THE ESTROGEN RECEPTOR GENE IS ASSOCIATED WITH THE EFFECTIVENESS OF ANTI-RESORPTIVE TREATMENT IN SLOVAK POSTMENOPAUSAL WOMEN

R. Omelka¹, V. Mondockova¹, M. Lukacova¹, M. Adamkovicova¹, R. Babosova¹, D. Galbavy², M. Martiniakova¹, M. Bauerova¹

¹Constantine the Philosopher University in Nitra, ²Private Orthopedic Ambulance, Nitra, Slovakia

Objective: We analysed the associations of Pvu II and Xba I polymorphisms in the estrogen receptor α (ER α) gene with a response to two types of anti-osteoporotic therapy.

Methods: The study included 140 Slovak postmenopausal women treated for osteoporosis. The treatment types included application of HRT/17 β estradiol (1 mg/day; N=76; 63.2 $\pm$ 8.7 y.) or SERMs/raloxifene (60 mg/day; N=64; 65.3 $\pm$ 7.9 y.) during 48 months. Femoral (FBMD) and lumbar spine (LBMD) BMD were measured before and after the treatment period. All procedures were approved by the Ethical Committee of the Specialized Hospital of St. Svorad in Nitra (Slovakia).

Results: Both treatment types had a significant effect ($P<0.01$) on positive change in FBMD and LBMD. When considering the effect of the ER α gene on estradiol treatment, the subjects with Xba I/XX genotype had better response to the therapy compared to xx genotype carriers in both, FBMD (+0.26 $\pm$ 0.10 of T-score; $P<0.05$) and LBMD (+0.35 $\pm$ 0.10 of T-score; $P<0.01$). In LBMD, the xx genotype responded poorer when compared also with Xx genotype (-0.22 $\pm$ 0.08 of T-score; $P<0.05$). The Pvu II/PP genotype showed an increase of 0.25 $\pm$ 0.10 in FBMD as compared to pp genotype ($P<0.05$). The PP and Pp genotypes responded 0.39 $\pm$ 0.11 to 0.46 $\pm$ 0.15 of T-score ($P\leq 0.05$) better also in LBMD. The effect of the ER α gene on raloxifene therapy was reported only in LBMD. Subjects with xx genotype had -0.30 $\pm$ 0.11 of T-score worse response ($P<0.05$) in comparison with Xx genotype. The pp genotype showed 0.39 $\pm$ 0.11 to 0.46 $\pm$ 0.15 lower T-score in LBMD ($P<0.01$) when compared with the other Pvu II genotypes.

Conclusion: The Xba I/xx and Pvu II/pp genotypes showed worse response to estradiol/raloxifene therapy in comparison with other genotypes. The findings may contribute to more effective treatments on an individual basis.

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P679

LOW BMD IS COMMON IN AXIAL SPONDYLOARTHROPATHY

G. Fitzgerald¹, T. Anachebe¹, K. Mccarroll², F. O' Shea¹

¹Department of Rheumatology, ²Department of Medicine for the Elderly, St James's Hospital, Dublin, Ireland

Objective: Osteoporosis is a consequence of inflammatory arthritis (IA). It is often ignored in axial spondyloarthropathy (axSpA), an IA which predominantly affects men, and so prevalence figures are largely unknown. The aim of this study is to investigate the prevalence of low BMD in axSpA and explore relationships.

Methods: A detailed assessment was performed on axSpA patients, including demographics, clinical characteristics and laboratory investigations. Disease severity was assessed with validated tools measured on a 0-10 scale – higher numbers reflect more severe disease: BASDAI (disease activity), BASMI (spinal mobility) and BASFI (function). BMD was

assessed using DXA of the spine, hip and radius. The WHO criteria were used to classify low BMD.

Results: One hundred and four patients with axSpA were consecutively recruited: 77.9% (n=81) male, 98.1% (n=102) Caucasian, mean (SD) age 51 (12) years, disease duration 26 (13) years. The mean (SD) BASDAI was 3.9 (2.2), BASMI was 4.3 (1.9) and BASFI was 3.8 (2.5), reflecting mild to moderate disease burden. A history of fracture was present in 42.3% (n=44) of the cohort, with only 3 fragility fractures. Of the cohort, 42.3% (n=44) had osteopenia and 16.3% (n=17) had osteoporosis. Low BMD was most prevalent at the spine, with 44% of the cohort affected, followed by the femoral neck (30.1%, n=22). Low BMD at the radius was uncommon (<10% of the cohort). Only 6.4% of the cohort had a prior diagnosis of osteoporosis and only 39.4% had a previous DXA. Female gender, higher BASFI, lower BMI and lower urate levels were significantly associated with bone loss at both the spine and the hip. Other measures of disease severity had no impact on low BMD. Additionally, longer disease duration was associated with spine BMD loss. Non-obese patients were more likely to have low BMD than obese patients (62.3% v 40%, OR 2.5, $p=0.04$).

Conclusion: Low BMD is common in this axSpA cohort, with over 58.6% affected. Most cases of low BMD were undiagnosed prior to this study and less than half of the cohort had ever had a DXA, suggesting a continued low awareness of the risk of osteoporosis in a male-dominated disease.

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ENZYMES OF PURINE METABOLISM IN PATIENTS WITH EARLY OSTEOARTHRITIS

S. A. Bedina¹, E. E. Mozhgovaya², A. S. Trofimenko³, I. A. Zborovskaya³

¹Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy", ²Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy", ³Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy" Volgograd State Medical University, Volgograd, Russia

Objective: Early osteoarthritis is characterized by rapid pain at rest. This pain is perceived by patients as a manifestation of the age, and not as a reason for seeking medical attention. This creates difficulties for early diagnosis of RA. Our aim was to study the enzymatic patterns of purine metabolic pathway in lymphocytes of early osteoarthritis patients.

Methods: We observed 57 patients with early OA (41 women and 16 men) and 30 healthy individuals. The average duration of the disease ($M\pm m$) was 10.9 $\pm$ 0.6 months. Synovitis was found in 35 patients. The diagnosis according to ACR criteria. Adenosine deaminase (ADA), AMP-deaminase (AMPDA), adenine deaminase (AD), and 5'-nucleotidase (5'-NT) activities were determined in lymphocytes spectrophotometric methods.

Results: ADA activity in lymphocytes of healthy persons was 37.0 $\pm$ 55.8 nmol/mines/ml. AMPDA activity was 2.26 $\pm$ 4.22 nmol/mines/ml, AD activity was 1.43 $\pm$ 2.47 nmol/mines/ml, 5'-NT activity was 33.3 $\pm$ 22 nmol/mines/ml. In comparison with healthy persons, only AD activity ($p<0.001$) was higher in OA patients. AD activity ($p<0.001$) and 5'-NT activity ($p=0.006$) were higher in OA patients with synovitis in comparison with healthy persons. Enzyme differences were not detected in OA patients without synovitis in comparison with healthy persons. In OA patients with synovitis ADA activity ($p=0.003$), AMPDA ($p<0.001$), AD ($p<0.001$) and 5'-HT ($p=0.005$) were higher in comparison with OA patients without synovitis.

Conclusion: The results of our study were shown that in the early stages of OA detected violation of purine metabolism, particularly pronounced in the presence of synovitis.

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THE EFFECT OF CADMIUM EXPOSURE ON FUNCTIONS OF HUMAN CULTIVATED OSTEOBLASTS

M. Martiniakova¹, M. Lukacova¹, M. Adamkovicova¹, V. Mondockova¹, V. Kovacova¹, A. Sarocka¹, M. Bauerova¹, R. Omelka¹

¹Constantine the Philosopher University in Nitra, Nitra, Slovakia

Objective: Cadmium (Cd) is a widespread environmental pollutant which negatively affects bone health even after low-level exposure. This study aimed to analyse the effect of Cd exposure on cell viability and expression of specific genes in cultivated human osteoblasts.

Methods: Primary Human Osteoblasts (PromoCell) were incubated without (control group) or with Cadmium Chloride at final Cd concentrations of 0.1, 2.0, and 5.0 μ M in growth medium for 48 h. We determined cell viability by alamarBlue assay (Bio-Rad). An expression of 9 genes connected with osteoblast-specific pathways, oxidative stress and apoptosis was determined by quantitative PCR (RT2 Profiler PCR Array, Qiagen). Results: Osteoblasts viability significantly decreased at the highest (5.0 μ M; $P < 0.05$) Cd concentration. Moreover, we found significant down regulation of collagen type I α 1 (COL1A1; -1.74 in fold regulation, 0.58 fold change; $P < 0.05$), alkaline phosphatase (ALPL; -1.22 in fold regulation, 0.82 fold change; $P < 0.01$), and glutathione peroxidase 1 (GPX1; -1.97 in fold regulation, 0.51 fold change; $P < 0.01$) genes at Cd concentration of 5.0 μ M. In case of this Cd content, no changes in gene expression were identified for BGLAP, WNT5A, RUNX2, BAX, CASP1, and SOD1 genes. Cd concentrations of 0.1 and 2.0 μ M did not show significant changes in the expression of any analysed gene.

Conclusion: Our results demonstrate that Cd in higher dose (5.0 μ M) may negatively affect cell viability, production of collagen, and thereby growth and development of bones. It may also modulate oxidative stress by inhibiting GPX1. The results does not support any effect of Cd (at doses used in our study) on cell apoptosis.

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P682

DIETARY CALCIUM INTAKE IN CAUCASIAN AND EAST ASIAN ADOLESCENTS: A STUDY OF EXPATRIATE MALE HIGH SCHOOLERS AGED 16-18 YEARS RESIDING IN SINGAPORE

A. D. Chandran¹, M. Chandran²

¹St Joseph's Institution International, ²Osteoporosis and Bone Metabolism Unit, Singapore General Hospital, Singapore

Objectives: Adequate calcium intake during adolescence is critical for adequate skeletal mineralization and for achievement of peak bone mass. Data evaluating dietary calcium intake of adolescents across different racial backgrounds is very limited. We evaluated whether the diets of adolescents from two racial backgrounds; East Asian and Caucasian met the minimum RDA for calcium and whether differences existed in dietary calcium intake between the 2 groups. These 2 races are linked to distinct and unique cultures that may affect the types of food they consume.

Method: A self-administered survey based on 2 validated Food Frequency Questionnaires developed to specifically estimate calcium intake was used. 50 males aged between 16-18 years with 25 each belonging to Caucasian (Western Europe and North America) and East-Asian (Japan, Korea, China) heritage were studied. All the food items in the questionnaire were available in the multi-cuisine cafeterias and vending machines in the international school that was the setting of the survey and at local supermarkets and restaurants. Photographs of these were included in the questionnaire to facilitate food identification and recall.

Results: The mean calcium intake (mg) (SD) was 1083.8 (156.3) and 931.4 (64.4) amongst the Caucasians and East Asians respectively ($p = 0.0004$). The Caucasian group had more dietary variations between themselves, had a larger quantity of their daily calcium intake from fewer dietary sources viz mostly dairy products (63%) and fast food (18%) whereas the East-Asian group diet was more uniform across individuals and had a more evenly spread intake from different sources including dairy (38%) and soy products (21%), fish (6%), vegetables (14%) and lentils (15%).

Conclusion: The dietary calcium intake of expatriate adolescent males living in a first-world country with easy access to multiple food choices was still below the threshold (1300 mg) of the RDA. It was significantly lower in East-Asians compared to Caucasians. The diets of Caucasian adolescents, though higher in calcium, differed more between individuals and was less varied with a large quantity of daily calcium from fewer sources whereas that of East-Asian teenagers had a more even spread and varied less between individuals perhaps due to the East-Asian students likely being more consistent in their daily food intake, portion size and source of nutrients than the Caucasians.

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INTERACTIVE EFFECTS OF ACRYLAMIDE AND ETHANOL ON BONE MICROSTRUCTURE OF MICE

A. Sarocka¹, V. Kovacova¹, R. Omelka¹, R. Babosova¹, E. Kapusta², Z. Goc², G. Formicki², M. Martiniakova¹

¹Constantine the Philosopher University in Nitra, Nitra, Slovakia,

²Pedagogical University in Cracow, Cracow, Poland

Objective: To examine femoral bone microstructure of mice after single and simultaneous administration to acrylamide and ethanol. Interactive effects of these toxins were analysed after one remodelling cycle.

Methods: Twenty clinically healthy 12-weeks-old Swiss mice (males) were randomly divided into four groups: A group - males were treated per orally with acrylamide (40 mg/kg b.w.) during 14 days; E group - mice drank a solution composed of 15% ethanol for 2 weeks; AE group - animals received both toxins, and a control (C) group. Modern 2D and 3D imaging methods were used to determine bone microstructure. The study was approved by the First Local Ethic Committee on Experiments on Animals in Cracow (No. 175/2012).

Results: Single and simultaneous exposure to acrylamide and ethanol affected only compact bone microstructure. No significant changes in trabecular bone morphometry (relative bone volume, trabecular number, trabecular thickness and separation, bone surface) were detected among all groups. In mice from A group, vasoconstriction of primary osteon's vascular canals (POVC) was identified ($P < 0.05$). However, POVC were significantly increased (vasodilation) in E group ($P < 0.05$). In AE group, the sizes of POVC approximated to the C group. Relative bone volume with and without marrow cavity and BMD of the compact bone were unchanged in mice from A group. However, they were significantly decreased in E group ($P < 0.05$). Similar changes were also detected in AE

group, excluding relative bone volume without marrow cavity (insignificant difference).

Conclusion: Both toxins had negative impacts on compact bone after one remodeling cycle; however, these effects were reduced by their simultaneous exposure.

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THE EFFECT OF APRICOT SEEDS ADMINISTRATION ON BONE MICROSTRUCTURE OF RABBITS

V. Kovacova¹, A. Sarocka¹, P. Sranko¹, R. Omelka¹, M. Halenar², A. Kolesarova², M. Racanska³, M. Martiniakova¹

¹Constantine the Philosopher University in Nitra, ²Slovak University of Agriculture in Nitra, Nitra, Slovakia, ³Masaryk University, Brno, Czech Republic

Objective: To analyse possible effects of apricot seeds administration on bone microstructure in rabbits. The seeds contained amygdalin (5.2%), one of the most popular alternative cancer cures in many countries.

Methods: Twelve clinically healthy Californian rabbits (males) were randomly divided into three groups: E1 group - rabbits were fed by crushed apricot seeds (60 mg/kg b.w.) during 28 days, E2 groups - males received the seeds (300 mg/kg b.w.) for four weeks and a control (C) group. Modern 2D and 3D imaging methods were used to determine femoral bone microstructure. All experimental procedures were approved by the State Veterinary and Food Institute of Slovak Republic, no. 3398/11-221/3 and Ethic Committee.

Results: In rabbits from E1 and E2 groups, significantly decreased sizes of primary osteon's vascular canals, Haversian canals and secondary osteons ($P < 0.05$) were identified. These findings could be associated with a negative impact of amygdalin on blood vessels (vasoconstriction) present in osteons and also collagen synthesis. On the contrary, other parameters of the compact bone (relative bone volume, BMD, bone surface, cortical bone thickness) were not affected by the seeds application. Similarly, trabecular bone morphometry (relative bone volume, trabecular number, trabecular thickness and separation, bone surface) did not differ significantly among E1, E2 and C groups.

Conclusion: Consumption of apricot seeds at doses used in our study influenced only compact bone microstructure. It had no impact on trabecular bone tissue.

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PROSPECTIVE ASSOCIATIONS OF OSTEOSARCOPENIA AND OSTEODYNAPENIA WITH INCIDENT FRACTURE AND MORTALITY OVER 10 YEARS IN COMMUNITY-DWELLING OLDER ADULTS

S. Balogun¹, T. Winzenberg¹, K. Wills¹, D. Scott², M. Callisaya¹, G. Jones¹, D. Aitken¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart, ²Department of Medicine, School of Clinical Sciences at Monash Health, Faculty of Medicine, Nursing and Health Sciences, & Peninsula Clinical School, Central Clinical School, Monash University, Clayton, Australia

Objectives: To determine whether older adults with low muscle mass (sarcopenia) and strength (dynapenia), in the presence of low bone mass (osteoporosis/osteopenia), have an increased risk of fracture and mortality over 10 years, compared to those with sarcopenia or dynapenia alone, low bone mass alone or those with neither condition.

Methods: 1032 participants (52% women; mean age 62.9 ± 7.4 years) were studied at baseline, 2.5, 5 and 10 years. Mortality was ascertained from the death registry. Fractures were self-reported. Baseline appendicular lean mass (ALM) was assessed using DXA and normalised to BMI. Hand grip strength (HGS) was assessed by a dynamometer. Participants were classified as osteopenic if they had T-scores of the total hip and/or lumbar spine $BMD < -1$, sarcopenic or dynapenic if they were in the lowest 20% of the sex-specific distribution for ALM/BMI or HGS respectively. Osteopenia and sarcopenia or dynapenia occurring together were termed osteosarcopenia and osteodynepenia respectively.

Results: Incident fracture risk was significantly higher in participants who were osteodynepenic ($RR = 2.07$, 95%CI: 1.26–3.39), dynapenic alone ($RR = 1.74$, 95%CI: 1.05–2.87), and osteopenic alone ($RR = 1.63$, 95%CI: 1.15–2.31), compared to those without dynapenia or osteopenia. Mortality risk was significantly higher only in participants with osteosarcopenia ($RR = 1.49$, 95%CI: 1.01–2.21) compared to those without sarcopenia or osteopenia. Osteosarcopenia and osteodynepenia did not significantly add to fracture or mortality risk compared to having sarcopenia, dynapenia or osteopenia alone.

Conclusion: Osteopenia combined with sarcopenia or dynapenia does not significantly increase the risk of fracture or mortality compared to having osteopenia or sarcopenia/dynapenia alone. This suggests that combining these assessments may not improve prediction of fracture and mortality.

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BONE DENSITY OF HEALTHY MALE POPULATION PER AGE GROUP

P. Kokkoris¹, I. Hatzidakis¹, N. Marmara¹, G. Toloumis¹

¹Hellenic Air Force General Hospital, Athens, Greece

Objective: To evaluate the BMD of healthy male population and how it changes with age.

Methods: We evaluated a sample of 1902 healthy males, aged between 20-59 years old for BMD in both the hip and the lumbar spine, T-scores, Z-scores and anthropometric measurements. The participants were divided into four age groups (Group A:20-29, Group B:30-39, Group C:40-49, Group D:50-59 years old). The mean values for the total population studied were the following: age 39.4 years old, weight 83.6 kg, height 177 cm, BMI 26.5 ± 3 kg/m², lumbar spine BMD 1.21 ± 0.16 g/cm² and hip BMD 1.05 ± 0.22 g/cm².

Results: The lumbar spine measurements for each group were the following: Group A 1.27 ± 0.14 g/cm², Group B 1.23 ± 0.15 g/cm², Group C 1.20 ± 0.16 g/cm², Group D 1.19 ± 0.18 g/cm². For the hip the corresponding BMD measurements were: Group A 1.15 ± 0.28 g/cm², Group B 1.08 ± 0.33 g/cm², Group C 1.01 ± 0.16 g/cm², Group D 0.98 ± 0.12 g/cm². Statistical analysis showed that there were statistically significant differences in hip BMD, in each age group comparing with the other three groups ($p < 0.05$). However, in the lumbar spine there was statistically significant difference only comparing groups A and B with the other groups, while there was no statistically significant difference between groups C and D.

Conclusion: In a healthy male population, a decrease in BMD is observed as age increases. The decrease in BMD is more apparent in the hip than in the lumbar spine. While an expected decrease is also noticed in lumbar spine measurements, this only takes place until the age of 40. After this age, no statistically significant difference was observed. However, it would be reasonable to propose that these measurements may overestimate BMD, because of the increased prevalence of osteophytes after the age of 40.

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MODULATION OF LONG NONCODING RNAs BY RISK SNPS UNDERLYING GENETIC PREDISPOSITIONS TO OSTEOARTHRITIS

B. Yang¹, S. Yao², Y.-J. Zhang², S.-S. Dong², Y. Guo², T.-L. Yang²

¹Department of Orthopaedics of the Shaanxi Provincial People's Hospital, ²Key Laboratory of Biomedical Information Engineering of Ministry of Education, School of Life Science and Technology, Xi'an Jiaotong University, Xi'an, China

Objective: Genome-wide association studies (GWAS) have identified many osteoarthritis-associated SNPs that located in non-coding regions. However, the functional mechanism of these loci have not been revealed. Long non-coding RNA (lncRNA) is a key regulator of osteoarthritis. In this study, we aimed to use lncRNAs to identify the functional and regulatory mechanism of osteoarthritis-associated SNPs.

Methods: Osteoarthritis-associated index SNPs were downloaded from NHGRI GWAS Catalog with P value $< 5 \times 10^{-8}$. Since the low genomic coverage of GWAS genotyping microarrays may overlook the genuine risk-associated variants, we generated SNPs that were in strong linkage disequilibrium (LD) with index SNPs ($r^2 > 0.8$) using the 1000 Genomes Phase III data. The expression quantitative trait loci (eQTL) data in osteoarthritis relevant tissues from the GTEx database were used to identify the target lncRNAs of osteoarthritis-associated SNPs. Subsequently, we identified experimentally verified and computationally predicted microRNA targets on lncRNAs through DIANA-LncBase and miRcode.

Results: We obtained a total of ten osteoarthritis-associated index SNPs from the NHGRI GWAS Catalog, eight of them were identified in white populations, one in East Asian and one in African American. We further identified four SNPs, which high LD with the osteoarthritis-associated index SNP rs11842874, contributed to the gene expression variation of *LINC00452*. Has-miR-21-5p was predicted to be one of the predicted targets of *LINC00452* through two online database, DIANA-LncBase and miRcode. Has-miR-21-5p could also target the osteoarthritis-associated gene, *ERG*. Functional validation in the Mouse Genome Informatics database showed that *ERG* was a critical molecular regulator of the endurance of articular cartilage during postnatal life and *ERG* could mitigate spontaneous and experimental osteoarthritis. We also found the significant positive correlation between the expression of *ERG* and *LINC00452* ($P=0.019$), indicating the critical role of *LINC00452* in *ERG* gene regulation via combining with has-miR-21-5p during osteoarthritis.

Conclusions: We identified the molecular mechanism and pathogenesis of *LINC00452* in osteoarthritis which will provide the theoretical and scientific basis for the clinical treatment.

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P688

IMPACT OF THE FRAILTY STATUS ON THE COST OF DRUGS CONSUMED IN NURSING HOMES: RESULTS OF THE SENIOR COHORT

F. Buckinx¹, A. Charles¹, A. Quabron¹, T. van Hees², J. Petermans³, J.-Y. Reginster¹, O. Bruyère¹

¹University of Liège, Department of Public Health, Epidemiology and Health Economics, ²University of Liège, Department of Pharmacy, ³CHU of Liège, Geriatrics Department, Liège, Belgium

Objective: The financial impact associated with drug consumption is important, both for the elderly and social security. However, this is currently poorly investigated among frail subjects and more specifically in nursing home setting. The main purpose of this study was to determine the average monthly cost of drugs consumption among nursing home residents according to their frailty status.

Methods: This is an analysis of the 1-year follow-up of the SENIOR (Sample of Elderly Nursing home Individuals: an Observational Research) cohort. All participants included in this cohort were classified into "frail" and "non-frail" according to the Fried's criteria (i.e., weight loss, weakness, exhaustion, slow gait, low physical activity level) at baseline (T0). During the study period, residents' monthly bills from the pharmacy were analyzed in order to determine the average monthly cost of drugs consumed, according to their frailty status.

Results: A sample of 87 residents from the SENIOR cohort was included in this analysis. These subjects were 83.8 ± 9.33 years old and 75.9% of them were women. The prevalence of frailty in the studied sample was 28%. The median number of medications consumed each day was 9 (6-12) (i.e., 8.5 (5-11) among frail subjects, 9 (7-13) among non-frail subjects; $p=0.15$) and the overall median monthly cost was € 109.6, of which 49% were covered by the Belgian social security, the balance being covered by the patient. When comparing the drug expenses between frail subjects and non-frail ones, the overall average monthly amount does not differ between the 2 groups ($p=0.057$). Nevertheless, the expenditure remaining to be borne by residents, after the Belgian Social Security intervention, was significantly higher among frail residents (€ 65.7) than among non-frail ones (€ 47.6; $p=0.017$). Moreover, expenditures for drugs treating the digestive system and metabolism ($p=0.032$) and those treating dermatological system ($p=0.019$), were significantly higher among frail residents compared to non-frail residents.

Conclusions: Frailty status has an impact on the expenditures related to the consumption of drugs. However, although the overall monthly cost is not impacted by the frailty status, the balance remaining to be borne by frail nursing home residents is significantly higher.

P689

LONG TERM BENEFICIAL EFFECT OF HYALURONIC ACID VISCOSUPPLEMENTS ON CARTILAGE QUALITY

M. Gaumet¹, I. Badoud², P. Ammann²

¹TRB Chemedica, ²University Hospital Geneva, Geneva, Switzerland

Objectives: The osteochondral unit is a biocomposite responsible for the optimal distribution of load during movements and axial compression of joint. Any alteration of tissue mechanical properties (cartilage or bone) could interfere with this function. Viscosupplementation with hyaluronic acid (HA) might improve cartilage quality, at time of injection, as well as on the long-term. The present study aimed at verifying these hypotheses using different viscosupplements varying in terms of HA properties.

Methods: In vitro experiments were performed on distal femurs harvested from adult rats. The femurs were first incubated overnight in 6 different HA-based solutions ranging from 0.5 to 90 MDa, as well as one synthetic polymer solution. Controls were incubated in PBS. The samples were then incubated overnight in PBS. Bio-indentations were performed on the condyle before and immediately after incubation, as well as after the second incubation in PBS. Three different physiologically areas, each submitted to various mechanical loadings, were studied. The elastic modulus (MPa) and the maximal force (N) were recorded. Indentation depths were located in the upper part of the hyaline cartilage. Cartilage thickness at the site of indentation was evaluated by contrast enhanced computed tomography.

Results: Hyaline cartilage thickness was similar in each of the studied groups (average=0.037 mm). Five of the HA-based products increased significantly cartilage elasticity compared with PBS. This positive effect (up to 27%) was observed in all 3 investigated regions. Among linear HA solutions, the formulation with a higher HA molecular weight was least effective (+4.04±0.61%) compared with products containing lower molecular weight HA (from 24.21±5.61% to +27.22±4.17%). The results suggest that the molecular weight and linearity of the HA chain might influence HA penetration into the cartilage, thus improving its mechanical properties. Furthermore, this effect was maintained after the second incubation in PBS, indicating that some of the investigated HA products might remain within the cartilage.

Conclusions: The present study demonstrates that HA improves cartilage mechanical properties as a function of chain linearity and molecular weight. Interestingly, this beneficial effect was observed even after the product was eliminated from the incubation medium.

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OWN ATTITUDE REGARDING AGING AMONG NURSING HOME RESIDENTS: RESULTS OF THE SENIOR COHORT

F. Buckinx¹, A. Charles¹, X. Rygaert¹, J.-Y. Reginster¹, S. Adam², O. Bruyère¹

¹University of Liège, Department of Public Health, Epidemiology and Health Economics, ²University of Liège, Psychology of Aging Unit, Liège, Belgium

Objective: In the field of health, the stereotypes associated with aging are of great concern as extensive literature emphasizes its deleterious effects on physical and mental health of the elderly. The aim of this study was to assess the relationship between the attitude toward aging and the frailty status of nursing homes residents.

Methods: A cross-sectional analysis of the data collected at the inclusion in the SENIOR (Sample of Elderly Nursing Home Individuals: an Observational Research) cohort was conducted. All subjects included in the study received an assessment of frailty based on the Fried's criteria. They also responded to questions assessing their attitude towards aging (i.e., the Attitude to Aging Questionnaire (AAQ), the subjective age and questions about the age at which someone stops being considered young and is considered old and the open-ended Image-of-Aging question) in order to evaluate, ultimately, the relationship between this perception of aging and frailty.

Results: A sample of 272 residents (i.e., who have a complete assessment for both frailty and attitude toward aging questions), including 75% women, from 28 different nursing homes participated in this study. These subjects were 83.9±8.19 years old and had a MMSE score of 25.2±3.85 points. Out of these, 54 (19.9%) subjects were frail, 182 (66.9%) were pre-frail, and 36 (13.2%) were robust. The results of this study reveal that, according to the AAQ questionnaire, frail subjects have a more negative

perception of aging (score of 80.3±10.2 points on the questionnaire) than pre-frail subjects (83.6±10.8) and robust subjects (86.5±10.5) ($p=0.02$). However, the three groups (i.e., frail, pre-frail and robust subjects) did not differ in the age that would mark, to their opinion, the end of youth ($p=0.93$) or the beginning of old age ($p=0.98$). The subjective age isn't significantly different according to the frailty status. Finally, based on the Open-Ended Image of Aging question, the residents' vision of aging isn't different according to the frailty status.

Conclusion: Based on the AAQ, frail subjects have more negative attitude to ageing compared to pre-frail subjects and robust ones. Longitudinal studies are needed to understand the causality between the underlying mechanisms.

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PHYSICAL ACTIVITY LEVEL AND COMPOSITE INDICES OF FEMORAL NECK STRENGTH IN A GROUP OF YOUNG LEBANESE MEN

E. Zakhem¹, A. Berro¹, A. Khawaja¹, C. El Khoury¹, R. El Hage¹

¹Department of Physical Education, Fass, University of Balamand, Kelhat EL Kurah, Lebanon

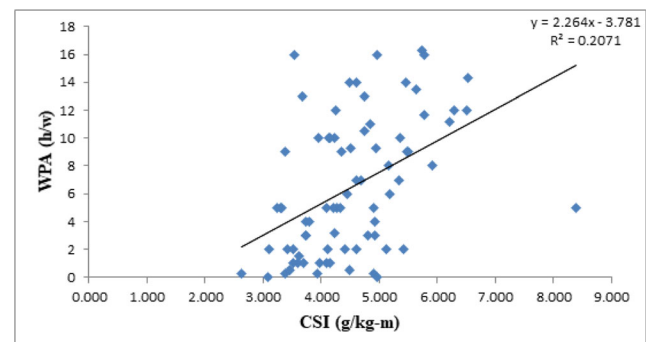
Objective: To examine the associations between weekly physical activity level and composite indices of femoral neck strength in young Lebanese men.

Methods: 80 overweight (BMI >25 kg/m²) young Lebanese men whose ages from 18-35 years participated in this study. Weight and height were measured, and BMI. FN was measured by DXA and Compressive strength index (CSI), FN bending strength index (BSI) and FN impact strength index (ISI) were calculated. Compressive ([FN BMD * FN width/weight]) and bending strength ([FN BMD * FN width²]/[hip axis length * weight]) express the forces that the FN has to withstand in weight bearing, whereas impact strength ([FN BMD * FN width * hip axis length]/[height * weight]) expresses the energy that the FN has to absorb in an impact from standing height. The weekly physical activity (WPA) was evaluated by the Global Physical Activity Questionnaire (GPAQ).

Results: Our results showed that WPA was positively correlated with composite indices of FN strength at all calculated sites ($r=0.50$; $p<0.001$ for CSI, $r=0.43$; $p<0.001$ for BSI, $r=0.43$; $p<0.001$ for ISI).

Conclusion: This study suggests that WPA is a positive determinant of composite indices of FN strength in young overweight men.

Figure 1. Relation between CSI and weekly physical activity level.



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INTEGRATIVE ANALYSIS OF GENOTYPING DATA SUGGESTS THAT MULTIPLE VITAMIN D RECEPTOR GENE VARIANTS ARE ASSOCIATED WITH BONE FRAGILITY IN POSTMENOPAUSAL WOMEN

P. Marozik¹, E. Rudenko², M. Tamulaitienė³, V. Alekna³, I. Mosse¹, A. Rudenka⁴, V. Samokhovec⁵, K. Kobets¹, A. Mastavičiūtė³

¹Institute of Genetics and Cytology NAS Belarus, Minsk, Belarus, ²Belarusian State Medical University, Minsk, Belarus, ³Vilnius University, Vilnius, Lithuania, ⁴Belarusian Medical Academy of Postgraduate Training, ⁵Minsk City Clinical Hospital, Minsk, Belarus

Objective: Vitamin D receptor (VDR) is one of the main mediators of the biological activity of vitamin D. VDR dysfunction might substantially contribute to development of postmenopausal osteoporosis (PMO). PMO is characterized by reduced BMD and increased bone fragility and has a strong genetic component. Purpose of work: to reveal informative genetic markers, involved in vitamin D metabolism, and their combinations, associated with the risk of osteoporosis in Belarusian and Lithuanian postmenopausal women.

Methods: Case group included women with severe PMO (66 Belarusians and 28 Lithuanians), the control group comprised postmenopausal women with the BMD T-score of >-2.5 and without previous fragility fractures (170 Belarusians, and 45 Lithuanians). Polymorphic variants in VDR gene (*Apal*, *BsmI*, *TaqI* and *Cdx2*) were determined using PCR analysis with TaqMan probes (Thermo Scientific). Significance was assessed using χ^2 test and multivariate logistic regression (R-package).

Results: The genotyping revealed a statistically significant difference in the genotype and allele frequencies of the *Apal* polymorphism between the patients and the controls ($\chi^2=13.74$ and $\chi^2=15.31$, respectively, $P<0.01$). The patients with PMO were also 2.6 times more likely to carry the "risk" *Bb* genotype of the VDR *BsmI*, when compared to controls. The analysis of the relationship between gene polymorphisms and BMD in both population groups revealed a statistically significant association between the femoral neck BMD level and the genotypes of the VDR *Apal* and *TaqI* polymorphisms. The favourable combinations of analysed VDR gene variants were significantly over-represented among the asymptomatic control group, when compared with the PMO group, and *vice versa*.

Conclusion: The results help to reveal the genetic mechanisms, determining decrease of BMD and fracture risk. Screening of genetic markers of predisposition to OP may enable early identification of risk groups. Considering the effects of unfavorable gene variants, it is possible to improve effectiveness of OP therapy.

P693

OSTEOPOROSIS PRESCREENING AFTER FRACTURE WITH PULSE-ECHO ULTRASOUND (P-EUS): DOES IT SAVE UNNESCESSARY DXA SCANS?

P. van den Berg¹, P. P. M. van Haard¹, D. H. Schweitzer¹

¹Reinier de Graafgasthuis, Delft, The Netherlands

Objectives: Combined pulse-echo ultrasound (P-EUS) and DXA measurements were applied as a part of fracture liaison service care (FLS) and agreement was evaluated between the two methods. We aimed to apply P-EUS for prescreening purposes directly at the plaster room during fracture treatment.

Methods: A total of 187 consecutive women with a recent fracture at age between 55-70 years (median 64 yr) were included in the study. These women were measured with a handheld pulse-echo ultrasonometer

(Bindex[®], Bone Index Finland, Kuopio, Finland) that measures cortical thickness (CT) at the tibia and reports a Density Index (DI), an estimate for DXA hip BMD. The subject classification by DI was compared to DXA results (Hologic Discovery QDR) in line with the NOS/ISCD guidelines. Previously, 90% sensitivity and specificity thresholds for osteoporosis with axial DXA have been determined for DI, classifying patients to healthy (>0.844 g/cm²; green), intermediate (between the thresholds - DXA investigation needed; orange) or osteoporotic (<0.779 g/cm²; red).

Results: The study population included 71 women with and 116 without osteoporosis. Bland&Altman plotting showed a high homoscedastic distribution, although 2 outliers. In this study-population the comparison of P-EUS to DXA based osteoporosis classification showed a sensitivity of 95.8%, specificity of 81.7%, positive predictive value 76.7% and negative predictive value 96.9% when 39% of women were between the thresholds. In the FLS, *only screening approach* of P-EUS could be applied by only using the upper threshold, and DXA investigations could have been avoided in 31% of the women. Two out of 71 patients classified as 'osteoporotic' by DXA, had a 'healthy' DI (>0.844). Finally, there were 10 women with traumatic vertebral fractures and 2 women with vertebral loss of height $>40\%$ without trauma. The latter had an 'osteoporotic DI' as well as a hip T-score ≤ -2.5 SD.

Conclusions: Based on this study, the use of P-EUS seems to save 1/3 of the unnecessary DXA scans in women with a fracture in the age of 55-70 years. Further, the high negative predictive value (96.9%) further supports the application of P-EUS as a prescreening tools in the FLS services.

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THE CONNECTION BETWEEN OSTEOPOROSIS, ANTICITRULLINATED PROTEIN ANTIBODIES AND RHEUMATOID ARTHRITIS

A. Cioroianu¹, L. M. Florescu¹, R. M. Iancu¹, A. M. Bumbea¹, P. L. Ciurea¹, A. E. Musetescu¹, B. Altemimi¹

¹University of Medicine and Pharmacy Craiova, Craiova, Romania

Objectives: Rheumatoid arthritis (RA) is an autoimmune disease which alters the bone structure due to the production of pro-inflammatory cytokines [1]. RA can be associated with Sicca symptoms resulting in an overlap between RA and secondary Sjögren's syndrome (sSS) [2]. Our aim was to assess the risk of osteoporosis in RA patients in correlation with the presence of rheumatoid factor (RF) and anti-citrullinated protein antibodies (ACPA).

Methods: The study group consisted of 25 sex and age-matched controls and 25 patients (20 females, 5 males) with RA with mean age of 59.8 (± 2.64 years) and mean disease activity before inclusion in the study of 6.5 years (± 1.5 years). We determined the serum levels of RF and ACPA and measured the BMD of the lumbar spine using a DXA scanner.

Results: ACPA were positive in 17 patients (68%) while RF was positive in 18 patients (72%). 10 patients (40%) associated sSS and all of them were ACPA positive. We divided the patients into two groups: group I which included the patients with positive ACPA or RF and group II with negative ACPA and RF. The BMD, quantified by the T-score, measured in group I was significantly lower, with a mean value of -2.12 standard deviations (± 0.24) than the one in group II with a mean value of -1.77 standard deviations (± 0.14).

Conclusions: We discovered that ACPA were negatively related to lumbar BMD. Furthermore, ACPA may not only be responsible for high disease activity which results in bone erosions, but also for generalized bone loss in RA.

References:

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2. Dinescu ŞC et al. *Rom J Morphol Embryol* 2017;58:409

P695

RELATIONSHIPS BETWEEN BONE VARIABLES AND BIOCHEMICAL MARKERS OF BONE TURNOVER IN A GROUP OF YOUNG LEBANESE MEN

E. Zakhem¹, C. El Khoury¹, A. Berro¹, A. Khawaja¹, R. El Hage¹

¹Department of Physical Education, Fass, University of Balamand, Kelhat EL Kurah, Lebanon

Objective: To investigate the relationships between bone variables (BMD, bone mineral content (BMC), composite indices of FN strength, trabecular bone score (TBS) and geometric indices of hip bone strength) and biochemical bone turnover markers such as calcium, PTH and alkaline phosphatase in a group of young Lebanese men.

Methods: A cross-sectional study was carried out with 72 overweight young Lebanese men aged between 18-35 years. Weight and height were measured, and BMI was calculated. BMD was measured by DXA at whole body (WB). TBS and geometric indices of hip bone strength were also measured by DXA. FN compressive strength index (CSI), FN bending strength index (BSI) and FN impact strength index (ISI) were calculated. Biochemical bone turnover markers were measured by the Nichols Advantage competitive binding chemiluminescence immunoassay.

Results: Serum calcium was positively correlated to ISI ($r=0.33$; $P=0.007$), BSI ($r=0.24$; $P=0.04$), CSI ($r=0.23$; $P=0.04$) and negatively to total z-score ($r=-0.25$; $P=0.03$) and arms BMD ($r=-0.351$; $P=0.0021$). Alkaline phosphatase was negatively correlated to BMD L1-L4 ($r=-0.24$; $P=0.03$), neck BMD ($r=-0.21$; $P=0.06$), wards BMD ($r=-0.24$; $P=0.04$), femur total BMD ($r=-0.22$; $P=0.04$), head BMD ($r=-0.29$; $P=0.01$), legs BMD ($r=-0.23$; $P=0.04$), trunk BMD ($r=-0.23$; $P=0.04$), and total BMD ($r=-0.27$; $P=0.01$). PTH was negatively correlated with composite indices of FN strength at CSI ($r=-0.24$; $p=0.03$) and ISI ($r=-0.29$; $p=0.01$).

Conclusion: This study suggests that biochemical markers of bone turnover are among the determinants of bone mass and composite indices of FN strength in young Lebanese men.

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SLEEP QUALITY IS A DETERMINANT OF COMPOSITE INDICES OF FN STRENGTH AND BMD IN A GROUP OF YOUNG LEBANESE MEN

E. Zakhem¹, A. Khawaja¹, A. Berro¹, C. El Khoury¹, R. El Hage¹

¹Department of Physical Education, Fass, University of Balamand, Kelhat EL Kurah, Lebanon

Objective: To explore the relationship between sleep quality and bone variables (BMD, bone mineral content, composite indices of FN strength trabecular bone score and geometric indices of hip bone strength) in a group of young Lebanese men.

Methods: Seventy-seven overweight ($BMI > 25 \text{ kg/m}^2$) young Lebanese men aged from 18-35 years participated in this study. Weight and height were measured, and BMI was calculated. Body composition, BMD, bone mineral content, geometric indices of hip bone strength and trabecular bone score was measured by DXA. FN compressive strength index (CSI), FN bending strength index (BSI), and FN impact strength index (ISI) were calculated. The Pittsburgh sleep quality index (PSQI) was used to

assess sleep habits and quality; higher scores represent worse sleep quality.

Results: PSQI was positively correlated to CSI ($r=0.2$; $p=0.03$), ISI ($r=0.24$; $p=0.04$), wards BMD ($r=0.23$; $p=0.035$) and trochanter BMD ($r=0.32$; $p=0.003$).

Conclusion: Our study shows positives correlations between PSQI and many bone variables (ward BMD, trochanter BMD, CSI and ISI). Therefore, this study suggests that the quality of sleep is a determinant of composite indices of FN, wards and trochanter BMD.

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3D ANALYSIS OF THE CORTICAL AND TRABECULAR BONE OF ELITE FEMALE ATHLETES INVOLVED IN HIGH- AND LOW-IMPACT SPORTS

L. Humbert¹, L. Del Rio², A. Lizaraga³, M. Bellver⁴, R. Winzenrieth¹, A. Amani², F. Drobnic³

¹Galgo Medical, Barcelona, Spain, ²CETIR Centre Medic, Barcelona, Spain, ³Football Club Barcelona, Barcelona, Spain, ⁴Centro de alto Rendimiento, Sant Cugat del Valles, Spain

Objective: To assess and compare the cortical and trabecular bone of the proximal femur of athletes involved in high-impact sports (football and volleyball) and low-impact sports (swimming, synchronised swimming and water polo) using DXA-derived 3D analysis.

Methods: Elite female athletes from the football first team of FC Barcelona and from the Spanish national team of volleyball, swimming, synchronised swimming and water polo were included in this study. Hip DXA scans were performed at the Medical Services of FC Barcelona (Barcelona, Spain) using a Lunar iDXA scanner (GE Healthcare, Madison, WI). Areal BMD (aBMD) were calculated at total femur. The 3D-SHAPER software (v2.7, Galgo Medical, Barcelona, Spain) was used to provide 3D analysis of the cortical and trabecular bone from hip DXA scans. Trabecular volumetric BMD (vBMD) and cortical surface BMD (sBMD) were calculated at total femur. DXA and DXA-derived 3D measurements calculated for every groups were compared using Student's t-test.

Results: The number and mean age ($\pm$ SD) of the female athletes involved in this study was $N=60$, 22 ± 4 years (football); $N=26$, 23 ± 6 years (volleyball); $N=18$, 19 ± 4 years (swimming); $N=25$, 21 ± 5 years (synchronised swimming); and $N=14$, 24 ± 4 years (water polo). No difference in aBMD, trabecular vBMD and cortical sBMD was found between athletes involved in high-impact sports (football and volleyball). Among the groups involved in low-impact sports, water polo athletes had 10% higher aBMD, trabecular vBMD and cortical sBMD ($p < 0.05$ for all measurements), compared to swimmers. They showed 7% higher cortical sBMD ($p < 0.05$), compared to synchronised swimmers, while no significant differences were found for aBMD and trabecular vBMD. Athletes involved in high-impact sports had higher aBMD (12% to 21%), trabecular vBMD (17% to 34%) and cortical sBMD (11% to 27%), compared to low-impact sports. Distribution of the mean differences in cortical sBMD between football and swimming athletes are shown in Figure 1.

Conclusion: Athletes involved in high-impact sports exhibited higher densities in both cortical and trabecular compartments, compared to low-impact sports. Interestingly, water polo athletes have higher cortical density compared with other swimming athletes which could be explained by higher workout.

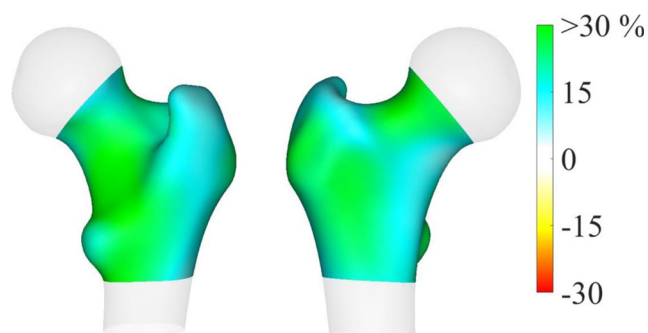


Figure 1. Anatomical distribution of mean differences in cortical sBMD between football athletes and swimming athletes.

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THE IMPACT OF A LOW-COST DIGITAL AND PRINT AWARENESS CAMPAIGN ON PATIENT BEHAVIOUR IN RELATION TO PERSONAL RISK OF OSTEOPOROSIS AND FRAGILITY FRACTURE

C. Bovey¹, T. Jones¹, H. Arden¹

¹National Osteoporosis Society, Bath, UK

Objectives: To establish whether the marketing intervention increased take up of the online quiz, and to what extent the quiz influenced patient behaviour with regard to their bone health.

Methods: The National Osteoporosis Society (NOS) 'Stop at One' campaign aims to encourage people aged over 50 who have broken a bone to find out, by taking an online quiz, if they are at risk of osteoporosis and to take action to reduce their fracture risk. A low-cost marketing intervention was trialed making printed campaign materials available direct to patients at the point of care (fracture clinic). Between May and October 2017, the NOS placed Stop at One printed campaign materials encouraging people to take the online bone health quiz at 8 sites across the UK covering 13% (16/124) of UK postcode areas. 7 sites had no enhanced provision for secondary fracture prevention such as a fracture liaison service, 1 had a partial service. People who took the online quiz were sent a follow-up electronic survey one month later.

Results:

Up to 1st January 2018, 1909 people took the quiz:

- 21% (443) of these lived in postcode areas of the pilot sites.
- 1359 people were sent a follow up survey one month after taking the online quiz, and 10% (142) completed it. 27% (39) of these were individuals living in the postcode areas of the pilot sites.

Of the 142 survey respondents:

- 73% (104) thought they were at risk of osteoporosis after taking the test.
- 24% (34) had booked or attended an appointment with their GP to discuss their risk of osteoporosis.
- 10% (14) intended to book a GP appointment to discuss their risk.
- 31% (43) had made changes to their exercise habits.
- 33% (45) had made changes to their diet.

Conclusions: The electronic patient survey shows meaningful changes in patient behaviour to reduce personal fracture risk. Visibility of the awareness campaign at the point of care increased uptake of the quiz and subsequent survey.

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WHAT DO PRIMARY CARE PHYSICIANS (PCP) KNOW ON EXTRASKELETAL EFFECTS OF VITAMIN D?J. Morales Torres¹, H. Gutierrez Hermosillo², X. Lopez Partida³, J. Morales Vargas¹¹Morales Vargas Centro de Investigacion, ²Department of Medicine and Nutrition, University of Guanajuato, ³Instituto Mexicano del Seguro Social, Leon, Mexico

Objective: Abundant evidence links vitamin D (VitD) with modulating effects on cell growth, neuro-muscular function, immunity and even inflammation¹. Its deficiency is common as age advances and many of its impacts on health may go unnoticed by health professionals. Our aim was to identify attitudes and knowledge of PCP about the impact of VitD on general health.

Methods: On August 2017, during the National Congress of Family Physicians in Leon, Mexico, attendees were invited to respond anonymously a multiple-option questionnaire on diverse aspects on VitD in daily practice. A total of 500 forms were distributed. We report findings using descriptive statistics.

Results: The questionnaire was responded by 274 Physicians (54.8% of those who received it), 197 (71.9%) women and 77 (28.1%) men, with a mean age of 37.2 (± 10.1) years, and 11.1 (± 8.3) years of professional practice. Their work setting is limited to public institutions in 231 (84.3%) and in 39 (14.3%) it included private practice. Of them, 66.8% consider VitD deficiency common in Mexico and over 80% acknowledge that the main source of VitD is sun exposure and that its production decreases in the elderly, but less than half identifies hypovitaminosis D as a cause of osseous pain, increased risk of some cancers or autoimmune and inflammatory diseases. Only 36.5% are aware that VitD supplementation may decrease the rate of falls in the elderly persons. Only 22.6% recognize the need to provide it to lactating women to optimize the intake of VitD by the baby.

Conclusions: The relevance of VitD on general health is poorly recognized by PCP. There is a need to increase awareness among Health Professionals to correct hypovitaminosis D and its adverse outcomes.

Reference: 1-National Institutes of Health. Vitamin D Fact Sheet for health professionals, 2016. Available at <https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/>

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ASSOCIATIONS BETWEEN RADIUS LOW-FREQUENCY AXIAL ULTRASOUND VELOCITY AND BONE FRAGILITY IN ELDERLY MEN AND WOMENE. Biver¹, J. Pepe¹, A. De Sire¹, T. Chevalley¹, S. Ferrari¹¹Geneva University Hospitals and Faculty of Medicine, University of Geneva, Division of Bone Diseases, Geneva, Switzerland

Objective: The contribution of distal radius BMD and cortical microstructure to fracture risk has recently been demonstrated. In this context, we investigated whether low-frequency quantitative ultrasound measurement at the distal radius may capture the peripheral determinants of bone fragility assessed with DXA and high resolution peripheral quantitative computed tomography (HR-pQCT).

Methods: Low-frequency velocity (V_{LF}) was measured at the radius using OsCare Sono[®], a portable axial transmission ultrasonometer, in 271 community-dwelling postmenopausal women and men (age 71.5 ± 1.4 years) from the Geneva Retirees Cohort. Cortical (Ct) and trabecular (Tb) volumetric (v) BMD and microstructure at the distal radius were

assessed by HR-pQCT, in addition to areal (a) BMD by DXA, at the same time point.

Results: V_{LF} was highly correlated with aBMD at the distal third radius ($r=0.72$, $p<0.001$), while moderately correlated with central aBMD (hip or spine lowest T-score, $r=0.47$, $p<0.001$). A V_{LF} T-score threshold $\geq 1SD$ (27% of the population) excluded osteoporosis (T-score $\leq -2.5SD$ at the spine, total hip or femoral neck, 25% of the population) with a negative predictive value of 97%. For microstructure parameters, V_{LF} was most highly correlated with cortical area ($r=0.59$, $p<0.001$). In stepwise analyses, V_{LF} also captured bone geometry (total area) and cortical tissue mineral density independently of aBMD. In models adjusted for age and sex, V_{LF} was significantly associated with prevalent low-trauma fractures [OR 95%CI for one SD decrease of V_{LF} 1.50 (1.05, 2.14), $p=0.024$], with ability to discriminate between subjects with or without prevalent fractures assessed with receiver operating characteristic curve analyses comparable to femoral neck or distal radius aBMD.

Conclusion: Assessment of low frequency velocity at the radius by portable ultrasound may be used as a practical surrogate to evaluate bone fragility and fracture risk in an elderly population.

P702

THICKNESS-BASED CORRECTIVE MODEL OF SOFT TISSUE EFFECTS FOR A BETTER TBSF. De Guio¹, F. Michelet¹, D. Tran¹, D. Hans²¹Medimaps, Canéjan, France, ²Center of Bone diseases, Bone and Joint Department, Lausanne University Hospital, Lausanne, Switzerland

Objective: Trabecular bone score (TBS) is a textural parameter based on DXA spine scans that provides an indirect index of trabecular microarchitecture, a valuable clinical tool in osteoporosis. To account for soft tissue variability between individuals, TBS iNsight v3.0 and older currently integrate a TBS correction based on BMI. However, in some datasets acquired on Hologic systems, a residual significant negative correlation between TBS and BMI has been reported. We aim to develop and test a new soft tissue corrective model to overcome this problem, while preserving or improving the clinical performance of TBS.

Methods: The new correction is based on the tissue thickness estimated by the DXA machine. We acquired scans of dry ex vivo human vertebrae with several thicknesses of soft tissue equivalent material. We estimated the relationship between TBS and soft tissue thickness. From there, a derived specific model was defined and applied to TBS measured in vivo on several datasets: one population-based cohort of women (N=6742, age=61 $\pm$ 9), one population-based cohort of men (N=1343, age=56 $\pm$ 11) and one case-control study (44 fractured patients, 145 matched controls, age=64 $\pm$ 9). We calculated the correlation coefficients between TBS and BMI for the current and new correction. We also evaluated the clinical performance in the case-control study (OR per SD increase of TBS in a logistic regression model to explain the prevalence of fractures).

Results: There was a very good fitting of ex vivo TBS values as function of tissue thickness (R^2 of the model >0.99), ensuring a robust corrective model for in vivo scans. In women, TBS-BMI correlation coefficient changes from -0.24 (current TBS) to 0.08 (TBS with new correction). Similarly, in men, it evolves from -0.26 to 0.08. For the case-control study, OR rises from 2.4 ($p=0.001$) for the current TBS to 3.1 ($p=0.0006$) for the new TBS, adjusted for age, BMD and BMI.

Conclusion: With the new model for soft tissue effects in Hologic systems, the negative correlation with BMI vanished and becomes positive, as the BMD-BMI correlation. The new approach seems to also improve the clinical performance of TBS. Larger prospective studies are needed to further evaluate the clinical performance.

Disclosures: All authors are employees of Medimaps company that develops TBS iNsight software.

P703

SURVIVAL TIME AND PROGNOSTIC FACTORS IN PATIENTS WITH SPINAL METASTASES: A RETROSPECTIVE COHORT AND PROGNOSTIC STUDY

U. Piyapromdee¹, V. Adulyanukosol¹

¹Department of Orthopedic Surgery, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima, Thailand

Objective: To determine the survival time in patients with spinal metastases and identify the factors associated with survival time.

Methods: A retrospective cohort study of patients with spinal metastases treated at Maharat Nakhon Ratchasima Hospital between January 2009 and December 2013 was performed. The following assessment parameters were recorded: General demographic data, ambulatory status, the number of involved vertebrae, visceral organ metastases, lung metastases or lung tumor, known or unknown primary sites of metastases, surgical operation, radiotherapy and the survival period. The Kaplan-Meier survival analysis, the log-rank test and Cox proportional hazard regression model were used to determine the survival analysis.

Results: There were 119 patients included in the study; 62 were female. The mean age was 61 years old. The most common identified sites of primary tumor were lung, prostate, cervix, breast and multiple myeloma, but 47.9% were from unknown primary sites. The median survival time was 132 days. The multivariate survival analysis revealed statistically significant factors were: type of primary malignancy, evidence of lung metastases or lung cancer.

Conclusion: The prevalence of an unidentifiable primary site is high and the most common site is the lungs followed by the prostate. The presence of lung metastases or lung tumor were the factors that associated with poor patient survival.

P704

PATIENT AND PUBLIC VIEWS OF BISPHOSPHONATE DECISION AIDS: NOT FIT FOR PURPOSE

Z. Paskins¹, A. Worrall¹, S. Chapman¹

¹Keele University, Keele, UK

Objectives: Decision aids (DAs) can be used to facilitate communication of the risks and benefits of treatment with patients. Two small trials have reported the use of one osteoporosis DA resulted in improvements in satisfaction, knowledge, and patient engagement, with small improvements in bisphosphonate adherence. However, in the UK, DAs are not being used in clinical practice. We conducted a qualitative evaluation of existing DAs with a Patient and Public Involvement and Engagement (PPIE) group, and additionally report PPIE priorities for future research in this area.

Methods: During a meeting with PPIE members of our Osteoporosis Research User Group, 2 web-based and 2 paper DAs were reviewed: Mayo Clinic Osteoporosis DA; Health Decision Osteoporosis Shared Decision Making Tool; Cochrane Fosamax DA and National Institute for Health and Care Excellence (NICE) bisphosphonate decision support tool. The group was asked to comment on general impressions, suitability of the DA for use in the consultation, whether or not information was relevant or individual to their needs and their requirements for a new DA. A thematic analysis of discussion notes was conducted.

Results: No DA was perceived as wholly meeting patient needs. Paper based DAs were perceived as too complicated and not understandable. Insufficient information was perceived as given about adverse effects, and it was noted that information on side effects was inconsistent between DAs. Cates plots used to convey fracture risk were welcomed but too small, using inappropriate colours or did not convey individualised fracture risk. Web-based tools were preferred, and PPIE members wanted a DA that could be used quickly within time constraints of the consultation, with a print-out to be referred to afterwards.

Conclusions: Existing DAs for bisphosphonate starters do not meet patient needs. Future research in this area needs to engage with PPIE, and clinicians, to ensure DAs meet the needs of stakeholders.

P705

THE CORRELATION BETWEEN SJÖGREN'S SYNDROME AND THE DEVELOPMENT OF OSTEOPOROSIS: A STUDY GROUP

A. Cioroianu¹, L. M. Florescu¹, A. M. Bumbea¹, P. L. Ciurea¹, A. E. Musetescu¹

¹University of Medicine and Pharmacy Craiova, Craiova, Romania

Objectives: Sjögren's syndrome (SS) is an autoimmune disease characterized by hypofunction of the exocrine glands and can be either primary or secondary when related with other pathologies such as rheumatoid arthritis or systemic lupus erythematosus [1]. Our aim was to assess a possible correlation between SS and the development of osteoporosis.

Methods: The study group consisted of 20 age and sex-matched controls without risk factors for osteoporosis such as menopause, endocrine diseases, glucocorticoid consumption or other inflammatory diseases and 20 patients (17 females, 3 males) with SS. The patients' mean age was 47.7 years (± 3.1 years) and the mean history of disease prior to study inclusion was 6.3 years (± 1.2 years). The majority of patients (80%) underwent remissive therapy with hydroxychloroquine (HCQ). We measured the BMD of the lumbar spine using a DXA scanner.

Results: Sicca symptoms were encountered in the majority of patients (90%) and parotidomegaly was discovered in 15 patients (75%). Extraglandular manifestations were represented by arthritis in 11 patients (55%), purpura in 6 patients (30%) and renal tubular acidosis in 4 patients (20%). The BMD, defined by the T-score, was higher in patients with SS with a mean value of -1.54 standard deviations (± 0.14) compared to -1.81 standard deviations (± 0.17) in the healthy control group.

Conclusions: In SS patients the BMD was higher in contrast with the control group due to the use of remissive therapy with HCQ. A study on the effects of HCQ on osteoporosis in patients with SS demonstrated that HCQ decreases bone mineral resorption in vitro [2].

References:

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P706

MICROELEMENTAL COMPOSITION OF TIBIA IN RATS OF VARIOUS AGES AFTER EXCESSIVE PALM OIL INTAKE AND ADMINISTRATION OF GARCINIAE CAMBOGIA EXTRACT

A. Lyashchuk¹, V. Luzin¹, Y. Gayvoronskaya¹, I. Prikhodchenko¹

¹LPR SE "St. Luke State Medical University of Lugansk", Lugansk, Ukraine

Objectives: To analyze microelemental composition of tibia in rats of different ages after excessive palm oil (PO) intake and administration of *Garcinia cambogia extract* (GE) as medication.

Methods: The experiment involved 216 rats of three ages: immature, mature and senile animals. The animals were split into the groups as follows: the 1st group comprised intact animals (the controls), the 2nd group comprised the animals that received intragastric PO in dosage of 30 mg/kg of body weight, and the 3rd group PO and intragastric GE in dosage of 0.25 mg/kg of body weight. The animals were withdrawn from the experiment by the 1st, the 10th, the 30th and the 60th day after 6-week of PO intake. Upon expiration of observation terms right tibiae were prepared for chemical analysis.

Results: Excessive intake of PO resulted in destabilization of the microelemental composition of tibia. The alterations started manifesting from the 1st to 10th days of observation and continued growing throughout the experiment. In immature animals copper and manganese shares decreased as compared to the control values from the 10th to the 60th days by 4.78%, 5.06% and 5.84% and by 6.56%, 6.70% and 7.35% respectively and zinc share by the 10th and 30th days – by 5.08% and 4.85% (here and below $p < 0.05$ in all cases). In mature animals the same values changed in the same way by 5.44%, 6.29% and 6.84%, by 6.18%, 6.89% and 6.92%, and by 5.20% and 6.69% respectively. In senile rats copper and manganese shares decreased as compared to the control values from the 1st to the 60th days by 6.11%, 6.00%, 5.84% and 6.99% and by 7.61%, 7.99%, 8.67% and 10.26%, and zinc content from the 10th to the 60th days – by 6.00%, 6.59% and 7.06%. After GE administration, by the 60th days in immature rats copper, zinc and manganese shares increased as compared to the 2nd group by 5.17%, 6.27% and 9.78%, in mature rats by 6.77%, 6.33% and 5.03%, and in senile rats – by 5.76%, 5.35% and 7.98% respectively.

Conclusions: Long-term excessive intake of PO results in destabilization of the microelemental composition of tibia. Terms and intensity of alterations depend on age of experimental animals. Administration of GE reduced negative effects of PO on the microelemental composition of tibia.

P707

BUDGET IMPACT ASSESSMENT OF NON-ANIMAL STABILISED HYALURONIC ACID (NASHA) FOR THE TREATMENT OF OSTEOARTHRITIS OF THE KNEE IN THE UK

H. J. Holmes¹, J. Shore¹

¹York Health Economics Consortium, York, UK

Objective: To estimate the likely cost implications of introducing the NASHA (DUROLANE[®]) injection into the UK care pathway for knee osteoarthritis.

Methods: A budget impact model using a Markov structure was developed to compare the costs of introducing NASHA injection into the treatment care pathway of patients with osteoarthritis. The analysis was taken over a 1 to 10 year time horizon. The costs of the intervention pathway were compared with the current standard of care in the UK based on NICE clinical guidelines for osteoarthritis. NASHA was an adjunctive therapy after ‘intra-articular injection’ and before ‘referral for joint surgery’. Probabilities used to determine the number of patients entering the model, and the effectiveness of treatments received to determine the movement of patients through the pathway, were taken from literature. Resource use and subsequent costs were reflective of the UK NHS, and parameter uncertainty was explored using sensitivity analysis.

Results: Compared to the standard care pathway, the introduction of NASHA into the care pathway could be associated with cost-savings of £1053 and £283 per patient over 3 and 10 years, respectively. The primary driver of this saving was the annual cost of patients waiting for joint surgery, however this parameter is associated with considerable uncertainty. The cost of a total knee replacement and a NASHA injection also had significant impacts on the results.

Conclusions: Although NASHA introduces a new stage to the pathway and therefore increases costs, the rise in costs from introducing NASHA is outweighed by the reduction in costs from delaying joint surgery and from patients using primary and secondary care resources whilst waiting for a knee replacement. NASHA also presents a new treatment option for patients contraindicated to knee replacement surgery.

Disclosures: YHEC has received payment from Bioventus Coöperatief U.A. to undertake this analysis.

P708

CANCER STEM CELLS AND MIRNA IN RARE HIGH-GRADE TYPES OF OSTEOSARCOMA

G. Palmi¹, C. Romagnoli¹, R. Zonefrati¹, G. Galli¹, F. Marini¹, A. Aldinucci², C. Mavilia¹, G. Leoncini¹, A. Simoni¹, A. Franchi³, G. Beltrami⁴, D. A. Campanacci⁵, R. Capanna³, M. L. Brandi¹

¹Department of Surgery and Translational Medicine, University of Florence, Florence, ²Department of Neurofarba, University of Florence, Florence, ³Department of Translational Research and of New Technologies in Medicine and Surgery, University of Pisa, Pisa, ⁴Ortopedia Oncologica Pediatrica, AOU Careggi-AOU Meyer, Florence, ⁵SOD Ortopedia Oncologica e Ricostruttiva, AOU Careggi, Florence, Italy

Objective: In this study, the existence of CSCs in two rare high-grade type of osteosarcoma (OSA), the telangiectatic osteogenic sarcoma (TOS) and the small cell osteosarcoma (SCO), and the presence of a different expression of micro-RNAs (miRNAs) is showed.

Methods: The human SCO and TOS samples have been collected at the “Unit Ortopedia Oncologica e Ricostruttiva”, AOU Careggi, Florence, with informed consent approved by the local Ethical Committee. First of all, the primary human cancer cell cultures of TOS and SCO have been established. After that, the subpopulation of CSCs has been isolated from both by the sarcosphere formation assay. Consequently, several cellular assays/stainings and molecular analyses have been performed to assess the presence of markers and properties, which are unique signature of the CSCs phenotype. After that we have studied the miRNAs expression in both the CSCs lines.

Results: For first, we have established a primary cell line of a high grade SCO and of a TOS, from the samples collected, respectively marked as OSA3 and OSA4. Consequently, from these we have isolated CSCs and we have established a SCO- and a TOS-CSCs lines, named as OSA3- and TOS1-CSCs. The stemness of both has been confirmed by observing their capacity to differentiate into osteoblasts and into adipocytes, by showing the positive presence of the mesenchymal stem cells (MSCs) and of the embryonic stem cells (ESCs) markers into the cell lines, and by evaluating their clonogenic capacity. We have also assessed the neoplastic phenotype by studying the invasion capacity by several assays. Finally, we have analysed and obtained different miRNAs expression levels in both these CSCs lines.

Conclusions: In conclusion we have established and completely characterized, a TOS- and a SCO-CSCs lines at cellular and molecular level, setting up two new *in vitro* models. The preliminary results obtained about the different expression profile of miRNAs in these lines could be

important to identify a common “miRNA code” among these types of OSA, that could be used to develop new molecular therapies against these tumors.

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P709

HYPOPHOSPHATEMIC RICKETS

R. Turturea¹, I. F. Turturea², I. Agachi³, A. Hrituc¹, O. Botezan¹, A. Valea⁴, M. Carsote⁵, C. E. Georgescu⁴

¹Clinical County Hospital, Cluj-Napoca, ²Clinical County Hospital, Dej,

³Clinical County Hospital, Cluj-Napoca, ⁴I. Hatieganu University of Medicine and Pharmacy & Clinical County Hospital, Cluj-Napoca,

⁵C.I. Parhon National Institute of Endocrinology,

Objective: Hypophosphatemic rickets, previously called vitamin D resistant rickets is a disorder in which the bones become painfully soft and bend easily, due to low levels of phosphate in the blood. We aim to present a case of a 20 year old female patient diagnosed at the age of 1 with hypophosphatemic rickets.

Case report: The 20 year old female patient was admitted for persistent pain in both shoulder articulations and thoraco-lumbar spine, thoracic constriction sensation and psycho-emotional instability. Biological and clinical reassessed was performed under treatment with one microgram vitamin D3 daily, four grams of phosphorus, sodium and potassium per day, initiated in another service. Clinical examination revealed statural hypotrophy, current height of 140 cm, range of arms of 143 cm, height according to the generes of 154.5 cm, the statural deficit of -4.15 SD with vertex-pubis/pubis-ground supraunit ratio, proeminent frontal bosses, asymmetry of sterno-clavicular articulations, thorax with flared base, inframamar Harrison crest, bilateral knee and ankle surgical scars after genu-varum and valgus ankle deviation surgeries, teeth deformities. Medical history revealed the same pathology in her older sister and maternal grandfather. Biological and hormonal assessment showed an increased alkaline phosphatase value (of 160 U/L, normal: 30-120 U/L), decreased phosphate value (of 2.02 mg/dL, normal: 2.5-4.5 mg/dL), PTH in normal range (of 39.2 pg/mL, normal: 11-67 pg/mL), increased osteocalcin values (of 46.9 ng/mL, normal: 11-43 ng/mL), also increased β -CrossLaps of (0.72 ng/mL, normal:<0.573 ng/mL) and vitamin D at the lower limit of normal range (of 34 ng/dL, normal: 30-100 ng/dL). Abdominal ultrasound examination reveals renal nephrocalcinosis. Associated neurological and cardiac disorders were also revealed. It was decided to continue phosphate supplements and vitamin D therapy. Further follow-up is necessary.

Conclusion: Current therapy with phosphate supplements and vitamin D analogs partly correct rickets and osteomalacia and improves the quality of life. It is obvious that outcomes of this therapy are still not optimal and that therapies targeting the pathophysiology of the disease are required.

P710

PHYSICAL PERFORMANCE VARIABLES AND BMD IN A GROUP OF YOUNG OVERWEIGHT AND OBESE WOMEN

A. J. Berro¹, A. Khawaja¹, S. Ahmaidi², G. Maalouf³, M. Rizkallah³, R. El Hage¹

¹Balamand university, Kourah, Lebanon, ²University of Picardie Jules Verne, Amiens, France, ³Bellevue University Medical Center, Mansourieh, Lebanon

Objective: To explore the relationships between performances obtained in different physical tests and bone parameters (BMD [BMD], bone mineral content [BMC], hip geometry indices, and trabecular bone score [TBS]) in a group of young Lebanese overweight and obese adult women.

Methods: 77 overweight and/or obese (BMI>25 kg/m²) young women whose ages range from 18-35 years participated in this study. Weight and height were measured, and BMI was calculated. Body composition, BMD, cross-sectional area (CSA) and cross sectional moment of inertia (CSMI) of the femoral neck (FN), and TBS were measured by DXA. Maximum oxygen consumption (VO₂ max, in liter per minute) was determined indirectly using a progressive shuttle run test. One-repetition-maximum half squat was directly measured and maximum power (P max) of the lower limbs was calculated.

Results: Lean mass was positively correlated to whole-body BMC ($r=0.54$; $p<0.001$), whole body BMD ($r=0.51$; $p<0.001$), total hip BMD ($r=0.32$; $p<0.01$), femoral neck BMD ($r=0.39$; $p<0.001$), FN cross-sectional area ($r=0.55$; $p<0.001$), and FN cross sectional moment of inertia ($r=0.51$; $p<0.001$). VO₂ max (in liter per minute) was positively correlated to whole body BMC ($r=0.60$; $p<0.001$), whole-body BMD ($r=0.51$; $p<0.001$), total hip BMD ($r=0.31$; $p<0.01$), and FN BMD ($r=0.41$; $p<0.001$). VO₂ max (in milliliter per minute per kilogram) was positively correlated to whole body BMC ($r=0.24$; $p<0.05$). One repetition maximum was a positive determinant of whole-body BMC ($r=0.25$; $p<0.05$), whole body BMD ($r=0.31$; $p<0.01$), FN BMD ($r=0.31$; $p<0.01$), cross sectional area ($r=0.36$; $p<0.01$) and cross sectional moment of inertia of the femoral neck ($r=0.28$; $p<0.05$). Vertical jump performance was positively correlated to whole-body BMC ($r=0.23$; $p<0.05$), whole body BMD ($r=0.33$; $p<0.01$), total hip BMD ($r=0.31$; $p<0.01$) and L1-L4 BMD ($r=0.25$; $p<0.05$). Maximum power was a positive determinant of whole-body BMC ($r=0.51$; $p<0.001$), whole body BMD ($r=0.51$; $p<0.001$), total hip BMD ($r=0.31$; $p<0.01$), FN BMD ($r=0.40$; $p<0.01$), cross sectional area ($r=0.51$; $p<0.001$) and cross sectional moment of inertia of the femoral neck ($r=0.47$; $p<0.001$). After adjustment for lean mass, VO₂ max (L/min) remained positively correlated to WB BMC while vertical jump performance remained positively correlated to WB BMD and to L1-L4 BMD.

Conclusion: This study suggests that lean mass, VO₂ max (in liter per minute), and maximum power are positive determinants of BMD and hip geometry indices in young overweight and obese women.

P711

TREATMENT OF PAIN WITH LOW-DOSE RADIOTHERAPY IN OSTEOARTHRITIS AND SOFT TISSUE PATHOLOGIES

F. Aramburu¹, M. Novella Navarro¹, A. Montero¹, E. Calvo Aranda¹, J. Gonzalez¹, S. Rodriguez¹, C. Rubio¹, P. Garcia de la Peña¹

¹HM Hospitales, Madrid, Spain

Objectives: To evaluate the effectiveness of low-dose radiotherapy to control pain in osteoarthritis or soft tissue pathology in patients with poor response to conventional treatment such as infiltrations, non-steroidal anti-inflammatory drugs or rehabilitation.

Methods: We designed an observational, prospective study that included 114 patients (18 men, 96 women) from April 2015 to October 2017. The main variable was the change in visual analogue scale (VAS) prior and after the treatment. The secondary variables were age, gender, type of pathology (trochanteric bursitis, tenosynovitis, osteoarthritis of thumb, knee, hip, hand, calcinosis, plantar fasciitis). All the patients received a 6 Gray (Gy) treatment of radiotherapy divided in six sessions during two weeks. After six to eight weeks all patients were evaluated and if they did

not achieve a significant reduction of VAS they received another treatment with the same characteristics. Statistical analysis: Descriptive statistics of frequencies for qualitative variables; mean, standard deviation for quantitative variables. Contrast of hypothesis for paired samples (T-test) and Fisher's for qualitative variables.

Results: The mean age was 64.4 years $\pm$ 11.1 years. The VAS reduction is showed in Table 1. Responder patients were considered whom the decrease in VAS was at least 50%. We observed a decrease in global VAS of 2.89 CI 95% (2.29-3.31) after the first treatment statistically significant (p-value<0.001). Those patients that received a second treatment had a decrease of mean VAS of 1.125 IC 95% (0.671-1.578), statistically significant (p-value<0.001).

53 patients responded to first treatment. 40 patients out of 61 who did not respond received a second treatment and obtained response 27. The global percentage of VAS diminution was 70.1% of the total of patients. Due to the heterogeneity of pathologies studied, we grouped them for analysis in peripheral osteoarthritis, enthesitis, tenosynovitis. An association between type of pathology and response to the treatment statistically significant (p=0.023). The pathologies that had a greater response were peripheral osteoarthritis and enthesitis.

Table 1

	mean	sd
Pretreatment VAS	7.26	1.56
Post first treatment VAS	4.45	2.75
Post second treatment VAS	3.62	2.72

Conclusions: According to our study, low-dose radiotherapy is effective to decrease the pain measured by VAS in osteoarthritis and soft tissue pathology. Furthermore, it is a safe alternative of treatment.

P712

PRIMARY HYPERPARATHYROIDISM WITH ACUTE RENAL FAILURE AS A FIRST MANIFESTATION

O. Botezan¹, I. Agachi¹, A. Hrituc¹, R. Turturea¹, M. Carsote², I. F. Turturea³, C. E. Georgescu⁴, A. Valea⁴

¹Clinical County Hospital, Cluj-Napoca, ²C.I. Parhon National Institute of Endocrinology, Bucharest, ³Clinical County Hospital, Dej, ⁴I. Hatieganu University of Medicine and Pharmacy & Clinical County Hospital, Cluj-Napoca, Romania

Objective: Primary hyperparathyroidism is a common endocrine disorder which can cause progressive deposition of calcium in the kidney leading to calculi in the urinary tract and renal insufficiency. A case of primary hyperparathyroidism diagnosed after presentation for recent-onset renal insufficiency is introduced.

Case report: A 60-year old male with no prior medical history is admitted to the Nephrology Department for recent-onset renal failure found on routine examination, malaise, nausea, constipation, calf pain and conjunctival hyperaemia. Biochemical evaluation showed high levels of creatinine (of 3.8 mg/dL, normal: 0.67-1.17 mg/dL) and urea (of 100 mg/dL, normal: 17-43 mg/dL), glomerular filtration rate (eGFR of 15 mL/min/1.73m²), hyperpotasemia (of 5.22 mmol/L, normal: 3.5-5.1 mmol/L) and hypercalcemia (of 13.62 mg/dL, normal: 8.8-10.6 mg/dL, ionic calcium of 7.27 mg/dL (normal: 4.4-5.4 mg/dL). Examinations for secondary causes of hypercalcemia were performed. A mediastinal opacity deviating the trachea to the right, measuring 40 mm diameter was found on the thoracic radiography and, also, hyperechoic kidneys on renal ultrasound.

An increased value of PTH was found (of 881.2 pg/mL, normal: 11-67 pg/mL and hypercalciuria (of 343 mg/24h, normal: <300 mg/24h. The patient was transferred to the Endocrinology Department for further evaluation. The thyroid ultrasound presented an inhomogeneous hypoechoic lesion on the posterior side of the left lobe, with intrathoracic extension, measuring 3.54/4.94/5.4 cm. Laboratory findings showed a normal thyroid function, normal prolactin and calcitonin, low vitamin D level (of 19.3 ng/dL, normal: 30-100 ng/dL). DXA was performed and osteopenia was found. The cervico-mediastinal computed tomography revealed the mentioned lesion, localized in the superior mediastinum, measuring 5/5/3.7 mm and deviating the trachea to the right, with left parathyroid adenoma significance. After correct hydration and diuretic treatment, there was an improvement in biochemical parameters: decreased total calcium (of 11.99 mg/dL), ionic calcium (of 6.36 mg/dL), creatinine (of 1.91 mg/dL), urea (of 64 mg/dL) and increased eGFR (of 37 mL/min/1.73m²). Parathyroidectomy was established as the next treatment course and the patient will return afterwards for subsequent therapy.

Conclusion: Due to the renal function impairment, surgery is the elected treatment and should be performed with priority. Minimally invasive parathyroidectomy has a 95% efficiency and a decreased rate of postoperative complications.

P713

EXPERIENCE ON THE USE OF TERIPARATIDE FOR TREATMENT OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS

M. Saparbayeva¹, B. Issayeva¹, S. Issayeva¹

¹Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

Objective: Teriparatide is a drug of choice for treatment of glucocorticosteroid-induced osteoporosis (GIO) in men and women with low energy fractures or with anamnesis of high 10 - year absolute risk of major osteoporotic fractures by FRAX. The goal is to present a clinical case of using teriparatide in patient with severe glucocorticosteroid-induced osteoporosis.

Methods: 56 years old patient, with a documented diagnosis of mixed connective tissue disease from 22 years and receiving glucocorticosteroid for >30 years in moderate doses (prednisone 10-30 mg/d). Suffers from hypertension for about 10 years, taking antihypertensive medications. Menopause at age 44 years. The pain is in the thoracic, lumbar spine, loss of height (10 cm) observed during the last year. On x-rays of the spine revealed wedge-shaped deformation of the vertebrae of the thoracic spine. Mineral bone density (BMD): T-criterion "- 4.3 standard deviations" in the lumbar spine (LS), and in the femoral neck (FN) "-3.4, respectively". First line therapy for the treatment of GIO - alendronic acid 70 mg once weekly with calcium and vitamin D was appointed. After 5 months during coughing she had severe pain in the chest, the examination revealed fractures of 3-4 ribs. Densitometry: T-criterion in LS was "-5.2", in FN was "-3.8 standard deviations". Serum calcium - 2.2 mmol/l, alkaline phosphatase - 4.0 u/l. In case of the presence of fresh fractures, alendronic acid was stopped and assigned to teriparatide 20 ug subcutaneously daily. The dose of prednisolone reduced to 5 mg/d of primary disease, designated nonsteroidal anti-inflammatory drugs on demand.

Results: At baseline, except of fresh rib fractures, continues the pain in the joints, back, worse when walking, fatigue, headache, depression. There was an increase in laboratory parameters of activity of the process: ESR-30 mm/h, rheumatoid factor -19.7 IU/ml, CRP-38.1 IU/ml.

Clinical improvement was noted after 2 months of therapy with teriparatide: back pain significantly reduced at rest and when walking; the dose of prednisolone was reduced to 1.25 mg/daily. Repeat

densitometry after 12 months of therapy with teriparatide: T-criterion in LS "-3,2", in FN "-3,2 standard deviations". The patient continues anabolic therapy.

Conclusion: Teriparatide is a drug for the treatment of GIO after failure of prior antiosteoporotic therapy.

P714

HYPERCALCEMIA FOLLOWING TOTAL THYROIDECTOMY

I. Agachi¹, A. Hrituc¹, O. Botezan¹, R. Turturea¹, I. F. Turturea², A. Valea³, C. E. Georgescu³, M. Carsote⁴

¹Clinical County Hospital, Cluj-Napoca, ²Clinical County Hospital, Dej, ³I. Hatieganu University of Medicine and Pharmacy & Clinical County Hospital, Cluj-Napoca, ⁴C.I. Parhon National Institute of Endocrinology, Bucharest, Romania

Objective: The association of primary hyperparathyroidism with nodular goiter is relatively frequent especially in endemic areas due to incidental overlap. Their coexistence may lead to overlooking of hypercalcemia, thyroid cancer or a toxic nodule, and may challenge the adequate management. A case report is introduced regarding a female patient with hyperparathyroidism and nodular goiter. Endocrine evaluation of the patient followed in different departments: thyroid stimulating hormone (TSH), free thyroxine (FT4), anti-thyroglobulin (TGAb) and anti-thyroid peroxidase antibodies (TPOAb), calcitonin, PTH and 25-hydroxyvitamin D (25OHD), biochemical tests like total calcium, ionic calcium (Cat/i), and imagery assessment: thyroid ultrasound (TUS), parathyroid SPECT Tc99m scintigraphy (Sc), central DXA.

Case report: A 63-year patient is admitted for evaluation of choking sensation, asthenia and fatigue. The endocrine assays revealed normal TSH, FT4, calcitonin, and negative TgAb, TPOAb in addition to a TUS finding of a large parenchymal nodule with calcifications and intra and perinodular vascular signal. Total thyroidectomy was recommended, histological aspects were benign. 3 months after surgery, the patient accused insomnia, dysphonia and bone pain. Thyroid substitution with 100 ug LT4/day was adequate but, even during first assessment calcemia was normal, currently high Cat/i (of 11.58 mg/dL, normal: 8.8-10.2 mg/dL), respective of 5.08 mg/dL, normal: 3.82-4.82 mg/dL) was identified and increased PTH (of 286.3 pg/mL, normal: 15-65 pg/mL), low 25OHD (of 9.4 ng/mL, normal >30 ng/mL). SPECT Sc revealed a hyper-functional parathyroid, of about 2 cm in the long axis, located in the lower left cervical area. DXA confirmed osteoporosis. Left inferior parathyroidectomy was recommended followed by initiation of treatment with vitamin D, bisphosphonates and continuation of daily thyroxine treatment.

Conclusions: The prevalence of coexistence of nodular goiter in patients with primary hyperparathyroidism is higher than in general population. Accordingly, thyroid nodules should be carefully evaluated before surgery and the possibility of primary hyperparathyroidism should always be investigated.

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DAILY PRATICE ASPECTS IN PRIMARY HYPERPARATHYROIDISM

A. Hrituc¹, O. Botezan¹, R. Turturea¹, I. Agachi¹, M. Carsote², I. F. Turturea³, C. E. Georgescu⁴, A. Valea⁴

¹Clinical County Hospital, Cluj-Napoca, ²C.I. Parhon National Institute of Endocrinology, Bucharest, ³Clinical County Hospital, Dej, ⁴I. Hatieganu University of Medicine and Pharmacy & Clinical County Hospital, Cluj-Napoca, Romania

Objective: Primary hyperparathyroidism (PHPT) is an abnormality of parathyroid glands causing short-term and long-term complications. Apparently asymptomatic cases may be accidentally detected while the cause of long-term kidney stones (KS) may be missed. Other challenge is represented by cases of PHPT without imagery identification of the source to attain cure through surgery. This is a series cases. Endocrine assessment related to PHPT is provided. The patients were followed in different tertiary centres of endocrinology.

Case 1: A 59-year woman without significant medical history is diagnosed with hypercalcemia on routine examination through her primary health practitioner. Further investigations pointed: high PTH 122.3 pg/mL (Normal: 11-67 pg/mL) and total calcium (TC) 10.8 mg/dL (Normal: 8.8-10.6 mg/dL), respective ionic calcium (IC) 5.59 mg/dL (Normal: 4.4-5.4 mg/dL), hypercalciuria 0.69 mg/24-h (Normal: <0.25 mg/24-h), hypophosphatemia 2.13 mg/L (Normal: 2.5-4.5 mg/dL), low 25-hydroxyvitamin D(25OHD) 12.2 ng/mL (Normal: 30-100 ng/mL), and normal alkaline phosphatase 87 U/L (Normal: 30-120 U/L). Ultrasound suggested an inferior left mass confirmed at SESTAMIBI scan. Osteoporosis was identified at lumbar DXA: BMD=0.764g/cm³, T-score=-2.8DS. Parathyroid adenoma was removed in association with therapy with weekly alendronate (5600 mg) and vitamin D.

Case 2: This is a 55-year female known with a 4-year history of osteoporosis in addition to PHPT. Mild calcemia elevation was persistent while no localisation of PT adenoma was provided by parathyroid scintigram, computed tomography or magnetic resonance of the neck. The patient refused blind PT-ectomy. Currently, TC is 11.7 mg/dL (N: 8.4-10.2), IC=4.8 mg/dL (N:3.9-4.9), PTH=162 pg/mL (N: 5-65), 25OHD=22.4 ng/mL (N: >30 ng/mL), suppressed CrossLaps=1.92 ng/mL (0.33-0.782) after 3 years of bisphosphonates, high osteocalcin=121.8 ng/mL (15-46), and PINP=185.4 ng/mL (15-74). A third (since first diagnosis) ^{99m}Tc sestamibi scintigram identified high intake at inferior right thyroid area suggestive for an adenoma so surgery could be performed.

Case 3: This is a 47-year male with a history of several years involving KS with infections requiring urological procedures. After 6 years, a small increase of calcemia was detected and referred to endocrinology. On admission, TC increased to 13 mg/dL (N: 8.5-10.2), PTH=261 pg/mL (N:15-65) in association to low 25OHD=22 ng/mL and high bone turnover markers: CrossLaps=1.02 ng/mL (N: 0.158-0.442), osteocalcin=84.78 ng/mL(N: 14-42), PINP=86.71 ng/mL (15-74). The patient had normal DXA and Tc scintigram confirmed as well as computed tomography a left inferior PT adenoma which was further removed.

Conclusion: Challenges in daily practice regarding PHPT vary from detection to imagery findings which require adequate protocols of case finding strategies.

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POOR ASSESSMENT OF BMD AFTER A FOREARM FRACTURE IN WOMEN AGED 50 YEARS OR OLDER: DATA FROM A FRENCH HEALTH INSURANCE DATABASE (SNIIRAM)

E. Cattelain-Lopez¹, D. Chu Miow Lin², A. Happe³, P. Goupille¹, F. Jacquot⁴, P. Tauveron⁴, K. Haguenoer⁵, E. Rusch⁵, E. Oger⁶, D. Mulleman¹

¹Université François-Rabelais de Tours. Service de Rhumatologie, CHRU de Tours, ²Service de Rhumatologie, CHRU de Tours, Tours, ³UPRES-EA 7449 REPERES, CHRU de Brest, Brest, ⁴Cabinet de Rhumatologie, Centre de l'Ostéoporose, Tours, ⁵Service d'Information Médicale, d'Epidémiologie et d'Economie de la Santé, Laboratoire de Santé Publique, CHRU de Tours, Tours, ⁶Centre Régional de Pharmacovigilance, Pharmaco-épidémiologie et Information sur le

Médicament, CHRU de Rennes. UPRES-EA 7449 REPERES, Université de Rennes 1, Rennes, France

Objective: BMD testing is a useful tool to evaluate bone fragility and is largely recommended for patients at risk of osteoporosis. Here, we evaluated BMD assessment and prescription of anti-osteoporotic drugs after a forearm fracture in women.

Methods: We identified all forearm fractures in women ≥ 50 years old in the Centre-Val de Loire area of France between January 2011 and December 2012. We used the national health insurance database, which covers both the private and public sector for the entire population in France, to analyze the reimbursement and determinants of BMD assessment in terms of age, consumption of inducing osteoporosis and anti-osteoporotic drugs and comorbidities. Associations between these variables were calculated by chi-square test, and regression analysis was used for univariable and multivariable analysis.

Results: Among 4120 women with a forearm fracture, 546 (13.3%) had a BMD assessment during the next year, with a median delay of 4 months (range 4–365 days) after the fracture; 399 (9.7%) began taking an anti-osteoporotic drug in the year after the fracture. Taking an anti-osteoporotic drug during the next year was more frequent with than without a BMD assessment: 168/546 (30.8%) vs. 231/3574 (6.5%), $p < 0.001$. Women who had a BMD assessment were significantly younger than those without an assessment [mean age 67.4 [SD 9.4] vs. 74.6 [SD 12.1] y; odds ratio [OR]=0.94 (95%CI 0.93–0.95)]. BMD assessment was associated with aromatase inhibitors (OR=3.2, 95%CI 2.0–5.3) but not corticosteroids (OR=0.9, 95%CI 0.6–1.2).

Conclusion: In this large population of women ≥ 50 years old, in the year after a forearm fracture, <15% had a BMD assessment and <10% received an anti-osteoporotic drug.

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HIGH BMD ON ROUTINE BONE DENSITY SCANNING: FREQUENCY AND CAUSES

A. Nottez¹, S. Kolta², I. Legroux-Gérot¹, G. Lion¹, B. Cortet¹, J. Paccou¹

¹Lille University Hospital, Lille, ²APHP Cochin, Paris, France

A finding of high BMD on routine DXA scanning is not infrequent. However, epidemiological studies of high BMD are few and definition thresholds variable. This study was performed to assess the frequency and causes of high BMD within the general population referred for DXA scanning in a tertiary referral hospital.

DXA databases were initially searched for individuals with a BMD T- or Z-score $\geq +3$ at any site within the lumbar spine or hip, at the Lille University Hospital (France). Two Hologic scanners were available at the Lille University Hospital. Frequency of high BMD was evaluated at the lumbar spine, total hip and femoral neck, as were causes associated with high BMD.

In total, 27,247 historical DXA hip scans (9,857 in men and 17,390 in women) and 28,438 lumbar spine scans (10,209 in men and 18,229) were screened across 2 databases over a period of 12 years (between 2005 and 2017). The frequency of high BMD (T- or Z-score $\geq +3$) was 0.44%, 0.55% and 2.93% at total hip, femoral neck and lumbar spine respectively. A total of 16,695 individuals with at least one scan were identified among all scanners performed.

In total, DXA scans and medical records of 728 individuals (237 men and 491 women) with high BMD were screened to assess causes. Then, the frequency of high BMD was 4.36%. High BMD at the hip (total hip and/or femoral neck) without high BMD at the lumbar spine was only found in 90 individuals (0.54%, 19 men and 71 women). "Generalized" increase in bone mass (BMD T- or Z-score $\geq +3$ at both total hip and lumbar spine) was only found in 62 individuals (0.37%, 16 men and 46 women). DXA scans of all those with T- or Z-scores $\geq +3$ were inspected by two reviewers; approximately 60% were considered to have artefactually raised BMD due to degenerative changes. Of the remaining cases, rare hereditary diseases (e.g., osteopetrosis), acquired-high BMD (e.g., renal osteodystrophy, myelofibrosis, sclerotic bone metastases..) and unexplained high BMD were found.

The frequency of high BMD (T- or Z-score $\geq +3$ at any site) was higher than expected. This study indicates that the causes of high BMD were mainly due to osteoarthritis. Further works are needed to differentiate artefactually raised BMD (focal and generalized) from hereditary or acquired high BMD and to investigate unexplained high BMD.

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A CASE REPORT OF A PATIENT WITH ANKYLOSING SPONDYLITIS, MULTIPLE FRACTURES AND SEVERE MUSCULOSKELETAL PAIN, DIAGNOSED WITH PARATHYROID ADENOMA

V. Boyadzhieva¹, N. Stoilov¹, R. Stoilov¹

¹University Hospital Sv. Iv. Rilski, Sofia, Bulgaria

Objective: The main clinical characteristics of ankylosing spondylitis are inflammatory low back pain secondary to sacroiliitis and spondylitis. They experience increased bone loss and bone turnover, resulting in reduced BMD and osteoporosis. Most often, primary hyperparathyroidism is due to an adenoma of the parathyroid glands. The combination of these two diseases increases the risk of osteoporosis and multiple paravertebral or fracture with other localization.

Methods: A clinical case of hyperparathyroidism due to adenoma demonstrate the management of patient with AS, multiple fractures and severe musculoskeletal pain syndrome.

Results: A case report of a 60-year-old patient diagnosed with ankylosing spondylitis - central form in 1994. In 2013 when performing daily activities, the patient reports of sudden severe pain in the right wrist. Fracture "in loco typico" was diagnosed. Two months later appeared symptoms of pain and limited movement in left hip. Patient was diagnosed with pertrochanteric fracture that was surgically corrected. In recent months, the complaints from pain and limited mobility in the spine are intensifying. NSAIDs treatment had insufficient effectiveness. Laboratory analysis confirmed: ESR: 5 mm, CRP 1.8 mg/l; P, Ca in serum and urine – within reference range; PTH: 204 pg/mL (11 - 67); 25-OH vit. D3/2: <5 ng/ml (<12 - deficiency); alkaline phosphatase: 130 U/L (<120 U/L); N-mid osteocalcin: 31.85 ng/ml (14–46) β -CrossLaps/serum: 0.514 ng/ml (<0.704); X-ray reveals new fractures of Th6, Th7, Th8, Th9, Th10, Th11. DXA spine T-score: -4.5; femur T-score: -4.3; SPECT of the neck and mediastinum - hypodense rounded formation/central dorsal to manubrium sterni - parathyroid gland adenoma (13 mm) with ectopic retrosternal localization. The patient was directed to surgically remove the adenoma. Therapy with vit.D3, tramadol and bisphosphonates was initiated after the surgery.

Conclusion: Successful parathyroidectomy was followed by normalization of plasma levels of PTH and calcium-phosphorus metabolism. This is also the only effective method to reduce the risk of bone fractures and loss of BMD. Treatment with bisphosphonate and vitamin D3 supplementation reduce the fracture risk.

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DISEASE ACTIVITY AND EXTRAARTICULAR MANIFESTATIONS OF RHEUMATOID ARTHRITIS IN ELDERLY

M. V. Volkava¹, A. V. Kundzer²

¹Belorussian Medical Academy of Postgraduate Education, Cardiology and Rheumatology Department, ²Belorussian Medical Academy of Postgraduate Education, Minsk, Belarus

Objective: Every third patient with rheumatoid arthritis (RA) is a patient of old age. Diagnosis and treatment of these patients are accompanied by objective difficulties and requires additional effort from medical personnel. The purpose of this study was to determine the peculiarities of clinical manifestations of RA in the elderly.

Methods: Current study is observational with a retrospective analysis based on collection of information obtained from RA patients during their visit to the rheumatologist or the period of hospitalization in Rheumatology Department. During the examination doctors-rheumatologists filled out a specially designed card of examination of patients with RA, approved by the Ministry of Health of the Republic of Belarus. In total, 141 patients with RA aged 60 years and older were enrolled in the study: 24 men (17.03%) and 117 women (82.97%). The median age of the patients was 68.51 years (95%CI: 66.00 – 68.53). All patients were divided into 2 groups depending on the age of onset of the disease: group I included the patients in whom RA occurred at age of 60 years and later, group II – patients who became ill with RA at age earlier than 60. The 1st group included 79 patients: 14 men (17.73%), 65 women (82.27%). The average age of the patients was 70.78±7.09 years. Mean age of RA onset in this group was of 67.81±6.40 years. Median period from the onset of the disease to the diagnosis was 7.00 months (95%CI: 3.35 – 12.00), median disease duration of RA was 36.00 months (95%CI: 20.34 – of 46.98). 62 patients were included in the 2nd group, among them 10 men (16.13%) and 52 (83.87%) women. The average age of these patients was 65.61±4.66 years. RA debuted at the age 51.50 years (95%CI of 49.00 – 55.26). The period from the first clinical manifestations to diagnosis verification was 12.00 months (95%CI: 6.00 – 12.00). The median disease duration of RA was 168.00 months (95%CI: 120.00 – 233.76). In the first group radiographic stage 0 was diagnosed in 1.26% of patients, I stage in 15.19% of patients, II stage – in 54.43% of patients, III stage – in 18.99% of patients, IV stage – in 10.02% of patients. In the second group I radiographic stage was detected in 4.84% of patients, II stage – in 29.03%, III stage – in 53.23%, stage IV – in 12.90%. In the first group I functional class was observed in 20.25% of patients, functional class II – in 70.89%, functional class III – in 10.77%, IV functional class – in 8.86%. In the second group I functional class was installed in the 20.00% of the patients, functional class II – in 61.54%, functional class III – in 10.77%, IV functional class – in 7.69%.

Results: Disease activities parameters were not differ between groups (Table 1).

Table 1. Parameters of diseases activity in elderly patients

Parameter	1 group EORA	2 group YORA (60 year and older)	Significance of difference
ESR, mm/h**	23.50;14.58 -27.00	18.5;13.00-29.00	p>0.05
CRP, mg/ml**	12.60;7.37-22.78	10.40;5.87-17.84	p>0.05
Pain assessment by patient, mm of VAS*	40.43±27.11	40.72±25.59	p>0.05
Global health assessment by physician, mm of VAS	38.19±20.92	35.18±19.24	p>0.05
Global health assessment by patient, mm of VAS	41.39±24.41	45.13±23.47	p>0.05
Disease activity assessment by patient, mm of VAS*	45.39±24.64	43.86±23.31	p>0.05
TJC 28, n**	6.00;4.00-8.00	7.00;4.00-10.00	p>0.05
SJC 28, n**	4.00;2.00- 5.35	4.00;2.00-7.00	p>0.05
TJC 68, n**	7.00;5.00-11.35	8.00;4.52-12.00	p>0.05
SJC 66, n**	4.00;2.65 -5.35	4.00;2.00-7.48	p>0.05
DAS-28 (CRP), ед*	4.15±1.45	4.55±1.31	p>0.05
DAS-28 (ESR), ед*	3.89±1.71	4.66±1.49	p>0.05
SDAI, ед*	21.34±14.41	25.22±13.98	p>0.05
CDAI, ед*	20.51±12.06	21.45±13.53	p>0.05

* - results are shown as mean±SD

** - results are shown as median; 95%CI

Systemic manifestations of RA have been observed in the 22.58% of patients in the 1st group: 4.83% were diagnosed with Sjogren's syndrome, 4.83% - anemia, 1.26% - leukopenia, 5.06% - rheumatoid nodules, 2.53% - amyotrophy, 1.26% - necrotizing vasculitis, 1.26% - myalgia.

In the 2nd group systemic manifestations have been documented at 35.48% of patients: amyotrophy in 4.83% of patients, rheumatoid nodules - 22.58%, the rheumatoid lung - 3.08%, Sjogren's syndrome - 3.08%, anemia - 1.54%, thrombocytopenia, leukopenia - 1.54%, capillary - 1.54%, necrotizing vasculitis - 1.54%.

Conclusions: Higher frequency of systemic manifestations of RA (p<0.05) in the 2nd group can be explained by longer disease duration and, thereby, more pronounced immunological inflammation, which acquires systemic character in selected patients. At the same time in the 1st group frequency of occurrence of systemic manifestations of RA is rather high, which should be considered in the appointment of treatment and monitoring the effectiveness of therapy.

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THE ASSESSMENT OF RELATIONSHIP BETWEEN ESTRADIOL AND TESTOSTERONE CONCENTRATIONS, BMD AND BONE METABOLISM MARKERS IN MEN WITH DIAGNOSED OSTEOPOROSIS

W. Stępień-Kłos¹, M. Stuss², P. Bazela³, E. Sewerynek²

¹Department of Endocrine Disorders and Bone Metabolism, Endocrinology, Medical University of Lodz, The Regional Center of Menopause and Osteoporosis, Military Medical Academy University Teaching Hospital in Lodz, Łódź, ²Department of Endocrine Disorders and Bone Metabolism, Endocrinology, Medical University of Lodz, The Regional Center of Menopause and Osteoporosis, Military Medical Academy University Teaching Hospital in Lodz, Łódź, ³John Paul II Memorial Municipal Hospital in Elblag, Elblag, Poland

Objective: Osteoporosis is a systemic bone disease that affects 20–30% of men. Peak bone mass achieved by men is significantly higher than in women. In addition, due to the linear decrease in testosterone concentration in men, there is no rapid phase of bone loss like in perimenopausal women, and an increase in the frequency of osteoporotic fractures begins about 10 years later than in women. However, complications of fractures occur much more frequently in men and are one of the main causes of morbidity and mortality in this subpopulation. The aim of the study was to determine the correlation between changes in BMD and bone metabolism markers levels during the study depending on the initial concentrations of estradiol, testosterone and SHBG as well as the therapeutic intervention used in the male population.

Methods: A total of 55 men, patients of the Regional Center of Menopause and Osteoporosis of Military Medical Academy University Teaching Hospital in Łódź with diagnosis of osteoporosis, based on the result of hip and / or lumbar spine densitometry (T-score $\leq$ -2.5 SD) were enrolled in the study. Patients were divided into two groups: 43 patients received alendronate 70 mg once a week, in addition to calcium and vitamin D3 supplements, while the other participants received only calcium and vitamin D3 supplements. The patients' visits were repeated after three, six and twelve months. Measurements of β -CTX (C-terminal telopeptide of type I collagen), osteocalcin (OC), alkaline phosphatase concentrations in serum, as well as of total 24-h calcium and phosphate levels in serum and urine, were carried out in material collected at baseline and after three, six and twelve months of therapy. Hip and lumbar spine densitometry was done twice (at baseline visit and after one year). The vitamin D, estradiol, testosterone, dehydroepiandrosterone sulphate (DHEA-S) and SHBG concentrations were determined only once at the beginning of the study. The groups did not differ significantly in femoral neck and total hip BMD, estradiol and testosterone concentrations.

Results: There were no significant differences in BMD and T-score values between groups after 12 months of study duration. There were also no significant ($p > 0.05$) differences in osteocalcin and β -CTX concentrations within groups and changes of their levels in time were not related with group, but in the alendronate subpopulation we observed a significant decrease in ALP level (after 6 and 12 months vs. baseline). However, in the study group we found statistically significant negative correlations between the initial values of OC or β -CTX and of total hip BMD and between the initial lumbar spine BMD and the OC concentration ($p < 0.05$). Additionally, a positive correlation was observed between the baseline Neck BMD and the initial OC concentration in the control group ($p < 0.05$). A significant correlation ($R = 0.3305$, $p = 0.0457$) between initial lumbar spine BMD and estradiol concentration was noticed in the study group. In addition, significantly higher testosterone levels ($p < 0.05$) were observed in the subpopulation without osteoporotic fractures of alendronate group.

Conclusions: The results of the study indicate the role of sex hormones in maintaining higher bone mass. Higher levels of testosterone can exert a protective effect on the bone and reduce the risk of fractures.

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THE QUALITY OF LIFE ASSESSMENT IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS DEPENDING ON THE APPLIED THERAPY

I. Król¹, M. Stuss², E. Sewerynek²

¹Department of Family Medicine, Poznan University of Medical Sciences, Poznań, ²Department of Endocrine Disorders and Bone Metabolism, Endocrinology, Medical University of Lodz, The Regional Center of Menopause and Osteoporosis, Military Medical Academy University Teaching Hospital in Lodz, Łódź, Poland

Objective: The assessment of patient's quality of life, depending on applied therapy: ibandronate (IBA), strontium ranelate (SR) and denosumab (DEN) and the observation time period.

Methods: Out of 180 women, qualified to the study, 69%, on the average, persisted in a 12-month therapy. In that group, 37 patients were treated with oral IBA (150 mg/month), 50 patients received DEN (60 mg/6 months) and 37 patients were treated with SN (2.0 g once daily). The quality of life assessment was carried out, using the SF-36 Questionnaire Form three times during the 12-month therapy: at therapy onset and after 6 and 12 months.

Results: Most patients, who completed the 12-month therapy/observation period, were in the DEN-treated group (83%). The greatest life quality improvement was noted in the DEN-treated patients vs. either IBA- or SR-treated groups. Deterioration was observed in the IBA-treated patients, regarding their daily functioning, however, without effect on their self-service abilities. Pain levels decreased in the SR- and DEN-treated groups during the entire 12-month therapy period. In case of the DEN-treated patients, pain alleviation correlated with its less intrusive effects on the patients' will to undertake daily tasks. In the DEN-treated patients, the observed improvement involved much less effects of physical fitness and psychic status on social contacts. A higher number of concomitant conditions and received drugs correlated with worse patient view of general health status (IBA and DEN). Absolute change in health during the annual observation was inversely proportional to the amount falls.

Conclusions: Among the used treatment, evaluated after the study, DEN made the most for life quality improvement. Drug administration regimen has a great influence on patient's wellbeing and satisfaction. A higher number of concomitant diseases and received drugs in female patients with postmenopausal osteoporosis correlates with worse life quality.

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EPIDEMIOLOGY OF OSTEOPOROTIC FRACTURES IN RESIDENTS OF TALDYKORGAN, REPUBLIC OF KAZAKHSTAN

S. Issayeva¹, B. Issayeva¹, D. Dilmanova¹, O. Lesnyak²

¹Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan, ²North-Western State Medical University named after I.I. Mechnikov, St. Petersburg, Russia

Objective: To determine the incidence of major osteoporotic non-vertebral fractures: hip fractures (HF), fractures of proximal humerus (FPH), distal forearm (FDF) and distal tibia (FDT) in Taldykorgan, Kazakhstan, in 2015.

Methods: the study of incidence of major peripheral osteoporotic fractures in Taldykorgan was held in the framework of the project EVA – a multicenter epidemiological studies in different countries of Eurasia. The total population of the city Taldykorgan at the beginning of 2016 amounted to 165 296 people, residents 40 years and older 60 198 people

(36.42%), men - 25 347 and women - 34 851. Data collection was performed retrospectively from 1 January to 31 December 2015. Registration journals of hospitalization and refusal of hospitalization, data of electronic register of patients of a hospital providing trauma care and the trauma consultation journals of trauma office were examined. To prevent double registration of the same fracture the data from different sources were verified, and cases of double registration of the same patient from the database were removed. We identified all outpatient and inpatient cases (ICD S72.0, S72.1, S72.2, S52.5, S52.6, S42.2, S82.3, S82.5, S82.6), in men and women 40 years and older, residents of Taldykorgan. Exclusion criteria were pathological fractures.

Results: In 2015, in total 568 cases of fracture among population 40 years and older were registered: in men - 170, in women - 398. The highest frequency was in FDF - 398.68 per 100 000 people (men - 189.37, women - 550.92). Incidence of FDT - 204.33 per 100 000 people (men - 189.37, women - 215.2, respectively). HF was registered in 21.3% of patients, the incidence was 201.00 per 100 000 people (men - 193.32, women - 206.59). The frequency of new cases of FPH was 139.54 per 100 000 people (men - 98.63, women - 169.29) (Table 1).

Table 1. Incidence of fractures in 2015 (per 100 000 people) in Taldykorgan, Kazakhstan

n	Men		Women	
	Incidence	n	Incidence	
Fractures of distal forearm	48	189.37	192	550.92
Fractures of proximal humerus	25	98.63	59	169.29
Fractures of distal tibia	48	189.37	75	215.20
Hip fractures	49	193.32	72	206.59

Conclusions: The major nonvertebral osteoporotic fractures were more common in females. It should be emphasized that about a quarter of the fractures were a significant fractures like a hip fractures.

P723

WHICH IS THE TARGET LEVEL FOR SERUM CALCIFEDIOL TO OPTIMIZE THE FUNCTIONAL RECOVERY FOLLOWING A HIP FRACTURE? A PROSPECTIVE, SHORT-TERM STUDY OF 1350 INPATIENTS

M. Di Monaco¹, C. Castiglioni¹, S. Di Carlo¹, E. La Marmora², I. Filipovic², E. Milano¹, M. A. Minetto², G. Massazza²

¹Osteoporosis Research Center, Division of Physical Medicine and Rehabilitation, Presidio Sanitario San Camillo, Torino, ²Division of Physical Medicine and Rehabilitation, Department of Surgical Sciences, University, Torino, Italy

Objective: To investigate the association between serum calcifediol categorized into 4 classes and the functional recovery after hip fracture.

Methods: We prospectively evaluated 1350 inpatients with hip fracture consecutively admitted to a rehabilitation facility. Serum calcifediol was measured by an immunoenzymatic assay 14.7 ± 4.4 (mean $\pm$ SD) days after surgery and categorized into 4 classes: I class <12 ng/ml; II class 12-20 ng/ml; III class 21-29 ng/ml; IV class ≥ 30 ng/ml. The functional outcome was assessed by using the Barthel index effectiveness (proportion of potential improvement in ability to function actually achieved by each patient during the rehabilitation course).

Results: We found a significant difference in Barthel index effectiveness at the end of inpatient rehabilitation across the 4 classes of vitamin D

status: χ^2 (3, n=1350) 24.05; $p < 0.001$. The difference persisted ($p = 0.007$) after adjustment for 8 covariates. By comparing pairs of classes, we found that Barthel index effectiveness was lower in the 829 patients of the I class than in the 275 of the II ($p = 0.014$) who had in turn Barthel index effectiveness lower than the 132 patients of the III class ($p = 0.037$). Conversely, no significant differences emerged between the patients of the III class and the 114 patients of the IV class ($p = 0.441$).

Conclusions: Calcifediol levels below 12 ng/ml were associated with a worse recovery than those between 12 and 20 ng/ml that were in turn associated with a worse recovery than those between 21 and 29 ng/ml. Conversely, no significant differences were found between the patients with calcifediol between 21 and 29 ng/ml and those with calcifediol ≥ 30 ng/ml. Despite caution due to the observational design, our study suggests that vitamin D depletion should be treated after hip fracture to optimize the functional outcome, with a target level for serum calcifediol of 21-29 ng/ml and no further advantages associated with calcifediol levels of 30 ng/ml or higher.

P724

THE INCIDENCE OF FALLS DEPENDING ON PHYSICAL ACTIVITY IN WOMEN OVER 50 YEARS OLD: THE PILOT STUDY

A. Berwecki¹, M. Berwecka², T. Ridan¹, A. Spannbauer³

¹University of Physical Education, Department of Physiotherapy, Section of Kinesiotherapy, ²Jagiellonian University Medical College, Faculty of Health Sciences, Department of Bone and Joint Diseases Krakow, ³Jagiellonian University Medical College, Faculty of Health Sciences, Department of Experimental and Clinical Surgery, Krakow, Poland

Objective: Falls and fall-related injuries occurring in postmenopausal women constitute a significant public health problem and often lead to fractures, disability and even death. The aim of a study was to evaluate incidence of falls in women over 50 years old.

Methods: The pilot study included 98 women aged 50-70 who were divided into two groups: 51 women (mean age 62.26 ± 2.38) were swimmers, regularly training whereas the control group consisted of 47 randomly selected Krakow residents (60.74 ± 3.46). The research was conducted using a questionnaire containing questions on the occurrence of falls during the preceding year, 5 years, their circumstances, causes, consequences as well as physical activity. Physical activity was considered systematic if undertaken at least 3 times a week.

Results: In the study group in the preceding five years 30% of respondents reported falls (none in the preceding year), and in the control group 64% (20% in the preceding year). There was a significant correlation ($p = 0.0029$) between the systematically undertaken physical activity and fall occurrence. The difference in the fall consequences are of particular importance. The significant correlation was found ($p = 0.0143$) between systematic physical activity and the occurrence of an injury - people who were physically inactive were more likely to sustain a fall-related injuries than those who were physically active. The number of injuries resulting from a fall in the study group amounted to 8%, in the control group to 58%. In both groups fractures occurred to be the most frequent fall-related type of injury with 35% in the study group and 70% in the control group. No major decrease in independence was observed in the study group as a result of a fall as opposed to the control group.

Conclusions: Systematic swimming in postmenopausal women has a significant impact on the reduction of the incidence of falls, resulting injuries and related hospitalizations. It greatly limits the incidence of fractures, affecting the risk of disability, loss of independence and death.

P725

INFORMATION SCARCENESS IN RARE DISEASES: A CASE OF FIBROUS DYSPLASIA NEVER RECEIVING BISPHOSPHONATES

C. Gomez Acotto¹, L. Missana², E. Roldán³¹Maimonides Univ., Buenos Aires, ²University of Tucumán, Tucumán, ³Gador S.A, Buenos Aires, Argentina

Fibrous Dysplasia (FD) is a rare condition caused by a mutation at GNAS1 gen, and overexpression of proto-oncogene c-fos. So, there is an abnormal proliferation of fibroblasts, defective differentiation of osteoblast and increase of bone resorption. The clinical expression is frequently identified by pediatricians, and lately derived if skeletal pain, deformations and fracture risks are imminent. Osteologists offer bisphosphonate (BP) therapy based on studies showing pain reduction and a trending to minimize fracture risks, although not curative, it improves patient quality of life. For such reason it is striking to find a case that after several years of being diagnosed with FD, has never been prescribed with BPs

A 20-year-old male was diagnosed with FD after suffering several fractures in his childhood (Enders fixation at femora). Although his hometown was in South Patagonia he managed to receive medical attention at main centers in Argentina and Spain. Now he practices sports and stands without supporters. He reports pain at different skeletal sites, with supra-normal values of 25(HO)D (28.3 nmol/L), Alkaline phosphate (36.2 IU/L) and serum cross laps (663,9 ng/mL). Skeletal scintigraphy shows hot spots mainly at hips.

The Chapulat schedule was given (3 doses of pamidronate 60 mg IV) achieving pain reduction and normalization of bone biochemical parameters. The treatment has been well tolerated.

Due to the fact that BPs are effective and affordable in FD, they are usually offered as an option. Therefore, in this case uncertainties in the diagnoses may have occurred, or more likely lack of information about BPs. Besides, the medication is prescribed off-label, and/or not covered by insurance systems. Nevertheless, after a period of fractures the patient evolved moderately well in spite of pain relapses, poorly responsive to NSAIDs, and bone metabolism disturbs. BP intervention could have aided dramatically. The patient responds satisfactorily to the current late pamidronate administration. Lack of adequate information affects patients suffering FD and other rare diseases.

P726

ASSESSMENT OF THE OCCURRENCE OF SPINAL PAIN IN THE COURSE OF RHEUMATOID ARTHRITIS

T. Ridan¹, A. Stryzowska¹, A. Berwecki¹, M. Berwecka²¹University of Physical Education, Department of Physiotherapy, Section of Kinesitherapy, ²Jagiellonian University Medical College, Faculty of Health Sciences, Department of Bone and Joint Diseases Krakow, Krakow, Poland

Objective: To investigate the occurrence of pain in the cervical and lumbar spine in patients with rheumatoid arthritis.

Methods: The research involved a group of 64 patients of the Rheumatology Ward, Specialist Hospital J. Dietl in Krakow, including 26 men and 38 women. The age of the respondents ranged between 23-78 years (average age 56 years, SD=15.1 years). The research was carried out in the year 2017 based on the author's questionnaire, NDI and RMI questionnaires in the Polish validated language versions. The correlations were studied with the use of, among others, the chi-square independence

test, Pearson's correlation coefficient, t-student test for independent samples (the level of significance $\alpha=0.05$).

Results: Assessment of the relationship between the sex in the occurrence of spinal pain showed no significant dependence ($p=0.7688$) for the lumbar spine and a significant dependence ($p=0.0030$) for the cervical spine. There was a significant correlation ($p=0.0327$) between the biological treatment and the occurrence of pain in the cervical spine, with no correlation in the lumbar spine ($p=0.1417$). There was a statistically significant ($p=0.22039$) positive correlation of Spearman's rank ($R=0.2858$) between the time of diagnosis of RA and pain in the lumbar spine, with the absence of connection for the cervical spine ($R=0.00339$, $p=0.978742$). There was a significant correlation ($p=0.000$) between the duration of the disease and the age ($p=0.000$), and severity of symptoms in the lumbar spine. The average result in NDI questionnaire was 18.91, and in RMI questionnaire – 11.9.

Conclusions: Rheumatoid arthritis adversely affects pain in both the cervical spine and, especially, the lumbar spine. The sex affects the occurrence of the cervical pain, women are more likely to complain of pain, with the absence of correlation in relation to the lumbar pain syndrome. Biological treatment has a significant impact on cervical pain, patients treated in this way less frequently complain about neck pain.

P727

THE EFFECTIVENESS OF PHYSIOTHERAPY AND MYOFASCIAL RELEASE TECHNIQUES IN THE TREATMENT OF LOW BACK PAIN: THE PRELIMINARY REPORT

T. Ridan¹, K. Kacik¹, A. Berwecki¹, M. Berwecka²¹University of Physical Education, Department of Physiotherapy, Section of Kinesitherapy, ²Jagiellonian University Medical College, Faculty of Health Sciences, Department of Bone and Joint Diseases Krakow, Krakow, Poland

Objective: To evaluate the effectiveness of physiotherapy and myofascial release techniques in the treatment of low back pain.

Method: The study was carried out in a group of 44 men and 56 women with a mean age of 51.78 years (± 13.85) who had been diagnosed with diagnosed lumbar radiculopathy based on a patient interview (the McKenzie protocol) and an MRI scan. The patients under study were randomly divided into two groups of 50 people: group A – a series of 10 massage and physiotherapy treatments (TENS, ultrasound, laser therapy), group B – a series of Stecco's Fascial Manipulation[®] treatments. The effectiveness of the procedures used was verified by: a self-designed questionnaire, the Roland-Morris (RMI) questionnaire in the polish validated form, Schober's test for lumbar spine range of motion. The data obtained was subjected to statistical analysis using MS Excel 2010 and the Statistica v.10.0 Pl ($p=0.05$).

Results: The patients in group B achieved statistically significantly higher reductions in the VAS pain scores ($p=0.0001$, $t\text{-value}=-4.1803$, $df=98$), the pain score changed by 3.84 points on average as compared with 2.5 points in group A, and statistically significantly better disability scores according to the RMI questionnaire ($p=0.0000$, $t\text{-value}=-5.6856$, $df=98$). A comparative analysis of the range of motion for spinal flexion revealed that the improvement in group B was greater by 1.58 cm. The difference proved to be statistically significant ($t=3.6061$, $df=98$, $p=0.0005$). The statistical analysis revealed a greater, statistically significant effectiveness of fascial therapy in the reduction and elimination of pain in thighs and buttocks, and in the complete elimination of pain.

Conclusions: 1. Fascial therapy and physiotherapy treatments combined with therapeutic massage are an effective method of reducing low back

pain associated with lumbar radiculopathy. 2. Fascial therapy is more effective in reducing pain and improving spinal mobility. 3. Both those therapeutic procedures are effective in reducing the level of disability perceived according to the RMI questionnaire. The improvement in this parameter is more visible in the patients treated with fascial therapy.

P728

SM04690, A SMALL MOLECULE WNT PATHWAY INHIBITOR APPEARED TO HAVE NO DELETERIOUS EFFECTS ON BONE, JOINT AND TISSUE HEALTH IN KNEE OA MODELS

V. Deshmukh¹, C. Barroga¹, S. Cho¹, T. Seo¹, S. Kennedy¹, J. Tambiah¹, N. Lane²

¹Samumed, LLC, San Diego, ²UC Davis Medical Center, Davis, USA

Objective: Wnt signaling modulates bone and cartilage turnover. Animal and human data from SM04690 (a Wnt pathway inhibitor with cartilage protective and regenerative effects), were reviewed to determine effects on bone, joint, and tissue health.

Methods: SM04690 was administered by intra-articular (IA) injection in a rat surgical knee OA model (0.3µg, 1µg); in normal dogs (50µg, 1750µg, 35,000µg single injection, or 12µg, 36µg, 116µg, up to 9 repeat injections) and in knee OA subjects (30µg, 70µg, 230µg). In the rat model, subchondral bone volume/total volume (BV/TV) ratios were evaluated at week 13 with Image J software. Osteoblast markers were measured by qPCR at week 5. In dogs, joint histology was semi-quantitatively evaluated (cartilage, meniscus, subchondral bone, synovium), at Day 111 post single IA injection, or Day 94 or 273, after 3 or 9 repeat injections. In a human phase 1 trial, bone health serum biomarkers were collected (weeks 0, 4, 12, 24); BMD in knee and hip joints was measured by qCT (weeks 0, 12, 24) and DXA scans, respectively (weeks 0, 24), and bone marrow edema (BME) assessed with knee MRI (weeks 0, 12, 24).

Results: In the rat OA model, SM04690 (0.3µg, 1µg) had no effects on week 13 BV/TVs, or osteoblast marker expression compared to vehicle. In dogs, joint histology was normal with single IA 50µg, 1750 µg and all repeat IA doses. Synovial inflammation was observed with the 35,000µg dose at day 2 which resolved by day 111. There was no evidence of non-target tissue reactions in any treatment group. The no-observed-adverse-effect-levels in dogs for single and repeat injections were 1750µg and 116µg, respectively, an equivalent 8-fold safety margin to highest human IA dose. In humans, there were no concerning shifts of serum biomarkers between groups and no appreciable BMD or BME effects seen in knee and hip joints.

Conclusions: SM04690 had no appreciable bone, joint, or tissue health effects at pharmacologically active or higher dose equivalents, and appeared safe and well-tolerated in rats, dogs and humans.

Disclosures: V. Deshmukh, C. Barroga, S. Cho, T. Seo, S. Kennedy, and J. Tambiah are all employees and shareholders of Samumed, LLC. N. Lane: Consultant for Samumed, LLC.

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SM04690 CAUSED DOSE-DEPENDENT WNT PATHWAY MODULATION WITHIN A HOMEOSTATIC RANGE IN A RAT MODEL OF KNEE OSTEOARTHRITIS

V. Deshmukh¹, C. Barroga¹, S. Kc¹, R. Lories², N. Lane³

¹Samumed, LLC, San Diego, USA, ²Skeletal Biology and Engineering Research Center, Leuven, Belgium, ³UC Davis Medical Center, Davis, USA

Objective: Wnt signaling affects pathogenesis of osteoarthritis (OA) by regulating chondrogenic stem cell differentiation and cartilage catabolism¹. Both excessive Wnt pathway activation and repression are implicated in OA^{2,3}. The aim of this animal study was to determine an optimal dose for SM04690, a small-molecule Wnt pathway inhibitor, to protect and regenerate cartilage in a preclinical OA model.

Methods: SM04690 joint and plasma levels were measured on days 30, 90, 180 after single intra-articular (IA) injection in rats (0.3, 1, 3, 9µg) and dogs (3, 30µg). Surgical knee OA was induced in rats (8-12/group), and a single IA injection of SM04690 (0.1ug, 0.3ug, 1ug) given. Chondrogenic matrix production (Col2a1, Aggrecan, Sox9, Col10a1) and cartilage catabolism (MMP1, 3, 13, ADAMTS5) markers were measured by qPCR at Day 35. Serum OA biomarkers (COMP, PIIANP) were also measured. Histologic severity of OA was assessed by OARSI scoring at Day 90. Safety was assessed in rats (8-12/group) and dogs (6-8/group). All comparisons were to vehicle.

Results: SM04690 showed dose-linear IA concentrations (>180 days), with no detected systemic exposure. In the rat OA model, changes with 0.1ug dose were not significant, but 0.3ug increased (p<0.05) chondrocyte differentiation and decreased (p<0.05) cartilage catabolism markers. SM04690 1ug had no effects on cartilage differentiation markers but decreased (p<0.05) MMP1, 13 and ADAMTS5 expression (not MMP3). Serum COMP decreased and PIIANP increased at 0.3ug (p<0.05), but showed no changes at 1ug. SM04690 0.3ug decreased OARSI scores (p<0.05), while 0.1ug and 1ug doses did not. Doses were well-tolerated in rats and no-observed-adverse-effect-level in dogs was 1750ug (58ug rat dose equivalent; 194-fold over pharmacologically active dose).

Conclusions: In a rat knee OA model, 0.3ug SM04690 maintained cartilage homeostasis, and inhibited protease production, compared to vehicle. Lower and higher doses were not effective. SM04690 was well tolerated in animals at doses 58-fold higher than those tested for efficacy. These data suggested SM04690 caused dose-dependent Wnt signaling modulation within a homeostatic range.

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Disclosures: V. Deshmukh, C. Barroga, and S. KC are all employees and shareholders of Samumed, LLC. R. Lories: Consultant for AbbVie, Boehringer-Ingelheim, Celgene, Janssen, Merck, Novartis, Pfizer, and UCB. N. Lane: Consultant for Samumed, LLC.

P730

BONE MICROARCHITECTURE, DENSITY, AND GEOMETRY PREDICT INCIDENT FRACTURE INDEPENDENTLY OF DXA BMD IN OLDER WOMEN AND MEN: THE BONE MICROARCHITECTURE INTERNATIONAL CONSORTIUM (BOMIC)

E. J. Samelson¹, S. Demissie², J. Adachi³, S. Amin⁴, E. Atkinson⁴, C. Berger⁵, E. Biver⁶, S. Boyd⁷, K. Broe⁸, L. Burt⁷, R. Chapurlat⁹, T. Chevalley⁶, S. L. Ferrarini⁶, D. Goltzman¹⁰, D. Hanley¹¹, M. T. Hannan⁸, D. Karasik⁸, S. Khosla⁴, C.-T. Liu², M. Lorentzon¹², R. McClean⁸, D. Mellstrom¹³, B. Merle¹⁴, M. Nethander¹⁵, C. Ohlsson¹⁶, R. Rizzoli⁶, E. Sornay-Rendu¹⁴, D. Sundh¹², P. Szulc¹⁷, B. van Rietbergen¹⁸, A. Wong¹⁹, H. Xu², L. Yang⁸, D. P. Kiel⁸, M. L. Bouxsein²⁰

¹Hebrew Senior Life, Harvard Medical School, Boston, USA,

²Department of Biostatistics, Boston University School of Public

Health, Boston, USA, ³Department of Medicine, Michael G. DeGroote School of Medicine, St Joseph's Healthcare - McMaster University, Hamilton, Canada, ⁴Mayo Clinic College of Medicine, Rochester, USA, ⁵Research Institute of the McGill University Health Centre, Montreal, Canada, ⁶Division of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland, ⁷McCaig Institute for Bone and Joint Health, Calgary, Canada, ⁸Institute for Aging Research, Hebrew SeniorLife, Harvard Medical School, Boston, USA, ⁹INSERM UMR 1033, Université de Lyon, Hospices Civils de Lyon, Lyon, France, ¹⁰Departments of Medicine, McGill University and McGill University Health Centre, Montreal, Canada, ¹¹McCaig Institute for Bone & Joint Health, Calgary, Canada, ¹²Geriatric Medicine, Centre for Bone and Arthritis Research, Institute of Medicine, University of Gothenburg, Gothenburg, Sweden, ¹³Geriatric Medicine, Centre for Bone and Arthritis Research, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, ¹⁴INSERM UMR 1033, Pavillon F, Hôpital E Herriot, Lyon, France, ¹⁵Bioinformatics Core Facility, Sahlgrenska Academy, Centre for Bone and Arthritis Research, Institute of Medicine, University of Gothenburg, Gothenburg, Sweden, ¹⁶Centre for Bone and Arthritis Research, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, ¹⁷INSERM UMR1033, University of Lyon, Hôpital Edouard Herriot Place d'Arsonval, Lyon, France, ¹⁸Department of Biomedical Engineering, Eindhoven University of Technology, Eindhoven, The Netherlands, ¹⁹Toronto General Hospital, Toronto, Canada, ²⁰Dept of Orthopedic Surgery, Harvard Medical School, Boston, USA

Objectives: Although DXA assessed BMD is the clinical standard for determining fracture risk, the majority of older adults who sustain a fracture do not have osteoporosis (T-Score < -2.5). Importantly, bone fragility results not only from low BMD, but also deterioration in bone structure. Although prior cross-sectional studies found associations between history of fracture and deficits in bone structure, prospective studies are limited. Therefore, we combined 6 cohorts to conduct a prospective study of bone microarchitecture, evaluated by HR-pQCT, and fracture incidence. Further, we evaluated whether HR-pQCT indices were associated with fracture risk independently of DXA assessed femoral neck areal BMD (FN aBMD).

Methods: Participants included 4,911 individuals (2,578 women, 2,333 men) from the Framingham Osteoporosis Study, Geneva Retirees, Mayo Clinic, MrOS Sweden, OFELY, and STRAMBO cohorts. Participants underwent HR-pQCT scanning (XtremeCT, Scanco Medical AG) at the distal radius and tibia, and were followed for incident fracture for a mean ($\pm$ SD) of 4.8 $\pm$ 2.9 yr. We performed a meta-analysis of log-hazard ratios (HR) from Cox proportional HR models for the association between FN aBMD and HR-pQCT bone measures and incidence of fracture, adjusted for age, sex, and cohort. Based on preliminary findings, we *a priori* selected 6 HR-pQCT bone measures for analysis.

Results: Mean age was 69 $\pm$ 9.5 yr (range, 40-96). Cumulative incidence of fracture was 11% (563/4,911). Fractures included 154 (27%) spine, 80 (14%) wrist, 60 (11%) rib, 54 (10%) hip, 48 (9%) upper arm, and 167 (29%) other. Adjusted HR for fracture was 1.57 per SD decrease in DXA FN aBMD (Table). For each SD decrease in CtBMD, CtAr, TbBMD, and TbN, risk for fracture was increased 30% to 50%, and remained increased 10% to 40% after accounting for FN aBMD. In contrast, CtPo was weakly or not associated with incident fracture. Failure load was associated with 2-fold increased risk of fracture (per SD decrease in μ FEA), with HR=1.8 after adjustment for FN aBMD.

Conclusions: Our results from this large international cohort of women and men confirm and extend prior studies showing that deficits in trabecular and cortical bone density and structure contribute to fracture risk

independently of DXA assessed aBMD. Assembly of this large cohort will allow us to examine in the future whether bone microarchitecture is important in those with osteopenia, and whether bone microarchitecture predicts fracture independent of FRAX.

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THE ORGANIZATION OF SECONDARY FRACTURE PREVENTION SERVICES IN RUSSIAN FEDERATION

O. Lesnyak¹, K. Belova², O. Ershova²

¹North-Western State Medical University named after I. I. Mechnikov, Saint-Petersburg, ²Yaroslavl State Medical University, Yaroslavl, Russia

Objective: Due to the high prevalence of osteoporotic fractures in recent years the programs devoted to organization of secondary fracture prevention services (fracture liaison services, FLS) have been set up in many countries. In 2012, the International Osteoporosis Foundation (IOF) initiated the project "Capture the fracture" for the widespread establishment and support of FLS. It was shown that the best indicators of clinical and economical efficiency can be achieved in FLS which had a dedicated nurse-coordinator. Our aim was to provide the creation of FLS in Russian Federation.

Results: In 2012 the Russian Association on Osteoporosis (RAOP) initiated the project called "Prometheus" ("Creation of the system for secondary fracture prevention in patients with osteoporosis") to create FLS in Russia. The project includes three main directions: 1) the training of the specialists in the framework of mentorship program. At first the workshop was organized by IOF on 28 NOV 2016 in St. Petersburg (the mentor was Prof. Kassim Javaid). The doctors and nurses from 10 health care institutions participated in it. Since March 2017 a one-day trainings have been held in Yaroslavl city for the specialists from different regions who wanted to organize the FLS in their hospitals. Four trainings were conducted in 2017; 2) the informational support through the RAOP website (www.osteoporoz.ru). There is a page "Secondary fracture prevention services" containing the main documents and news on the issue; 3) the organization of FLS in the regions of the country. Since 2013 the creation of FLS has started in different regions of the Russian Federation. The first FLS recognized by the IOF appeared in 2015 in Yaroslavl city. It was awarded with the "silver" level. By JAN 2018 they were seven FLS on the interactive map of the project "Capture the fracture". Two of them were assessed to "silver" and three – to "bronze" level of achievement.

Conclusion: The project "Prometheus" initiated by RAOP includes different directions of work and successfully supports the creation of FLS in Russian Federation.

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SECONDARY FRACTURE PREVENTION SERVICE IN YAROSLAVL, RUSSIAN FEDERATION

K. Belova¹, O. Ershova¹

¹Yaroslavl State Medical University, Yaroslavl, Russia

Objective: Due to high prevalence and serious health and social consequences of osteoporotic fractures secondary fracture prevention services (fracture liaison services, FLS) have been created in many countries during several last years. Our aim was to develop and evaluate the effectiveness of FLS in Yaroslavl, Russian Federation.

Methods: The FLS creation was commenced at the Emergency health care hospital n. a. N. V. Solovyov on the base of Regional osteoporosis

centre in 2013. In 2014 to optimize the identification and management of patients a nurse-coordinator was added to FLS staff.

Results: The FLS effectiveness evaluation was carried out from 01 Mar 2015 to 31 Aug 2015. During this period 484 inpatient persons were identified, the share among all patients with fragility fractures was 94.28%. Risk assessment of subsequent fractures (including FRAX and DXA) was performed to 395 (81.61%) patients. Only in 46 (9.5%) cases it was not done due to earlier discharge from the hospital. The assessment timing was at the highest level: 40.76 days after the fracture. The counseling by the specialist for osteoporosis reached 77.89%. The therapy by calcium and/or vitamin D was assigned to 92.90% of patients. Only in 4.19% it was not done according to organizational reasons, the others required additional examination (due to hypercalcaemia, hyperparathyroidism, severe urolithiasis etc.). The antiosteoporotic drugs were assigned to 70.65%. They were not prescribed due to severe health condition, dementia, patient refusal, hypocalcaemia, hyperparathyroidism. Organizational problems were noted in 7.10% of patients. In FLS the falls risk assessment, a survey for causes of secondary osteoporosis and the identification of undiagnosed vertebral fractures were carried out for all patients. The consulting doctor corrected previous osteoporosis treatment, advised on changing the modifiable risk factors and assigned a follow-up plan. To improve the adherence for treatment in FLS the patient education was organized. A nurse-coordinator performs phone calls to the patient after 4 and 12 months to assess the outcomes and the therapy adherence.

Conclusions: The FLS organization with a dedicated nurse-coordinator allows to achieve the good results in identification, diagnosis, therapy prescription and improve the therapy adherence in fragility fractures patients.

P733

THE INDICATOR OF ACTIVITY IN DAILY LIVING BY KATZ SCALE IN PATIENTS WITH HIP FRACTURE

O. Ershova¹, K. Belova¹, O. Ganert¹, M. Romanova¹, O. Sinitsyna¹, L. Shubin¹

¹Yaroslavl State Medical University, Yaroslavl, Russia

Objective: Hip fracture reduces physical activity of patients and ability for independent movement in the early period after the injury and till 1 year after that and more¹. Our aim was to evaluate the ratio of activity in daily living by Katz scale² (ADL) and its dependence from different factors in patients with hip fracture.

Methods: All the inhabitants of Yaroslavl city, Russian Federation, ≥50 years who received hip fracture from 01 Sep 2010 to 31 Aug 2011 were included (n=446, average age 76.81±10.32 years). The ADL was estimated before fracture (retrospectively) and on 3, 6, 12 and 24 months after the injury. We used the Tau-Kendall correlation coefficient.

Results: At 3 months after the fracture 50.0% of the patients reached independence in performing majority functions of ADL (grade A and B), at 6 months their number totaled 70.2%, at 12 months 77.0%, at 24 months 82.1%. At all stages of observation the ADL depended on the age (p<0.01). We revealed significant relationship with cardiovascular diseases (ischemic heart disease, congestive heart failure, stroke, heart rhythm disorders) and diabetes mellitus. Patients with mental disorders by MMSE-scale³ restored the level of ADL significantly worse (p<0.01). The occurrence of delirium at hospital worsened the recovery of ADL at

3 and 6 months. The correlation with scale of anesthesiological risk (American Society of Anesthesiologists physical status classification system, ASA)⁴ and with the total number of chronic diseases was revealed. Among the lab tests the significant influence was revealed for the lower level of total protein (at all stages) and for higher creatinine (at 3 months). The recovery of ADL was significantly reduced in patients who were not operated.

Conclusions: After hip fracture the ADL level was gradually recovering within two years. It significantly depends on age, presence of cardiovascular disease, diabetes mellitus, decreased mental function, the development of delirium at the hospital, value of ASA-scale, number of concomitant diseases, level of total protein and creatinine, and absence of operational treatment.

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VITAMIN D REVERTS PALMITATE-INDUCED LIPOTOXICITY IN HUMAN OSTEOBLASTS

S. Tyagi¹, A. Chong-Halliday¹, L. Singh¹, G. Duque¹

¹Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, St. Albans, Australia

Objectives: Sharing a common precursor cell, the mesenchymal stem cell, osteoblasts (Ob) and adipocytes differentiate in bone marrow. With age and in higher scale in osteoporosis, the balance of differentiation between these cells tips toward adipocytes, which populate most of the bone marrow milieu of osteoporotic bones. Marrow adipocytes produce fatty acids, the most predominant being palmitic acid (PA). PA has been shown to be toxic to Ob, impacting upon Ob differentiation, function and survival, a process known as lipotoxicity. Active vitamin D (1,25(OH)₂D₃) enhances bone formation by increasing Ob survival, differentiation and function. We therefore hypothesised that 1,25(OH)₂D₃ rescues Ob in vitro from the negative lipotoxic effects of PA on their function and survival.

Methods: Normal human Ob were cultured in vitro and treated with either PA (100, 250 and 500 mM) alone or in combination with 1,25(OH)₂D₃ (10⁻⁷–10⁻⁹M). For cell survival analysis Ob were treated for 24, 48 and 72 h. Apoptosis was determined by TUNNEL and Annexin V assays. Autophagy was determined by western blotting and immunofluorescence of autophagolysosomes. In addition, differentiation and mineralisation were quantified at day 1, 7 and 14 using alkaline phosphatase and alizarin red staining respectively.

Results: PA-treated Ob showed dysfunctional autophagy and lower differentiation, mineralisation and survival. All these lipotoxic effects were significantly reverted by the higher concentrations of 1,25(OH)₂D₃ in the media (10⁻⁸ and 10⁻⁷M), which also correspond to the previously reported osteoanabolic doses of 1,25(OH)₂D₃ in vitro.

Conclusion: Additionally to the well-known anabolic effect of 1,25(OH)₂D₃ on bone, a previously unknown protective effect of 1,25(OH)₂D₃ against bone lipotoxicity was identified in this study. In conclusion, treatment of osteoporotic bone with 1,25(OH)₂D₃ could convert a lipotoxic bone marrow into an active bone-forming milieu. However, further in vivo studies are still required.

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ASSOCIATION BETWEEN OSTEOPOROSIS AND COGNITIVE IMPAIRMENT IN A COMMUNITY DWELLING OLDER POPULATION

F. Sharifi¹, G. Shafiee², R. Heshmat², I. Nabipour³, B. Larijani⁴, A. Ostovar⁵

¹Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ³The Persian Gulf Biomedical Research Institute, Bushehr University of Medical Sciences, Bushehr, ⁴Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁵Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Cognitive impairment is one of common geriatric syndromes. Osteoporosis in elderly could result to disability and mortality because of femoral and vertebral fractures. Relationship between these two disorders has not clearly be revealed. This study was designed to clarify the relationship between cognitive impairment and osteoporosis in a community representative sample of older adults in Iran.

Methods: The sample of this study was representative of aged >60 years that were selected using a cluster random sample method based on the Neighborhoods of Bushehr city, Iran. Demographic data was gathered used an approved questionnaire. Cognitive status was assessed using, Mini Mental State Examination (MMSE), Animal Naming Score (ANS), Functional Assessment Test, and history of dementia (and Alzheimer's disease). Who had problem in one of this test or had history of dementia was considered as subject with cognitive impairment and those had normal condition in all testes was assumed as subjects with normal cognition. Bone densities of neck of femur and lumbar vertebra were evaluated using DXA. Osteoporosis was defined as T-score ≤ -2.5 in each of mentioned sites. Multivariate logistic regression model used for assessed association between osteoporosis and cognitive impairment. The results of association was adjusted for age, sex, and BMI.

Results: Data of 2263 subjects from 2426 participants that had cognitive and bone densitometry assessment results were considered for analyses. Of total, 51.8% were women. Mean age of the participants was 69.28 (6.33) years. In multivariable regression model, odds ratio (OR)=1.276 (CI 95%; 1.036 – 1.572 for spinal osteoporosis and OR=1.350 (CI 95%; 0.966-1.887) for femoral osteoporosis were calculated.

Conclusion: It seems that the cognitive impairment is independently associated with osteoporosis. This association was more significant in spinal osteoporosis. It may be a similar pathway such as inflammation could be explained this relationship.

P736

ASSOCIATION BETWEEN BONE DENSITY AND QUALITY WITH METABOLIC SYNDROME IN OLDER ADULTS: BUSHEHR ELDERLY HEALTH STUDY

M. Bagherzadeh^{1, 2}, M. Ebrahimipour¹, F. Sharifi³, F. Amini Nezhad¹, A. Ostovar¹, G. Shafiee³, R. Heshmat³, N. Mehrdad³, I. Nabipour⁴, B. Larijani¹

¹Endocrinology and Metabolism Clinical Sciences Institute, Tehran, ²Clinical Research Development Center, Qom University of Medical Sciences, Qom, ³Endocrinology and Metabolism Population Sciences Institute, Tehran, ⁴The Persian Gulf Biomedical Sciences Research Institute, Bushehr, Iran

Objective: Trabecular bone score (TBS) is a gray-level measurement derived from lumbar spine DXA image texture that is related to microarchitecture and fracture risk independent to BMD. TBS is only improving markers on areal BMD (aBMD) measurement to predict the incidence of fractures in postmenopausal women. Metabolic syndrome (MS) has two conflicting factors: obesity known to be protective against osteoporosis and an inflammation that activates bone resorption. The association between metabolic syndrome (MS) and bone health remains unclear. The study aimed to evaluate the association between metabolic syndrome and TBS-BMD, and the risk of osteoporosis in elderly population in Bushehr Elderly Health study (BEHS).

Methods: This is a cross-sectional analysis of BEHS that data of 2241 people (1158 women, 1083 men) aged 65+ were included. BMD of the participants were measured at the lumbar spine and femoral neck regions. Metabolic syndrome (MS) was defined according to the ATP-III criteria. Lumbar spine TBS was derived from spine DXA blinded to clinical parameters and outcomes.

Results: the mean age of the participants was 69.3 (6.3) years. The prevalence of metabolic syndrome was 49.1% in male and 63.3% in female. The total prevalence of osteoporosis was 30.9% that in men this rate was 16.2% and in women was 44.7%. The prevalence of osteoporosis among subjects with metabolic syndrome was 28.9% and in subjects without metabolic syndrome was 33.2% (P=0.029). the mean TBS was 1.30 (0.11) that significantly differed between subjects with and without metabolic syndrome (1.32 vs. 1.28, P<0.001, respectively). In multivariable linear regression models, TBS was associated with MS (β = -0.059, P=0.002). Moreover, in logistic model osteoporosis was related to MS (OR=0.516, P<0.001) both models adjusted for age, sex, and smoking.

Conclusion: It seems that metabolic syndrome is a protective factor for osteoporosis while it causes to decrease the bone quality. Therefore, assessment of quality of bone by TBS is recommended strongly in subjects with MS.

P737

SARCOPENIA AND OSTEOPOROSIS IN CHINESE GERIATRIC HIP FRACTURE PATIENTS: PREVALENCE AND CORRELATION WITH DIFFERENT FACTORS AND FUNCTIONAL OUTCOME

Y. K. Lee¹, K. L. Tiu¹, W. Li¹

¹Orthopaedics and Traumatology, Queen Elizabeth Hospital, Hong Kong, Hong Kong, China

Objectives: Sarcopenia and osteoporosis were prevalent among geriatric patients. Osteoporosis put them at high risk of hip fractures after fall, while sarcopenia might hamper their rehabilitation after surgery. The purpose of this study was to determine the prevalence of sarcopenia in Chinese geriatric hip fracture patients, and the correlation of cortical thickness indices (CTI) with T-score by DXA. We also looked for any association between sarcopenia and various patient factors, as well as the functional outcome after rehabilitation.

Methods: In this retrospective observational study, data of 81 geriatric hip fracture patients admitted to Queen Elizabeth Hospital were studied. We measured relative appendicular skeletal muscle mass index (RASM) and T-scores with DXA, pre-morbid and end-of-rehabilitation functional status with the Barthel index (BI). Pearson's correlation was used to examine the correlation between RASM and other factors.

Results: Sarcopenia prevalence was higher in geriatric hip fracture patients than in community dwellers (Male: 67% according to the Asian Working Group for Sarcopenia (AWGS) algorithm (2014), 76% according to European Working Group on Sarcopenia in Older People

(EWGDOP) 2010; female: 40% and 45% respectively). RASM was positively correlated with body weight ($p < 0.01$), BMI ($p < 0.01$), and T-scores with statistical significance ($p = 0.001$ in T-score (LS spine), $p = 0.018$ in T-score (hip)). RASM was positively correlated with BI with statistical significance only in male group of patients ($p = 0.049$). No similar correlations were found in female group. RASM was also negatively correlated with length of stay in our locality, however, with no statistical significance. Length of stay was positively correlated with BI with statistical significance ($p = 0.031$). CTI had shown no correlation with T-score.

Conclusions: Geriatric hip fracture patients with risks factor such as low body weight and low BMI may benefit from early diagnosis and treatment of sarcopenia in order not to hamper their postoperative rehabilitation. Length of stay and functional outcome after rehabilitation appeared less affected by sarcopenic status, but more by other factors such as co-morbidities and carer availability. We do not recommend the CTI as a primary screening parameter to assess osteoporotic status in these patients. It is not a reliable substitute to DXA scan.

P738

THE CHANGE OF BMD AFTER ONE-YEAR ADMINISTRATION OF DENOSUMAB ANALYZED BY PRECEDING DRUGS AND MEASUREMENT SITES

N. Suzuki¹, S. Otsuka¹, M. Fukuoka¹, J. Mizutani¹, A. Kondo¹, T. Otsuka¹

¹Department of Orthopaedic Surgery, Graduate School of Medical Sciences, Nagoya City University, Nagoya, Japan

Objective: The effectiveness of denosumab has already been reported, but most of those are the results of introducing denosumab as the naive to osteoporosis. In clinical practice, some other osteoporosis treatments have already been installed before the administration of denosumab, especially after teriparatide and for the cases refractory to bisphosphonate. But the data accumulation is small how much denosumab increased the BMD in such non-naïve cases. The purpose of this study is to analyze the change of BMD by prior drug and measurement site after one-year administration of denosumab.

Methods: The cases who could continue to use denosumab more than one year were included in this study. Pretreatment drugs are classified as without pre-medication, after teriparatide (after tera), after bisphosphonate (after bis), after SERM, after active vitamin D (after active D) and the change of BMD after one-year denosumab administration was analyzed. The effect of premedication on BMD in lumbar spine and femoral neck was also analyzed.

Results: 135 patients fulfilled the criteria, 123 were females and the age was 73.9 years old on average. There were 49 cases without premedication, 38 cases after tera, 39 cases after bis, 3 cases after SERM, and 6 cases after active D. The increase of BMD after one-year administration of Denosumab was 5.0% without premedication, 4.5% after tera, 3.1% after bis, 4.3% after SERM and 4.6% after active D. In addition, the change of BMD divided by the measurement site was 7.5% for 27 without premedication lumbar spine, 1.6% for 21 without premedication femoral neck, 4.7% for 24 after tera lumbar spine, 4.0% for 14 after tera femoral neck, 3.0% for 32 after bis lumbar spine and 1.8% for 6 after bis femoral neck. The increase of BMD at without premedication lumbar spine and after tera femoral neck tended to be good.

Conclusions: As previously reported, the use of denosumab after bis is disadvantageous for increase of bone density. The change of femoral neck BMD after tera was quite good, suggesting that the order of those drugs use may important.

P739

POPULATION SCREENING TO RISK STRATIFY AND TARGET PRIMARY PREVENTION MEASURES FOR OSTEOPOROSIS IN PRIMARY CARE IN UK: A FEASIBILITY STUDY

S. K. Nedungayil¹, R. Azzam², S. Cooper², S. Davis³, M. Ninan⁴

¹Integrated MSK, Pain & Rheumatology Service, East Lancashire Hospital NHS Trust, Blackburn, ²Peel House Medical Practice, Accrington, ³Burnleywood Medical Practice, Burnley, ⁴Darwen Healthcare, Darwen, UK

Objective: Screening of patient-populations to identify people at high risk of osteoporosis and fragility fractures and target them with primary prevention measures.

Methods: 47988 primary care electronic patient records were analysed using computerised algorithms. Risk stratification was carried out using FRAX fracture probability tool (1). Patients with a high risk of osteoporosis and fragility fractures who met the NOGG criteria for treatment without the need for BMD measurement (2) were identified.

Results: 15201 (31.68%) patients met the criteria for the risk group of osteoporosis. Of this, 977 (6.4%) patients met the 'treat' criteria. 6363 (41.9%) patients fell into the 'assess' and 7727 (47.9%) were in the 'reassure' categories of NOGG guidance respectively. 3.8% of patients had incomplete records. 545 (3.58%) patients, at an average of 133 per practice, were identified as the high-risk cohorts for targeting primary prevention. The remaining (432) were already undergoing interventions for osteoporosis. Using scientific modelling (3) this approach estimates prevention of 31 hip fractures over four years.

Conclusion: Identifying patients in the 'treat' category for osteoporosis by using the FRAX tool is a cost-effective way of targeting primary prevention. Data can be captured, without physical screening of patients. The feasibility study has been able to establish that this approach would optimise treatment, reduce future fractures, not put additional pressures on manpower or material resources, and deliver cost-savings for health and social care budgets.

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P740

EVALUATION OF QUALITY OF LIFE AND PERSISTENCE TO TERIPARATIDE TREATMENT IN POSTMENOPAUSAL PATIENTS AFFECTED BY SEVERE OSTEOPOROSIS: A SINGLE CENTER RETROSPECTIVE ANALYSIS OF 10 YEARS

R. Guzel¹, I. Coskun Benlidayi¹, S. Inan², M. Evran³, S. Basaran¹

¹Cukurova University Medical Faculty Department of Physical Medicine and Rehabilitation, Adana, ²Dortyol Government Hospital Department of Physical Medicine and Rehabilitation, Hatay, ³Cukurova University Medical Faculty Department of Endocrinology, Adana, Turkey

Objective: Aim of this single center retrospective study was to evaluate the quality of life after 6 months of therapy with teriparatide (TPTD) and the persistence of patients to therapy.

Methods: A retrospective analysis was carried in our center in 2016 for all patients who had been commenced on Teriparatide since it was first licensed in Turkey in 2005. Data about the previous osteoporosis medications, fractures and the quality of life by Qualeffo after 6 months of therapy have been extracted from the patients' files. The patients have been contacted by telephone and interviewed about the effects of the treatment on a five point Likert scale, about the adverse events and persistence to therapy and the reasons of withdrawal.

Results: There were 215 patients commenced on TPTD in accordance to the Turkish reimbursement policies. 191 of them were postmenopausal women, 58 (30.3%) could be contacted by phone, 7 were dead during the 10 years period. Mean age for women was 74.6±5.9 (63-90), 96% had previous vertebral fractures, 4% had hip fractures, 17% had extremity fractures. 78% had been on bisphosphonates before TPTD. The decrease in the scores of pain, physical function, general health perception and mental health were statistically significant and total Qualeffo score decreased from 78.8 to 57.9 (p>0.05). On interview 84.5% had claimed that the therapy was effective on pain, 86.3% stated that the drug was easy to use, 77.6% found the treatment useful. The mean duration of treatment was 10.9±5.1 (1-18 months). 6% had stopped treatment in the first month due to side effects, 26% did not continue treatment after 6 months claiming that they were free of pain and did not need further treatment, 12% had stopped treatment with the recommendation of their primary care physician in 12 months, stating that DXA measurements were better and they did not have any new fractures.

Conclusions: Although TPTD treatment was effective in our patients, the persistence was low. These results suggest that different factors such as quality of information, frequency of special osteoporosis clinic visits and the knowledge of primary care physicians should be improved.

Disclosure: R Guzel has received speaker honoraria from Eli Lilly and Amgen.

P741

PAIN AND FUNCTIONAL OUTCOME WITH CARTILAGE REGENERATION IN PATIENTS WITH KNEE OSTEOARTHRITIS AFTER AUTOLOGOUS ADIPOSE TISSUE-DERIVED STEM CELLS THERAPY: A PHASE II RCT

M. R. Khasru¹, T. Marzen², M. N. Khandaker¹, M. Moniruzzaman³, A. K. M. Salek¹

¹Department of Physical Medicine and Rehabilitation, Banganbandhu Sheikh Mujib Medical University, ²Department of Gynaecology and Obstetrics, Dhaka Medical College, ³Department of Physical Medicine and Rehabilitation, Dhaka Medical College, Dhaka, Bangladesh

Osteoarthritis (OA) of the knee is one of the main causes of musculoskeletal disability. Because of limitations in the effectiveness of conventional management options, alternative options such as biological and regenerative methods are coming into vogue. The most recent knowledge regarding tissue biology highlights the potential use of specific growth factors as therapeutic proteins for cartilage repair, and this is now being widely investigated in vitro and in vivo. Nevertheless, the complex OA process involves interplay of several growth factors needed in joint homeostasis and cartilage metabolism. Adipose tissue is an excellent source of mesenchymal stem cells (MSCs) and can be easily obtained by performing liposuction. Autologous adipose SVF containing both stem cells and ECM can potentially be an excellent agent for cartilage regeneration. Adipose tissue SVF has been widely used in Korea over decades by plastic surgeons as a semipermanent volume expander. In June 2009, the Korean Food and Drug Administration (KFDA) had allowed adipose SVF to be used as a medical procedure when obtained and processed within a same medical facility with minimal processing. Many other studies have confirmed that autologous ADSCs in human adipose SVF are potential agents capable of regenerating cartilage in OA patients. Keeping in view these gray areas in our knowledge, this prospective clinical trial is designed to evaluate the role of adipose tissue derived stem cell therapy in knee OA and alopecia. A clinical trial will be conducted in the Centre for advance Biomedical Research, BSMMU, Dhaka for duration of one year. After proper evaluation and clinical examination patient will undergo study procedure and evaluated by selected assessment criteria. Purpose of this study is to find out the efficacy of adipose tissue derived stem cell therapy in patient with knee OA. This phase II pilot RCT is being conducted in the Physical Medicine and Rehabilitation (PM&R) Department of BSMMU after the IRB ethical clearance. All the patients attending PM&R Department having Knee Joint Osteoarthritis (Kellgren-Lawrence grade III & IV) will be the sample. Among them who fulfil the inclusion criteria will be selected as study subjects. Total 30 numbers of patients with OA of knee will be selected as per inclusion and exclusion criteria. Joint ultrasonography will be done to measure cartilage thickness for all respondents. All respondents will be divided into two groups by using randomization technique. Randomisation will be done by someone not associated with the care or assessment of the patients by means of a random number table. Allocations will be concealed in sequentially numbered, opaque, sealed envelopes. In group I (Control group) 15 patients will receive standard care for Knee Osteoarthritis and in group II, 15 patients will receive with autologous adipose SVF with calcium chloride-activated autologous PRP and HA at day 0. Subsequently, the patients will be returned to the clinic every week for 3 weeks for HA and autologous PRP activated with calcium chloride. A specifically developed assessment form/questionnaire are being used for data collection. All subjects are being enrolled after providing informed written consent. The patients are being assessed at the weeks of 2, 4, and 12 for pain improvement in terms of VAS and function improvement in terms of (Western Ontario and McMaster Universities Arthritis Index [WOMAC] scoring. In addition, these patients will be followed by post-treatment ultrasonography 3 months after the treatment. Each patient will enjoy every right to participate or refuse or even withdraw from the study at any point of time. Because we just started to enroll respondents, therefore, we could not analyze the gathered data for outcome. We will publish the results in future.

P742

DETECTING EPISTASIS WITHIN CHROMATIN REGULATORY CIRCUITRY REVEALS FRRS1L AS A NOVEL SUSCEPTIBILITY GENE FOR OSTEOPOROSIS

B. Yang¹, S. Yao², S.-S. Dong², Y. Guo², T.-L. Yang²

¹Department of Orthopaedics of the Shaanxi Provincial People's Hospital, ²Key Laboratory of Biomedical Information Engineering of

Ministry of Education, School of Life Science and Technology, Xi'an Jiaotong University, Xi'an, China

Objective: Genome-wide association studies (GWAS) have identified hundreds of susceptibility SNPs for osteoporosis. However, missing heritability problem is still a challenge and the ignorance of genetic interactions is an important cause. Current methods for detecting interactions always ignore regulatory elements in noncoding regions. In this study, we aimed to detect genetic interactions within chromatin regulatory for osteoporosis.

Methods: We used two in-house GWAS datasets to analysis the genetic interactions within chromatin regulatory for osteoporosis. The first dataset comprises 2286 unrelated US Caucasians of Northern European origin and the second dataset comprises 1627 unrelated Han Chinese individuals. Potential interacting SNP pairs were then obtained based on Hi-C datasets, PreSTIGE (Predicting Specific Tissue Interactions of Genes and Enhancers) algorithm, and super enhancer regions in osteoporosis relevant cells/tissues. SNP × SNP interaction analyses were then performed using linear regression in R after quality control. SNP quality control was performed with the following criteria: individual missing rate <5%, SNP call rate >95%, minor allele frequency (MAF) >5%, and Hardy-Weinberg equilibrium (HWE) P-value>0.001. SNP pairs with two SNPs in linkage disequilibrium (LD, $r^2>0.1$) with each other were removed.

Results: A total of 654,823 SNP × SNP analyses were performed. Meta-analyses showed that one SNP pair, rs4978747-rs999729 (combined $P=6.34 \times 10^{-8}$) was associated with hip BMD after multiple testing correction. Single SNP analyses did not show significant association signals for these two SNPs. In osteoporosis relevant cells, rs4978747 is located in intergenic enhancer, while rs999729 is located in the region of strong transcription of *FRRS1L*. Functional validation in the International Mouse Phenotyping Consortium database showed that *FRRS1L* was associated with bone mineral content ($P=0.02$).

Conclusions: We identified *FRRS1L* as a novel osteoporosis susceptibility gene through epistasis analyses within chromatin regulatory circuitry. We hope this method could facilitate the interaction analyses for other complex diseases and offer new insights into solving the missing heritability problem.

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P743

TREATMENT OF RHEUMATOID ARTHRITIS IN ELDERLY: DATA OF OBSERVATIONAL STUDY

M. V. Volkava¹, A. V. Kundzer²

¹Belorussian Medical Academy of Postgraduate Education, Cardiology and Rheumatology Department, ²Belorussian Medical Academy of Postgraduate Education, Minsk, Belarus

Objective: Every third patient with rheumatoid arthritis (RA) is a patient of old age. Diagnosis and treatment of these patients are accompanied by objective difficulties and requires additional effort from medical personnel. The purpose of this study was to determine the efficacy of RA treatment in the elderly.

Methods: Current study is observational with a retrospective analysis based on collection of information obtained from RA patients during their visit to the rheumatologist or the period of hospitalization in Rheumatology Department. During the examination doctors-rheumatologists filled out a specially designed card of examination of patients with rheumatoid arthritis (RA), approved by the Ministry of health of the Republic of Belarus. In total, 141 patients with RA aged 60 years and

older were enrolled in the study: 24 men (17.03%) and 117 women (82.97%). The median age of the patients was 68.51 years (95%CI: 66.00-68.53). All patients were divided into 2 groups depending on the age of onset of the disease: group I included the patients in whom RA occurred at age of 60 years and later, group II – patients who became ill with RA at age earlier than 60. The 1st group included 79 patients: 14 men (17.73%), 65 women (82.27%). The average age of the patients was 70.78±7.09 years. Mean age of RA onset in this group was of 67.81±6.40 years. Median period from the onset of the disease to the diagnosis was 7.00 months (95%CI: 3.35 – 12.00), median disease duration of RA was 36.00 months (95%CI: 20.34 – of 46.98).

62 patients were included in the 2nd group, among them 10 men (16.13%) and 52 (83.87%) women. The average age of these patients was 65.61±4.66 years. RA debuted at the age 51.50 years (95%CI of 49.00-55.26). The period from the first clinical manifestations to diagnosis verification was 12.00 months (95%CI: 6.00-12.00). The median disease duration of RA was 168.00 months (95%CI: 120.00-233.76). In the first group radiographic stage 0 was diagnosed in 1.26% of patients, I stage in 15.19% of patients, II stage – in 54.43% of patients, III stage in 18.99% of patients, IV stage in 10.02% of patients. In the second group I radiographic stage was detected in 4.84% of patients, II stage in 29.03%, III stage in 53.23%, stage IV in 12.9%. In the first group I functional class was observed in 20.25% of patients, functional class II in 70.89%, functional class III in 10.77%, IV functional class in 8.86%. In the second group I functional class was installed in the 20.00% of the patients, functional class II in 61.54%, functional class III in 10.77%, IV functional class in 7.69%.

Results: All available sDMARD were used for therapy of RA in both groups. Monotherapy with methotrexate was applied most often. Patients in both groups received low doses of methotrexate (<15 mg/week). When analyzing the frequency of use of glucocorticoids we found that >40% of patients in both groups regular took oral glucocorticoids. At the same time only 20.97% of patients received biological therapy in the 2nd group and 6.32% in the 1st group ($P<0.05$). A detailed description of RA therapy in both groups is presented in Table 1.

Table 1. Treatment of RA in elderly patients

Drug	1 group EORA	2 group YORA (60 year and older	Significance of difference
Without sDMARD, % of patients	15.19	6.45	$p>0.05$
Methotrexate, % of patients	70.89	80.65	$p>0.05$
Dosage of methotrexate, mg/week*	9.95 ±2.59	11.60±2.93	$p>0.05$
Sulfasalazine, % of patients	8.86	4.84	$p>0.05$
Leflunomid, % of patients	2.53	6.45	$p>0.05$
Hydroxychloroquine, % of patients	1.27	0.00	$p>0.05$
Combined therapy of sDMARD, % of patients	1.27**	1.61***	$p>0.05$
Glucocorticoids, % of patients	44.30	47.69	$p>0.05$
Biologics, % of patients	6.32	20.97	$p<0.05$

* - results are shown as mean±SD

** - methotrexate 10 mg/week + sulphasalazine 2 g/d;

*** - methotrexate 7.5 mg/week +leflunomid 20 mg/d

Despite the fact that >80% of patients in the 1st group and 90% patients in the 2nd group received DMARD treatment of RA, and >40% in both groups received glucocorticoids, the number of patients who achieved disease remission according to SDAI was quite low. However, in the 1st group the frequency of achieving remission was significantly higher (11.94%) compared to the 2nd group (1.61%; $p<0.05$). It should be noted that >30% of patients in the 1st group and 45% in the 2nd group had high degree of RA activity. Analysis of the effectiveness of therapy of RA is presented in Table 2.

Table 2. Efficacy of treatment in elderly patients

Disease activity by SDAI	1 group EORA, %patients	2 group YORA (60 year and older, %patients)	Significance of difference
Remission	11.94	1.61	$p<0.05$
Low disease activity	20.90	25.81	$p>0.05$
Moderate disease activity	34.33	24.19	$p>0.05$
High disease activity	32.84	48.39	$p>0.05$

Conclusions: Thus, >60% of elderly patients with RA did not reach the treatment goal - remission or low disease activity despite ongoing therapy with sDMARD and glucocorticoids. This indicates a lack of effectiveness in assessing the clinical state of these patients and consequently inadequate therapeutic strategy, which can require increase of sDMARD dose or use of the 2nd line drugs such as biological. Primarily because high activity RA in older patients leads to rapid occurrence of functional disorders and complications, such as osteoporosis, osteoarthritis, more severe manifestation of atherosclerosis and metabolic disorders. These factors significantly affect the patient's quality of life and lead to poor prognosis.

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EFFECT OF 12-WEEK BAREFOOT SHOES INTERVENTION FOR HALLUX VALGUS DEFORMATION

Q. C. Mei¹, L. L. Xiang², Y. D. Gu³, J. Fernandez⁴

¹Research Academy of Grand Health Interdisciplinary, Ningbo University,

²Faculty of Sports Science, Ningbo University, ³Research Academy of Grand Health Interdisciplinary, Ningbo University, Ningbo, China,

⁴Auckland Bioengineering Institute, University of Auckland, Auckland, New Zealand

Objective: Hallux valgus is a normal foot deformity, presenting a deviation of hallux to other toes and prominence of the first metatarsal distal head. Long-term ill-fitted shoes and high-heeled shoes wearing were previously established as a contributory factor. Barefoot populations presented significantly lower ratio of hallux valgus, which were believed to be the reason of little restriction from tight or sharp head shoes. The objective of this study was to analyse the foot shape and plantar loading changes after a 12-week barefoot shoes intervention.

Method: Twelve male participants volunteered to join the barefoot intervention project, all showing moderate hallux valgus deformity. Prior to the barefoot intervention, foot morphology were recorded via CT and foot surface scanning, and walking and running plantar pressure were

measured using EMED force plate. Participants were instructed to perform walking or jogging on treadmill using barefoot shoes (Five-fingers) three times a week for twelve weeks. Foot morphology and plantar pressure were measured after the 12-week intervention. Statistical analysis was performed using the OriginPro 2017.

Result: A significantly smaller hallux angle was observed after the barefoot shoes intervention. The first metatarsal-phalangeal angle showed a significant reduction to $14.57\pm 2.6^\circ$, with $p=0.02$. Peak pressure (456.87 ± 131.9 kPa) and force time integral (46.85 ± 16.9 Ns) to the first metatarsal showed significant ($p=0.01$ and 0.003) reduction from 574.79 ± 172.1 kPa and 67.27 ± 21.53 Ns after 12-week intervention.

Conclusion: Barefoot locomotion was reported to enable a motor adaptation over millions of years from an evolutionary perspective. Less restriction for unshod feet has been found with unique toes and forefoot shape and ambulatory functions. A twelve-week barefoot intervention in this study found that hallux valgus deformation presented altered foot shape and plantar loading distribution after unrestricted exercise. Barefoot shoes intervention altered the deformed foot shape and plantar loading in this preliminary study. Future study shall investigate the lower extremity biomechanics alterations.

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THREE DIMENSIONAL COMPARISONS BETWEEN QCTPRO AND MIAF FEMUR FOR THE PROXIMAL FEMUR MEASUREMENTS

L. Wang¹, O. Museyko², K. Brown³, X. Cheng¹, K. Engelke²

¹Department of Radiology, Beijing Jishuitan Hospital, Beijing, China,

²Institute of Medical Physics, University of Erlangen, Erlangen, Germany, ³Mindways Software, Austin, USA

Objective: Quantitative computed tomography (QCT) is commonly employed in research studies to measure BMD or structure parameters at the proximal femur for the assessment of bone fragility. However, compared to DXA, QCT is less standardized. The aim of this study is to compare the proximal femur measurements between QCTPro and Medical Image Analysis Framework (MIAF)-Femur in vivo.

Methods: QCTPro CTXA Hip and MIAF-Femur were used for the analysis of CT datasets from 155 subjects age 60-81 years (80 females and 75 males). Hip QCT scans were acquired at 120 kVp, 125 mAs, 1 mm slice thickness simultaneously with a Mindways calibration phantom. Integral, cortical and trabecular vBMD, volume, and bone mineral content (BMC) of the femur neck (FN), trochanter (TR), inter-trochanter (IT), and total hip (TH) volumes of interest (VOIs) were measured. As inconsistencies between cortical vBMD with aBMD were recently reported for QCTPro [1,2], so called raw data and data corrected for partial volume artifacts (corrected data) were both used for the comparisons with MIAF measurements.

Results: Correlations (R^2) of integral and trabecular bone parameters of all VOIs between QCTPro and MIAF ranged from 0.51 to 0.91. The correlations between QCTPro corrected cortical vBMD and MIAF were negative for TH, FN and IT VOIs, whereas QCTPro raw data correlated positively with MIAF measurements for all VOIs. Integral, cortical and trabecular vBMD values of all VOIs of QCTPro were higher than corresponding MIAF, except for FN and TR integral vBMD.

Conclusion: Integral and trabecular bone parameters are highly correlated between QCTPro and MIAF. With respect to volumetric cortical measurements it is recommended to use QCTPro raw data, because corrected data correlated negatively with MIAF cortical vBMD and as shown before with aBMD [2].

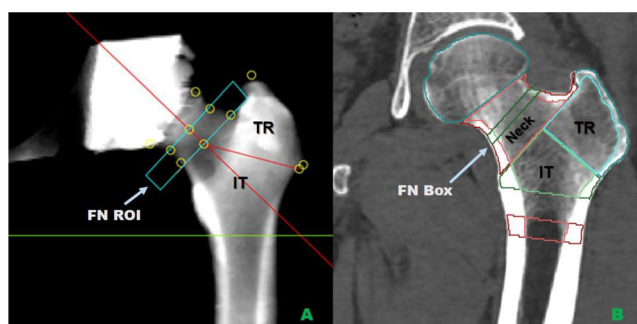


Table 1 Comparisons of vBMD parameters between QCTPro and MIAF Femur

VOI	Variable	CTXA (n=155)	MIAF (n=155)	Difference	R ²
Total Hip	IntgBMD	265.53+ 45.62	242.19+ 41.98	23.34	0.72
TrabBMD		147.75+ 22.31	94.02+ 31.95	53.73	0.74
CortBMD		833.96+ 65.19	532.55+ 64.76	301.41	0.05
Femoral Neck	IntgBMD	267.19+ 48.48	289.44+ 56.27	-22.25	0.79
TrabBMD		153.9+ 27.59	107.4+ 43.24	46.50	0.67
CortBMD		815.6+ 58.81	576.51+ 73.2	239.09	NS
Trochanter	IntgBMD	178.42+ 35.97	200.42+ 38.27	-22.00	0.79
TrabBMD		147.17+ 22.22	78.2+27.64	68.97	0.70
CortBMD		616.74+ 47.69	426.43+ 68.43	190.31	0.23
Intertrochanter	IntgBMD	320.21+ 56.16	258.91+ 50.15	61.30	0.65
TrabBMD		147.09+ 24.48	96.64+ 35.58	50.45	0.77
CortBMD		872.32+ 69.59	648.45+ 77.33	223.87	0.13

All differences (P<0.01). QCTPro CortBMD referred to Raw data.

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P746

KNEE OSTEOARTHRITIS AND PLATELET-RICH PLASMA TREATMENT: HOW TO IMPROVE THE EFFICACY?

C. Milants¹, O. Bruyère², J. F. Kaux¹

¹University and University Hospital of Liège, ²University of Liège, Liège, Belgium

Objective: Knee osteoarthritis (OA) is one of the major causes of pain and physical disability in older sportsmen. The management of chondral disease is challenging because of its inherent low healing potential. New studies have focused on modern therapeutic methods that stimulate cartilage healing process and improve the damage, including the use of

platelet-rich plasma (PRP), an autologous growth factor treatment. PRP is prepared from autologous blood by centrifugation to obtain a highly concentrated sample of platelets, which is four to five times higher than that of normal blood. Many papers were published on PRP for knee OA, including a lot of randomized controlled trials (RCTs) and different systematic reviews. Due to the mixed results from controlled studies, the clinical efficacy of PRP in the treatment of knee OA is unclear with shortcomings in the current literature. The objective of this study was to evaluate the similarities and differences between the variety of PRP formulations, preparation, and uses of this techniques in literature and to try to determine characteristics of the PRP which tend to give the best responses for the treatment of knee osteoarthritis.

Methods: A comparison of the outcomes of randomized controlled trials (RCTs) included in the 3 most recent and high-quality meta-analyses to classify the different studies in 2 groups (bad responders group (BRG) and very good responders group (VGRG)). The minimal clinically important improvement (MCII) was defined to help determining whether an observed difference is clinically important. We used MCII values to classify the different studies in 2 groups depending on the outcomes: BRG<MCII and VGRG>2xMCII.

Results: From the 19 RCTs analyzed, 7 trials were included in the VGRG and 4 in the BRG. In VGRG, 1 or 2 injections were performed in 4/7 trials, time between injections was 2 to 3 weeks in 4/5 studies with many injections, volume injected varied from 2.5 to 8 mL, and single spinning technique was used in 5/7 studies. PRP classification was Mishra 4B and PAWP2B/β in 5/7 studies. The use of PRP with leukocytes is only found in the BRG.

Conclusion: There is a lack of standardization in PRP preparation technique for knee osteoarthritis. However, our study helped identify features of PRP recommended for knee OA treatment, such as the use of a single spinning technique, a platelet concentration lower than 5 times the baseline (from 3 to 4), and avoiding leukocytes and erythrocytes. We recommend leveraging this information about PRP for future studies.

P747

CHRONIC TENDINOPATHIES AND PLATELET-RICH PLASMA TREATMENT: HOW TO IMPROVE THE EFFICACY?

J. F. Kaux¹, T. Emonds-Alt²

¹University and University Hospital of Liège, ²University Hospital of Liège, Liège, Belgium

Objective: Platelet-rich plasma (PRP) is blood plasma with a high concentration of autologous platelets which constitute an immense reservoir of growth factors. The clinical use of PRP is widespread in various medical applications. Although highly popular with athletes, the use of PRP for the treatment of tendinopathies remains scientifically controversial, particularly due to the diversity of products that go by the name of "PRP". This may partly explain the disparity of results obtained in the literature. The objective of this study was to evaluate the similarities and differences between the variety of PRP formulations, preparation, and uses of this techniques in literature and to try to determine characteristics of the PRP which tend to give the best responses for the treatment of knee osteoarthritis.

Methods: In a literature review, we take a closer look at eight parameters which may influence the quality of PRP: 1) anticoagulants used to preserve the best platelet function, 2) the speed of centrifugation used to extract the platelets, 3) the platelet concentrations obtained, 4) the impact

of the concentration of red and white blood cells on PRP actions, 5) platelet activators encouraging platelet degranulation and, hence, the release of growth factors, and 6) the use or nonuse of local anesthetics when carrying out infiltration. In addition to these parameters, it may be interesting to analyze other variables such as 7) the use of ultrasound guidance during the injection with a view to determining the influence they have on potential recovery.

Results: Analysis of the 59 studies shows that a majority use ACD-A as an anticoagulant during sampling. A platelet activator (calcium chloride) is only used in a few studies. However, the best results have been obtained in studies which use no platelet activator. In terms of the speed of centrifugation, analysis of all these studies appears to confirm the existence of a great number of protocols in the literature. It is difficult to draw any conclusions when these different variables are unknown (volume of initial sample, equipment used to obtain the PRP). Currently, no studies have been carried out neither on the use of a “buffer” product to neutralize the acidity caused by the anticoagulant nor on the optimal volume of PRP to be injected. Although it would appear inadvisable to administer a local anesthetic because the anesthetic may reduce the local pH and lead to the inhibition, reduction, or absence of platelet degranulation, the literature shows that the majority use a local anesthetic. They do not, however, obtain better results than those not using a local anesthetic. Finally, it appears to be advisable to carry out infiltration under ultrasound guidance, even if PRP diffusion is observed after injection. This all aims to show that there is still a need for high quality studies, with standardized collection protocols and the use of PRP in the context of tendinopathies, in order to better scientifically understand the real effectiveness.

Conclusion: There is a lack of standardization in PRP preparation technique for chronic tendinopathies. However, our study helped identify features of PRP recommended a platelet concentration lower than 5 times the baseline (from 3 to 4), and avoiding leukocytes and erythrocytes. We recommend leveraging this information about PRP for future studies.

P748

EFFECTS OF 12 MONTHS OF RESISTANCE TRAINING VS. ENDURANCE TRAINING ON BMD, HIP GEOMETRY INDICES AND TRABECULAR BONE SCORE IN A GROUP OF YOUNG OVERWEIGHT MEN

R. El Hage¹, C. El Khoury¹, A. J. Berro¹, A. Khawaja¹, G. Maalouf²

¹Department of Physical Education, Faculty of Arts and Social Sciences, University of Balamand, El-Koura, Kelhat, Lebanon, ²Bellevue University Medical Center, Faculty of Medicine, Saint Joseph University, Mansourieh, Lebanon

Objective: To analyze the effects of two different training protocols on body composition, bone mineral content (BMC), BMD, geometric indices of hip bone strength, composite indices of femoral neck strength and trabecular bone score (TBS) in a group of young overweight men.

Methods: Forty-two young overweight men (BMI >25 kg/m²) whose ages range from 18-32 years were randomly assigned to resistance training group (RTG), endurance training group (ETG), or a control group (CG). The experimental groups performed incremental training for 12 months, three sessions per week. Weight, height, body composition, BMC, BMD, trabecular bone score (TBS), geometric indices of hip bone strength (cross-sectional area (CSA) and strength index (SI)), maximal strength and maximal aerobic velocity were measured before and after the training period. Composite indices of femoral neck (FN)

strength (Compression strength index (CSI), bending strength index (BSI) and impact strength index (ISI)) were calculated before and after the training period as previously described [1].

Results: Both experimental groups (RTG and ETG) showed significant decreases in weight, BMI, fat mass and fat mass percentage. Both experimental groups (RTG and ETG) showed significant increases in CSI, BSI and ISI values. RTG showed significant increases in maximal strength, maximal aerobic velocity, whole body BMC, lumbar spine (L1-L4) BMD, TBS and SI. ETG showed significant increases in maximal aerobic velocity and L1-L4 BMD but a significant decrease in whole body BMC. CG did not show any significant changes in bone variables. RTG showed the highest improvements in bone variables and muscular strength.

Conclusion: The present study shows that resistance training is an effective method to decrease fat mass and to increase BMD, trabecular bone score and composite indices of femoral neck strength in young overweight men.

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P749

NEW POSSIBILITIES FOR THE ESTIMATION OF RHEUMATOID ARTHRITIS TREATMENT EFFICIENCY

E. E. Mozgovaya¹, S. A. Bedina¹, A. S. Trofimenko¹, I. A. Zborovskaya¹

¹Federal State Budgetary Institution «Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy», Volgograd, Russia

Objective: To evaluate the possibility of using the enzymatic tests for the estimation of efficiency therapy in rheumatoid arthritis (RA) patients.

Methods: 150 RA patients and 30 healthy controls were included in our study. Mean age of patients (±SD) was 42.2±3.5 years, mean RA duration (±SD) was 10.8±2.3 years. The diseases were diagnosed in accordance with ACR criteria (1987). The activity of RA was determined according by Disease Activity Score (DAS-28). Low activity had 31 (20.67%), moderate activity - 99 (66%), high activity - 20 (13.33%) RA patients. The effectiveness of complex therapy in RA after the course of hospital treatment was evaluated according to the EULAR criteria. Adenine deaminase (AD), adenosine deaminase (ADA), AMP deaminase, guanine deaminase (GDA), guanosine deaminase (GSDA), guanosine phosphorylase (GP), xanthine dehydrogenase, xanthine oxidase, 5'-nucleotidase, purine nucleoside phosphorylase (PNP) activity, ADA-2, PNP-2 isoforms were determined in blood serum.

Results: We revealed the substantial changes of purine metabolism enzymes activity in RA. The increased AD (p<0.05), GDA (p<0.001), GP (p<0.001), PNP (p<0.001) activities, ADA-2 (p<0.001) and PNP-2 (p<0.001) isoforms, the decreased GSDA (p<0.001) activity in blood serum were observed in RA patients in comparison with healthy controls. Dynamics of ADA, 5'-nucleotidase, PNP activities and ADA-2, PNP-2 isoforms demonstrated correlation with dynamics of an estimation of a health state (on VAS), number of painful joints, time of morning constraint, ESR, index DAS-28.

Conclusion: The enzymatic tests based on determine of activity and isoforms of some purine metabolism enzymes in blood serum can be used as auxiliary markers in estimation of efficiency RA therapy.

P750

INFLUENCE OF DIFFERENT HEEL MIDSOLE STRUCTURE ON THE IMPACT LOADING OF BADMINTON LUNGE

L. Yu¹¹Loudi Vocational and Technical College, Loudi, China

Objective: Badminton lunge enables players to rapidly move directions, control motor segments to finish shuttle return, and form a stable base for the next movements. Efficient footwork contribute to moving the best position executing shots and also maintaining good balance and body control. Athletic footwear can help improve lunge performance, prevent excessive load and potential injuries with shock attenuation properties and stability control. This study aimed to investigate the effect of different heel midsole structure on the lower extremity biomechanics while performing badminton lunge.

Methods: Ten male badminton athletes participated in this study. Two badminton shoes, one with soft midsole design, the other without any soft design to the heel region, were used for this study. VICON Motion System (200 Hz) were used to capture the kinematic data of lunge movements and Kistler force platform (1000 Hz) was used to measure the three-dimensional ground reaction forces (GRF) of the right foot. The biomechanics, including GRF, ankle inversion/eversion angle and knee flexion/extension angle, of right forward lunge movement were analysed.

Results: The soft heel midsole badminton shoe had smaller peak force than non-soft shoe. The ankle angle of soft midsole shoes was smaller compared with non-soft shoe. In addition, knee angle was found to be smaller for soft midsole shoes than non-soft shoes in right hand forward lunge footwork. According the results, it was suggested that the soft midsole shoe design has positive effect on lower limb kinematic and kinetic in badminton lunge movements. Future studies shall focus on the joint loading and muscle activities while performing badminton footwork with different footwear design.

Conclusion: Footwear material and structural properties can be optimized to attenuate external impact forces, which are the potential factors leading to badminton musculoskeletal injuries.

P751

EPIDEMIOLOGY OF OSTEOARTHRITIS IN KAZAKHSTAN (2011-2015)

B. Issayeva¹, M. Saparbayeva¹, S. Issayeva¹¹Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

Objective: To assess the dynamics of total and first-ever occurrences of osteoarthritis (OA) in Kazakhstan for period of 5 years (2011-2015).

Methods: We used statistical reports of the Ministry of healthcare of Kazakhstan on the health of the population (MedInform, form No. 12).

Results: The analysis revealed an increase of total occurrences of OA in the population of Kazakhstan from 44 808 in 2011 to 107 426 in 2015: among women from 29 086 to 73 454 (the growth rate amounted 140% and 152%, respectively). There was an increase in the number of patients for the analyzed period with first-ever diagnosed OA from 13 169 to 37 768: among women – from 7 965 to 25 691 (the dynamics of growth 187% and 222%, respectively). The overall incidence of OA in Kazakhstan were 268.7; 365.4; 414.7; 444.4; 612.3 per 100 000 people (here and hereinafter the data for 2011-2015). High indicators of first-ever incidence (79; 98.1; 137.4; 149.8; 215.3 per 100 000 people, respectively) were registered.

Conclusion: High dynamics of growth of total and first-ever occurrences of osteoarthritis in population of Kazakhstan for period of 5 years were marked, which indicates the importance of the problem.

P752

THE KNOWLEDGE ON OSTEOPOROSIS AMONG THE STUDENTS OF UNIVERSITIES IN LUBLIN (SOUTHEASTERN POLAND)

D. Żolnierczuk-Kieliszek¹, T. B. Kulik¹, M. Janiszewska¹, A. Zdunek²¹Medical University of Lublin, Faculty of Health Science, Public Health, Lublin, ²St Sophia Hospital in Warsaw, Błonie near Warsaw, Poland

Objective: The main aim of the study was to evaluate the level of knowledge on osteoporosis among the university students in Lublin (southeastern Poland).

Methods: The research was carried out by means of a survey method, a poll technique. Osteoporosis Knowledge Test by Phyllis Gendler (OKT revised 2011) was used as a research tool. An original questionnaire with questions about socio-demographic data and the students' knowledge on osteoporosis was also used. The study was conducted from August to October 2014. The study involved 120 students of Lublin universities, including 40 students of the Medical University of Lublin, 40 students of the University of Maria Curie-Skłodowska University and 40 students of the Lublin University of Technology. The purposive sampling was used. The obtained material was subjected to descriptive and statistical analysis. Chi², Kruskal-Wallis, Mann-Whitney, Shapiro-Wilk tests and Spearman's rank correlation coefficient were all applied. A statistical significance level was set at $\alpha=0.05$.

Results: Students had insufficient knowledge about osteoporosis. The arithmetic mean of the OKT score was 14.6 (maximum score 32). The biggest deficit of knowledge occurred on physical exercise in the osteoporosis prevention. Students of the Medical University of Lublin presented a significantly higher level of knowledge when compared with other students. No significant differences were found between the students' age, gender, domicile, the current whereabouts and their knowledge on osteoporosis. As many as 67.5% of respondents declared negligible knowledge on osteoporosis and gladly would learn more on this topic. Almost half of the respondents (44.2%) obtained information on osteoporosis from the Internet, 27.5% indicated on the information provided during the classes at the university, 14.2% for information from specialist books on osteoporosis, 14.2% obtained this knowledge from articles in the women's magazines, 11.6% used educational programs. A small group of respondents gained knowledge about osteoporosis from magazines and brochures for patients (4.2%) as well as from health professionals - doctors, nurses, midwives (2.5%).

Conclusion: There is the need of promoting knowledge on osteoporosis among the students of Lublin universities.

P753

ADRENAL CRISIS AFTER FIRST INFUSION OF ZOLEDRONIC ACID: A CASE REPORT

M. Smrečnik¹, Z. Kavcic Trsinar², T. Kocjan³¹General Hospital Novo Mesto, Novo Mesto, ²General hospital Brezice, Brezice, ³University Medical Centre Ljubljana, Dept. of Endocrinology, Diabetes and Metabolic Diseases, Ljubljana, Slovenia

Patients with Addison's disease are at greater risk of having reduced BMD and hip fractures and are thus more likely to receive a

bisphosphonate than their peers. Potent intravenous bisphosphonates could provoke an acute phase reaction.

Clinical case: An 80-year old female with Addison's disease received her first infusion of zoledronic acid for osteoporosis at our outpatient clinic around noon. Despite doubling her usual afternoon hydrocortisone dose, she became feverish, nauseous, extremely weak, and hypotensive over the night. When transported to the nearest general hospital the next morning, the patient was found to have signs of hypovolemic shock and she was admitted to the ICU. Crystalloid infusion, followed by dobutamine and norepinephrine drip, had no effect. Only after her European emergency card for glucocorticoid cover was found, adrenal crisis was recognized, and she was immediately given an intravenous bolus of hydrocortisone followed by continuous hydrocortisone infusion. The patient's condition rapidly improved and she was transferred to a regular ward the next day, where hydrocortisone dose was gradually tapered.

Conclusion: Our experience suggests that patients with Addison's disease should probably receive zoledronic acid in a hospital setting. Their usual oral dose of hydrocortisone should be doubled or even tripled. Careful monitoring of these patients seems to be warranted, and intravenous hydrocortisone should be given if any symptoms or signs of the imminent adrenal crisis are noted.

P754

REACTIONS TO IMPAIRMENT AND DISABILITY AND SELF-ESTIMATION OF HEALTH STATE IN PATIENTS DIAGNOSED WITH OSTEOPOROSIS

M. Janiszewska¹, T. B. Kulik¹, D. Żołnierczuk-Kieliszek¹, S. Bączkowska²

¹Medical University of Lublin, Faculty of Health Science, Public Health,

²The Graduate from Medical University of Lublin, Faculty of Health Science, Public Health, Lublin, Poland

Objective: To determine the relationship between chosen sociodemographic features as well as self-assessment of health state and reactions to impairment and disability in patients diagnosed with osteoporosis.

Methods: The research was carried out by means of a survey method, a poll technique. Impairment and Disability Inventory – RIDI H. Livneh and R. F. Antonak - Polish Adaptation by Kirenko and Byra was used as a research tool. An original questionnaire was also used.

The study comprised 145 patients diagnosed with osteoporosis. The study was conducted from February to April 2016 in health care centres in Lublin, a city in south-eastern Poland: Regional Specialist Hospital, Private Health Care Centre REUMED and Private Health Care Centre VIS VITALIS. The purposive sampling was used. The obtained material was subjected to descriptive and statistical analysis. Chi², Kruskal-Wallis, Mann-Whitney, Shapiro-Wilk tests and Student's t-test as well as Spearman's rank correlation coefficient were all applied. A statistical significance level was set at $\alpha=0.05$.

Results: A correlation between the self-estimation of health state and reactions to impairment and disability was found. The better the self-estimation of health state the higher denial and adjustment, the lower shock, anxiety, depression, internalized anger, externalized hostility as well as acknowledgement. The strongest correlation was found between the self-estimation of health state and externalized hostility. Elderly respondents presented worse adaptation to osteoporosis showing anxiety, internalized anger, shock, externalized hostility as well as estimated their health state as worse. Permanent country dwellers were characterized by significantly higher shock, anxiety, depression and externalized hostility.

Conclusion: The meetings of patients suffering from osteoporosis could be helpful in better adaptation to the disease. The patients could exchange their experiences and support each other. Chats, eating together, exercising together could change patients' feeling towards their disease. Permanent country dwellers who experience difficulties in adapting to osteoporosis have greater need for such meetings. Doctors and nurses should encourage their patients to take part in such meetings.

P755

AN UNUSAL ASSOCIATION OF RELAPSING CHONDRIITIS, UVEITIS AND PEMPHIGUS

Y. Cherif¹, M. Mrouki¹, Z. Haj Ali¹, F. Ben Dahmen¹, R. Kort², M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, ²External consultations department, regional hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Pemphigus vulgaris (PV) is an autoimmune disease of the skin and mucosa characterized by antibodies directed against desmoglein 3. Oral lesions represent the initial feature of PV in 50–70% of cases. Bone, skeletal and cartilaginous involvement is uncommon in cases of PV. Chondritis is characterized by the presence of progressive inflammation and destruction of cartilaginous tissues. We herein report a case of pemphigus vulgaris associated with chondritis.

Case report: A 52-year-old woman with a 5 years history of bilateral uveitis, swelling in both ears and recurrent mouth ulcers was admitted to our Department of Internal Medicine. He had no past history of infectious or autoimmune diseases. In the outpatient clinic, RP was suspected. Physical examination showed swelling of ears sparing the earlobes, mouth and vulvar erosive and patch ulcers. Her ears were warm and painful. However, no abnormal findings were observed in the heart, abdomen, joints or lungs, including airway stenosis. Laboratory assessment revealed a high level of serum CRP at 39 mg/dL and antinuclear and anti-neutrophil cytoplasmic antibodies were negative. Serological screening such as syphilis, herpes virus simplex and HIV was negative. Other exams, including chest x-ray, echocardiogram, complete blood count, and abdominal ultrasound were all within normal ranges. Histopathological examination of mouth and vulvar ulcers revealed parakeratinized stratified squamous epithelium with intra-epithelial blister formation with a thick area of fibrinous exudate and deposits of IgG and C3 complement. Based on the histopathological findings, the diagnosis of pemphigus vulgaris associated with chondritis was made. Topical analgesic mouthwash was prescribed to our patient. Then, ulcers had reduced.

Conclusion: Clinical, immunological, and histological features were consistent with the diagnosis of typical PV in our patient. To our knowledge, PV associated with chondritis was not reported in the literature. This link between pemphigus and chondritis is unclear. Other reports are necessary to confirm and better understand this link.

P756

ANTI SIGNAL RECOGNITION PARTICLE ANTIBODIES: NOT THAT BAD OUTCOME!

Y. Cherif¹, M. Mrouki¹, R. Amri², F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, ²Tahar Maamouri Hospital, Nabeul, Internal Medicine Department, Nabeul, Tunisia

Objective: Anti signal recognition particle (SRP) antibodies are usually associated with immune-mediated necrotizing myopathy (IMNM) and severe manifestations hardly controlled by multiple immunosuppressive agents. Herein, we report the case of three patients with anti-SRP antibodies with no severe clinical features.

Methods: All Three patients were women aged respectively 21, 52 and 62 years old. The main complaint for the first patient was vascular purpura of the lower limbs, oligoarthritis and erythematous papules over the 3rd and 4th metacarpophalangeal joints. There were no muscular weakness or dysphagia. Creatine kinase (CK) was mildly elevated to 188 UI/l. Anti-nuclear antibodies (ANA) were positive (1/160) with anti JO1 and anti-SRP antibodies. ANCA and cryoglobulinemia were negative. There were no cardiac, pulmonary or esophageal involvement. The diagnosis of myositis with anti-SRP antibodies was assessed in the second patient over walking trouble, proximal muscle weakness, involvement of the diaphragmatic muscle, elevated CK (6540UI/l) and confirmed by EMG and muscle biopsy. ANA were negative and anti-SRP antibodies were positive. The third patient had been followed for systemic sclerosis (SSc) with Raynaud phenomenon, digital ulcerations, esophageal involvement and pericarditis for two years. During follow up a systematic immunological test was performed, anti-SRP was screened and confirmed over a particular cytoplasmic aspect of fluorescence. Initially, there were no muscular complaints, CK was normal. Three months after anti-SRP screening results, the patients developed proximal muscular weakness, CK raised to 1999UI/l and muscle biopsy showed necrotizing myopathy. In all cases, there were no malignancies associated.

Results: In the absence of myopathy manifestation in the 1st patient, she is followed-up at present without any treatment; the second and the 3rd patient (even though she had SSc) were treated with oral prednisone 1mg/Kg/d with progressive tapering associated to methotrexate 20 mg/week. The clinical evolution was favorable for both patients respectively in 6 months and 10 weeks.

Conclusions: Anti-SRP antibodies have been described to be closely associated to severe and lethal manifestation. However, our three cases illustrate the fact that these antibodies may have different and heterogeneous clinical features and not always with severe and lethal outcome. A close follow-up is needed to set the treatment at the right time.

P757

BONE LOSS IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES IN A NORTH AFRICAN POPULATION: A COMPARATIVE STUDY

Y. Cherif¹, M. Mrouki¹, H. Ajlani², Z. Tayeb¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, ²External Consultations Department, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Chronic inflammatory rheumatic diseases are at high risk of bone fragility either by the disease itself or secondary to the therapeutic used. This study aimed to determine the prevalence of bone loss in patients with ankylosing spondylitis (AS) and rheumatoid arthritis (RA) and its risk factors.

Methods: A comparative study was carried out between patients meeting the ACR criteria for RA and patients who met the

Modified New York Classification criteria for AS. The patients were matched by sex and age. BMD was measured in both groups by DXA method at femoral neck and lumbar spine. A statistical study was used to assess the correlation between BMD and anthropometric features, hormonal status, ESR, CRP and the treatment used in each group.

Results: The study included 30 patients with RA and 30 patients with AS. The mean age was, respectively, 45.23±11.75 years and 45.16±11.49. Both groups comported 15 men and 15 women. The mean follow-up was 6.9 years for RA group and 12.63 years for AS group (p=0.04). 10% of women in each group were postmenopausal. The mean CRP and ESR levels were significantly higher in RA group (ESR: 48.7mm in RA vs. 39.8mm in AS; CRP: 22.9 mg/l in RA vs. 13.1 mg/l in AS; p=0.03). 73.3% of RA patients were treated with corticosteroids (CS). Mean BMD was significantly lower in RA patients at both femoral (p<0.001) and lumbar sites (p=0.01). Osteoporosis and osteopenia were more frequently found in RA patients respectively in 36.7% vs. 26.7% and 50% vs. 36.7%. Elevated ESR and BMI were significantly correlated to bone loss in both RA and AS groups.

Conclusion: Bone loss in chronic inflammatory rheumatic diseases is an early complication secondary to the disease itself and contributes to its severity. It is also related to several other facts such as corticosteroids and inflammation. All risk factors of bone loss are important to screen for in order to prevent osteopenia or osteoporosis and improve the course of the diseases and the quality of life.

P758

HEADACHE, WHAT IF THE BONE WAS THE GUILTY?

Y. Cherif¹, M. Mrouki¹, E. Gharbi¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Chronic headache is a common complaint in everyday practice often neglected by the practitioner especially in older patients. Secondary headaches should be differentiated from primary headaches in order to set the right treatment. We, herein, report the case of a patient experiencing persistent headache secondary to Morgagni-Stewart-Morel Syndrome.

Methods: A 65-year-old postmenopausal woman was followed-up for a poorly controlled type 2 diabetes, arterial hypertension for 20 years, and thyroid disorders for which she underwent a thyroidectomy 4 years ago. She was referred for a persistent headache failing to respond to paracetamol. On examination, she was obese and had a prominent forehead. There were no abnormalities on neurological examination. Cranial X-ray showed a thickening of the frontal bone. The cranial CT-scan confirmed the diagnosis of type D hyperostosis frontalis interna (HFI). She had no psychiatric or cognitive impairments.

Results: Insulin therapy and hygeno-dietetic measures were set for this patient to control diabetes and help lose weight. Anti-hypertension treatments were reinforced and paracetamol with caffeine was administrated with a partial improvement. NSAIDs could not be used due to arterial hypertension.

Conclusion: HFI is an asymptomatic condition of the cranial bone. It, usually, occurs in postmenopausal women in isolation or associated with numerous conditions such as endocrine disturbances, diabetes, obesity and hirsutism. In our case, symptoms may be related to large and extensive bony nodules, which compressed the brain.

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IMPACT OF RHEUMATOID ARTHRITIS ON BONE LOSS: A CROSS-SECTIONAL STUDY IN A NORTH AFRICAN WOMEN POPULATIONY. Cherif¹, M. Mrouki¹, H. Ajlani², S. Hamrouni¹, F. Ben Dahmen¹, M. Abdallah¹¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, ²External Consultations Department, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Rheumatoid arthritis (RA) is the most frequent chronic inflammatory rheumatic disease that not only causes bone and cartilage destruction but also is known to be an independent risk factor of osteoporosis. This study aims to evaluate the prevalence of osteoporosis and to assess the other risk factors of bone loss in a North African population with RA.

Methods: A comparative cross-sectional study was carried out in a North African women population between randomly identified healthy women matched by age to patients followed-up for RA. BMD was measured using DXA images at the femoral neck and the lumbar spine. BMD was correlated to postmenopausal status, disease activity and treatment.

Results: The study included 140 women who met the ACR criteria for RA and 140 healthy women. Mean age in RA group was 54.7±12.9 years. The mean duration of the disease was 10.8±8.4 years. RA was seropositive in 66.9% of patients. 54.3% of women were postmenopausal. 80% were treated with methotrexate and 87% used corticosteroids. Osteoporosis was noted in half RA patients and osteopenia in 32.3%. BMD was normal in 17.7% of RA patients. Compared to the control population, the BMD was significantly lower in RA group in both femoral ($p<0.001$) and lumbar ($p<0.001$) sites. The age of the onset of the disease, the age of menopause and BMI were significantly correlated to osteoporosis.

Conclusion: Bone loss in RA is multifactorial. It is secondary to chronic inflammation, the course of the disease itself, the hormonal changes and the different treatments used. The early management of the disease and the control of the inflammatory state should permit osteoporosis prevention.

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MEDIASTINITIS DUE TO SEPTIC ARTHRITIS OF THE STERNOCLAVICULAR JOINT: A CASE REPORTY. Cherif¹, M. Mrouki¹, F. Ben Dahmen¹, A. Merghni², S. Mezghani³, M. Abdallah¹¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, ²Department of Heart and Thoracic Surgery, Abderrahmen Mami Hospital, Tunis, ³Department of Radiology, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Mediastinitis is a life-threatening infection of the mediastinum. It is usually associated with cardiac surgery, oesophageal perforation, dental causes and cervicofacial cellulitis. Purulent mediastinitis secondary to septic arthritis of sternoclavicular joint (SCJ) is scarce. We report a new case of mediastinitis in a diabetic patient.

Case report: A 52-year-old diabetic woman was admitted in our Department of Internal Medicine for a second episode of urinary tract infection. Apart from a 5-year history of diabetes mellitus controlled by diet and insulin, the patient was in good health. She was treated with ciprofloxacin and gentamycin daily. The clinical course was initially good and the patient was afebrile from the third day of onset of antibiotic

treatment. However, laboratory assessment showed a persistent inflammatory biological syndrome and leukocytosis with an elevated neutrophils count of 13560/mm³. A week after, the patient complained of severe tenderness, redness and swelling over her left SCJ with fever. The chest X-rays showed a left-sided pleural effusion. Pleural puncture was performed. The analysis of pleural effusion fluid detected an increased number of white cells of 530000/mm³ and thoracic ultrasound highlighted an abscess and erosion of the SCJ. A CT scan revealed thoracic empyema and mediastinitis. Thus, a diagnosis of mediastinitis due to a septic arthritis of SCJ was established. Our patient was taken for thoracic surgery and the entire left SCJ was resected. Cultures of purulent soft tissue grew out streptococcus agalactiae and β -hemolytic streptococcus. Otherwise, the patient was given colimycin and ciprofloxacin during 4 weeks with clinical improvement. No recurrence was noticed 2 months after hospital discharge.

Conclusion: Mediastinitis due to septic arthritis of SCJ is rarely described. As in our case, the diagnosis can be difficult due to misleading clinical history and radiological findings. Diabetes mellitus, as in our case, has been reported to be the most frequent predisposing factor. SCJ arthritis is caused most commonly by *Staphylococcus aureus*. No case of mediastinitis due to *Streptococcus agalactiae* is reported. Resection of SCJ with mediastinal debridement and suitable antibiotics may be the best approach to treat these cases.

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CHANGES OF BONE METABOLISM: DO NOT FORGET CONNECTIVE TISSUE DISEASEY. Cherif¹, Z. Tayeb¹, M. Mrouki¹, H. Mejri², F. Ben Dahmen¹, M. Abdallah¹¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, ²External Consultations Department, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Osteomalacia corresponds to a decrease in mineralization of newly formed bone. Hypophosphatemia represents one of the most frequent reason. Tubulointerstitial nephritis (TIN) can lead to an increase in urinary phosphate excretion. We report the case of a female diagnosed with multiple autoimmune syndrome (MAS) and who developed osteomalacia.

Case report: A 53-year-old woman with a history of central nervous system inflammatory demyelination was diagnosed with type 3 MAS that associated vitiligo, Hashimoto thyroiditis, dermatitis herpetiformis and psoriasis. She complained of xerostomia and xerophthalmia. Her examination showed a waddling gait, proximal muscle weakness and a difficulty to stand up without help. Nonstimulated salivary flow was low. Schirmer test was at 4 mm in the right eye and 7 mm in the left eye. Laboratory findings showed renal impairment (creatinine at 180 μ g/l), hypocalcemia and hypophosphatemia. Urinary analysis showed an increase in kaliuresis and a low calciuria. Serum levels of alkaline phosphatase and PTH (90 pg/ml) were elevated. A serious deficiency of 25-hydroxy(OH) vitamin D (5 μ g/l) was detected. Immunofixation in serum showed a monoclonal IgG lambda (2 g/l). Ratio kappa/lambda was elevated at 2.25. The bone marrow aspiration was normal. X-ray of the dorsal and lumbar spine, sacroiliac joint, hips and femur showed diffuse demineralization. The BMD testing showed osteoporosis. A salivary gland biopsy revealed sialoadenitis with focus score 3. The clinical and laboratory features were compatible with the diagnosis of vitamin D deficiency associated with osteomalacia, Sjögren syndrome and tubular impairment. She was treated with oral Cholecalciferol at dose of 100000 U monthly during 4 months.

Conclusion: In our case, osteomalacia was due to many factors: tubulointerstitial nephritis associated with Sjögren syndrome, hyperparathyroidism chronic renal disease and vitamin D deficiency. Otherwise, screening tests of early renal involvement are recommended in patients with Sjögren syndrome. Thus, oral or intravenous Cholecalciferol may be an effective and safe way to treat vitamin D deficiency in MAS patients, leading to a significant clinical improvement. The correction of electrolyte imbalance is also essential.

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SUN, FUN, RHABDOMYOLYSIS AND HYPOKALEMIA: WHO'S THE ODD?

Y. Cherif¹, M. Mrouki¹, Z. Tayeb¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Exertional heat stroke (EHS) is a life-threatening condition caused by a rapid rise of one's core temperature due to high intensity of physical exercise in a hot and humid environment. It's responsible for serious multisystemic damage, especially, rhabdomyolysis and acute renal failure. Herein, we report a case of rhabdomyolysis, renal impairment and hypokalemia.

Methods: A 15-year-old boy with no past medical history was admitted during the summer for rhabdomyolysis and acute renal failure. Two days before, he underwent a long car trip without air conditioning then went swimming, played football and had no correct rehydration. Upon admission, the patient presented with fatigue and limb cramps. His temperature was 38.5°C, the physical examination was normal otherwise. Laboratory examinations showed elevated Creatine-Kinase (CK) (>6000 mmol/L), impaired renal function (creatinine 271 µmol/l) without oligoanuria and a normokalemia (5 mEq/l). Blood count cell and liver function were normal. There was no coagulopathy. The diagnosis of EHS was made, and he was cooled with rehydration and intravenous saline fluid.

Results: The evolution was favorable as shown in the Table 1 within a week, although a hypokalemia developed as the rhabdomyolysis improved. It was corrected by oral potassium substitution.

	Kalemia (mmol/l)	CK (mmol /l)	Creatinine (µmol/L)
Day 1	5	>6000	271
Day 2	3.7	6125	124
Day 6	3	487	63
Day 17	3.6	191	67
Day 53	4	208	60

Conclusion: Rhabdomyolysis in this case was caused by sunstroke and an intensive physical exercise. The particularity of our case is a normo and hypokalemia in this condition rather than hyperkalemia regarding rhabdomyolysis and acute renal failure. It is explained by respiratory alkalosis, sweating and overproduction of aldosterone. Besides, hypokalemia induces polyuria, which worsen the potassic loss. Furthermore, hypokalemia was described, in rare cases, to induce or predispose to rhabdomyolysis by the limitation of normal potassium-mediated vasodilatation and the decrease of the blood flow of skeletal muscles which is probably the case in our observation.

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SONOZAKI SYNDROME: A NEW CASE REPORT

Y. Cherif¹, M. Mrouki¹, E. Gharbi¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Sonozaki syndrome, a scarce disease, involves palmoplantar pustulosis as well as arthroosteitis. The most common bone involvement is in anterior chest wall, the spine and the sacroiliac joints. We herein report a new case where the diagnosis was made 3 years after to draw attention to diverse features of this disease.

Case report: Our patient was a 53-year-old woman with a medical history of thyroiditis, admitted 3 times to our Department of Internal Medicine for arthralgias of the proximal interphalangeal and wrist joints, pain of the last right ribs, low back pain and right sternoclavicular joint pain. Physical examination was notable with only swollen right clavicle. She had no fever, no prior evidence of infection or neoplasm, no previous surgery. She did not receive any treatment apart analgesic drugs, with no clinical improvement. The laboratory tests showed elevated ESR of 67 mm/h, elevated C-reactive protein of 56 mg/l and seropositive anti-CCP antibody of 31 U/ml. The X-rays showed degenerative changes of the lumbar spine with no other lesions. CT scan showed focal erosion with thickness of the right sternoclavicular joint and bilateral sacroiliitis. Despite the absence of cutaneous lesions, the diagnosis of Sonosaki syndrome was made. Nonsteroidal anti-inflammatory drugs were prescribed, with a significant clinical improvement. However, relapse occurred one year after.

Conclusion: The diagnosis of Sonozaki syndrome remains a challenge, since different features do not appear at the same time. Our case showed that Sonosaki syndrome should be considered in cases where chronic inflammatory bone disorders were diagnosed. Given its clinical manifestations, the differential diagnosis involves SAPHO syndrome, infectious osteomyelitis, bone metastases, osteosarcoma, psoriatic arthropathy, rheumatoid arthritis and Tietze's syndrome.

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VITAMIN D DEFICIENCY AND PRIMARY HYPERPARATHYROIDISM: HOW TO TREAT?

Y. Cherif¹, Z. Tayeb¹, M. Mrouki¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Hypercalcemia can be life-threatening condition. This disorder is most commonly caused by primary hyperparathyroidism and malignancy. However, other less common causes of elevated calcium levels need to be considered. Vitamin D plays an important role in calcium and phosphate homeostasis and is also involved in many physiological processes such as glucose and lipid metabolism. We report a case of a patient who had a vitamin D deficiency associated with a primary hyperparathyroidism.

Case report: A 30-year-old woman was admitted in our Department of Internal Medicine for high blood pressure. She complained about headaches. Apart asymmetrical goiter, blood pressure at 150/80 mmHg and a BMI at 32.4 kg/m², physical examination was normal. Routine laboratory analysis revealed hypercalcemia at 3.1 mmol/l (normal range: 2.2-2.5 mmol/l) and hypophosphoremia at 0.45 mmol/l (normal range: 0.8-1.45 mmol/l). PTH level was high (1169 pg/ml). Vitamin D deficiency was detected (<8.1 µg/l). Cervical ultrasound showed a thyroid mass measuring 40 * 26 mm. Sestamibi scintigraphy located a thyroid nodule. The

diagnosis of vitamin D deficiency associated with a primary hyperparathyroidism was established. The patient was treated with oral cholecalciferol, aggressive hydration and disodium clodronate. Calcium and PTH levels decreased. She underwent parathyroidectomy and her hypercalcemia resolved in the postoperative period.

Conclusion: Vitamin D deficiency associated with primary hyperparathyroidism can be a therapeutic challenge especially in case of hypercalcemia. Some studies suggested an association between vitamin D deficiency and severity of primary hyperparathyroidism. Besides, this association seems to be more frequent in patients with primary hyperparathyroidism than in general population. Our patient presents a high level of PTH. The typical feature of our case is hypercalcemia. Vitamin D has a potent hypercalcemic effect. Therefore, patient may develop severe and uncontrolled hypercalcemia. Studies showed safety of the supplementation with vitamin D in patients with primary hyperparathyroidism associated to vitamin D deficiency. This supplementation reduces the levels of PTH while observed in our patient.

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EARLIER BONE MICROARCHITECTURE ALTERATIONS EVALUATED BY HRPQCT, AFTER STROKE WITH HEMIPLEGIA

A. Amouzougan¹, H. Locrelle¹, L. Mathevon¹, M. Normand², P. Garnier³, P. Calmels⁴, L. Vico², H. Marotte⁵, T. Thomas⁶

¹Rheumatology Department, University Hospital of Saint-Etienne, ²INSERM U1059, Lab Biologie Intégrée du Tissu Osseux, University of Lyon, Saint-Etienne, ³Thrombosis Research Group EA 3065, Neurology Department, University Hospital of Saint-Etienne, ⁴Laboratoire de Physiologie de l'Exercice (LPE EA 4338), University of Saint-Etienne, ⁵InsERM 1059, Department of Rheumatology, University Hospital, ⁶INSERM U1059, Rheumatology Department, University Hospital of Saint-Etienne, Saint-Etienne, France

Objective: Stroke is the first cause of acquired physical disability. The incidence is in France of 145/100 000 inhabitants per year. It increases markedly with age. In recent years, a 30% reduction in early mortality has been observed, due to active medical and paramedical care and better prevention of complications, exposing these patients to osteoporosis and fragility fractures. We evaluated in a comparative monocentric prospective study, the early bone microarchitecture abnormalities after stroke-induced hemiplegia.

Methods: After inclusion within 15 days after stroke, 2 visits were planned at 3 and 6 months as part of the physical medicine and rehabilitation management after hemiplegia. Parameters of microarchitecture were measured by HR-pQCT (XtremeCT, Scanco Medical AG) in weight-bearing (tibia) and non-weight bearing bones (tibia and radius, respectively) and on both paretic and non-paretic sides. Non parametric tests were used, Wilcoxon test for paired sample. Spearman correlations were tested and p values adjusted with FDR method for multiple comparisons with R software.

Results: We analyzed data of 10 out of 11 patients who completed the follow-up. 3 women and 7 men aged 64±9 years with mean BMI at 26.6 ±4 kg/m². All were right-handed and hemiplegia occurred on the left side in 4 of them. Cortical thickness decreased (Table), first at tibia site (9.1%) followed by radius site (7.1%) within 6 months. Cortical porosity increased at tibia site, both paretic (9.4%) and non-paretic (10.6%) within 6 months but this difference was not significant (Table). Median values of BV/TV at both sites as other parameters (TbBMC, CtBMD, TbN, TbTh, Tb1/S.D) did not change over the 6-month period of assessment. Adjustment on age, BMI, PTH and vitamin D did not change the results.

No significant correlations were found between PTH, vitamin D and microarchitecture parameters at both sites.

Conclusion: Stroke-induced hemiplegia was associated with early microarchitecture damages only in the cortical bone first at weight-bearing sites then at non-weight bearing sites. Parameters of trabecular compartment did not change during this period. These results may have impact on bone loss prevention including pharmacologic treatments.

Table: Mean values of cortical thickness and cortical porosity

	Cortical thickness (Ct Th); median values				stand. p	stand. p
	Paretic radius	Normal radius	Paretic tibia	Normal tibia		
Day 15	0.69	0.78	0.97	1.02	p=0.16	P=0.09
	0.67	0.725	0.95	1.01		
Month 3					P=0.077	p=0.040
Month 6	0.62	0.71	0.83	1.03	p=0.077	p=0.039

	Cortical porosity (Ct Po); median values (%)				stand. p	stand. p
	Paretic radius	Normal radius	Paretic tibia	Normal tibia		
Day 15	2	3.1	8.5	7.5		
Month 3	2.3	2.3	8.5	7.85		
Month 6	2.1	3.05	9.3	8.3		

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TENOFOVIR AND STAVUDINE INCREASE BONE RESORPTION IN GROWING RATS

A. Matuszewska¹, B. Nowak¹, T. Sozański¹, J. Kwiatkowska¹, A. Szeląg¹

¹Wrocław Medical University, Department of Pharmacology, Wrocław, Poland

Objective: HAART (highly active antiretroviral therapy) seems to increase risk of fracture in treated children. The aim of the study was to assess the influence of tenofovir and stavudine, both antiretroviral agents commonly used in children, on bone metabolism in growing rats.

Methods: The study was conducted on 8-week-old male Wistar rats divided in 3 groups (6 rats each): KN – control group receiving saline solution, T – rats receiving tenofovir (15 mg/kg) and S – rats receiving stavudine (3 mg/kg). Serum osteocalcin (OC) and C-terminated telopeptide of type I collagen (CTX) levels were measured with ELISA on day 1 and day 85.

Results: On day 1 there was no difference in serum OC and CTX levels between experimental groups. On day 85, comparing to day 1, there was significant increase in serum CTX level in groups T (2.79±1.44 ng/ml vs. 11.83±3.59 ng/ml, $p<0.05$) and S (3.50±2.15 ng/ml vs. 8.60±2.77 ng/ml, $p<0.05$), whereas in KN group serum CTX level remained stable (2.23 ±0.74 ng/ml vs. 2.49±2.23 ng/ml, $p>0.05$). We observed as well significant increase in OC level in group T (0.86±0.97 pg/ml vs. 2.74±1.99 pg/ml, $p<0.05$). No significant differences between day 1 and day 85 serum OC levels in group KN and S were detected (0.24±0.33 pg/ml vs. 0.56 ±1.23 pg/ml, $p>0.05$ and (0.89±1.60 pg/ml vs. 2.91±3.25 pg/ml, $p>0.05$, respectively).

Conclusions: The results obtained suggest that tenofovir and stavudine increase bone resorption in growing rats. Additionally tenofovir seems to increase bone formation as well.

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PECULIARITIES OF CORRECTION OF ANTIOXIDANT STATUS IN PATIENTS WITH OSTEOARTHRITIS IN THE REHABILITATION PROCESS

V. Alexandrow¹, A. Alexandrow¹, L. Shilova², M. Nikitin³, N. Alexandrowa¹

¹Federal State Budgetary Institution «Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy», Volgograd,

²Volgograd State Medical University, the Department of Hospital Therapy, Volgograd, ³Sanatorium-resort complex "Vulan" - Branch Federal state budget institution "Russian scientific center of medical rehabilitation and balneology" of the Ministry of health of the Russian Federation, Gelendjik, Russia

Objective: The correction of immunological and biochemical changes by the present-day methods of physiotherapy is worthy of use in the rehabilitation of patients with osteoarthritis (OA). Our aim was to study the effect of a special three-component rehabilitation program on the antioxidant status of OA patients.

Methods: We observed 62 patients with a reliable diagnosis of OA: 42 women and 20 men aged 30 to 68 years (mean age was 51.4±9.5 years old). Patients with OA were divided into two groups, comparable by sex, age, duration of the disease: primary (n=30) and control (n=32). Patients of both groups received similar medication and were comparable in background therapy. For patients with OA (main group), a 21-day rehabilitation program was developed and applied, including the simultaneous use of three components: kinesitherapy (morning hygienic gymnastics, dosed walking), hydrokinetic therapy (therapeutic swimming in the sea water pool for 20-40 min, at a water temperature of 26° C, a course of 18-20 daily procedures) and low-frequency magnetotherapy (0.3 to 100 Hz, up to 5 mT, duration of exposure 30 min, 10 procedures every other day). Clinico-immunological evaluation of the effectiveness of this rehabilitation program was carried out twice: at the primary reception and on the 28-30th day of observation. We considered the dynamics of special laboratory studies characterizing the functioning of antioxidant system: quantitative determination of the total antioxidant status by the method of enzyme immunoassay (Immundiagnostik, Germany); quantitative determination of peroxides by the method of enzyme immunoassay (Biomedica, Austria); quantitative determination of uric acid (Callegari, Italy); the content of antibodies to xanthine oxidase (anti-XO) by the method of enzyme immunoassay.

Results: A significant number of patients with OA (37.1%) before the start of treatment showed oppression of the general antioxidant status of varying severity ($p=0.037$), increased peroxides content ($p=0.048$) and a tendency to increase the uric acid content ($p=0.062$). Increased levels of anti-KO before treatment were observed in 24.2% (n=15) of OA patients and averaged 0.63 ± 0.272 U ($p=0.027$ as compared with donors - 0.038 ± 0.027 U). When analyzing the dependencies of anti-XO levels, a direct relationship (from mild to moderate strength) with age of patients with OA and the duration of the pathological process was revealed ($p<0.05$ in both cases). After the treatment in the primary group, positive changes in all the studied parameters ($p<0.05$) were noted, in the control group - the tendency to increase the total antioxidant status ($p=0.067$). The positive effect of using low-frequency magnetotherapy in patients with OA may be connected with the purification of polarized membranes from fixed on their surface immune complexes that can deactivate membrane receptors and impede cellular metabolism. Under the influence of magnetotherapy,

there is also an improvement in cartilage metabolism, presumably due to the effect on microcirculation in the synovial membrane and periarticular tissues.

Conclusion: The inclusion of nonpharmacological methods designed to normalize the natural processes of homeostasis regulation into rehabilitation measures in the treatment of patients with osteoarthritis can positively influence the course of metabolic reactions and the degree of local inflammatory and general degenerative processes in this particular pathology.

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VERTEBRAL FRACTURES CASCADE: POTENTIAL ETIOLOGIES AND RISK

H. Che¹, V. Breuil², B. Cortet³, J. Paccou³, L. Chapuis⁴, F. Debiais⁵, R. M. Javier⁶, N. Mehse Cetre⁷, T. Thomas⁸, C. Roux⁹, K. Briot⁹, S. Loiseau Peres¹⁰

¹CHU Montpellier, Montpellier, ²CHU Nice, Nice, ³CHU Lille, Lille, ⁴Hopital Vitre, Vitre, ⁵CHU Poitiers, Poitiers, ⁶CHU Strasbourg, Strasbourg, ⁷CHU Bordeaux, Bordeaux, ⁸CHU Saint Etienne, Saint Etienne, ⁹CHU Cochin, Paris, ¹⁰CHR Orleans, Orleans, France

Objective: Vertebral fracture (VF) is the most common osteoporotic fracture, and a strong risk factor of subsequent vertebral fracture. Prospective studies have shown that a recent VF increases an imminent risk of a subsequent one, and attention has been paid recently to a possible cascade phenomenon i.e., the occurrence of multiples VFs in less than one year. This cascade could have severe consequences, and we prompted a study to identify potential causes of osteoporosis and risk factors.

Methods: Vertebral fractures cascade (VFC) observations were collected retrospectively between January 2016 and April 2017. VFC was defined as the occurrence of at least 3 vertebral fractures within one year. Patients with other etiologies than osteoporosis (i.e., malignant or traumatic VFs) were excluded. The cause of osteoporosis associated with VFC was the one retained by the physician at the time of diagnosis.

Results: Ninety-five observations of VFC (80% of women, mean age of 71 years) were collected in 10 centers (9 tertiary centers and 1 outpatient center). The median number of incident VFs over 1 year was 4 (3-11). Forty-five patients (45.9%) had a previous major fracture before the VFC and 65 (70.7%) had densitometric osteoporosis (T-Score ≤ -2.5 SD either at lumbar or femoral site). Eighteen (19%) patients currently received oral glucocorticoids treatment at the time of VFC, with a mean daily dose of 20mg. Thirty-three (35.1%) patients received systemic glucocorticoids in the past. The main comorbidities were history of cancer (n=19) and chronic inflammatory diseases (n=21) including asthma (n=7), chronic obstructive pulmonary disease (n=7) and rheumatoid arthritis (n=7). A secondary osteoporosis associated with the cascade was diagnosed in 54 patients (54.5%) with the following causes: glucocorticoid-induced osteoporosis (n=22, 23.7%), benign hemopathies (mastocytosis, MGUS) (n=7, 7.1%), use of aromatase inhibitors (n=3, 3.1%), anorexia nervosa (n=3, 3.1%), alcoholism (n=3, 3.1%), pregnancy and lactation-associated osteoporosis (n=2, 2.1%), primary hyperparathyroidism (n=2, 2.1%) and hypercorticism (n=1, 1.1%). In addition, 11 cases (11.3%) were reported following a vertebroplasty procedure. Primary either postmenopausal or idiopathic osteoporosis was diagnosed in 48 patients (51.6%). A total of 29 (29.6%) patients previously received an anti-osteoporotic treatment. In six patients (6.3%), VFC occurred early (in the year) following discontinuation of an anti-osteoporotic treatment: 5 after denosumab and one 12 months after an infusion of zoledronic acid.

Conclusion: The results of this retrospective study show that almost half of VFC occurred in patients with secondary osteoporosis. While they

suggest that a careful management has to be given to these patients in order to prevent VFC in these circumstances, prospective studies are needed to further explore the determinants of such a severe complication of osteoporosis.

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VITAMIN D DEFICIENCY AND SECONDARY HYPERPARATHYROIDISM AMONG PATIENTS WITHOUT CHRONIC KIDNEY DISEASE

Y. Cheri¹, Z. Tayeb¹, M. Mrouki¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: 25-OH-vitamin D (VitD) and PTH are crucial to control the calcium-phosphate balance. In general, the VitD decrease the level of calcium whereas the PTH raises it. Thus, a secondary hyperparathyroidism may be due to a VitD deficiency. We report a case series of patients with hypercalcemia due to secondary hyperparathyroidism associated with VitD deficiency. The renal function of all patients was within normal ranges. Correction of VitD resulted on normocalcemia and decrease or normalization of PTH.

Case report: Seven patients were recorded. The mean age was 67 years (53-76 years). Four patients had a medical history of diabetes mellitus and arterial hypertension. Hypothyroidism was noticed in 3 patients. Apart obesity in 3 patients, physical examination was normal. A low VitD level was detected in all patients. The creatinine level was within the normal range in all cases. The average level of VitD was 5.15 ng/mL (3-9 ng/ml) which corresponded to a serious deficiency in VitD (<8 ng/ml). PTH was elevated in all patients. The average level of PTH was 206 ng/l (150-306 ng/l). Cervical ultrasound and other Imaging did not show neither enlarged parathyroid gland nor parathyroid nodes. Serum protein electrophoresis was normal in all patients. Vitamin deficiency was treated in all patients with oral cholecalciferol. Serum calcium became within normal ranges in all cases within 6 months.

Conclusion: The level of VitD should be considered in all elders patients, patients suffering from obesity, malabsorption syndrome. Hypocalcemia is usually noticed in VitD deficiency. Hypercalcemia is often due to VitD intoxication. However, the possibility of secondary hyperparathyroidism due to deep VitD deficiency should be considered.

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ATTITUDES AND KNOWLEDGE ON VITAMIN D AND CALCIUM AMONG PRIMARY CARE PHYSICIANS (PCP)

J. Morales Torres¹, H. Gutierrez Hermosillo², X. Lopez Partida³, J. Morales Vargas¹

¹Morales Vargas Centro de Investigacion, ²Department of Medicine and Nutrition, University of Guanajuato, ³Instituto Mexicano del Seguro Social, Leon, Mexico

Objective: Osteoporosis is a growing problem in Mexico. PCP have a fundamental role in detection and initial management of susceptible patients. It would be ideal to homogenize their information in accordance with published treatment guidelines¹. Our aim was to identify niches of opportunity for educational interventions on calcium and vitamin D (VitD) in osteoporosis.

Methods: On August 2017, during the National Congress of Family Physicians in Leon, Mexico, attendees were invited to respond anonymously a multiple-option questionnaire on diverse aspects on VitD and

calcium in daily practice. A total of 500 forms were distributed. We report findings using descriptive statistics.

Results: The questionnaire was responded by 274 Physicians (54.8% of those who received it), 197 (71.9%) women and 77 (28.1%) men, with a mean age of 37.2 (±10.1) years, and 11.1 (±8.3) years of professional practice. Their work setting is limited to public institutions in 231 (84.3%) and in 39 (14.3%) it included private practice. Of them, 66.8% consider VitD deficiency common in Mexico, but only 51.1% usually think of its relevance. Up to 66.8% considers risk factors to identify hypovitaminosis D, but only 8.4% have requested measurement in serum at some point. Ideal dose to supplement is between 200 and 600 IU daily for 69.3% of PCP, and 81% opt for Calcitriol and only 10% mention cholecalciferol for supplementation (probably due to availability of calcitriol in the institutions). Daily intake of calcium is calculated roughly from diet by 60% of PCP and 92% prescribe calcium supplements in patients with low bone mass, at doses between 800 and 1500 mg daily (87% of PCP), but 36.5% feel that most patients on these supplements will develop nephrolithiasis.

Conclusions: Many PCP show divergent concepts from Mexican practice guidelines on osteoporosis, regarding VitD and calcium. These findings identify opportunities for continuous medical education.

Reference: Torres Arreola LP. Diagnóstico y tratamiento de osteoporosis en mujeres posmenopáusicas. Mexico. Secretaria de Salud; 2013.

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PREVALENCE OF HYPOVITAMINOSIS D IN PATIENTS FROM A PRIVATE HOSPITAL

H. Gutierrez Hermosillo¹, J. Morales Torres², J. Romero Ibarra², G. Aguilar Orozco³

¹Department of Medicine and Nutrition, University of Guanajuato, ²Morales Vargas Centro de Investigacion, ³Hospital Aranda de la Parra, Leon, Mexico

Objective: Hypovitaminosis D is extremely common worldwide. There is limited information in Latin America, but existing reports suggest that its prevalence is also high and probably linked to important health impacts. Attempts to improve our knowledge on hypovitaminosis D may come from many sources. Our aim was to establish the frequency of vitamin D deficiency and insufficiency in patients studied in a private hospital in Leon, Mexico.

Methods: This is an observational, descriptive study including all the 25-OH-Vitamin D measurements performed at the laboratory of Hospital Aranda de la Parra from June 19, 2012 to September 19, 2017 by chemiluminescent microparticle immunoassay (Abbott Diagnostics, USA). We considered vitamin D insufficiency in those below 30 ng/ml and deficiency below 20 ng/ml.

Results: We identified 2165 measurements (1795 in women, 370 in men), of whom 1538 (71%) were vitamin D insufficient and 559 (25.8%) were deficient. Mean age according to the levels of vitamin D are: <10 ng 62 ±23 years; 10-30 ng/ml, 56±18 and >30 ng, 57±17 (p=0.658). Table 1 shows the distribution of values across decades of age.

Conclusions: Hypovitaminosis D is highly prevalent in all age groups in this sample of population. This prevalence tends to be higher in the extremes of age

Table 1. Levels of Hypovitaminosis D across decades of age

Age (years)	n (%)	<20 ng/ml (%)	<30 ng/ml (%)
0-10	59 (2.7)	14 (23.7)	44 (74.5)

11-20	48 (2.2)	9 (18.7)	37 (77)
21-30	87 (4)	29 (33.3)	66 (75.8)
31-40	170 (7.8)	40 (23.5)	123 (72.3)
41-50	271 (12.5)	70 (26.1)	203 (74.9)
51-60	581 (26.8)	132 (22.7))	404 (69.5)
61-70	495 (22.8)	107 (21.6)	328 (66.2)
71-80	342 (15.9)	106 (30.9)	245 (71.6)
81-90	100 (4.6)	44 (44)	76 (76)
91-100	12 (0.5)	7 (58.3)	12 (100)
TOTAL	2165 (100)	559 (25.8)	1538 (71)

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TRABECULAR BONE SCORE: A PERSPECTIVE METHOD OF BONE QUALITY EVALUATION IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

N. G. Mokrysheva¹, S. S. Mimaya¹, A. K. Eremkina¹, Y. A. Krupinova¹, E. E. Bibik¹

¹Endocrinology Research Center, Moscow, Russia

Objective: Trabecular bone score (TBS) is a recently-developed analytical tool that performs calculated measurements on lumbar spine DXA images and represents information relating to bone texture and microarchitecture which may be useful to potentially evaluate the risk of bone fracture. The aim of the study was to investigate the relationship between TBS and others laboratory and instrumental parameters of bone turnover in patients with primary hyperparathyroidism (PHPT).

Methods: We included 19 patients with confirmed PHPT regardless of low-trauma fractures in anamnesis (16 postmenopausal women, 3 men over 50 years). In all patients following biochemical parameters were assessed: serum total and ionized calcium, serum phosphorus, 24-hours urinary calcium; and markers of bone turnover (25-hydroxyvitamin D, osteocalcin, C-terminal telopeptide of type I collagen (β -CTX), alkaline phosphatase (ALP), intact PTH). TBS as well as spinal (LS), femoral (total (TH) and neck (FN)) and radial (UD, 33%, total (RT)) BMD were measured by GE Lunar iDXA (Healthcare, USA).

Results: TBS in study group was low (1258), representing abnormal trabecular microstructure (normal ≥ 1.35). We did not find any significant correlations between TBS and biochemical or bone turnover markers (osteocalcin, β -CTX, ALP) in study group. A significant negative relationship between TBS and PTH ($r=-0.637$, $p<0.05$) was observed isolated in postmenopausal women ($n=16$). In all patients TBS was strongly correlated with LS-BMD ($r=0.516$, $p<0.05$) and RT-BMD ($r=0.473$, $p<0.05$). In postmenopausal women this link of values was unreliable ($r=0.478$ and $r=0.401$, both $p>0.05$ in correlation TBS with LS-BMD and RT-BMD respectively).

Conclusion: The study showed that measurement of TBS to assess the bone structure in patients with PHPT instead BMD of different sites is controversial. It is necessary to carry out further large-scale investigations and assess complementary parameters to more detailed study of this problem.

P773

POLYMER MATRIX CONTAINING NANODIAMONDS AS A POTENTIAL METHOD FOR TREATING OSTEOPOROSIS

A. Grigoryan¹, A. Dimitrova¹, T. Betova², K. Kostov¹, M. Apostolova³

¹Medical University - Pleven, Department of Pathophysiology, Pleven,

²Medical University - Pleven, Department of Pathoanatomy, Pleven,

³Institute of Molecular Biology, Medical and Biological Research Lab, Sofia, Bulgaria

Objective: The ageing of the population has resulted in an increasing need to replace irreversibly damaged bone and joint tissue. Rapid adhesion of bone cells is of great importance for appropriate bone implant osseointegration. This study was focused on analyzing the tissue reaction and efficacy of a polymer matrix, containing nanodiamonds, applied as intra-bone injection, to an osteoporotic rat model.

Methods: Twenty nine, 2 months old female Wistar rats of reproductive age were divided into 3 groups: Ovariectomized Group (G1)-15 animals subjected to bilateral ovariectomy and treated with polymer matrices, containing nanodiamonds (OVX+Nd); Control Group (G2)-7 ovariectomized animals (ovx); and Control Group (G3)-7 sham-operated animals (sham). The effect of polymer matrices on bone regeneration was assessed by using immunohistochemical and histological methods. Changes of matrix metalloproteinase-9 (MMP-9), MMP-13, osteonectin (SPARC) and collagen type 1 (COL-1) were studied by immunohistochemistry in the epiphyseal zone of the femur.

Results: Our results showed that the bone turnover significantly increased and bone mass significantly decreased the 8 weeks after rats' ovariectomy. We found that MMP-9 in the osteoclasts and MMP-13 in the osteoblast and osteocytes were highest in the group with osteoporosis (G2) and significantly decreases ($p<0.05$) following in bone injection of polymer matrices containing nanodiamonds in (G1). There is no significant difference in MMP-9 between G1 and G3. Fig.1. The results also showed that SPARC and COL-1 were higher in G1 and G3 compared to G2 ($p<0.05$).

Conclusion: Increased MMP-9 in G2 osteoclasts confirms that estrogen deficiency leads to the development of osteoporosis by MMP-9 dependent pathway. The in bone injection of polymer matrices with nanodiamonds increases COL-1 and SPARC and reduces MMP-9 and MMP-13 in G1, thus promoting bone regeneration.

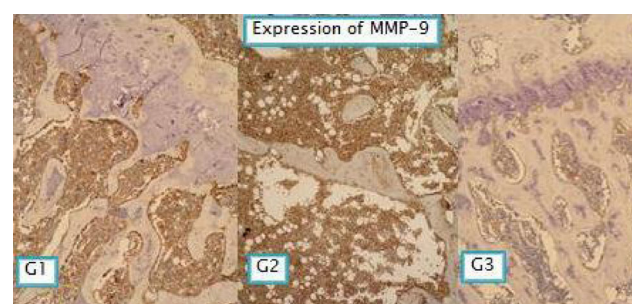


Fig.1

P774

PREGNANCY AND LACTATION-ASSOCIATED OSTEOPOROSIS (PLO): DIAGNOSIS AND TREATMENT IN 5 YOUNG PRIMIGRAVID WOMEN WITH MULTIPLE VERTEBRAL FRAGILITY FRACTURES

V. Pambianco¹, D. Colangelo¹, G. Autore¹, E. Pola¹

¹Department of Orthopaedics and Traumatology - Spine Division - Catholic University of the Sacred Heart - "A. Gemelli" University Hospital, Rome, Italy

Objective: PLO (pregnancy and lactation-associated osteoporosis) is an acute, rare and invalidating pathology that occurs during the last trimester of pregnancy or during lactation, determining the onset of moderate-severe osteoporosis and multiple vertebral fractures with acute pain, disability and serious psychological impact on young mothers. Pathogenesis is not fully known and there are no guidelines for treatment.

Bisphosphonates were effective, but their use is not recommended because of their half-life bone is about 10 years with possible adverse effects on subsequent pregnancies. Satisfactory results have been shown with the administration of teriparatide, vitamin D and kyphoplasty depending on the case.

Methods: We present a case series of 5 primigravid patients (mean age 32 yrs) with acute back pain after recent eutocic childbirth. Negative anamnesis for other pathologies. Spine X-Ray and MRI documented multiple fragility fractures. Blood samples showed vitamin D deficit and lumbar and femoral DXA documented diffuse osteoporosis. Patients were treated with rigid brace, in some cases kyphoplasty and, afterwards suspension of breast-feeding and informed consent, with off-label anabolic therapy with Teriparatide 20 ug/die s.c. for 12 weeks and vitamin D3. VAS and SF12 questionnaires were used in order to monitor pain and quality of life based on the psychophysical restoration of the normal daily habits and the ability to take care of the child. Time points: 3, 6 and 12 months.

Results: At the end of the treatment all the patients reported pain reduction and improvement of the quality of life. Lumbar T-score increased significantly (osteopenia/normal bone mineralization); vitamin D was in the range at the end. There were no new vertebral fractures and all patients maintained a correct sagittal balance after 12 months. No adverse effects related to anabolic therapy were recorded.

Conclusion: PLO is a severe and often undiagnosed condition with serious psychological and physical damage for the young women. As demonstrated by other studies and our case series, the experimental treatment with teriparatide and vitamin D for 12 weeks, immobilization with rigid brace and sometimes surgery, appears to be a valid option for the treatment of PLO with multiple vertebral fractures in young mothers. More studies are needed to test the effect of this drug in the treatment of this pathological condition.

P775

THE EFFECT OF A SUPERVISED HOLISTIC THERAPEUTIC EXERCISE PROGRAM ON ANXIETY AND DEPRESSION PARAMETERS IN PATIENTS WITH KNEE OSTEOARTHRITIS

P. Gkriilas^{1,2}, E. Tsepis², E. Papadopoulou³, C. Matzaroglou², Z. Kokkalis¹, E. Panagiotopoulos¹, P. Megas¹

¹University of Patras, Department of Orthopaedics, School of Medicine, Patra Achaia, ²Technological Educational Institute (TEI) of Western Greece, School of Health and Welfare, Department of Physical Therapy, Aigio Achaia, ³Hellenic Center for Mental Health and Research, Patra Achaia, Greece

Objectives: High anxiety and depression levels frequently coexist in people with long-term pain conditions such as osteoarthritis (OA). The purpose of this study was to examine: a) the short-term effects of a 2 months supervised holistic therapeutic exercise program (SHTEP) in anxiety and depression parameters in people with Knee-OA b) the same effects 2 months after the end of SHTEP.

Methods: 54 participants (24 Male and 30 Female) with knee-OA (2-3 grade in Kellgren-Lawrence scale) were divided into 2 equal groups, the exercise (Exe) and the control (Con) group. Participants in Exe were held a total of 24 sessions of STEP into a period of 2 months (3 times/week) while participants in Con continued their normal live without doing the SHTEP. Every session of the SHTEP lasted approximately 1 hour and included: a) warm-up aerobic walking, b) stretching, c) strengthening, d) balance exercises and e) cool-down. Participants in both groups were administered 2 self-

reported questionnaires: a) the Beck Anxiety Inventory (BAI) and b) the Beck Depression Inventory II (BDI-II) at 3 different periods: a) before the experiment (Baseline), b) by completion of the SHTEP, 2 months later (Phase 1) and c) another 2 months after Phase 1, totally four months from Baseline measurement (Phase 2). Analysis of Variance was used for comparisons between (Exe vs. Con) and within (Baseline vs. Phase 1 vs. Phase 2) groups.

Results: Both BAI ($p=0.004$) and BDI-II ($p=0.040$) scores in Phase 1 (BAI: 4.4 ± 3.0 , BDI-II: 9.1 ± 5.9), significantly decreased from the corresponding scores in Baseline (BAI: 6.8 ± 4.7 , BDI-II: 11.0 ± 5.2), for the Exe group. In Phase 2, BAI (5.3 ± 6.1) scores in Exe did not significantly differ from Phase 1 scores. In the same Phase (Phase 2), BDI-II (9.1 ± 6.7) scores significantly differ ($p=0.019$) from Baseline but not from Phase 1 corresponding scores. Participants in Con, did not show statistically significant differentiation for both BAI and BDI scores between Baseline (BAI: 7.7 ± 8.2 , BDI-II: 11.0 ± 6.8), Phase 1 (BAI: 7.1 ± 7.0 , BDI-II: 11.1 ± 6.6) and Phase 2 (BAI: 6.9 ± 5.1 , BDI-II: 10.8 ± 6.7) scores.

Conclusions: The application of a 2-month SHTEP, caused a significant decrease in short-term anxiety and depression levels in individuals with Knee-OA.

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OSTEOPOROSIS BEHAVIORAL RISK FACTORS AMONG SAUDI ADOLESCENT BOYS

R. Al-Raddadi¹, S. Alaidarous², M. Abbas, A. Alsulami, F. Hakim³, A. Alsarraj⁴, Z. Al-Raddadi⁵, F. Aljabri¹, R. Hakim⁶, S. Bahijri¹

¹King Abdulaziz University, ²King Abdul Aziz Medical City, ³Alfarabi College, ⁴Ministry of Health, ⁵King Faisal Specialist Hospital and Research Center, ⁶Fakeeh College for Medical sciences, Jeddah, Saudi Arabia

Objective: Bone health during teenage is critically important to improve peak bone mass and prevent osteoporotic fractures. Detecting behaviors that increase the risk of osteoporosis are the mainstay of prevention. The objectives of this study are to estimate the prevalence of behavioral risk factors among Saudi adolescent boys

Method: In this cross-sectional analytic study, a multistage sampling technique was adopted to recruit a representative sample of 403 boys from secondary school in Jeddah city. Data were collected using structured questionnaire includes demographic variables and questions on behaviors affecting bone health filled through interviews. Data were analyzed using SPSS version 22, t-test and chi-square were used and p-value of <0.05 was considered significant.

Results: The mean age was 17.3 SD 1.1 years. Underweight was found among 20% of the boys. Daily consumption of dairy products was reported by 27%, smoking by 6.6%, sun exposure of 15 min/d by 42.9%, consumption of soft drink (≥ 1 can daily), energy drink (≥ 3 cans/ week), and coffee (≥ 1 cup daily) was reported by 81.9%, 39.5%, and 32% of boys respectively. In addition, 40% reported that they did not perform any physical activities. History of fractures following minor trauma was reported by 15.5%. Advice regarding bone health by health professionals was given to 23.5%. A significant association was identified between low consumption of dairy products and reported fractures.

Conclusion: This study indicates that Saudi secondary school boys are at significant risk of developing osteoporosis based on the prevalence of risk factors and a high percentage of reported fractures following minor traumas. This is not surprising in view of the low level of professional advice promoting bone health.

P777

BMD IN GAUCHER PATIENTS

N. Temelkova¹, T. Chamova¹, I. Tournev¹, A. Gerganova¹, K. Temelkova², K. Sirakova¹, P. Popivanov¹

¹University Hospital "Aleksandrovska", ²University Hospital for Children Disease, Sofia, Bulgaria

Objective: Gaucher disease is a rare autosomal-recessive inherited disorder, due to the deficiency of the enzyme glucocerebrosidase, which has an effect on multiple organs. Bone changes comprise of bone-marrow infiltration, BMD changes, bone crisis. The aim of this study is to analyse BMD of the 15 patients in Bulgaria with Gaucher disease.

Methods: Between 2012-2017, 14 patients with Gaucher disease type 1 and one with type 3 were observed at our department. Their age was between 24-66. All of the patients were treated according to the international guidelines. Their BMD was measured with a DXA machine - Hologic Discovery A, at lumbar spine and left femur (total hip and femoral neck). The further analysis was made following the ISCD Official Positions. The results were interpreted by Z-score for all of the patients.

Results: BMD at the lumbar spine: 36% of the patients have Z-score ≥ -1.0 ; 27% have Z-score between ≥ -2.0 and < -1.0 ; 36% have low bone density below the expected range for age Z-score < -2.0 . BMD at the total hip: 18% have Z-score ≥ -1.0 ; 45% have Z-score between ≥ -2.0 and < -1.0 ; 36% have below the expected range for age Z-score < -2.0 . BMD at the femoral neck: 40% have Z-score ≥ -1.0 ; 50% have Z-score between ≥ -2.0 and < -1.0 ; 10% have below the expected range for age Z-score < -2.0 . The lumbar spine of the patient with type 3 Gaucher disease was not measurable because of a severe scoliosis. His BMDs at the total hip and femoral neck are as following Z-score=-1.7 and -0.4, and they do not show any significant change for a 6-year follow-up.

Conclusion: In 36% of the patients with Gaucher disease type 1 the mean BMD at the lumbar spine (L1-L4) or left femur (total hip) is below the expected range for age according to the criterion of ISCD (Z-score < -2.0). The other 63% have Z-score < -1 at the lumbar spine, 60% at the femoral neck and 81% at the total hip.

P778

INFLUENCE OF BMI ON MINERAL BONE DENSITY RESULTS AND ITS CORRELATION WITH OSTEOPOROSIS RISK FACTORS

Z. Grujic¹, T. Tomic¹, V. Jokic¹, L. Fatic¹

¹Specialized Rehabilitation Hospital Banja Koviljača, Banja Koviljaca, Serbia

Objective: To evidence whether BMI influences any parameter of bone densitometry result and what is its correlation with osteoporosis risk factors.

Methods: The study was conducted on 998 patients, both genders, without age limitations. The youngest patient was 23, and the oldest was 91. Both BMD values of spine and hip, expressed in g/cm², and T-score, expressed in SD, were observed and compared to BMI values. Osteoporosis risk factors were taken from a questionnaire which each patient completes, and these were processed. The following tests were used for statistical data analysis: Kruskal Wallis Test, Grouping Variable, Test Statistics (a,b), Robust Tests of Equality of Means.

Results: Statistical data analysis yielded positive correlation between BMI and BMD. Every correlation coefficient was positive with highly statistical significance: BMD of the spine 0.302 ($p < 0.01^{**}$), BMD of the hip 0.353 ($p < 0.01^{**}$), T-score of the spine 0.311 ($p < 0.01^{**}$), T-score of the hip ($p < 0.01^{**}$). Correlation between BMI and early menopause, previous fractures, risky diseases and risky group of medicines was not evidenced. The statistically significant correlation was obtained between BMI and age ($p < 0.01^{**}$), female gender ($p < 0.037^{*}$), height reduction ($p < 0.002^{**}$) and smoking ($p < 0.000^{**}$).

Conclusion: There is a positive, highly statistically significant correlation between BMI values and parameters of bone density results. Higher age, female gender, height reduction and over smoking with lowered BMI values are all negative predictors of BMD condition.

P779

HIP MOBILE: A COMMUNITY-BASED MONITORING, REHABILITATION AND LEARNING E-SYSTEM FOR PATIENTS FOLLOWING A HIP FRACTURE

A. Abou-Shark¹, N. E. Mayo¹, M. Wall², A. Albers¹, S. Bergeron¹, S. Jean³, P. Berube⁴, E. Edward¹, S. N. Morin¹

¹McGill University, Montreal, ²Research Institute of the McGill University Health Center, Montreal, ³Institut National de Santé Publique du Quebec, Quebec, ⁴Greybox Solutions, Montreal, Canada

Objective: Following a hip fracture, most patients do not return to pre-fracture autonomy level. e-Health solutions incorporated within homecare rehabilitation may lead to better outcomes and reduce cost to the healthcare system. Our objective is to enable recovery and improve quality of life following a hip fracture through the development and implementation of the HIP Mobile e-Monitoring and Coaching system.

Methods: Our interdisciplinary team partnered with Greybox Solutions for the development of the HIP Mobile technology. A trial was initiated to determine if this technology is more effective at improving mobility in adults 60 years and older with a recent hip fracture than a printed material support program.

Results: HIP Mobile is an e-Monitoring and Coaching support program, comprised of a wearable sensor- a smart insole for the shoe- with a tablet based app interface and a secure cloud based remote monitoring dashboard. Expert educational content (user guides, 6-level exercise program to be followed at home, and post-intervention exercise program), exercise-tracking algorithms and a patient-oriented interface have been piloted, validated and formatted for the electronic and printed versions and translated in French. Recruitment is ongoing for a randomized clinical trial with parallel groups with the primary outcome of functional mobility (as measured by gait speed and 30-second sit-to-stand activity) 6 months following hip fracture. Patient-reported outcomes and place of residence have been collected throughout the trial and persistence of effect will be determined at 12 months.

Conclusion: Our interactive HIP Mobile e-system encourages active engagement in the rehabilitation process following a hip fracture and has the potential to improve functional mobility and autonomy at reduced costs. If successful, such technology could be harnessed towards a variety of rehabilitation processes.

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Disclosure: Pierre Berube is president and CEO of Greybox solutions.

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RISK OF UNDIAGNOSED ACHALASIA FOR TREATMENT WITH BISPHOSPHONATES: CASE REPORTL. Franeckova¹, M. Voska²

¹Department of Internal Medicine - Outpatient Department of Rheumatology and Osteology, First Faculty of Medicine, Charles University and Military University Hospital, ²Department of Internal Medicine - Department of Gastrointestinal Endoscopy, First Faculty of Medicine, Charles University and Military University Hospital, Prague, Czech Republic

Objective: Oesophageal achalasia is a rare disease with an occurrence rate of 10/100 000 of the population, which is considered as a contraindication for administration of oral bisphosphonates, particularly alendronate and ibandronate, in the treatment of osteoporosis. The basis of achalasia is impaired innervation of the lower oesophagus wall with loss of peristalsis and higher lower oesophageal sphincter tone, which make release of the oesophageal content to the stomach difficult. The aetiology is unknown, and the most probable seems to be the autoimmune disorder theory supported by a finding of circulating antibodies against the neurons of the myenteric plexus. The symptoms (dysphagia of liquids and solids, retrosternal pain after taking food, vomiting and regurgitation of undigested food and saliva, difficult eructation caused by concurrent impairment of the upper oesophageal sphincter) of the disease are developing gradually and it takes 5 years in average before the patient seeks medical assistance. Realistic is thus the situation that bisphosphonate is administered to a patient with as yet undiagnosed achalasia to treat osteoporosis.

Case: 66 year old man with psoriatic arthritis treated with methotrexate who was diagnosed for osteoporosis shall be presented. He denied any swallowing or reflux problems. He was treated by supplementation of calcium and vitamin D and risedronate was administered after some time. After the 3rd tablet, he developed vomiting, odynophagia and the patient also vomited in the next 5 weeks before he contacted a gastroenterologist. He was diagnosed for severe oesophagitis, oesophageal dilation with retention of food and the cardia was found to be impenetrable for the endoscope. Oesophageal manometry was used to diagnose achalasia. Repeated therapeutic interventions followed – dilatation of the lower oesophageal sphincter by bougienage and using a balloon.

Conclusion: Before administration of oral bisphosphonates, it is necessary to ask the patient not only about the symptoms of the gastroesophageal reflux disease, but also problems with swallowing solids and liquids and retrosternal pain after taking food, which could be symptoms of as yet undiagnosed oesophageal achalasia. Just as applies in the case of alendronate and ibandronate, risedronate may also induce severe oesophagitis in a patient with oesophageal achalasia.

P781

TRANSIENT NON-PTH HYPERCALCEMIA IN TWO PATIENTS WITH PREGNANCY AND LACTATION-ASSOCIATED OSTEOPOROSISD. Grigorie¹, A. Carageorgheopol², A. Sucaliuc¹

¹National Institute of Endocrinology, Carol Davila University of Medicine, ²National Institute of Endocrinology, Bucharest, Romania

Objective: Pregnancy and lactation-associated osteoporosis (PLO) is a severe type of osteoporosis which occurs in the last trimester of pregnancy or immediately postpartum. We report 2 patients with PLO and hypercalcemia.

Methods: Case 1: A 38-year-old lactating woman experienced severe back pain and was unable to walk without assistance six weeks after her first delivery. 4 mo postpartum an MRI showed 1 severe at T12 and 6 mild-moderate vertebral fractures. Case 2: A 34-year old lactating woman reported severe back pain several days after delivery and an MRI showed 3 severe dorsal vertebral fractures 2 mo later. No risk factors for low bone mass were identified except bed rest during the last trimester in Case 2; they were not supplemented with calcium and vitamin D during otherwise uneventful pregnancy and delivery.

Results: Case 1: The biochemistries were: serum calcium 10.6 mg/dl (8.4-10.3), PTH 5.7 pg/ml; 25OHD 16.1 ng/ml; CTX 1.15 ng/ml. DXA scan revealed low BMD (LS Z-score -3.2 SD, FN Z-score -1.7 SD). Case 2: Serum calcium 10.5 mg/dl; PTH 3 pg/ml; 25OHD 14.8 ng/ml; CTX 0.35 ng/ml. DXA scan revealed low BMD (LS Z-score -2.1 SD, FN Z-score -1.8 SD). PLO was diagnosed in both cases and lactation was suppressed by cabergoline. Case 1 was treated with iv ibandronate, vitamin D supplementation, analgesics and was clinically significantly improved one mo later. Case 2 was treated symptomatically and was well several mo later. In both cases serum calcium and PTH normalized after weaning.

Conclusion: We report two cases of PLO with transient hypercalcemia and suppressed PTH, which suggests that PTHrP could be involved in their pathogenesis.

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PHYSICAL THERAPY AND NATURAL EGGSHELL MEMBRANE IN THE MANAGEMENT OF OSTEOARTHRITIC KNEE SYMPTOMSV. Bokan-Mirković¹, Z. Škarić-Karanikić¹, S. Nejgov¹, M. Vuković¹

¹Centre for Physical Medicine and Rehabilitation, Clinical Centre of Montenegro, Podgorica, Montenegro

Objective: We examined the clinical efficacy of natural eggshell membrane and physical therapy on several outcome measures (pain, movement, stiffness) in people with knee osteoarthritis. The primary endpoint was the change in overall WOMAC Index measured before and after therapy.

Methods: We studied twenty patients with osteoarthritis of the knee who were randomly assigned to receive physical therapy (FT) (n=10; mean age, 62.60±4.45 years) or FT and natural eggshell membrane (n=10; mean age 62.90±2.73 years). The FT treatment group received Transcutaneous electrical nerve stimulation high-frequency (100 Hz) applied to the knee for 3 weeks, and aerobic and resistance exercise of moderate intensity for 6 weeks. Natural eggshell membrane (dietary supplement [DS]) group received physical therapy and natural eggshell membrane 500 mg daily for 6 weeks. The research was conducted at the Clinical Centre of Montenegro. Primary outcome measures were: (1) pain intensity, quantified with a visual analogue scale (VAS, 0-100 mm) and (2) pain, stiffness and mobility measured with the WOMAC (0-100 points). We evaluated the scores before and after treatment. We confirmed that the patients in both groups did not receive any other co-interventions during the study period.

Results Both groups showed clinically and statistically significant improvements. Values of VAS before/after treatment were 63.50±19.44/39.40±14.39. Values of WOMAC index for pain before/after therapy were 10.40±3.10/5.95±2.21, WOMAC stiffness 3.25±1.97/1.55±1.39, WOMAC function 35.95±9.74/27.11±8.94. After therapy, VAS score for FT group (45.50) was higher compared to the DS group (33.30); the difference between these values is close to the level of statistical

significance, since $p=0.055$ ($t(18)=2.048$, $p>0.05$). However, the differences between the treatment groups were not statistically significant.

Conclusion: The present study showed that combined physical therapy and Natural eggshell membrane treatment is effective for pain relief and knee function improvement in patients suffering from knee OA. Further studies on a larger sample are necessary.

P783

THE SPINAL FRACTURE: A SILENT THREAT

A. Martin Martinez¹, C. Martinez Aznar¹, M. Campoamor Gonzalez¹, M. E. Monge Vazquez¹, C. Martin Hernandez¹

¹Hospital Miguel Servet, Zaragoza, Spain

Objectives: Describing the vertebral fractures (VF) characteristics distinguishing if they were symptomatic or asymptomatic. In addition, nutritional characteristics of asymptomatic patients will also be analysed. **Methods:** Case-control study comparing symptomatic VF patients with asymptomatic control subjects. This sample is based on the data taken from the service of Traumatology of the Hospital Miguel Servet of Zaragoza during 2011. A total of 358 patients diagnosed with osteoporotic hip fracture (HF) and VF have been considered for this case study.

Results: 72.6% of patients with HF and VF have not been diagnosed. Clinical VF is located on the lumbar spine more frequently than asymptomatic VF ($p=0.002$), finding no differences between both groups with dorsal location ($p=0.961$). A significantly higher serum Alkaline phosphatase has been found in patients with clinical VF (98.64 U/L) compared to patients with asymptomatic VF (94.11 U/L) ($p=0.040$). Same results were found for albumin ($p=0.005$) and vitamin D ($p=0.010$). Therefore, the percentage of both hypovitaminosis D ($p=0.043$) and deficiency ($p=0.012$) is greater among patients with asymptomatic VF.

Conclusions: 3 out of 4 VF were unnoticed due to lack of symptoms. Most clinical VF were more frequently lumbar. Patients who have presented asymptomatic VF have lower levels of vitamin D, albumin and serum alkaline phosphatase than patients with clinical VF, demonstrating a worse nutritional status. Patients with clinical VF have a higher risk of presenting contralateral HF in a year time.

P784

TBS HAS A POOR DISCRIMINATIVE POWER FOR FRACTURE IN OLDER PATIENTS WITH VERY LOW BMD

D. Grigorie¹, A. Sucaliuc¹

¹National Institute of Endocrinology, Carol Davila University of Medicine, Bucharest, Romania

Objective: Lumbar spine TBS is claimed to be a predictor of fracture and recently TBS was associated with biomechanical properties of human vertebrae. A proportion of old women with very low BMD does not fracture. Our aim was to evaluate the discriminative value of TBS for fractures in female patients with very low BMD.

Methods: In a retrospective study, we calculated TBS in 100 old females (mean age=70.7 yrs, range 56-88; mean BMI 23.7 kg/m²), patients with very low BMD (<-3.5 SD) at the LS (mean -3.7 SD) before treatment; 63 patients had fractures, 35% vertebral, 43% nonvertebral and 22% both fractures types.

Results: Mean TBS was 1.194 (range 1.009 și 1.414) and mean T-score -3 SD; only four patients had normal TBS. There was a weak correlation between TBS and age, BMI but no correlation with DXA BMD. TBS values were only numerically lower in patients with fractures vs. nonfracture (1.182 ± 0.081 vs. 1.215 ± 0.094) with limited significance ($p=0.06$). The predictive value estimated by AUC was 0.608 (95%CI=0.491-0.725, $p=0.073$). There were no significant differences in TBS or DXA LS T-score between patients with vertebral fractures vs. nonfractures.

Conclusion: TBS has a poor predictive power for fracture in older osteoporotic women with very low BMD.

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ASSESSMENT OF VITAMIN D LEVELS IN PATIENTS WITH RHEUMATOID ARTHRITIS WITH DISEASE DURATION OF UP TO 5 YEARS AND OVER 5 YEARS

N. Stoilov¹, V. Boyadzhieva¹, R. Stoilov¹, R. Rashkov¹

¹University Hospital Sv. Iv. Rilski, Sofia, Bulgaria

Objectives: To compare vitamin D levels in rheumatoid arthritis (RA) patients with disease duration of up to five years and over five years, undergoing concomitant therapy with corticosteroids and disease modifying antirheumatic drugs (DMARDs).

Methods: In the present study we have selected 35 patients with RA tested for the levels of vitamin D in the period January 2016. They were diagnosed with RA at least 12 months prior to this study (according to the criteria of the ACR/EULAR 2010). All of the patients are on stable dose DMARD at least 12 weeks prior participation in the study. Corticosteroids at a stable dose of <7.5 mg/d prednisone (or equivalent) at least four weeks prior to enrollment in the study. Patients have never received biological or anti-osteoporotic treatment, nor supplemental therapy with vitamin D. Patients were tested for serum levels of 25(OH)D (ELISA method). All of the patients are non-smokers with BMI in the range of 20-25. Comparison was performed by analysis variance ANOVA.

Results: The age of patients with RA is between 20-65 years (mean age 51 ± 9.3 SD). Three (9%) of the patients are men and 32 (91%) are women. The disease duration is between 1-20 years (mean 6.06 years). 63% of the patients (22) have disease duration up to five years. The rest of them – 37% (13) have duration of RA more than five years. The level of vitamin D in patients with RA with a disease duration of up to 5 years is 11.63 ng/ml (<12 deficiency). The other group has level of 11.32 ng/ml which also states deficiency. There is no significant difference in the levels of 25(OH)D ($p=0.246$) between the two groups.

Conclusions: In our study we found deficiency in both groups of RA patients, but without statistically significant difference to distinguish up to five or over five years as a key point.

P786

THE EFFECTS OF 60-DAY SODIUM BENZOATE INTAKE AND IONIZING RADIATION ON CHEMICAL COMPOSITION OF THE RAMUS OF MANDIBLE IN RATS

I. Stepanenko¹, V. Luzin¹, D. Astrakhantsev¹, M. Grishchuk¹

¹LPR SE “St. Luke State Medical University of Lugansk”, Lugansk, Ukraine

Objectives: The study is aimed at investigation of macroelemental composition of the mandibular ramus (MR) in rats in readaptation period after 60-day application of sodium benzoate (SB) and exposure to ionizing radiation (IR), and finding possibility of medication with sea buckthorn oil (SBO).

Methods: The experiment involved 240 rats with initial body weight of 180–200 g. The animals were distributed into 8 groups as follows: intact animals for the controls, animals that received per os SB in dosage of 1500 mg/kg daily for 60 days, animals exposed to IR (total 4 Grey in 4 sessions), received SBO in dosage of 300 mg/kg, combined SB and IR, SB and SBO, IR and SBO, and all three agents simultaneously. The animals were withdrawn from the experiment by the 1st, the 7th, the 15th, the 30th, and the 60th day after cessation of experimental influences by means of anaesthetized decapitation. Upon expiration of observation terms MR prepared for chemical analysis.

Results: Upon SB discontinue, Ca share and Ca/P ratio decreased as compared to the controls by 4.56% and 6.81%; after IR discontinue same values decreased by 6.84% and 10.13%; after combined action of SB and IR those values were lower by 8.65% and 12.05% ($p < 0.05$ in all cases). Also, upon SB discontinue, Na and K shares increased as compared to the controls by 7.63% and 9.92%; after IR discontinue same values increased by 10.92% and 15.23%; after combined action of SB and IR those values were higher by 11.87% and 16.17%. Restoration of chemical composition also depended on influence: by the 30th day after SB discontinue some differences were still observed, and after cessation of combined action chemical composition of MR did not restore. Application of SBO reduced negative effects of experimental conditions on chemical composition of the MR. The best recovery outcome was observed in animals that received only SB and the worst recovery outcome was yielded in rats exposed to combined action of IR and SB.

Conclusions: 60-day application of SB in dosage of 1500 mg/kg of body weight, exposure to IR and combined action result in destabilization of chemical composition of MR that expands even to readaptation period. This fact urges searching for medication and prophylactic measures for such a state. According to our findings SBO well satisfies this demand.

P787

SARCOIDOSIS AND NASAL INVOLVEMENT: A NEW CASE

Y. Cherif¹, M. Mrouki¹, Z. Tayeb¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: The naso-sinus involvement of sarcoidosis is rare but may reveal the disease. We report the case of a patient where a naso-sinus localization with nasal bone lysis revealed systemic sarcoidosis.

Case report: A 36-year-old patient with no significant medical history complained for 4 years of rhinitis associated with nasal obstruction and dyspnoea. Skin examination showed lesions of lupus pernio in the right ear and cutaneous sarcoids in the face. The nasopharyngeal examination revealed ulcers of nasal mucosa and synechiae connecting the inferior cavities to the nasal septum, which are difficult to pass through. Apart an elevated level of the angiotensin converting enzyme, the biological assessment was normal. The screening of ANCA

antibodies was negative. The histological study of nasal cavity biopsies revealed granulomatous rhinitis without vasculitis. Those of the cutaneous lesions showed epithelioid and gigantocellular follicles without caseous necrosis, surrounded by lymphocyte infiltrate. The sinus CT showed osteolytic lesion of the left nasal bone with rupture of the cortical bone and a mass of nasal soft tissues. The chest CT scan showed bilateral medial, hilar and bronchial lymph node enlargement associated with bilateral parenchymal nodules. Bronchoalveolar lavage showed lymphocytosis and an inverted CD4/CD8 ratio at 3.05. The search for koch bacilli in sputum and tuberculin intradermoreaction were negative. The diagnosis of systemic sarcoidosis with cutaneous, naso-sinus and mediastino-pulmonary involvement was made. The patient was treated with oral corticosteroids. The clinical and radiological course was good. The current decline is six months.

Conclusion: Nasal sinus involvement during sarcoidosis is rare but sometimes serious and its rate does not exceed 3% of cases. The course is most often good when the disease is treated with corticosteroids.

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GIANT CELL ARTERITIS WITH MULTIPLE COMORBIDITIES: SUCCESSFUL TREATMENT WITH TOCILIZUMAB

P. Athanassiou¹, L. Athanassiou², C. Katsavouni¹, T. Banti¹, A. Tzanavari¹, I. Kostoglou-Athanassiou³

¹Department of Rheumatology, St. Paul's Hospital, Thessaloniki, ²1st Department of Medicine, Asclepeion Hospital, Voula, Athens, ³Department of Endocrinology, Asclepeion Hospital, Voula, Athens, Greece

Objective: Giant cell arteritis (GCA) is accompanied by multiple comorbidities, which are exacerbated by treatment with high dose corticosteroids. In particular, osteoporosis is a major problem in the management of patients with GCA, corticosteroids being up to now the cornerstone of the therapeutic management of the disease. The aim was to describe two cases of patients with GCA and multiple comorbidities, such as osteoporosis and diabetes mellitus, in which tocilizumab was administered.

Methods: The cases of two patients with GCA are described. GCA presented with headache, fever, blurred vision, pain of the temporomandibular joints and palpable temporal arteries. Diagnosis was made by biopsy of the temporal artery. In one of the patient MRI angiography was performed and inflammatory aortitis was diagnosed. After diagnosis corticosteroids were administered in both patients. Corticosteroid administration had as a result improvement of the symptoms. However, in the first patient cataract in one of her eyes and in the second patient osteoporosis and diabetes mellitus appeared. Corticosteroid tapering was attempted. However, the disease recurred with increment of CRP and ESR. Thereafter, methotrexate was administered. The disease persisted and azathioprine was given. Despite multiple therapeutic attempts the disease persisted. In the first patient, cataract, whereas in the second patient osteoporosis and microangiopathy due to diabetes mellitus appeared. Due to disease persistence and the adverse effects of corticosteroids, namely cataract, osteoporosis and diabetes mellitus, tocilizumab 162 mg sc/wk was administered.

Results: The administration of tocilizumab in the GCA patients had as a result disease improvement and significant corticosteroid tapering. Both patients receive methylprednisolone 4 mg/day. In both patients CRP and ESR are within normal range.

Conclusions: In the cases of GCA patients described herein the combination of tocilizumab administered subcutaneously and low dose corticosteroids had as a result control of the disease. Inflammation indices improved. GCA is a serious disease affecting quality of life. In particular, quality of life is affected both by the disease itself, as well as the adverse effects of corticosteroids, which up to the present were the mainstay of treatment for GCA patients. Corticosteroid administration contributed to the development of cataract, osteoporosis and diabetes mellitus in GCA patients. However, today the biological agent tocilizumab, an IL-6 receptor inhibitor, may be administered to GCA patients with attendant disease control, comorbidity reduction and quality of life improvement.

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DEMOGRAPHIC FEATURES IN SECONDARY OSTEOPOROSIS

M. Saridogan¹, U. Akarirmak¹, S. Tuzun¹, M. N. Alcicek¹, G. Durmushali Emin¹, D. Palamar¹

¹Istanbul University, Cerrahpasa Medical Faculty, Physical Medicine and Rehabilitation Department, Istanbul, Turkey

Objective: Secondary osteoporosis is caused by disorders or their treatments, that interfere with the attainment of peak bone mass or may cause bone loss. Prior to initiating treatment, patients should be evaluated for causes of secondary osteoporosis. The aim of the present study was to investigate secondary causes of osteoporosis in patients in the treatment of osteoporosis.

Methods: A retrospective study was performed on 2800 patients followed with the diagnosis of osteoporosis between 2012-2017 in Istanbul University, Cerrahpasa Medical Faculty outpatient clinic. In a total of 751 patients, secondary causes were detected and 677 (90.1%) of these patients were female, 74 (9.9%) were male. When the diseases causing secondary osteoporosis were examined, with 382 (50.9%) cases endocrinologic diseases were found to be the most frequent cause and 93.71% of these endocrine disorders were thyroid diseases; others were diabetes mellitus, hypogonadism, hyperprolactinemia. Malignancy was detected in 126 (16.77%) patients and 81.74% of these patients were followed up for breast cancer. 73 (9.7%) patients had rheumatologic diseases and 61.64% of these patients were under treatment for rheumatoid arthritis. 63 (8.4%) patients were under follow-up due to neurological diseases and 76.19% of these had multiple sclerosis. Chronic obstructive pulmonary disease and asthma disease were detected in 32 (4.3%) cases. 54 (7.19%) patients were followed and treated due to other secondary diseases such as pemphigus, hematologic diseases, osteogenesis imperfecta, and transplantation.

Conclusion: A significant number of osteoporosis patients may have secondary causes. Thus, secondary causes of osteoporosis have to be aware of and assessed. It is also necessary to evaluate patients with these secondary diseases, in terms of osteoporosis that could lead to increased risk of fracture and morbidity.

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DEMOGRAPHIC CHARACTERISTICS, DXA MEASUREMENTS AND FRACTURE HISTORY IN STEROID-INDUCED OSTEOPOROSIS

M. Saridogan¹, D. Palamar¹, N. Eskiurt², N. Ahmadli¹, B. Okur¹, U. Akarirmak¹

¹Istanbul University, Cerrahpasa Medical Faculty, Physical Medicine and Rehabilitation Department, ²Kolan Hospital Group, Physical Medicine and Rehabilitation Department, Istanbul, Turkey

Objective: Corticosteroid treatment is the most common cause of secondary osteoporosis and iatrogenic metabolic bone disease. Treatment with systemic and inhaled corticosteroids may cause bone loss and can be associated with major complications such as vertebral and femoral neck fractures. The aim of the present study was to investigate demographic characteristics, DXA measurements and fracture history in steroid-induced osteoporosis.

Methods: A total of 209 patients in use of corticosteroid who were followed up for osteoporosis in our outpatient clinic were retrospectively evaluated in terms of demographic characteristics, DXA measurements, and fracture history. 175 (83.7%) of these patients were female, 34 (16.3%) were male. The mean age of the patients was 51.94±14.29 and the BMI was 27.36±6.17. In 19.1% (40) of the patients there was a history of fracture.

Results: When we assessed DXA values of the patients, the median of lumbar total T-scores was -2.41 (min: -5.10, max: 0.90), the median of femur neck T-scores was -2.40 (min: -4.39, max: 3.0), and the median of femur total T-scores was -1.8 (min: -4.24, max: 1.20). 85.17% (178) of these patients were using systemic corticosteroids and 14.83% (31) were using inhaled corticosteroids. The mean age of the patients was 51.18±14.06 and 55.46±15.04 in patients using systemic corticosteroids and inhaled corticosteroids, respectively. The mean BMI was 27.03±6.12 in systemic corticosteroids group and 28.64±6.36 in inhaled corticosteroids group. 18% (32) of the patients using systemic corticosteroids and 25.80% (8) using inhaled corticosteroids had a history of fracture. In systemic corticosteroids group the median of lumbar total T-scores was -2.4 (min: -5.10, max: 0.50), femur neck T-scores was -1.80 (min: -4.39, max: 3.0), and the median femur total T-scores was -1.71 (min: -4.24 max: 1.20). In inhaled corticosteroids group the median of lumbar total T-scores was -2.52 (min: -4.67, max: 0.90), femur neck T-scores was -2.40 (min: -4.35, max: 0.02), and the median femur total T-scores was -1.92 (min: -3.40, max: 0.65).

Conclusion: Corticosteroid use is an important cause for secondary osteoporosis and may lead to increased fracture risk. Thus, it is very important to develop the knowledge about steroid-induced osteoporosis, especially with regard to effective follow-up, management and prevention.

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OSTEOSARCOPENIA IN COPD PATIENTS: THE FIRST RESULTS OF THE STUDY

A. Suleymanova¹, I. Baranova¹

¹Pirogov Russian National Research Medical University, Moscow, Russia

Objectives: The skeletal muscle dysfunction is one of the most frequent extrapulmonary manifestations in COPD. This may be the result of the different factors such as the chronic inflammatory process, age, reduced physical activity etc. Osteoporosis was evaluated in most COPD studies, but there are limited studies examining sarcopenia and osteosarcopenia in COPD patients. The aim of this study is to investigate the relationships

between osteosarcopenia and clinical/functional parameters in patients with stable COPD.

Methods: This cross-sectional study included 46 COPD patients (40 males/6 females, mean age 66.7 ± 8.6 years). The following data were obtained and analyzed: sociodemographic data, clinical parameters (including exacerbation history, the symptoms assessment (mMRC, CAT)), BMI, the 6-min walk distance test results, pulmonary function test data, serum 25OHD. BMD of the lumbar spine and hip, the muscle mass were assessed using DXA. A complete diagnosis of sarcopenia has been made for all subjects according to the algorithm developed by the European Working Group on Sarcopenia in Older People (EWGSOP). The patients were assessed according to GOLD.

Results: 32 patients had sarcopenia and 16 patients had osteosarcopenia. The most of these patients were classified as C and D groups when using the GOLD combined disease assessment tool. The following significant association were revealed. BMD correlated with COPD duration ($r = -0.567$, $p < 0.01$) and the 6-min walk distance test result ($r = 0.490$, $p < 0.05$). The appendicular lean mass/height² was associated with diffusing capacity for carbon monoxide (DLCO) ($r = 0.582$ ($p < 0.05$) and serum 25OHD ($r = 0.673$, $p < 0.05$). Respiratory muscle strength ($PI_{\max}$ and $PE_{\max}$) correlated with the 6-min walk distance test result ($r = 0.638$, $p < 0.05$), serum 25OHD ($r = 0.725$, $p < 0.01$). The most patients had lower 25OHD level (13.89 ± 10.14 ng/ml).

Conclusions: In our study osteosarcopenia was frequent comorbidity among COPD patients. It was associated with COPD duration, lung function and serum 25OHD level. Further studies are needed to clear the main risk factors of osteosarcopenia in COPD patients, to study correlation between sarcopenia and respiratory muscle strength and to evaluate the prognosis for patients with osteosarcopenia.

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ASSOCIATION BETWEEN LOW LEAN MASS AND LOW BMD IN 79 MEN WITH HIP FRACTURE

M. Di Monaco¹, C. Castiglioni¹, S. Di Carlo¹, E. Milano¹

¹Osteoporosis Research Center, Division of Physical Medicine and Rehabilitation, Presidio Sanitario San Camillo, Torino, Italy

Objective: The loss of both muscle and bone mass results in fragility fractures with increased risk of disability, poor quality of life, and death. Our aim was to assess the association between low appendicular lean mass (aLM) defined according to different criteria and low BMD in men with hip fracture.

Methods: 79 men admitted to our rehabilitation facility underwent DXA 19.1 ± 4.1 (mean $\pm$ SD) days after hip-fracture occurrence. Low aLM was identified according to either Baumgartner's definition (aLM/height² less than two standard deviations below the mean of the young reference group) or the criteria from the Foundation for The National Institutes of Health (FNIH): aLM < 19.75 kg, or aLM adjusted for BMI < 0.789 . Low BMD was diagnosed with a T-score < -2.5 at the unfractured hip (at least one of femoral neck and total femur).

Results: Using the FNIH definition the association between low aLM and low BMD was significant: χ^2 (1, $n = 79$) = 5.18 ($p < 0.023$), and it was confirmed after adjustment for age and fat mass ($p < 0.037$). Conversely, we found no significant associations between low BMD and either low aLM/BMI ratio defined according to the FNIH criteria ($\chi^2 = 1.45$; $p = 0.29$) or low aLM/height² defined according to Baumgartner's criteria ($\chi^2 = 0.90$; $p = 0.344$).

Conclusions: The association between low aLM and low BMD in men with hip fracture dramatically depends on the adopted

definition of low aLM. Major diagnostic changes at both individual and epidemiological levels are expected to be associated with changes in the reference definition. FNIH threshold for aLM (< 19.75 kg) emerges as a useful tool to capture men with damage of both the components of the muscle-bone unit.

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HOME TRAINING AND DORSAL PAIN IN OSTEOPOROTIC FEMALES WITH RHEUMATOID ARTHRITIS: A RANDOMIZED CLINICAL TRIAL

R. Traistaru¹, D. Matei¹, D. Kamal², A. M. Bumbea¹, O. Rogoveanu¹

¹University of Medicine and Pharmacy of Craiova, ²Elga Clinic, Craiova, Romania

Objectives: Chronic dorsal pain is one of the most common symptom in osteoporosis rheumatoid arthritis females leading to complex disability. Various therapeutic approaches have been proposed for chronic dorsal pain in females with rheumatoid arthritis and osteoporosis. The aim of our study is to compare the effects of two therapeutic approaches in these females in terms of pain, disability (severity of rheumatoid arthritis) and self-control of the complex disorders. We take into consideration the literature data about the evidence-based primary care options for chronic dorsal pain.

Methods: 56 patients (mean age 43.5 years) with rheumatoid arthritis (mean disease duration 8.66 years) and osteoporosis (mean disease duration 5.15 years) were randomized to the two groups in accordance to the type of treatment: group 1 (43% of patients) - medication and physiotherapy (12 sessions of TENS, interferential current, ultrasound), and group 2 (57% of patients) medication and supervised aerobic home training (daily, 6 weeks - stretching, strengthening exercises for hip muscles and mild running for 20 min). Outcome measures were VAS pain, DAS 28, BMD (T-Score), HAQ score and Arthritis Self-Efficacy Scale (ASES). All assessments were performed pre-post intervention and at six month follow-up.

Results: All the groups showed similar decrease in pain, DAS-28 values as well as HAQ on the third assessment and there was no significant difference between the groups. We obtained a significant improvement in ASES ($p < 0.05$) and T-score at six month follow-up ($p < 0.01$) after supervised home training.

Conclusions: All of the two therapeutic approaches were found to be effective in diminishing pain and disability in osteoporosis rheumatoid arthritis females with chronic dorsal pain, but aerobic training was found to be more effective in improving BMD (T-Score) and psychological status. Type and duration of physical training must be individualized to each patient, in accordance with functional status of rheumatoid arthritis. Our results confirm the literature data - physical activity is an interesting therapy for the prevention and treatment of bone loss and osteoporosis because it has no adverse side effects, it is low cost, and it confers additional benefits such as postural stability and fall prevention.

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ELDERLY PATIENTS WITH KNEE OSTEOARTHRITIS: ASSESSMENT AND REHABILITATION

R. Traistaru¹, A. M. Bumbea¹, O. Rogoveanu¹, A. Musetescu¹, C. Kamal¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objective: Knee osteoarthritis (KOA) is an important cause of musculoskeletal pain and disability in old patient. Synovitis and joint effusion are secondary phenomena in OA as a consequence of chondrolysis. Goals of complete rehabilitation program in KOA include controlling pain, maintaining and improving the range of movement and stability of affected joints, and limiting functional impairment, for an optimal quality of life. In our prospective study, we assessed the efficacy of complete program based on the Rumalaya treatment and rehabilitation program (TENS, ultrasound and exercise program) over the presence of synovitis or joint effusion in elderly patients with painful primary KOA. We evaluated the correlation between these sonographic aspects and functional parameters, before and after rehabilitation program. Synovitis and effusion were recorded in the suprapatellar recess using US equipment.

Methods: We studied 79 patients (48 women, 28 men), aged between 71–82 years. All patients were clinical, functional (VAS scale, Lequesne index and WOMAC scale) and imagistic (X-rays and sonography) evaluated. The complex rehabilitation program (educational, dietetic, pharmacological, physical - kinetic) was performed 5 days/week, 2 weeks. All subjects received only Rumalaya forte for 2 months and were evaluated at baseline (T1) and at 2 (T2) and 8 (T3) weeks.

Results: The studied parameters had improved, especially in T2 moment ($p < 0.05$). Multivariate analysis showed that sonographic aspects correlated statistically with VAS score, Lequesne index and WOMAC score. The pain improvement is correlated with sonographic aspects. After 8 weeks, improved functional status was maintained.

Conclusion: Our results reflected two aspects: the first - the favorable complex effect (clinical, functional and sonographic) of rehabilitation performed in the old patients with painful KOA; the second - Rumalaya forte is an optimal treatment of disability status in knee pain for old patients with OA.

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SPINA BIFIDA OCCULTA IN ABC SCHOLARS: ASSESSMENT AND REHABILITATION

C. Voinea¹, R. Traistaru², D. Kamal³, C. Kamal²

¹Scholar Department of Craiova, ²University of Medicine and Pharmacy of Craiova, ³Elga Clinic, Craiova, Romania

Objective: Spina bifida occulta (SBO) is a congenital defect often missed at birth but "found" later in life on an x-ray. SBO - a benign closed neural tube defect NTD posterior vertebral defect only without a meningeal sac - is located in lumbar-sacral spine and is usually asymptomatic but sometimes creates instability of the spine, low back pain (LBP) and leads to a higher incidence of posterior disc herniation. In most cases of young patients with SBO certain muscles of the back that stabilize the spine are reflexively inhibited and do not spontaneously recover even if patients are pain free with a return to normal activity levels. Our observational study is performed to investigate the incidence of SBO on young patients with LBP and the relationship between pain and spine stability in accordance with kinetic program and functional parameters.

Methods: 120 young ABC scholars with LBP were enrolled in our study. Frontal (AP) and lateral lumbosacral regions were

radiological evaluated. We established clinical and functional parameters (VAS and The Roland-Morris Disability Questionnaire score) and made ultrasonography to measure the thickness of the erector spinae muscle at L4 and L5 level in maximum flexion, neutral posture, and maximum extension. All ABC scholars performed kinetic program for entire spine, 6 weeks, 3 sessions/week. All collected clinical and imagistic data were analyzed as raw data, or transformed into binary variables.

Results: The incidence of SPO is 18%. Common spinal deformities observed were kyphoscoliosis (35%) and increased lumbar lordosis (25%). Multivariate analysis showed that thickness differences between flexed and neutral, and flexed and extended maximally positions were correlated statistically with functional parameters. We obtained significant difference of functional parameters, pre and post kinetic program.

Conclusions: Although SBO are associated with stability of that segment, pain is more likely to arise in correlation with the erector vertebral muscle status. Visual observation of the image during contraction indicates that US may be a valuable biofeedback tool. Kinetic program (exercises that strengthen spine), avoiding sitting for long periods of time, sleep on an correct mattress and optimal daily activities are the most important recommendations for all ABC scholars with SBO.

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DEMENTIA AND SARCOPENIA

I. Kostoglou-Athanassiou¹, L. Athanassiou², P. Spyropoulos³, E. Xanthakou⁴, P. Athanassiou⁵

¹Department of Endocrinology, Asclepeion Hospital, Voula, Athens, ²1st Department of Medicine, Asclepeion Hospital, Voula, Athens, ³Endocrinologist, Athens, ⁴Endocrinologist, Sparta, ⁵Department of Rheumatology, St. Paul's Hospital, Thessaloniki, Greece

Objective: Dementia of various etiology is a modern medical entity which is a focus of research interest as well as a focus of interest for the patients themselves and their caregivers. The incidence of dementia has increased dramatically in all areas of the world recently. Eating and nutrition disorders may be a major problem for the patients and their caregivers as they affect the general health status of the patients. For the management of dementia cholinesterase inhibitors and NMDA receptor antagonists are used, which inhibit progression of the disease. Cholinesterase inhibitors and NMDA receptor antagonists induce gastrointestinal malfunction and may cause nausea and diminish appetite. The aim was to describe a group of patients with dementia of various etiology who received a therapeutic regimen for their disorder and appeared with decreased appetite and attendant sarcopenia.

Methods: A group of 10 patients, 8 female and 2 male, with dementia is presented. Patients suffered from Alzheimer's disease (5 patients), dementia of vascular etiology (4 patients) and post-traumatic dementia (1 patient). Patients received treatment with cholinesterase inhibitors and NMDA receptor antagonists.

Results: Patients presented with sarcopenia. Relative and absolute muscle mass, muscle strength, gait speed and sit-to-stand time were evaluated and found to be decreased. A complete laboratory investigation, including hormone and biochemical

profile, was made. Thyroid hormone profile was normal and hormones related to calcium metabolism, e.g., 25(OH)D3 and PTH, were also normal. Adequate nutrition and a mild exercise program was recommended for the management of sarcopenia. Yet, despite patients and their caregivers complied with the instructions for adequate nutrition and exercise, the problem of sarcopenia persisted.

Conclusions: A group of patients with dementia of various etiology being treated with cholinesterase inhibitors and NMDA receptor antagonists presenting with sarcopenia is described. Sarcopenia is presented as a manifestation of dementia and the accompanying appetite and eating disorders. Sarcopenia in the context of dementia may be a major problem for both patients and caregivers as it may reduce quality of life further and compromise physical function.

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TUBERCULOSIS SPONDYLITIS: A REPORT OF CASE WITH THORACIC SPINE LOCALISATION MIRJANA RUNCHEVA,¹ METODI ILIEV,² AND SASHO CENOV^{2,3,4,5} ORTHOPEDIC DEPARTMENT, CLINICAL HOSPITAL - SHTIP, SHTIP, FORMER YUGOSLAV REPUBLIC OF MACEDONIA

M. R. Runcheva¹, M. I. Iliev¹, S. C. Cenov¹

¹Clinical Hospital - Shtip, Shtip, Macedonia

Objective: Tuberculosis is still one of the most important health problems in the world. In developed countries, the proportion of extrapulmonary tuberculosis cases is increasing. Nowadays tuberculous spondylitis, also known as Pott disease, is a rare clinical condition but can cause severe vertebral and neurological sequelae that can be prevented with an early correct diagnosis. The aim of this paper is to increase awareness of tuberculous spondylitis in modern times, describing one case and discussing its best diagnostic and therapeutic approach based on the current literature. In 2014, among all 6 million notified cases of tuberculosis (TB), 0.8 million (14%) were new cases of extrapulmonary tuberculosis [1]. Tuberculous spondylitis, also called Pott disease, accounts for 1–5% of TB cases and represents about 50% of all bone and joint TB [2]. Despite the successful achievement in decreasing global pulmonary TB incidence in the last decades, the proportion of extrapulmonary tuberculosis seems to be increasing in developed countries, mainly as a consequence of higher immigration rates and human immunodeficiency virus (HIV) infection [3]. Despite all technological advances, the diagnosis of tuberculous spondylitis remains a clinical challenge since it depends on a high grade of clinical suspicion. Notwithstanding the low reported mortality of tuberculous spondylitis, this condition is still associated with significant clinical morbidity. In particular, significant diagnostic delay may lead to severe skeletal deformities and irreversible neurological complications [4]. The purpose of this paper is to describe one case of tuberculous spondylitis, focusing the diagnostic and treatment options according to the current literature.

Case report: A 33-year old Macedonian woman, nonsmoker, without a history of alcohol and drug abuse, and HIV negative, mother of two children. She did not have TB contact before. One month before, a history of severe back pain presentation, with no

constitutional or respiratory symptoms. Three days before first intrahospital evaluation she got neurological complication – lower limb paresthesia, and after these paraplegia. Magnetic resonance imaging (MRI) and CT scan of the spine revealed peripheral lesions located at T5-T7 vertebral bodies, associated with compression of spinal cord, intervertebral disc destruction, paravertebral abscess, and empyema. Surgical biopsy revealed MT (NAAT and culture positive; no drug resistance). The patient had surgery with fixation and arthrodesis of the segments involved. The microscopy smear of the acid-fast bacilli (AFB), the nucleic acid amplification test (NAAT), and the culture of *Mycobacterium tuberculosis* (MT) were positive, with no drugs resistance. The patient was started on isoniazid (H), rifampin (R), pyrazinamide (Z), and ethambutol (E) (HRZE) for 4 months, due to slow radiological resolution of the vertebral lesions, and remained in therapy with HR for 2 years.

Conclusion: Commonly, in tuberculous spondylitis, the symptoms develop insidiously due to the slow progression of the disease, contributing to a significant delay between symptoms onset and diagnosis. Even in developed countries, as we observed in the cases described, time to diagnosis can take more than six months, and it represents one of the worst prognostic factors [5]. Back pain is the most common symptom (83–100% of the patients), and constitutional symptoms, including fever, are relatively rare (33%) [3]. Spine deformities and neurological deficits are the worst complications of tuberculous spondylitis. Despite all the advances in diagnostic techniques, in developed countries, neurological deficits are still present at the time of diagnosis in 45% of the cases [6].

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PREDICTION OF INCIDENT FRACTURES BY HR-pQCT AMONG WOMEN WITH MODERATELY DECREASED BMD

M. Prorol¹, B. Merle², E. Vignot¹, P. Szulc², E. Lespessailles³, R. Chapurlat²

¹Hospices Civils de Lyon, Lyon, ²INSERM U1033, Lyon, ³Université d'Orléans, Orléans, France

The majority of fragility fractures occurs in non-osteoporotic women according to their aBMD. Our goal was to study the value of microarchitecture measured by HR-pQCT to predict fragility fracture risk in women with low BMD and to develop a combination of clinical, densitometric and microarchitectural factors.

The prospective QUALYOR cohort enrolled 1,579 postmenopausal women, 50 years or older, with a hip or spine T-score between -1 and -3. At baseline, we measured hip and spine

aBMD with Hologic Discovery A, microarchitecture at the distal radius by HR-pQCT and collected clinical risk factors for fracture. For 48 months, fracture events were collected (VFA, X-rays, surgical reports). Incident fracture risk has been modeled using Cox proportional hazard models. Reclassification techniques (IDI and method of areas under the Harrell's curve) have been used to quantify the improvement in fracture prediction provided by microarchitectural variables compared to a clinical-densitometric model.

125 women had one or more fragility fractures (fracture incidence of 7.9% over an average follow-up time of 3.6 years). After adjustment, the hazard ratio for fracture is 1.38 [1.18-1.61] per SD decrease in the trabecular number. A fracture risk prediction model combining {age, weight, femoral neck BMD, trabecular number} provides a significant improvement compared with a basic clinical-densitometric model ($p < 0.0001$ with IDI and $p = 0.045$ with area under the Harrell's curve). Compared to FRAX, the radius trabecular density improved the prediction of the risk of fragility fracture with 9.2% of fractured women correctly reclassified ($p < 0.01$).

Bone microstructure evaluation by HR-pQCT at the radius improves the prediction of fracture risk for women with moderately lowered BMD, confirming the results in a smaller cohort (OFELY) published recently (J Bone Miner Res 2017;32:1243).

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ANTHROPOMETRIC PARAMETERS IN BELARUSIAN CHILDREN WITH OSTEOGENESIS IMPERFECTA

I. Nenartovich¹, A. Pachkaila¹, E. Rudenka², A. Rudenka¹, V. Samakhavets³

¹Belarusian Medical Academy of Postgraduate Education, ²Belarusian State Medical University, ³Minsk City Clinical Hospital, Minsk, Belarus

Objective: To evaluate anthropometric data in children with osteogenesis imperfecta (OI).

Methods: We examined 20 patients with OI 5-17 (12 [6:15]) years old. Structure of OI types and severity was: I type – 14 (6 boys/8 girls), III – 5 (4 b/1 g), V – 1 (b); mild OI – 2 (g), moderate – 10 (7 b/3 g), severe – 8 (7 b/1 g) patients. We've analyzed anthropometric data with WHO Anthro+, used Anthropometric calculator. Average values: z-score were $-1SD < z \leq +1SD$, I failure degree: $-2SD < z \leq -1SD$, II failure degree: $-3SD < z \leq -2SD$, III failure degree: $z < -3SD$, high physical development: $z > +1SD$. Also we've used Belarusian national child growth rates and evaluated body mass, height, BMI and chest circumference; average values were: 25-75th, low: 10-25th, very low: <10th, increased: 75-90th, high: 90-95th, very high: >90 percentiles.

Results: By Anthro+: z-score weight-to-age: normal z-score identified in 5/20, I failure degree – in 1/20, III failure degree – in 13/20, obesity in – 1/20 patients; z-score height-to-age: normal – in 5/20, I failure degree – in 2/20, II failure degree – in 3/20, III failure degree – in 8/20, high – in 2/20 patients; z-score BMI-to-age: normal – in 11/20, I failure degree – in 1/20, II failure degree – in 1/20, III failure degree – in 1/20, overweight – in 1/20, obesity – in 5/20 patients. By National criteria: the height was average in 6/20, low – in 3/20, very low – in 11/20 patients. The body mass was average in 5/20, low – in 2/20, very low – in

10/20, increased – in 1/20, high – in 1/20, very high – in 1/20 patients. The BMI was normal in 15/20, low – in 1/20, very high (obesity) – in 4/20 patients. The chest circumference was average in 5/20, low – in 4/20, very low – in 8/20, increased – in 1/20, high – in 1/20, very high – in 1/20 patients; 3 patients had chest deformation.

Conclusion: By national criteria and Anthro+ the most of patients with OI have failure of weight, height, BMI and chest circumference.

P800

THE PAIN, DEPRESSION AND DISABILITY IN THOSE WITH LOW BACK PAIN

S. Nejkov¹, M. Vukovic¹, V. Bokan-Mirkovic¹, Z. Skaric-Karanikic¹, D. Vucic²

¹Center of Physical Medicine and Rehabilitation, Clinical Center of Montenegro, Podgorica, ²Institute of Physical Medicine, Rehabilitation and Rheumatology "Dr. Simo Milosevic", Igalo, Montenegro

Objective: Low back pain (LBP) is common, affecting most people at some point in their lives. In the last decade, there has been an increased focus on early identification of patients at risk for developing persistent LBP. The aim of this study was to examine the association between pain on one side and depression and disability on other side, in patient with LBP

Methods: Thirty patients with LBP (duration >3 months) were included in the study. The Patient Health Questionnaire (PHQ-9) is used for screening and measuring the severity of depression. We used The Keel Start Back Screen Tool (SBT) for screening prognostic indicators (both physical and psychosocial risk factors) for persistent, disabling low back. Based on the SBT scores, patients can be categorized into three groups: with total score between 0–3, patients are classified as low risk (minimal treatment, e.g., self-management strategies), those with scoring 3–4 points on total score are classified as medium risk (appropriate for physiotherapy management) and those scoring 4 or more, are classified as high risk of poor prognosis, regarding persistent disability (suitable for management with psychologically informed interventions). Visual Analogue Scale (VAS) is used for evaluated back pain. We used EZR statistical software in the statistical analysis.

Results: The demographic data of our study showed that 70% (21/30) were women (mean age 53.19 ± 13.31) and 30% (9/30) were men (mean age 55.55 ± 13.20). Mean value of VAS was 6.43 ± 1.86 , PHQ9 was 4.93 ± 4.13 and SBT was 4.26 ± 1.64 . There is no correlation using Pearson's rank test between PHQ9 and VAS ($t = 1.3097$, $df = 28$, correlation coefficient = 0.24, p value = 0.201) and between SBT and VAS ($t = 0.75299$, $df = 28$, correlation coefficient = 0.141, p -value = 0.4577). There is a correlation between SBT and PHQ-9 using the Pearson's rank correlation test ($t = 4.4261$, $df = 28$, p -value = 0.0001329, correlation coefficient 0.642).

Conclusion: The patients in this study is categorized as having high risk for developing persistent LBP and activity limitations. Our study has shown a positive correlation between high risk of disabling low back and depression, which is in line with previous research.

P801

BONE MARROW ADIPOSITY AND IGF SYSTEM IN OBESE CHILDREN AND ADOLESCENTS

E. Darrigo¹, S. Sader¹, T. Siena¹, M. Nogueira-Barbosa¹, J. Elias Jr¹, R. Liberatore Jr¹, L. Del Ciampo¹, I. Ferraz¹, F. J. De Paula¹, C. E. Martinelli Jr¹
¹Ribeirao Preto Medical School, Ribeirao Preto, Brazil

Objective: Body weight has a close correlation with bone mass in humans and high fracture rates has been reported in both obese and underweight individuals. It is not clear the role of bone marrow adiposity (BMA) and the IGF system in this process. The aim of this study was to analyze bone composition and BMA in obese and non-obese children/adolescents and correlate them with the expression of the IGF type-1 receptor (IGF1R) in peripheral lymphocytes and serum concentrations of IGF-I and IGFBP-3.

Methods: Thirty subjects aged 8-18 years old were enrolled and divided into 2 age-matched groups: obese (n=15) and non-obese (n=15). These groups were submitted to anthropometric evaluation, lumbar spine (L1-L4 and L3) and total body bone densitometry and lumbar spine and total abdominal magnetic resonance. Blood sample was collected at the same moment for IGF-I, IGFBP-3, IGF1R and biochemical evaluation.

Results: BMA was similar in the obese group and non-obese. BMD was higher in the obese group compared to non-obese even after adjustment for bone age or volumetric densitometry analysis. No correlation was found between BMA and BMD. A positive correlation between BMD and both fat mass and lean mass was observed in obese patients. On the other hand, in the non-obese group a positive correlation was found only between BMD and fat mass. IGF-I and IGFBP-3 concentrations were similar in both groups. No difference was observed regarding IGF1R gene expression. No correlation was observed between BMA or BMD and IGF1R gene expression, serum IGF-I or IGFBP-3 concentrations.

Conclusion: It was shown that there is no difference in BMA between obese and non-obese children/adolescents. A possible role for the IGF system in the BMA determination seems to be more important at paracrine/autocrine level. Body composition, especially fat mass, seems to be important in determining bone mass in obese children/adolescents.

P802

SEVERE VITAMIN D DEFICIENCY AS A CAUSE OF HIP FRACTURES

I. Kostoglou-Athanassiou¹, L. Athanassiou², A. Giannakopoulos³, A. Pastroudis³, P. Athanassiou⁴

¹Department of Endocrinology, Asclepeion Hospital, Voula, Athens, ²1st Department of Medicine, Asclepeion Hospital, Voula, Athens, ³6th Department of Orthopedics, Asclepeion Hospital, Voula, Athens, ⁴Department of Rheumatology, St. Paul's Hospital, Thessaloniki, Greece

Objective: Vitamin D deficiency is associated with the development of osteomalacia, as it decreases intestinal calcium absorption and bone mineralization. However, severe vitamin D deficiency may also be correlated with secondary hyperparathyroidism which induces osteoporosis. In addition, it induces muscular dysfunction which along with frailty in old age it may induce falls. The aim was to present a group of patients with severe vitamin D deficiency who developed a hip fracture.

Methods: A group of 10 old frail patients, aged 82-97 years, is presented, who developed a hip fracture. Patients were successfully operated for the hip fracture. Laboratory evaluation revealed marginally low blood calcium, low urinary calcium and very low 25(OH)D3 levels [25(OH)D3<7 ng/ml, normal range >30 ng/ml].

Results: Cholecalciferol was administered to the patients initially in high dosage, thereafter in lower doses. The patients recovered fully. A period of six months after discharge from the hospital they were reevaluated. They had normal 25(OH)D3 levels and they had recovered, physical condition found to be similar to that previous to the hip fracture.

Conclusions: In the group of patients with hip fracture presented the observed severe vitamin D deficiency contributed to the development of hip fracture,

whereas the administered vitamin D acted therapeutically and contributed to the postsurgical rehabilitation of the patients. Thus, it is recommended that in old patients presenting with a hip fracture vitamin D levels should be measured and the respective vitamin D deficiency should be corrected therapeutically with the administration of cholecalciferol. In frail patients who live in closed accommodation, due to inability to get out, the measurement of vitamin D should be performed. Vitamin D administration is recommended for the prevention of falls and fractures in this group of patients.

P803

SARCOPENIA AND VITAMIN D DEFICIENCY AFTER LONG-TERM TREATMENT IN AN INTENSIVE CARE UNIT

I. Kostoglou-Athanassiou¹, E. Pantazi², L. Athanassiou³, E. Xanthakou⁴, P. Spyropoulos⁵, P. Athanassiou⁶

¹Department of Endocrinology, Asclepeion Hospital, Voula, Athens,

²Department of Endocrinology, Alexandra Hospital, Athens, ³1st

Department of Medicine, Asclepeion Hospital, Voula, Athens,

⁴Endocrinologist, Sparta, Greece, ⁵Endocrinologist, Athens,

⁶Department of Rheumatology, St. Paul's Hospital, Thessaloniki, Greece

Objective: Sarcopenia is an emerging problem in patients having been hospitalized for a long period of time in an intensive care unit. Long-term treatment in an intensive care unit may be life-saving, as it may save the patient from his acute health problem. However, recurring life-threatening infections prolong hospitalization and even if patients leave the intensive care unit alive, they may have serious health issues. The aim was to describe the case of a patient who developed severe generalized sarcopenia after long-term hospitalization in an intensive care unit.

Methods: A patient, male, aged 42 years, presented with a myocardial infarction. He needed hospitalization in an intensive care unit. Thereafter, he recovered, however a second myocardial infarction necessitated his hospitalization in the intensive care unit again. The patient had diabetes mellitus type 1 on insulin therapy since childhood. During his hospitalization he developed severe repeated life-threatening infections and sepsis. After a period of six months, laboratory investigations revealed TSH 9.1 mIU/L (normal range 0.4-4.5 mIU/L) and 25(OH)D3 7.2 ng/ml (normal range >30 ng/ml).

Results: As a result of the repeated myocardial infarctions the patient developed cardiac insufficiency and mild renal insufficiency. Despite the effort for rehabilitation the patient developed severe sarcopenia. Relative and absolute muscle mass and muscle strength were evaluated and found to be extremely decreased. The patient could not get up and stand, therefore it was impossible to evaluate gait speed and sit-to-stand time. Thyroxine was administered at a dose of 50 µg/day and cholecalciferol was given at a dose of 25.000 units/wk orally. Intensive rehabilitation was initiated.

Conclusions: Treatment in an intensive care unit may be life-saving, leaving however the patient with long-term serious health issues. Sarcopenia is a severe health issue for a patient after long-term hospitalization in an intensive care unit. It requires good nutrition and intensive rehabilitation, so as the patient may recover his previous physical condition. Vitamin D deficiency may aggravate the problem of sarcopenia. Yet, although vitamin D deficiency may be corrected and adequate nutrition may be administered, without early and intensive rehabilitation, the patient may be left with severely impaired physical function. It is important to note that intensive rehabilitation must commence either within the intensive care unit or immediately after discharge from the unit, so as to prevent further deterioration of physical function.

P804

METABOLIC SYNDROME AGGRAVATES OSTEO- AND RHEUMATOID ARTHRITIS IN THE RAT

M. Bagi¹, J. Edwards¹, R. Berryman¹

¹Pfizer, Groton, USA

Metabolic Syndrome (MetS) combines several disorders including central obesity, insulin resistance, hypertension and atherogenic dyslipidemia.

Obese patients with MetS are more prone to osteoarthritis (OA) due to increased and uneven loads of the joints that can be further aggravated with adipokines, insulin resistance, systemic low-grade inflammation and lipid toxicity. Similarly, disorders of MetS and transformed adipokine profiles have also been associated with rheumatoid arthritis (RA). Our objective was to create OA and RA in the rat model of human MetS and test the hypothesis that MetS associated obesity, diabetes and inflammation aggravate progression of OA and RA.

All procedures performed were in accordance with regulations and established guidelines, reviewed and approved by the Pfizer IACUC. Mature male rats were given either standard diet and RO water (SD) or a high-fat, high-cholesterol diet and sugar water containing 55% fructose and 45% glucose (HFD). The rats kept on HFD also received a single dose of streptozotocin (Sz) to induce diabetes. OA was induced by partial medial-meniscectomy tear and RA by weekly intra-articular injection of 2% carrageenan. Alizarin and calcein were injected to label actively forming bone surfaces.

Serum chemistry, liver enzymes and biomarkers of bone metabolism were evaluated throughout a 16-week study. Ultrasound and histology were used to assess liver fibrosis. Cancellous and cortical bone was evaluated by mCT, 3-point bending and dynamic histomorphometry. Cartilage was assessed by contrast enhanced mCT and histology.

Rats fed a HFD developed several traits of MetS including central obesity, liver steatohepatosis and a mild diabetes. Bone structure was impaired in HFD rats relative to controls. Both OA and RA of the knee joint were successfully induced in rats regardless of the diet fed, however the disease was more severe in HFD rats. This study identified comorbidities of MetS as significant risk factors for increasing severity of OA and RA and showed that composite animal models that mimic complex diseases such as MetS can be successfully developed.

P805

TRABECULAR BONE SCORE IN WOMEN WITH COELIAC DISEASE: A CROSS-SECTIONAL STUDY

E. P. Thong¹, E. Newnham², B. J. G. Strauss³, P. R. Ebeling⁴, H. J. Teede⁵, F. Milat⁶

¹Monash Health, Clayton, Australia, ²Eastern Health, Box Hill, Australia, ³University of Manchester, Manchester, UK, ⁴Monash University, ⁵Monash Centre for Health Research & Implementation, ⁶Hudson Institute of Medical Research, Clayton, Australia

Objectives: The detrimental effects of coeliac disease (CD) on bone health are well established. Individuals with CD have an increased risk of osteoporosis and fractures, but few studies have evaluated bone microarchitecture in CD. Our aim was to evaluate trabecular bone score (TBS) derived from DXA images, as an indirect assessment of bone microarchitecture in individuals with CD compared with controls.

Methods: TBS was obtained from 29 female participants who were diagnosed with CD at age ≤ 55 years, 5 years after diagnosis(1), and from 29 female controls without CD. There was no history of prior fracture in either group. Multiple linear regression was performed to evaluate associations between age, BMI, CD and menopausal status, and TBS.

Results: Women in the CD group were five years younger (47.1 ± 10.0 vs. 52.2 ± 7.4 years, $p=0.03$). There were no significant differences in BMI (25.7 ± 3.2 vs. 25.2 ± 4.9 kg/m², $p=0.64$), lumbar spine BMD (1.16 ± 0.21 vs. 1.15 ± 0.18 g/cm², $p=0.83$), femoral neck BMD (0.96 ± 0.12 vs. 0.92 ± 0.10 g/cm², $p=0.21$) or menopausal status (54.8% vs. 75.9% postmenopausal, $p=0.11$) between groups. Individuals with CD had significantly lower TBS compared with controls (1.36 ± 0.11 vs. 1.41 ± 0.06 , $p=0.03$), despite an 89.7% mucosal remission rate on duodenal biopsy, 5 years after CD diagnosis. 27.5% of the CD group demonstrated seropositivity to either tissue transglutaminase or deamidated gliadin peptide antibodies. Using a cutoff of 1.35, 45.2% of the CD group had TBS in the degraded range, compared with 13.8% of controls ($p=0.01$). TBS was negatively

associated with both CD and postmenopausal status, but positively associated with lumbar spine BMD and BMI, suggesting neither BMD, nor menopausal status were responsible for the lower TBS in CD.

Conclusion: We show, for the first time, women with CD had significantly lower TBS compared with older controls matched by BMI and BMD. Degraded TBS secondary to CD was present in half of CD patients, despite remission. This suggests deteriorations in bone microarchitecture do not resolve after diagnosis of CD and treatment with a gluten-free diet. Longitudinal studies evaluating changes in bone microarchitecture in CD and how this relates to fracture risk, are now needed.

P806

RELATIONSHIP OF MUSCLE FUNCTION AND MASS WITH DXA-DERIVED 3D PARAMETERS

B. Buehring¹, D. C. Krueger¹, R. Winzenrieth², L. Humbert², N. Binkley¹

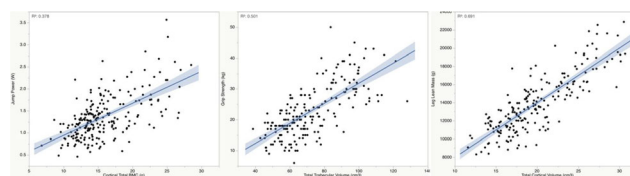
¹University of Wisconsin-Madison, Madison, USA, ²Galgo Medical, Barcelona, Spain

Objective: Muscle function (MF) is an independent predictor of fractures. Impaired MF not only increases falls risk but also alters bone mass and geometry. Traditionally, DXA measured areal BMD but did not estimate bone geometry or BMD distribution among bone compartments. Using a statistical model together with a 3D-2D registration approach based on qCT images, 3D-SHAPER software (v2.7, Galgo Medical, Spain) provides bone geometry and distribution estimates from anteroposterior DXA hip images. We hypothesized as a measure of validity of this approach that muscle function correlates with 3D-DXA parameters.

Methods: Data from older community dwelling participants from several studies in which muscle function, mass and proximal femur DXA were measured were used to correlate jump parameters, grip strength, gait speed and leg lean mass (LM) with DXA-derived 3D parameters (such as regional volume, density, BMC and BMD). Descriptive statistics and linear regression were used to examine these relationships.

Results: A total of 240 individuals (89 men /151 women) age 80 ($SD \pm 6.6$) years were included in the analysis. Mean jump power was $1.37 (\pm 0.5)$ W, grip strength $23 (\pm 8.4)$ kg, gait speed $0.89 (\pm 0.2)$ m/s. Leg LM was $14 (\pm 3.2)$ kg and areal total hip BMD was $0.900 (\pm 0.152)$ g/cm². Cortical and trabecular volume were $20 (\pm 4.4)$ cm³ and $72 (\pm 17.9)$ cm³, cortical and trabecular BMC were $16 (\pm 4.2)$ g and $10 (\pm 4.3)$ g respectively. Men generally had higher muscle function, mass and bone parameters than females. R^2 varied between muscle and bone parameter regressions but were best for leg LM and cortical and trabecular volume and BMC (up to 0.69), followed by grip strength (up to 0.51) and jump power (up to 0.38). DXA hip BMD values also correlated with jump power, grip strength and leg lean mass but R^2 values were lower (0.15 to 0.23). No significant correlation was found with gait speed.

Conclusion: In a cohort of older adults we found a correlation between leg LM and muscle functional tests that require high power and force (i.e., jumping and hand grip) with DXA-derived 3D parameters but not with gait speed. As force is known to be the primary parameter related to bone strength our data support validity of the 3D-SHAPER model. Larger and prospective studies are necessary to test whether DXA-derived 3D parameters can be used to better identify older adults at elevated fracture risk.



P807

IS OSTEOPOROSIS SELF-ASSESSMENT TOOL A GOOD SCREENING TOOL FOR MALE OSTEOPOROSIS?

P.-C. Wu¹, D.-H. Liu²¹Department of Chinese medicine, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, ²Department of Physical Medicine and Rehabilitation, Shin Kong Wu Ho-Su Memorial Hospital, Taipei City, Taiwan**Objective:** Validation and comparison of Osteoporosis Self-assessment Tool (OST) in multiple male races.**Methods:** We collected all researches about OST in men from MEDLINE®/PubMed®. Finally, 6 articles were included and summarized in table 1. The OST was calculated based on age and body weight using the following formula: [body weight (kg) – age (years)] × 0.2.**Results:** In Table 1, the OST has acceptable sensitivity (64.0-87.3%), fair specificity (36.0-60.3%) and high negative predictive value (83.0-97.5%) in multiple male races. The High negative predictive value can screen out men with low risk of osteoporosis. The area under the receiver operating characteristic curve (AUC) over 0.7 with p<0.05 was noted in U.S. Caucasians, U.S. Caucasians and Chinese in Hong Kong, but the AUC was unknown in China. The screening tool is poor and not acceptable if its AUC is under 0.7

Table 1 Validation of Osteoporosis Self-assessment Tool in multiple male races

Ethnicity	Portuguese	Indonesia	Moroccan	U.S. Caucasians	Africa Americans	U.S. Caucasians in Hong Kong	Chinese in Hong Kong	China
Age	≥50y/o					≥65 y/o		≥50 y/o
Osteoporosis Definition	WHO criteria: T-score ≤-2.5 at any one site of femoral neck, total hip, or lumbar spine							
Total Male Subjects	202	113	229	373	130	4658	1914	1488
Cut-off Value	3	2	2	5	6	1	-2	-1
AUC	0.659	0.574	0.667	0.72	0.58	0.714	0.759	NA
Sensitivity	0.735	0.74	0.64	0.754	0.7	0.793	0.818	0.873
Specificity	0.583	0.41	0.603	0.414	0.36	0.485	0.562	0.562
PPV	0.263	0.28	0.311	NA	NA	0.108	0.225	0.183
NPV	0.916	0.83	0.857	NA	NA	0.968	0.952	0.975

NA: Not Available; AUC: Area Under the receiver operating characteristic Curve; PPV: Positive Predictive Value; NPV: Negative Predictive Value

Conclusions: OST may be a simple tool with fair sensitivity/specificity and high negative predictive value. And it also could be a suitable screening tool to identify men at risk of osteoporosis, especially in U.S. Caucasians, U.S. Caucasians and Chinese in Hong Kong.**References:**

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P808

TIME FOR ACTION: CONFIDENCE, BELIEFS AND ATTITUDES IN BEST PRACTICE OSTEOARTHRITIS CARE IN THE CURRENT AND EMERGING HEALTH WORKFORCE INTERNATIONALLY

A. M. Briggs¹, B. Darlow², R. S. Hinman³, M. Leech⁴, K. L. Bennell³, A. Bendrup⁵, T. Pizzari⁵, P. Larmer⁶, A. M. Greig⁷, C. Mackay⁸, A. Francis-Cracknell⁴, J. E. Jordan⁹, H. Slater¹¹Curtin University, Faculty of Health Sciences, Perth, Australia, ²University of Otago, Wellington, New Zealand, ³University of Melbourne, Melbourne, Australia, ⁴Monash University, Melbourne, Australia, ⁵La Trobe University, Melbourne, Australia, ⁶Auckland University of Technology, Auckland, New Zealand, ⁷University of British Columbia, Vancouver, Canada, ⁸University of Toronto, Toronto, Canada, ⁹HealthSense (Aust) Pty Ltd, Melbourne, Australia**Objective:** A health workforce with requisite knowledge and skills is required to support implementation of contemporary osteoarthritis (OA)

models of care. We aimed to measure confidence, beliefs and attitudes of the current and emerging workforce concerning best-practice OA care.

Methods: A multinational (Australia, New Zealand and Canada) survey was delivered to clinicians (general practitioners (GPs), GP registrars, primary care nurses and physiotherapists) and final-year medical and physiotherapy students in 2017. Confidence in OA knowledge and skills was measured using a customised instrument. Biomedical orientation to care was assessed using the Pain Attitudes Beliefs Scale (PABS-biomedical; scored 10-60). Custom items measured extent of agreement regarding inevitability of total joint replacement (TJR), arthroscopy for management of knee OA, magnetic resonance imaging (MRI) for OA diagnosis/management and exercise as an intervention.**Results:** 1886 clinicians (1380 physiotherapists, 267 GPs, 81 GP registrars and 158 nurses) and 1161 students (465 medical and 696 physiotherapy) responded. Confidence in OA knowledge and skills was significantly greater in physiotherapists compared to GPs, GP registrars and nurses (p<0.001) and in GPs compared to nurses and GP registrars (p<0.01). Students' confidence scores were not significantly different. Biomedical treatment orientation was significantly greater in nurses compared to physiotherapists (mean difference; 95%CI: 6.7; 5.5-7.8), GPs (5.3; 3.9-6.6) and GP registrars (2.7; 0.8-4.6); in GPs compared to physiotherapists (1.5; 0.6-2.4); in GP registrars compared to physiotherapists (4.0; 2.5-5.6) and GPs (2.5; 0.9-4.2); and in medical students compared to physiotherapy students (2.0; 1.3-2.7). While most clinicians and students disagreed that TJR is inevitable (80.8-93.2% and 77.6-80.8%, respectively), fewer disagreed about the use of arthroscopy (63.7-82.4% and 55.6-65.5%) and MRI (38.6-91.1% and 47.5-79.0%). The majority agreed (90.4-98.0% and 91.4-96.8%) that exercise is indicated irrespective of the stage of OA.**Conclusion:** While physiotherapists self-reported superior confidence in OA care, for other disciplines, particularly nurses and trainees,

professional development that deemphasises a biomedical approach to management and explicitly informs indications for arthroscopy and MRI is needed.

P809

IN-VIVO ASSESSMENT OF ALTERED MECHANICAL RESPONSE OF METASTATIC FEMUR WITH AID OF IMAGE-BASED FINITE ELEMENT MODELS

C. Falcinelli¹, A. Gizzi¹, A. Di Martino¹, G. Vairo²

¹Campus Bio-Medico University of Rome, ²University of Rome "Tor Vergata", Rome, Italy

Objective: Scoring systems used to evaluate the femur fracture risk in patients with femoral metastases are characterized by a low specificity, overestimating the fracture risk [1]. As such, the fracture risk assessment in those patients is still challenging for clinicians. Computed tomography (CT)-based finite element (FE) models were widely used to characterize the femoral mechanical behavior and can be used to investigate the altered femoral mechanical response caused by changes that metastases induce on femur structure. A better understanding of the mechanical behavior of metastatic femur is crucial to a more accurate prediction of risk [2]. Thus, the objective of this study is to apply to clinical cases a comprehensive FE model of metastatic femur that includes a refined description of metastasis to accurately characterize the mechanical behavior of metastatic femur.

Methods: Femoral geometries were reconstructed from clinical CT images and discretized through unstructured meshes. Heterogeneous Young's modulus distribution was derived from the CT images and assigned to femur FE models. The metastases were identified using CT and MRI images and modelled through 3D functions. These functions were used to define different material properties for the lesion, in continuity with the healthy tissue to simulate changes of bone material properties due to metastasis. Different material model formulations were implemented (i.e., linear elastic and poroelastic) [3]. Stress and strain fields arising from the application of physiological loading were computed and compared among the different modeling approaches.

Results: Significant differences in strain and stress patterns were obtained comparing the patterns derived from the different material modeling formulations. These differences may lead to an enhanced prediction of femoral failure load and thus of fracture risk, improving the clinical scoring systems.

Conclusion: Preliminary results showed that a refined description of metastasis may yield to improve the mechanical behavior understanding of metastatic femur, and thus the capability to assess the femur fracture risk.

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P810

RELATIONSHIP BETWEEN THE DISEASE SEVERITY PARAMETERS AND OSTEOPOROSIS IN THE PATIENTS INCLUDED IN THE LUNG TRANSPLANTATION WAITING LIST

I. Baranova¹, A. Suleymanova¹, N. Karchevskaya², M. Kevorkova¹

¹Pirogov Russian National Research Medical University, ²Sklifosovsky Clinical and Research Institute for Emergency Medicine, Moscow, Russia

Objective: Osteoporosis is a frequent disease among patients with terminal stage of lung disease. The aim of the study was to evaluate the relationship between clinical/functional parameters and BMD of the patients in the waiting list for lung transplantation.

Methods: We conducted a cross-sectional study of the patients included in the lung transplantation waiting list. Demographic, clinical parameters of lung disease, lung function tests, laboratory data, osteoporosis risk

factors were analyzed. BMD of the lumbar spine and hip were measured by DXA.

Results: We evaluated 65 patients (33 females/32 males) with different lung diseases. The mean age was 34.82±11.07 years. 25 patients (38.5%) had cystic fibrosis, 19 (29.2%) had interstitial lung diseases, 4 (6.2%) had chronic obstructive pulmonary disease (COPD), 3 (4.6%) had non-cystic fibrosis bronchiectasis, and 14 (21.5%) had other diseases. 27 patients (41.5%) had long intake of oral glucocorticoids (OGCs). Only 4 patients had osteoporotic fractures. But 35 patients (53.8%) had low BMD (T/Z-score ≤ -2.5 SD). BMD correlated ($p < 0.05$) with BMI ($r = 0.30$), duration of OGCs therapy ($r = -0.40$), female gender ($r = 0.32$). We didn't reveal the significant association between BMD and age, the duration of the disease, daily OGCs doses, the history of smoking, PaCO₂ and the history of non-invasive ventilation treatment. In the patients with predominantly obstructive pattern of lung function tests, BMD correlated with forced expiratory volume in 1 second ($r = 0.57$; $p < 0.01$), forced vital capacity ($r = 0.51$; $p < 0.01$), airway resistance ($r = -0.66$; $p < 0.05$), diffusing capacity for carbon monoxide ($r = 0.65$; $p < 0.05$), PaO₂ on room air ($r = 0.6$, $p = 0.009$). In the patients with predominantly restrictive pattern of lung function tests, BMD correlated only with vital capacity ($r = 0.55$; $p < 0.05$).

Conclusions: Our study included younger patients than in most studies due to the high frequency of cystic fibrosis. Reduced BMD is prevalent in the patients with terminal stage of lung disease. The present results indicate that the development of osteoporosis in such patients is not as strongly associated with known risk factors of osteoporosis, as with the disease severity parameters, such as duration of GCs use, lung function tests, hypoxia.

P811

TRANSLATION, CULTURAL ADAPTATION, AND VALIDATION OF THE 10-YEAR FRACTURE RISK ASSESSMENT TOOL (FRAX) INTO FILIPINO

P. M. Del Rosario¹, M. J. Ticman¹, L. D. Caro¹

¹Department of Orthopaedics, East Avenue Medical Center, Quezon City, Philippines

Objectives: Screening tools for osteoporosis are relatively expensive and inaccessible to the general Filipino population. This study aims to develop a Filipino version of a validated measure, the Fracture Risk Assessment Tool, in order to facilitate improvement of fracture prevention care in the country.

Methods: The FRAX was translated and culturally adapted into a Filipino version using established forward and backward translation methods and was successfully tested for equivalence to the original. The final version was administered to 120 outpatients and was tested for reliability using BMD measurements of the distal radius.

Results: To be better understood and reliably answered by the Filipino population, several qualifiers were added to items such as those pertaining to previous fracture and rheumatoid arthritis. This was to account for the high incidence of high-energy trauma in the country, and the use of the same Filipino term for RA as with other arthritides, respectively.

Conclusion: The Filipino version of the FRAX appears to be an acceptable and reliable instrument, serving as a low-cost alternative to BMD and DXA scans which are generally inaccessible and unaffordable by majority of the population.

P812

UNCOMMON PRESENTATION OF A COMMON DISEASE

T. Arora¹

¹B.P.S.G.M.C. Khanpur Kalan, Sonapat, India

Objective: Uncommon presentation of common disease.

Method: Evaluation of diagnostic dilemma in a 14 year old patient not responding to standard treatment.

Results: A 14 year old boy presented with genu valgum, eversion deformity at the ankle joint, short stature, delayed development of teeth and bone pains. His radiographs showed cupping, fraying and splaying with widening of distal end of radius and ulna with generalised osteopenia. His blood chemistry showed low serum calcium (8.1 mg/dl), low phosphorus (1.8 mg/dl), very low vitamin D (4.5 ng/ml), normal serum creatinine with elevated intact iPTH (740 pg/ml). Patient was started on vitamin D and calcium supplementation but did not respond in next few months. He was reevaluated after 6 months of treatment and his blood workup showed high calcium (11.5 mg/dl), normal vitamin D levels (48.5 ng/ml) with persistently high iPTH levels (508 pg/ml). Tc99m sestamibi scan revealed right inferior parathyroid adenoma. Minimal invasive right inferior parathyroidectomy was done and histopathological report confirmed chief cell type parathyroid adenoma. Patient improved symptomatically during follow-up. He had significantly improved quality of life 12 months after surgery. His bone pains were gone and had significant improvement in bone deformities as well.

Conclusion: In children with hypocalcemia at presentation or children not responding to vitamin D supplementation; child should be evaluated to rule out primary hyperparathyroidism.

P814

AN ANALYSIS OF THE INFLUENCE OF HIGH SODIUM INTAKE ON TRABECULAR BONE SCORE (TBS) AND FRACTURE IN POSTMENOPAUSAL WOMEN

K. Nawata¹, M. Yamauchi², M. Yamamoto², T. Sugimoto²

¹Health and Nutrition, University of Shimane, Faculty of Nursing and Nutrition, ²Internal Medicine 1, Shimane University Faculty of Medicine, Japan, Izumo City, Japan

Objective: The role of high sodium (Na) intake in elevating fracture (Fx) risk remains unknown. On the other hands, a decrease in trabecular bone score (TBS), which is an indicator of the cancellous bone microstructure, is recognized as a risk factor for Fx, independent of BMD. Therefore, the present study investigated the influence of Na intake on TBS and Fx risk. **Methods:** The study examined 213 healthy postmenopausal women who had undergone osteoporosis screening. Levels of intact PTH, 25(OH)D, PINP and CTX, were measured. Lumbar (L) and femoral neck (FN) BMD were measured by DXA, and TBS (L1-4) was calculated. Nutrient intake was calculated using a food frequency questionnaire.

Results: Mean values of age was 63±8 years with the following measurements: L-BMD 0.84±0.15 g/cm², FN-BMD 0.62±0.09 g/cm², and TBS 1.31±0.07. Na intake was 5211±1697 mg. Na intake was not correlated with BMD or bone metabolic markers. In an analysis of TBS by quartile of Na intake, the highest Na intake group (highest Na) showed a value significantly lower than that of the lowest Na and high Na (p<0.05). While the presence or absence of vertebral Fx (VFx) showed significant differences in TBS, no such difference was observed between the Na intake and VFx in quartile analyses. On the other hand, while the presence or absence of non-VFx did not show differences in TBS and Na intake, the proportion of the presence of non-VFx in the highest Na (7561±1035 mg) was significantly higher as compared with the other groups. In a logistic regression analysis, the highest Na was identified as a significant risk factor for non-VFx even after adjusting for TBS, in addition to age, BMI, PTH, 25(OH)D, FN-BMD, other nutritional intake, and presence or absence of hypertension [odds ratio 3.1 (95%CI: 1.2-7.9), p<0.05].

Conclusion: Excessive Na intake deteriorates the cancellous bone microstructure. Excessive Na intake also elevates the risk of non-VFx. There was no significant association between the deterioration of the cancellous bone microstructure and the elevated risk of non-VFx.

P815

THE UNDER-DIAGNOSIS AND UNDER-TREATMENT OF OSTEOPOROSIS DUE TO INACCURATE CODING PRACTICES IN PRIMARY CARE IN UK

S. K. Nedungavil¹, S. Cooper², S. Davis³, M. Ninan⁴, R. Azzam²

¹Integrated MSK, Pain & Rheumatology Service, East Lancashire Hospital NHS Trust, Blackburn, ²Peel House Medical Practice, Accrington, UK, ³Burnleywood Medical Practice, Burnley, ⁴Darwen Healthcare, Darwen, UK

Objective: To study the burden of undiagnosed and untreated osteoporosis in primary care.

Methods: 47988 electronic patient records across 4 GP practices in North-West England were analysed using computerised algorithms. Patients with diagnosis codes for fragility fractures, osteoporosis, clinical risk fractures for osteoporosis and bone sparing therapy were identified. The data was used to quantify the prevalence rates, under-diagnosis and suboptimal treatment of patients.

Results: 15201 (31.67%) of patients were in the risk category for osteoporosis. The prevalence of osteoporosis was 1.6% (736 patients). 941 patients were analysed to have fragility fractures but only 336 (35.7%) patients of these patients were coded appropriately. Only 331 (43.38%) patients were on the right treatment for the condition while majority of 432 (58.69%) patients were not. 304 (47.87%) patients, despite being on treatment with bone sparing agents did not have a diagnosis code for osteoporosis.

Conclusion: There are clear guidelines on the diagnosis and management of Osteoporosis (1). However evidence suggests that under-diagnosis and under-treatment of the condition is not uncommon (2). This study identifies inconsistent coding of index events and lack of appreciation of co-existing clinical risk factors as the prime cause for under-diagnosis. The coding algorithm used in this study is robust in identifying the condition, easily replicable and should be the first step to ensure that patients are diagnosed in a timely manner. Timely secondary prevention measures reduces risk of further fractures and its resultant morbidity and mortality (3).

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CONDITION OF BMD IN PATIENTS WITH TYPE 2 DIABETES WITH INSULIN

Y. Dydyshka¹, A. Shepelkevich¹, V. Lobashova², E. Bogomolova¹, M. Mantachik¹, E. Brutskaya-Stempkovskaya, A. Sosedkova³

¹Belarusian State Medical University, ²Republic Center of Medical Rehabilitation, ³City Endocrinology Dispensary of Minsk City, Minsk, Belarus

Objective: There is epidemiological evidence the negative influence of type 2 diabetes mellitus (T2D) on bone quality, but the insulin anabolic effect on BMD is of interest. The aim of the study was the examination the relationship between the parameters of BMD and insulin therapy characteristics.

Methods: We studied 138 T2D patients with insulin in therapy (31 men and 107 women; mean age 51.43±8.41 yrs; duration of the disease 6.40±2.01 yrs; BMI 31.15±1.99 kg/m²; total daily dose (TDD) of insulin 0.74±0.12 U; duration of insulin use 3.86±0.87 yrs). Mean HbA1c was 8.05±0.95%, and patients were divided into two groups: 1st group (Gr1) 61 (44.2%) people predominantly compliant patients (HbA1c ≤ 7.5%), 2nd (Gr2) 77 (55.8%) people mostly not committed to the control of glycemia (HbA1c > 7.5%). The research involved anthropometry, general clinic examination, DXA performed on “Prodigy Lunar”.

Results: Osteoporosis was detected in 14.5% of cases (20 patients) with diabetes, osteopenia in 27.5% (38 people). There is a stronger degree of bone loss at femoral neck than at spine (W=14543.0; p<0.05): T-score – 0.81 (–1.81 – (–0.20)) vs. 0.01 (–0.54–0.60); U=148; p<0.001; and BMD 1.05 (0.85–1.14) vs. 1.22 (1.15–1.23) g/cm²; U=124; p<0.001). The

feedback is established with BMD and HbA1c in general group (T-score: $\rho=-0.35$, $p=0.012$; and g/cm²: $\rho=-0.21$, $p=0.039$; ρ – is the Spearman correlation coefficient) and in each subgroup. However, there was not a significant correlation between the TDD of insulin in Gr2 (T-score: $\rho=-0.42$, $p=0.127$; and g/cm² $\rho=-0.24$, $p=0.228$) and the duration of its use (T-score: $\rho=-0.31$, $p=0.102$; and g/cm² $\rho=-0.18$, $p=0.346$).

Conclusions: The data confirmed low BMD in type 2 diabetes mellitus patients. In the absence of target glycemia, the BMD correlates with the level of glycated hemoglobin, but not with the dose and duration of insulin therapy.

P818

THE MAJOR RISK FACTORS OF MALE OSTEOPOROSIS IN TAIWAN

D.-H. Liu¹, P.-C. Wu²

¹Department of Physical Medicine and Rehabilitation, Shin Kong Wu Ho-Su Memorial Hospital, Taipei City, Taiwan, ²Department of Chinese Medicine, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan

Objective: To detect the major risk factors of male osteoporosis in Taiwan.

Methods: A bus, equipped with DXA, serving for Taiwan countrywide BMD test was available between 2008-2011. Participants must complete a questionnaire regarding risk factors of osteoporotic fracture in FRAX®

tool before BMD test. The risk variables comprised gender, age, body height, body weight, previous fragility fracture, parent fractured hip, current smoking, alcohol consumption, glucocorticoids use, rheumatoid arthritis, and secondary osteoporosis. The participants are men (≥ 50 y/o). Osteoporosis was defined as lowest T-score ≤ -2.5 at any sites, including lumbar spine (L1–L4), total hip, femoral neck. We performed regression coefficients through the univariate and multivariable analysis to detect the major risk factors of male osteoporosis.

Results: A total of 2290 men (mean age: 69.6 ± 9.6 years) were enrolled in this study. Of the study subjects, 373 met the WHO definition of osteoporosis (16.3%). Through the univariate and multivariable analysis, we identified three major risk factors of osteoporosis, including age, body weight, and previous fragility fracture ($p < 0.05$). The index weights of the final three variables which derived from multiple variable regression are listed in Table 1. The regression coefficients for the univariate and multivariable analysis of male osteoporosis risk factors are showed in Table 1.

Table 1 Regression coefficients for the univariate and multivariable analysis of male osteoporosis risk factors in Taiwan

Variable	Univariate analysis			Multivariable analysis			Index weight
	β	SE*	p	β	SE*	p	
Age (vs. 10 years younger)	-0.172	0.030	<0.001	-0.092	0.029	0.001	-1
Body weight (vs. 10 kgs lighter)	0.358	0.027	<0.001	0.325	0.030	<0.001	3
Previous fragility fracture (vs. no)	-0.106	0.134	<0.001	-0.086	0.125	0.002	-1
Body height (vs. 10 cm shorter)	0.194	0.047	<0.001	0.022	0.050	0.471	
Parent hip fracture (vs. no)	0.016	0.098	0.579	-	-	-	
Glucocorticoids (vs. no)	-0.010	0.135	0.736	-	-	-	
Rheumatoid arthritis (vs. no)	-0.016	0.130	0.592	-	-	-	
Secondary osteoporosis (vs. no)	-0.021	0.113	0.482	-	-	-	
Smoking (vs. no)	-0.038	0.077	0.202	-	-	-	
Alcohol (vs. no)	0.013	0.138	0.661	-	-	-	

*SE: standard error; $p < 0.05$: statistically significant

Conclusions: Under the WHO definition of osteoporosis, this study revealed that the major risk factors of male osteoporosis in Taiwan are age, low body weight and previous fragility fracture.

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P819

CO-EXISTENCE OF CALCIUM PYROPHOSPHATE AND MONOSODIUM URATE CRYSTALS IN SYNOVIAL FLUID OF PATIENTS WITH PSORIATIC ARTHRITIS

S. T. Popova¹, M. Geneva-Popova², Z. Peshev³, V. Popova⁴

¹Medical University, Plovdiv, ²Medical University, Plovdiv, UMHAT "Sveti Georgi", Clinic of Rheumatology, ³Medical University, Plovdiv, Department of Clinical Pathology, ⁴Medical University, Plovdiv, UMHAT "Kaspela", Clinic of Rheumatology, Plovdiv, Bulgaria

Objectives: To investigate the frequency of monosodium urate and calcium pyrophosphate crystals in synovial fluid obtained from patients with psoriatic arthritis, the age of the patients with psoriatic arthritis, the duration of this disease and their treatment for the presence of crystals in the synovial fluid.

Methods: We analyzed results of synovial fluid obtained by aspirational arthrocentesis from one knee joint of 28 patients with psoriatic arthritis. For the identification of crystals we used polarization microscopy performed at the Department of Clinical Pathology, Medical University, Plovdiv. The analysis included the type of crystals, the age of the patients with the psoriatic arthritis, the duration of the disease and the type of treatment. The results were processed with the SPSS 24 statistical program.

Results: We found different crystals in patients with psoriatic arthritis in 22 patients (78, 57%). We found the presence of calcium pyrophosphate in 12 patients (42, 85%), monosodium urate crystals in 7 patients (25.0%), together both types of crystals in 3 patients (10.71%) and lack

of crystals in 6 patients (21.44%). The prevalence of calcium pyrophosphate crystals in the synovial fluid of patients with psoriatic arthritis is significantly more ($P=0.022$) than the presence of monosodium urate crystals in the observed patients. Patients who have monosodium urate crystals are older and have a longer duration of the disease ($P=0.01$). Of the patients who did not have crystals in the synovial fluid 3 had received treatment with the anti-TNF- α blocker.

Conclusion: Different crystals are found in patients with psoriatic arthritis with aspiration arthrocentesis, most often calcium pyrophosphate, monosodium urate or both. Future studies will show the effect of treatment with anti-TNF- α blockers on the lack of crystals in the synovial fluid of patients with psoriatic arthritis.

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P820

PRESENCE OF CALCIUM PYROPHOSPHATE AND MONOSODIUM URATE CRYSTALS IN SYNOVIAL FLUID OF PATIENTS WITH ACTIVE RHEUMATOID POLYARTHRITIS

S. T. Popova¹, M. Geneva-Popova², V. Popova³, Z. Peshev⁴

¹Medical University, Plovdiv, ²Medical University, Plovdiv, Bulgaria, UMHAT "Sveti Georgi", Clinic of Rheumatology, ³Medical University, Plovdiv, UMHAT "Kaspela", Clinic of Rheumatology, ⁴Medical University, Plovdiv, Department of Clinical Pathology, Plovdiv, Bulgaria

Objectives: To investigate the frequency of calcium pyrophosphate and monosodium urate crystals in synovial fluid obtained from patients with rheumatoid arthritis, the age of patients with the disease, the duration of the disease and the treatment of the patients.

Methods: We analyzed the results of synovial fluid obtained from aspirational arthrocentesis from one knee joint of 30 patients with rheumatoid

arthritis treated at the rheumatology clinic. For the identification of crystals we used polarization microscopy performed at the Department of Clinical Pathology, Medical University, Plovdiv. The analysis included the type of crystals, the age of the patients, the duration of the disease and the type of treatment. The results were processed with the SPSS 24 statistical program.

Results: We found different crystals in patients with rheumatoid arthritis in 8 patients (26.66%). We found the presence of calcium pyrophosphate in 2 patients (6.66%), monosodium urate crystals in 3 patients (10.0%), together both types of crystals in one patient (3.33%) and lipid crystals in 2 patients (6.66%). Patients with rheumatoid arthritis who had crystals were significantly older than those with no crystals ($P=0.01$). The same patients had a longer duration of the disease ($P=0.01$). We did not find patients with rheumatoid arthritis and crystals who received treatment with biological agents such as TNF- α blockers.

Conclusion: Despite differences in the pathogenesis of rheumatoid arthritis and crystals arthropathies, we have found crystals in the synovial fluid in patients with rheumatoid polyarthritis. The lack of crystals in patients with rheumatoid arthritis treated with anti-TNF- α blockers suggests a possible link between this treatment and the established finding in the synovial fluid of these patients.

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OSTEOPOROSIS AND FRACTURES IN PATIENTS WITH CIRRHOSIS: CAN FRAX BE USEFUL FOR SCREENING?

E. Casado¹, M. Arévalo¹, J. Profitós², A. Lira³, L. Del Río⁴, M. Larrosa¹, J. Sánchez-Delgado³, J. Gratacós¹

¹Rheumatology, University Hospital Parc Taulí (UAB), Sabadell,

²Gastroenterology and Hepatology, Consorci Hospitalari de Terrassa,

Terrassa, ³Gastroenterology and Hepatology, University Hospital Parc Taulí (UAB), Sabadell, ⁴Radiology, CETIR Centre Mèdic, Barcelona, Spain

Objective: Osteoporotic fractures are a serious complication in patients with cirrhosis. In addition to the high morbidity and mortality of the patients who suffer them, fragility fractures represent a high cost for healthcare systems. However, there are very few studies that evaluate the prevalence of osteoporosis and fractures in patients with liver cirrhosis different than primary biliary cirrhosis (non-PBC cirrhosis). There are also no clinical guidelines with recommendations for osteoporosis screening in these patients. Our aims were to assess the prevalence of osteoporosis and fragility fractures in patients with non-PBC cirrhosis in our environment, and the associated risk factors; and to analyse if the FRAX tool can be useful in the diagnostic screening of these patients.

Methods: From November 2015 to September 2017, outpatients older than 40 years diagnosed with non-PBC cirrhosis (any child stage) were randomly included. Demographic, clinical and analytical data (calcium, phosphorus, 25-hydroxyvitamin D and PTH) were collected from all patients. A bone densitometry, GE, Lunar Prodigy (DXA) and vertebral fracture assessment (VFA) were also performed, for the diagnosis of osteoporosis (T-score ≤ -2.5), and vertebral fracture. The 10-year absolute fracture risk was calculated using FRAX[®] (<https://www.sheffield.ac.uk/FRAX/tool.aspx?country=4>). A descriptive statistic of the main variables was carried out, with univariate and multivariate analysis to assess which predictive factors could be related to the presence of osteoporosis and/or fragility fractures.

Results: 92 patients were included (71% male and 29% female). Age 63 ± 11 years. The aetiology of cirrhosis was: alcohol (52%), hepatitis C virus (27%) and alcohol + hepatitis C virus (9%). Stage: Child A (80.4%), B (17.4%) and C (2.2%). Mean 25-hydroxyvitamin D was 18.5 ± 9.8 ng/ml and PTH 51.8 ± 23.0 pg/ml. 16 patients (17%) had osteoporosis by DXA, 54 patients (59%)

osteopenia and 22 (24%) had a normal BMD. 8 patients (9%) had suffered some fragility fracture (vertebral fracture in 6 cases). The 10-year absolute risk for major fracture (vertebra, humerus, femur or radius) by FRAX without BMD was 5.7 ± 4.5 ; and with BMD 4.7 ± 4.9 . Age and female sex were associated with the presence of osteoporosis, and a BMI higher than 30 was found to be a protective factor. A BMD in the range of osteoporosis was the only factor associated with fracture. FRAX for major fracture without BMD higher than 6.6% in this population had a high sensitivity (69%) and specificity (85%) for the diagnosis of osteoporosis, which implies a negative predictive value of 93%. Using this FRAX cutoff for indicating DXA in cirrhotic patients could expect a saving of 76% of DXA scans.

Conclusions: The prevalence of osteoporosis and fractures in patients with non-PBC cirrhosis, even in mild stages, is higher than in the healthy population, being more frequent in women and older patients. The FRAX tool can be useful in the selection of patients with cirrhosis to be assessed by a bone densitometry.

P822

EPIDEMIOLOGICAL FEATURES OF PERIPHERAL FRAGILITY FRACTURES IN MEN IN REPUBLIC OF MOLDOVA

V. Cazac¹, L. Groppa¹, E. Russu¹, L. Chislari¹, L. Rotaru¹

¹SMPU "Nicolae Testemitanu", Chisinau, Moldova

Objective: To determine the incidence and prevalence of fragility fractures in men, with comparison of epidemiological indexes between urban and rural areas in Republic of Moldova.

Methods: Approximately 6% of the state population was included in the study. Data regarding peripheral fragility fracture cases was collected from all specialized and primary medical institutions from the defined area. Fragility fractures of proximal humerus, distal forearm, proximal femur and distal calf, in men aged over 40 years old were collected. Using population statistics provided by the National Bureau of Statistics, epidemiological indexes regarding fracture incidence and prevalence were derived, with further comparison of derived epidemiological indexes for urban and rural areas.

Results: A general incidence of 659.5 peripheral fragility fractures per 100000 male population >40 years was determined, with a significantly higher incidence in urban areas (836.1 vs. 612.6, $p < 0.05$). The incidence of proximal humerus fracture was 67.1 per 100000 male population >40 years, significantly higher in urban areas (104.5 vs. 57.2, $p < 0.05$). The incidence of distal forearm fractures was 143.3 per 100000 population >40 years, significantly higher in urban areas (166 vs. 137.2, $p < 0.05$). The incidence of proximal femur fracture was 176.8 per 100000 population >40 years, significantly higher in urban areas (264.4 vs. 153.6, $p < 0.05$). The incidence of distal calf fractures was 272.3 per 100000 population >40 years, significantly higher in urban areas (301.2 vs. 264.6, $p < 0.05$).

Conclusion: There was an overall higher incidence of fragility fractures in the urban male population compared to the rural one, with a similar relationship in all four fracture groups. The association between urban residence and increased incidence of fragility fractures in men, could be attributed to a less active physical lifestyle (known risk factor in osteoporosis) in urban areas.

P824

BMD AND METABOLISM IN VERY ELDERLY PATIENTS WITH CONGESTIVE HEART FAILURE

S. Topolyanskaya¹, I. Osipovskaya², L. Lifanova³, T. Eliseeva², O. Vakulenko², L. Dvoretzky¹

¹First Moscow State Medical University (Sechenov University), Department of Hospital therapy N2, ²War Veterans Hospital N3, ³First Moscow State Medical University (Sechenov University), Moscow, Russia

Objective: Investigation of BMD and metabolism in very elderly patients with heart failure.

Methods: The study enrolled 125 patients (38 men and 87 women, aged 75-98 years) hospitalized with coronary artery disease (CAD); most of them (74%) were over 85 years. Study group comprised 61 patients with clinically significant CHF (NYHA FC III-IV), control group – 64 patients without clinically significant CHF symptoms. Main exclusion criteria were any other diseases that could cause osteoporosis as well as administration of medications reducing BMD. Lumbar spine and proximal femur BMD was measured by DXA on the Lunar Prodigy Advance (GE) machine. Also, fracture risk was measured under FRAX model, timed up and go test was conducted, and osteoporosis standard risk factors were analyzed. Osteocalcin concentration in the blood serum was measured by immunochemiluminescent method, and the β -CrossLaps level (degradation products of collagen type I) by electrochemiluminescence.

Results: BMD in the CHF patients was lower (both in absolute values and by the T-score) vs. the control group (age-matched patients with similar main disease – CAD). Largest differences were recorded in proximal femur: BMD in the CHF patients was $719.8 \pm 188.2 \text{ mg/cm}^3$ vs. $797.7 \pm 161.7 \text{ mg/cm}^3$ ($p=0.02$) in the control group. Greater differences in BMD were detected in female patients ($p=0.007$). Femoral neck BMD in the CHF patients was $649.4 \pm 137.1 \text{ mg/cm}^3$ vs. $696.2 \pm 121.8 \text{ mg/cm}^3$ ($p=0.03$) in the control group. There were no significant differences found in lumbar vertebrae BMD between the groups ($p=0.4$). Proximal femur BMD had normal values only in 5% of the CHF patients, whilst normal BMD values in the control group were in 31% of cases ($p=0.003$). A similar trend was found for lumbar spine

BMD, but these group differences did not achieve statistical significance ($p=0.11$). CHF impact on BMD was also confirmed during multiple regression analysis. It found that ultimate significant factors determining proximal femur BMD were CHF ($\beta=-0.375$, $p=0.005$) and female sex ($\beta=0.698$, $p<0.0001$). Reduced osteoblast function was observed in CHF patients: the mean osteocalcin level in the CHF patients was $1.2 \pm 1.7 \text{ ng/ml}$ vs. $4.2 \pm 4.1 \text{ ng/ml}$ ($p=0.03$) in the control group. In 60.6% of the CHF patients, osteocalcin concentration was below the lower limit of normal ($p=0.02$ vs. control). Also, mean β -CrossLaps level in the CHF patients reached $0.73 \pm 0.4 \text{ ng/ml}$ vs. $0.4 \pm 0.1 \text{ ng/ml}$ ($p=0.003$) in the control group. β -CrossLaps level was increased in 21.7% of the CHF patients, but no one had high β -CrossLaps values in the control group ($p=0.03$). There was negative correlation between β -CrossLaps concentration and BMD, especially in the proximal femur ($r=-0.4$, $p=0.03$). Negative correlation was found between TNF- α level with its serum concentration higher in the CHF patients ($p=0.04$) and BMD, especially in the proximal femur ($r=-0.9$, $p=0.03$). In patients with decreased leptin concentration (found only in the CHF patients), BMD values were lower than in those with normal or increased serum leptin concentration ($p=0.006$ for the proximal femur).

Conclusion: These study findings suggest that BMD in very elderly CHF patients is noticeably lower vs. the patient group similar in age and main diseases. This study has demonstrated significantly reduced osteoblast function in CHF patients and slight increase in bone resorption. Further studies of bone tissue condition in CHF patients with large patient sample and research into mechanisms of relationship between osteoporosis and heart failure are reasonable.

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ASSOCIATION BETWEEN NUTRIENT INTAKE AND OSTEOSARCOPENIC OBESITY: KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2008-2010

Y.-J. Bae¹

¹Shinhan University, Division of Food Science & Culinary Arts, Uijeongbu-si, South Korea

Objective: To examine the association between dietary intake and osteosarcopenic obesity (loss of bone and muscle mass with increased fat mass) in Korean females.

Methods: Data from 3,837 women aged ≥ 50 years were collected from the 2008-2010 Korea National Health and Nutrition Examination Survey. Body composition factors including BMD and fat and muscle mass were assessed by DXA. The association between nutrient and food intake and the score of body composition abnormalities, including low bone and muscle mass with increased adiposity, was analyzed by logistic regression adjusting for confounding factors.

Results: Participants with worse body composition scores tended to be older, less educated, and current smokers. There was also a tendency of less total energy and food intake for those with more adverse body composition. In women between 50-64 years old, those with more adverse body composition consumed significantly less milk.

Conclusions: Middle-aged and older women with co-occurring obesity, osteoporosis, and sarcopenia may have improper nutritional status with respect to micronutrients.

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P826

CORRELATION OF THE DURATION OF REHABILITATION WITH QUALITY OF LIFE AND PAIN IN PATIENTS WITH KNEE OSTEOARTHRITIS

S. Jandric¹

¹Faculty of Medicine of University of Banjaluka, Department of Physical and Rehabilitation Medicine, Banjaluka, Bosnia-Herzegovina

Objectives: Osteoarthritis of the knee is one of the leading causes of the pain, functional limitation and disability, especially in elderly patients. Physical therapy and rehabilitation have favorable therapeutic effect on the pain and quality of life in patients with knee OA. The aim of this study was to establish correlation of the duration of rehabilitation with age, pain and quality of life at the beginning and at the end of the rehabilitation of the patients with knee OA.

Methods: The study was designed as a retrospective study that included 40 consecutive knee OA patients (30 female and 10 male), average age of 66.4±8.1 years (range of 51–86 years) with diagnosis of knee OA according to ACR, that were hospitalized and treated in rehabilitation center. Average duration of the rehabilitation was 18.3±5 days. Program of kinesitherapy, occupational therapy, balneotherapy as well as procedures of the physical therapy were performed in all patients. Instrument used for assessment of the quality of life of these patients is a modified version of WOMAC Index and VAS scale for the pain assessment. All patients completed the questionnaires at the end of rehabilitation. Pearson test of correlation was used to analyze numerical data.

Results: Average value of the WOMAC score was 24.9±11.4 at the beginning and 17.9±9.3 at the end of rehabilitation. VAS scale was 6.4±1.9 at the beginning and 2.5±2.5 at the end of the rehabilitation. Duration of rehabilitation shows significant correlation with age ($r=0.525$, $p<0.05$).

Conclusions: Results of our research show that duration of rehabilitation of the knee OA patients is significantly associated with age. Age of the knee OA patients has significant influence on duration of rehabilitation. These findings can be important for planning rehabilitation of these patients.

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P827

CHRONIC PAIN AND VITAMIN D: THE DOVID STUDY, A RANDOMIZED PILOT STUDY IN PRIMARY CARE MEDECINE IN FRANCE

B. Merle¹, J. Haesebaert², M. Viprey², C. Bellouere³, J. Comtat³, L. Champiat³, S. Drujon D'Astros³, L. Magaud², C. Dupraz³, A. M. Schott⁴
¹INSERM U1033, Université de Lyon, ²Hospices Civils de Lyon & Health Services and Performance Research (HESPER) EA7425, ³Collège Universitaire de Médecine Générale, Université Claude Bernard Lyon 1, ⁴Hospices Civils de Lyon & Health Services and Performance Research (HESPER) EA7425, Lyon, France

Objectives: Several observational studies find a link between hypovitaminosis D and diffuse non-specific chronic musculoskeletal pain (DNCMP), but randomized controlled clinical trials evaluating the effectiveness of vitamin D supplementation are rare and their results heterogeneous. The DOVID study is a multicentric, controlled, randomized, double-blind pilot study conducted in community-based primary care practices in Rhône-Alpes, France. We aimed to evaluate the feasibility of a large-scale study to measure the efficacy of vitamin D vs. placebo supplementation on decreasing DNCMP intensity.

Methods: Patients aged 18–55 years old presenting DNCMP, with vitamin D <20.8 ng/ml and not supplemented in the last 3 months were randomized into 2 groups: oral cholecalciferol supplementation (600,000 IU, 3 intakes over 1 month) vs. placebo. Questionnaires evaluating chronic pain (BPI), quality of life (SF36), consumption of care and analgesics, eating habits and sun exposure were completed on D1, D45, D90. Total 25(OH)D level was measured at inclusion and D90. The primary endpoint was the decrease in the overall pain score between D1 and D90 (assessed by BPI item 5).

Results: Sixty-eight patients were included by 43 general practitioners (GPs). At D90, 91% of patients "supplemented" vs. 13% of "placebos" normalized their vitamin D level. No statistically significant difference in decrease in overall pain score between "supplemented" ($\Delta_{\text{moy}}=-1.91$) and "placebo" ($\Delta_{\text{moy}}=-2.61$) has been demonstrated ($p=0.33$). No significant difference between the 2 groups in other pain characteristics

(minimal, maximal, instantaneous pain), quality of life, or analgesic consumption was found between D1 and D90.

Conclusion: Treatment with vitamin D did not reduce pain in patients with DNCMP and vitamin D deficiency. The limited sample size of the trial and therefore its low statistical power limits the interpretation of the results. Several hypothesis could explain the low recruitment observed (limited eligible population due to frequent vitamin D supplementation, overestimation of the prevalence of DNCMP, difficulty to involve GPs in a clinical trial which methodology is hard to conciliate with an everyday practice) and should be considered to implement a larger scale study.

P828

BODY MINERAL DENSITY AND BODY COMPOSITION OF LONG-LIVER PATIENTS WITH CORONARY ARTERY DISEASE

S. Topolyanskaya¹, I. Osipovskaya², O. Vakulenko², T. Eliseeva², N. Balyasnikova², G. Kalinin², L. Dvoretzki¹

¹First Moscow State Medical University (Sechenov University), Department of hospital therapy N2, ²War Veterans Hospital N3, Moscow, Russia

Objective: Investigation of BMD in long-liver patients with coronary artery disease (CAD) and assessment of possible association between BMD, muscle strength and functional capacities.

Methods: 173 consequently admitted patients with CAD (females - 73%, males - 27%) aged 90–106 years were enrolled in this cross-sectional study. BMD and body composition were assessed by the DXA, handgrip strength by portable dynamometer, functional mobility by distance in the 6-min walk test.

Results: Overall BMD in the study group was 975.3±120.8 mg/cm³ and the mean T-score was -2.1SD (varying from -5.1 to +1.3SD). Osteoporosis has been diagnosed in 48.6% of all study patients, normal BMD was registered in 18.1% of subjects. The greatest BMD was recorded in lumbar spine (963.8±164.2 mg/cm³) and lower extremities (975.1±184.0 mg/cm³), the lowest BMD in ribs (613.3±82.6 mg/cm³). As expected, female patients had lower BMD in all parts of the body; the largest differences were observed in upper and lower extremities. The mean BMD in lower extremities in women was 899.5±118.6 mg/cm³, in men 1186.2±170.6 mg/cm³ ($p<0.0001$); the mean BMD in upper extremities was 733.5±83.4 и 919.6±116.7 mg/cm³, appropriately ($p=0.000001$). Significant positive correlation between BMD in all parts of the body and BMI was observed; the greatest significance was registered for trunk bones ($r=0.5$; $p=0.000009$) and ribs ($r=0.52$; $p=0.000003$). Also, significant correlation between fat mass in all parts of the body and BMD was observed. The greatest significance was detected for correlation between trunk BMD and trunk fat mass ($r=0.65$; $p<0.0001$), between BMD in ribs and trunk fat ($r=0.68$; $p<0.0001$). In addition, significant positive correlation between BMD in all parts of the body and lean mass was revealed; the greatest significance was detected for correlation between BMD in upper extremities and lean mass in upper extremities ($r=0.56$; $p<0.0001$) and for correlation between BMD in lower extremities and overall lean mass ($r=0.56$; $p<0.0001$). Positive correlation between BMD in all parts of the body and handgrip strength was registered (for upper extremities BMD – $r=0.38$; $p=0.02$; for lower extremities BMD – $r=0.46$; $p=0.0001$). BMD positively correlated with distance covered in the 6-min walk test ($r=0.36$; $p=0.003$ – for lower extremities BMD; $r=0.34$; $p=0.006$ – for overall BMD). In addition, negative correlation between BMD in all parts of the body and frailty scale scores was observed (for lower extremities BMD – $r=-0.4$; $p=0.0008$; for overall BMD – $r=-0.38$; $p=0.001$).

Conclusion: Study results demonstrated some features of body mineral density in patients with CAD aged 90 years or older. Relatively high percentage of patients in this population had normal BMD. The lowest BMD was revealed in ribs, the greatest BMD in spine and lower extremities. Significant associations between bone, fat and lean tissue as well as between BMD, muscle strength and functional capacities were observed in the study population.

P829

EPIDEMIOLOGY OF FRACTURES IN ARMENIA: DEVELOPMENT OF A COUNTRY-SPECIFIC FRAX MODEL AND COMPARISON TO ITS SURROGATE

S. Sahakyan¹, O. Lesnyak², A. Zakroyeva³, J. Bilezikian⁴, N. Hutchings⁵, V. Babalyan⁶, R. Galstyan⁷, A. Lebedev⁸, H. Johansson⁹, N. C. Harvey¹⁰, E. McCloskey¹¹, J. K. Kanis¹¹

¹Artashat Medical Center, Artashat, Armenia, ²North West State Medical University, St. Petersburg, Russia, ³Ural State Medical university, Ekaterinburg, Russia, ⁴College of Physicians & Surgeons, New York, USA, ⁵College of Physicians and Surgeons, New York, USA, ⁶“Diavant” LL, Yerevan, Armenia, ⁷Scientific Center of Traumatology and Orthopedics of the Ministry of Health of the Republic of Armenia, Yerevan, Armenia, ⁸Mechnikov North West State Medical University, St. Petersburg, Russia, ⁹Institute for Health and Ageing, Melbourne, Australia, ¹⁰University of Southampton, Southampton, UK, ¹¹Centre for Metabolic Bone

Diseases, University of Sheffield, Sheffield, UK

Objective: Fracture probabilities derived from the surrogate FRAX model for Armenia were compared to those from the model based on regional estimates of the incidence of hip fracture. Disparities between the surrogate and authentic FRAX models indicate the importance of developing country-specific FRAX models. Despite large differences between models, differences in the rank order of fracture probabilities were minimal. Armenia has relied on a surrogate FRAX model based on the fracture epidemiology of Romania. This paper describes the epidemiology of fragility fractures in Armenia used to create an Armenia-specific FRAX model with an aim of comparing this new model with the surrogate model.

Methods: We carried out a population-based study in two regions of Armenia (Ararat and Vayots Dzor representing approximately 11% of the country's population). We aimed to identify all low-energy fractures: retrospectively from hospital registers in 2011–2012 and prospectively in 2013 with the inclusion of primary care sources.

Results: The differences in incidence between the surveys with and without data from primary care suggested that 44% of patients sustaining a hip fracture did not receive specialized medical care. A similar proportion of forearm and humeral fractures did not come to hospital attention (48 and 49%, respectively). Only 57.7% of patients sustaining a hip fracture were hospitalized. In 2013, hip fracture incidence at the age of 50 years or more was 201/100,000 for women and 136/100,000 for men, and age- and sex-specific rates were incorporated into the new “authentic” FRAX model for Armenia. Compared to the surrogate model, the authentic model gave lower 10-year fracture probabilities in men and women aged <70 years but substantially higher above this age. Notwithstanding, there were very close correlations in fracture probabilities between the surrogate and authentic models (> 0.99) so that the revisions had little impact on the rank order of risk.

Conclusion: A substantial proportion of major osteoporotic fractures in Armenia do not come to hospital attention. The disparities between surrogate and authentic FRAX models indicate the importance of developing country-specific FRAX models. Despite large differences between models, differences in the rank order of fracture probabilities were minimal.

P830

CHANGES IN QUALITY OF LIFE AFTER OSTEOPOROTIC FRACTURES IN RUSSIAN FEDERATION: DATA FROM ICUROS STUDY

A. Solodovnikov¹, O. Lesnyak², K. Belova³, Y. Varavko⁴, G. Golubev⁵, V. Grebenshchikov⁶, O. Dobrovolskaya⁶, O. Ershova³, E. Zotkin², S. Ivanov⁷, A. Kochish⁷, L. Menshikova⁴, N. Toroptsova⁶, K. Usenko¹

¹Ural State Medical University, Yekaterinburg, ²North West Mechnikov State Medical University, St. Petersburg, ³Yaroslavl State Medical University, Yaroslavl, ⁴Irkutsk State Medical Academy for Postgraduate Education, Irkutsk, ⁵Rostov State Medical University, Rostov, ⁶Scientific and Research Institute of Rheumatology, Moscow, ⁷Russian Scientific and Research Institute of Traumatology and Orthopaedics, St. Petersburg, Russia

Objective: The International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) is a multinational observational study that aims to describe costs and Quality of Life (QoL) consequences of osteoporotic fractures. The objective of this publication is to describe changes in QoL following the first 18 months after osteoporotic fractures of five different locations (hip, wrist, vertebrae, humerus or ankle) in Russian population.

Methods: Data were collected at four time-points for five QoL point estimates: pre-fracture recalled QoL, within two weeks after fracture (Phase I), and at 4 (Phase II), 12 (Phase III), and 18 (Phase IV) months after fracture. Quality of life was derived from the EQ-5D-3L and presented in adjusted total score units. The data for the analyses were extracted from the ICUROS database on 15 May 2016.

Results: A total of 1143 subjects were recruited to the study and underwent the initial interview within 2 weeks after fracture. 106 (9.28%) subjects discontinued the study, and only complete cases (1037 subjects) were analyzed. There were three categories in QoL change: 1) hip fracture group has significantly lower QoL at all time points; 2) ankle, humeral and vertebral fracture groups were comparable for the majority of time points; 3) wrist fracture group maintained significantly higher QoL at all time points. Ankle fracture group showed the most significant and consistent QoL increase over time while QoL for vertebral fracture group remained basically the same from phase II and even decreased slightly at 18 months (Figure 1).

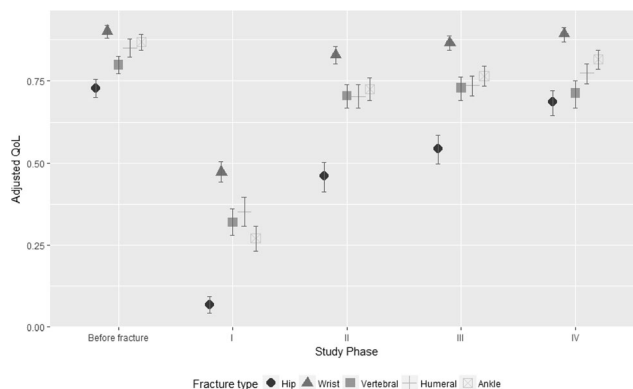


Figure 1. Quality of life by study phases and fracture type

Conclusions: Changes in QoL after osteoporotic fractures vary significantly depending on the fracture type. Hip fracture is associated with the most significant drop in QoL but shows consistent increase of QoL over time not reaching, however, pre-fracture values. Wrist fractures are showing better QoL at all time points with completely reversible changes. Vertebral fractures were associated with delayed but significant deterioration of QoL by 18th month after fracture.

Disclosures: In Russia, the study was supported by Hoffmann La Roche, Amgen and the Russian Osteoporosis Association.

P831

ASSOCIATION OF MENOPAUSE AGE AND NUMBER OF PREGNANCIES ON BONE MASS DENSITY AND TRABECULAR BONE SCORE: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

E. Taheri¹, A. Ghasemzadeh², G. Shafiee³, F. Sharifi⁴, R. Heshmat³, I. Nabipour⁵, B. Larijani⁶, A. Ostovar¹

¹Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran,

²Departments of Medicine and Endocrinology, Austin Health, University of Melbourne, Melbourne, Australia, ³Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁴Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁵Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, ⁶Endocrinology & Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: While BMD is a gold standard in the diagnosis of osteoporosis, trabecular bone score (TBS) is a novel gray-level texture measurement that is obtained after reanalysis of DXA exam. We aimed at investigating the association between reproductive health history parameters including menopause age and number of pregnancies with TBS and BMD in BEH study in Iran.

Material & method: A total of 1115 older women aged ≥ 60 years participated in the second stage of BEH, a prospective cohort being conducted in Bushehr, a southern city in Iran, were eligible to participate in the current analysis. BMD was measured using DXA (Discovery WI, Hologic, USA) and TBS was calculated using iNsight software. questionnaire was designed to collect initial data about the demographic and lifestyle status, general health and medical history and fertility history including menopause age and potential delivery frequency. The software SPSS version 22 was used for analysis.

Results: There were significant positive correlation of the age of menopause with TBS (L1: $r=0.07$, L2: $r=0.08$, L3: $r=0.05$, L1-L4: $r=0.07$, L2-L4: $r=0.06$; for all $P<0.05$) and BMD (L1: $r=0.14$, L2: $r=0.14$, L3: $r=0.17$, L4: $r=0.15$, L1-L4: $r=0.17$, L2-L4: $r=0.17$; for all $P<0.001$). The mean $\pm$ SD for TBS in L1 was significantly higher in women who received hormone replace therapy (1.25 ± 0.12) compared to untreated women (1.21 ± 0.12) ($P=0.02$). The frequency of delivery had negative correlation with both TBS (L1: $-r=0.11$, L2: $-r=0.14$, L3: $-r=0.15$, L4: $-r=0.08$, L1-L4: $-r=0.16$, L2-L4: $-r=0.16$; for all $P<0.01$) and BMD (L1: $-r=0.10$, L2: $-r=0.11$, L3: $-r=0.12$, L4: $-r=0.08$, L1-L4: $-r=0.11$, L2-L4: $-r=0.11$; for all $P<0.01$) in this study. There was no statistically significant association between the history of hysterectomy and TBS.

Conclusion: Delayed menopause was associated with decreased risk of osteoporosis, whereas the number of pregnancies correlated positively with low TBS and BMD in elderly women. Therefore, the reproductive health history parameters can be considered as potential risk factor of osteoporosis.

P832

ESTABLISHING A FRACTURE LIAISON SERVICE: A REHABILITATION APPROACH

B. Bajger¹, K. Holton², C. Ofner¹, M. Crotty²

¹Flinders Medical Centre, ²Flinders Medical Centre and Flinders University, Adelaide, Australia

Objective: Implementation of the first South Australian fracture liaison service (FLS) in hospital rehabilitation wards.

Methods: Rehabilitation wards treat many patients suffering from fragility fractures. Audits regularly show that there is inconsistent management

of osteoporosis and falls, at discharge. FLSs have been proven to reduce readmissions and re-fracture rates. They are suitable in rehabilitation services as they provide a complete approach in identifying patients at risk of further fractures, as well as endorsing evidence based interventions. The main challenge in the provision of these services is their implementation. This presentation highlights the lessons learned from the introduction of FLS into a rehabilitation setting. In 2014, a nurse was introduced as the FLS coordinator. After identifying all patients over 50 with a fragility fracture, using electronic records, she monitored various contributing factors. By scrutinising discharge medications she was able to re-call sub-optimally treated patients for an assessment at the clinic. This multi-disciplinary approach involved a rehabilitation physician, dietitian and physiotherapist.

Results: Since the service's establishment, between 2014-2017, 4151 patients were identified through the FLS screening process with fragility fractures. Of these, 493 were reviewed in FLS clinics. 72% of patients attending the clinic were discharged with optimal anti-osteoporosis treatment. For 20% the treatment was not clinically indicated and 8% declined the offered treatment. On admission to FLS, 7% of patients met calcium intake requirements and 97% were discharged from FLS on Vitamin D or Vitamin D/Calcium supplements. Falls risk assessments were performed on all patients, with 81% continuing or being referred to falls prevention programs. Annual and bi-annual follow up reviews were introduced in 2017. The patients' general practitioners were notified of the results of their investigations and provided with recommendations for their treatment.

Conclusion: Establishing FLS in rehabilitation facilities reduces the gap in osteoporosis treatment and fragmentation of care while improving coordination and communication with all parties across various care settings. It is vital to have a nurse coordinator, electronic medical records and good working relationships with a bone density unit and orthopaedics to facilitate the establishment of such a service.

P833

THE ROLE OF PLATELET-RICH PLASMA (PRP) THERAPY IN PATIENTS WITH KNEE OSTEOARTHRITIS: OBSERVATIONAL STUDY

A. M. Bumbea¹, R. Traistaru¹, R. Dumitrascu², B. Bumbea³, M. Borcan⁴, A. Musetescu⁵, O. Rogoveanu¹

¹University of Medicine and Pharmacy, Department of Medical Rehabilitation, Craiova, ²Emergency Teaching Hospital, Department of Medical Rehabilitation, Craiova, ³Emergency Teaching Hospital, Department of Orthopedics, Craiova, ⁴Neuropsychiatry Teaching Hospital, Department of Medical Rehabilitation, Craiova, ⁵University of Medicine and Pharmacy, Craiova, Romania

Objectives: To highlight the effect of PRP treatment in patients with primary knee osteoarthritis

Method: We enrolled 63 patients diagnosed with primary knee osteoarthritis, grade 2 according to the Kellgren-Lawrence classification. Patients received intra-articular PRP treatment following the administration protocol. An ultrasound was performed and cases with articular fluid were excluded. Patient assessment was performed prior to PRP administration, after 6 months and one year after treatment. Patient were monitored by: visual analogue scale (VAS) scale, WOMAC Index and 6-min walking distance test (6 MWD).

Results: The study found a decrease in pain perception of 38.3% at 6 months, the functional component increased by 35.3% in the 6 MWD test. The WOMAC score improved by 18.2%. The one-year assessment recorded a decrease of only 12.3% for pain, an improvement of 6 MWD, with 17.45% and just 7.3% for the WOMAC scale.

Conclusions: PRP therapy improves the painful and functional component of patients with primary knee osteoarthritis, grade 2. The results are maintained at 6 months, but functional acquisition is reduced to one year. In order to maintain and slow the osteoarthritis destructive joint process, PRP therapy should be repeated at an average of 6 months.

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P834

ARTIFACTS IN DXA SCANS FOR WOMAN UNDER 80 YEARS

A. Adamenka¹, E. Dr. Rudenka²¹Belarussian Medical Academy of Postgraduate Education, ²Belarussian Medical University, Minsk, Belarus

Objective: To examine factors limiting the analysis results of DXA scans in women older than 80 years.

Methods: The BMD was assessed with DXA by LUNAR Prodigy Advance, GE, USA, 2008 in the lumbar spine (LS) (assessment of BMD L1-L4, g/cm²; Z-score L1-L4, SD; T-score L1-L4, standard deviation (SD)) and femoral neck (FN) (BMD region total, g/cm²; Z-score region total, SD; T-score region total, SD). Standard radiography of the LS in the lateral projection carried out as necessary. Statistical processing was performed using the program Statistika 8.0.

Results: There were examined 115 women aged over 70 years with osteoporosis (n=115, mean age in the examining group was 88,5±8.5 years, BMI (kg/m²) was 43.14±15.6). Vertebra deformities of the lumbar spine, based on the standard radiography scans or vertebral morphometry scans, were detected in 57 (49.5%) women; degenerative and focal changes processes lead to additional pathological ossification – diffuse idiopathic skeletal hyperostosis (DISH or Forestier's disease), osteochondrosis of the lumbar spine, spondyloarthropathy) were detected in 100 (87%) women. The quantity of artifacts (osteoarthritis, congenital or acquired hip dislocation, aseptic necrosis of the femoral head) in the DXA scans of the femoral neck was significantly less and was diagnosed in 20 (17.4%) women.

Conclusion: FN DXA is more preferable and reliable for women over 80 years than LS DXA. DXA of the lumbar spine is recommended to complement by vertebral morphometry or standard radiography in order to visualize artifacts and improve the reliability of the analysis. Carrying out DXA of the femoral neck allows you to more accurately interpreting the results of the measurement of BMD in women over 80 years for the verification of osteoporosis. The presence of artifacts is not allowed to exactly estimate the BMD changes in time.

P835

PAIN RELIEVE OF ACUTE THORACOLUMBAR SPINE COMPRESSION FRACTURE BY TRADITIONAL CHINESE MEDICINE

P.-C. Wu¹¹Department of Chinese Medicine, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan

Objectives: This 95 year-old female patient, who visited our traditional Chinese medicine clinic on January 5, 2018, has no hypertension, no diabetes, no cardiovascular disease, and no rheumatic autoimmune disease. She complained of severe back pain, VAS=10, that began after a fall about one week earlier since December 12, 2017. There was no radiation pain, numbness or weakness of the lower extremities. And NSAID was ineffective for her back pain.

Methods: The patient sat in a wheelchair and her blood pressure was 179/81 mmHg. She complained of severe back pain, VAS=10, the decrease in body height (about 10 cm), and body weight was 45 kg. The image studies showed multiple compression fractures of the T8-T11 and L1-L2 vertebral bodies and the T-score of BMD at left femoral neck was -2.9. The concept of traditional Chinese medicine of the patient's symptom is "Dampness-heat Impeding" and this treatment is adjusting the meridian system through "Clear Heat, Drain Dampness" formula by "Dang Gui Nian Tong Tang".

Results: After 15 min of receiving traditional Chinese mendment, the formula of "Dang Gui Nian Tong Tang" treatment, the follow-up result of the Patient revealed that her back pain was relieved (VAS decreased from 10 to 2) and she could climb up the stairs by herself. Besides, no obvious side effect was found after these two weeks of treatment.

Conclusion: The acute thoracolumbar spine compression fracture may cause severe pain. Thus, some medical therapies for treating this pain were proposed, such as NSAID. Through the positive report in this case, we suggest traditional Chinese medicine may be a safer, simpler, cheaper and more effective treatment for severe pain by acute thoracolumbar spine compression fracture.

P836

PHYSICAL ACTIVITY RESTRICTION IN PATIENTS WITH CHRONIC FOOT PAIN OF DEGENERATIVE ETIOLOGY

M. L. Cevei¹, D. L. Stoicanescu^{2,3}, R. N. Suciu¹¹University of Oradea, Faculty of Medicine and Pharmacie, Oradea,²University of Medicine and Pharmacie, Victor Babes, Timisoara,³University of Medicine and Pharmacie. Victor Babes, Timisoara, Romania

Objective: Chronic painful foot is a condition that affects tarsal and metatarsophalangeal joints by developing osteoarthritis that leads to feet deformities and to development of a long-term algic symptomatology that is difficult to treat due to localization and constant pressure on these joints. Our aim was evaluation of the activity of patients with chronic foot pain using specific questionnaires.

Method: We conducted a prospective study on a group of 220 patients hospitalized in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, 200 women and 20 men, evaluated clinically, paraclinically and by questionnaires. Inclusion criteria: over 60 years of age, talar and plantar pain. Patients had degenerative chronic lesions such as flat feet of varying degrees, plantar fasciitis with calcaneal spur, foot osteoarthritis of different degrees, plantar pain due to sesamoiditis and deforming osteoarthritis of the foot due to hallux valgus of varying degrees. Exclusion criteria: infectious arthritis, rheumatoid arthritis, diabetes mellitus, psoriatic arthritis, trauma. All cases were clinically and radiologically investigated. The tests used were: Foot Function Index, SF-36 questionnaire and VAS questionnaire.

Results: Patients mean age was 63.16±8.34 years, with onset of pain on average 91 months ago. The mean FFI score was 51.91. SF-36 questionnaire revealed that general health was generally fair/poor, compared to the previous year much worse at present. Limitations of activities scored 1-2, a very important limitation of social, emotional and physical activities due to pain. The mean VAS score on admission was 60% severe pain, 20% moderate pain and 8% low intensity pain. All these assessments have shown a deterioration in patients' health.

Conclusions: Chronic painful foot, by affecting normal movements and limiting daily activities, contributes to health deterioration. Onset was approximately 10 years ago, with oscillating symptomatology. Common association with other osteoarthritis, especially hip, knee and hand osteoarthritis was noticed. The study also revealed higher frequency in females and association with obesity.

P837

LONG, PRONOUNCED BUT TRANSIENT HYPOPHOSPHATAEMIA IN A PATIENT TREATED WITH ZOLEDRONIC ACID DUE TO HUNGRY BONE SYNDROME

A. Y. Zhukov¹, E. A. Pigarova¹, L. Y. Rozhinskaya¹¹Endocrinology Research Centre, Moscow, Russia

Objective: Hypophosphatemia is not a common complication of bisphosphonate treatment. Our aim was to describe a clinical case of hypophosphatemia in a patient treated with zoledronic acid (ZA).

Methods: A 63-year old woman came to our attention due to secondary hyperparathyroidism (PTH 13.37 pmol/l (normal values 2.5–6.9), Ca total 2.1 mmol/l (2.15–2.55)) and hypophosphatemia of 0.55 mmol/l (0.79–1.45). Her disease history was remarkable for endometrial cancer at the age of 56 years treated by panhysterectomy. At the age of 62 years the disease relapsed as mts in paraaortic lymph nodes and she was treated with surgery and regional radiation therapy. A year later the patient had multiple vertebral compression fractures (Th6, Th9–12, L2–L4) that were considered by oncologists as pathological due to presumable (but not shown on MRI) bone mts. She was treated by 3 monthly infusions of 4 mg ZA after which her otherwise satisfactory condition deteriorated with profound muscle weakness, involuntary contractions and she was referred to our Center. DXA L1–L4 -1.0 SD, neck -1.8 SD, total femur -1.9 SD. She was started on calcium 1000 mg+alfacalcidol (alfa) 1 µg. But for normalization of PTH and serum phosphate it was needed to escalate the dose of alfa to 4 µg/d and change calcium preparation to ossein-hydroxyapatite compound (contains also phosphate and the only one available phosphate preparation in Russia) with elevation of dose of calcium delivered by it up to 1780 mg/d with phosphate amount of 820 mg/d (10 tablets), plus 7 000 IU of cholecalciferol daily. After normalization of PTH, ZA was reintroduced at the dose of 5 mg a year, her calcium-phosphate and alfa doses gradually decreased by 2 years of treatment to 3 tablets and 1 µg, respectively. She had no new fractures, her physical function much improved. Bone scintigraphy showed nearly resolution of previously seen hyperfixation of radiotracer at Th4–12, L1–5, pelvic bones, right femoral neck, ribs, and sternum syndesmosis.

Conclusion: The case of our patient raises questions about the difficulty is some cases of differential diagnosis of bone metastases, postmenopausal and radiation-induced osteoporosis. Such high doses of alfa/calcium and the need of addition of phosphate preparation could not be explained other than hungry bone syndrome as there was no malabsorption, and initially suspected hypersecretion of FGF23 was not clinically confirmed as complete resolution of hypophosphatemia was seen in conjunction with osteoporosis improvement.

P838

HOW HSCT AFFECTS BONE MARKERS IN PEDIATRIC THALASSEMIC PATIENTS AFTER 2 YEARS

Z. Hamidi¹, A. A. Hamidieh², M. R. Mohajeri-Tehrani¹, F. Mohseni¹, M. Behfar³, B. Larijani¹, A. Ghavamzadeh³

¹Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Pediatric Stem Cell Transplant Department Children's Medical Center, Tehran University of Medical Sciences, Tehran, ³Hematology-Oncology and Stem Cell Transplantation Research Center of Tehran University of Medical Sciences, Tehran, Iran

Objective: β -thalassemia major and its treatment by hematopoietic stem cell transplantation can have deleterious effect on bone integrity. So we assessed the effects of HSCT (hematopoietic stem cell transplantation) on bone markers of pediatric thalassemic patients after 2 years of HSCT.

Methods: Bone-specific alkaline phosphatase and osteocalcin (bone formation markers), NTX (bone resorption marker), serum calcium, phosphorus, non-specific alkaline phosphatase, PTH and vitamin D measured in 20 major thalassemic patients with mean age of 10.7 $\pm$ 3.9 y/o. The female to male ratio was 6:14. Parameters checked at the baseline (before HSCT), and 2 years after HSCT.

Results: After stem cell transplantation, mean serum levels of bone-specific alkaline phosphatase (decreased), osteocalcin and NTX (increased) changed significantly (P value<0.001, <0.001 and <0.001, respectively). Calcium, nonspecific alkaline phosphatase, vitamin D (increased) and phosphorus (decreased) changed significantly (P value<0.001, <0.001, 0.048, and <0.046, respectively) but PTH not.

Conclusion: Increase of nonspecific alkaline phosphatase, while bone specific alkaline phosphatase decreases, may be due to effects of immunosuppressive drugs on the liver. Regular administration of calcium and vitamin D in these patients, can lead to increase of serum calcium and vitamin D that we found. HSCT in pediatric thalassemic patients after 2 years increases both bone formation and bone resorption markers. Though due to low sample size it is difficult to reach any conclusion, may be it means that bone status in this situation is in a high turnover status.

P839

DYNAMIC OF BMD IN PERIMENOPAUSAL PERIOD

N. Temelkova¹, A. Gerganova¹, K. Sirakova¹, K. Temelkova², P. Popivanov¹

¹University Hospital "Aleksandrovska", ²University Hospital for Children Disease, Sofia, Bulgaria

Objective: The curves representing the reference databases of BMD, which DXA manufacturers report in the DXA scans, present BMD as a function of the age. The aim of this pilot study is to observe the perimenopausal dynamic of BMD, not only as a function of age, but also as a function of menopause age.

Methods: In a prospective cohort study for a duration of 11 years 72 women's BMDs were measured at baseline and at follow-up during perimenopausal period. BMD was measured on a DXA machine – Hologic Discovery A. The women were examined for a period of $\pm$ 5 years in regards to their age of menopause. The patients, who were excluded from the follow-up, were those with early or surgical menopause and those with secondary osteoporosis. The results were collected and analyzed with the statistics program SPSS v.19.0.0. BMDSC: Hologic and NHANES were used as a reference database for lumbar spine and left femur, respectively.

Results: 1) Association between BMD and menopause age: a) at lumbar spine (L1–L4) coefficient of correlation $r=-0.855$, $p=0.001$; b) at total hip $r=-0.923$, $p=0.003$; c) at Neck $r=-0.900$, $p=0.006$.

2) Dependence of BMD on age: a) at lumbar spine (L1–L4) $r=-0.583$, $p=0.02$; b-c) at total hip and neck – insignificant correlations.

Conclusion: 1) As expected the correlation between BMD and menopause age is significantly greater than the correlation between BMD and age. 2) It is pretty essential that the curves of the reference databases of BMD are adjusted to the menopause age, too.

P840

CLINICAL AND DENSITOMETRIC CHARACTERISTICS IN PEDIATRIC POPULATION WITH RISK FACTORS TO DEVELOP LOW BONE MASS

B. Magallares¹, J. Betancourt², G. Fraga², E. Quesada-Masachs³, M. López-Corbetó³, M. Torrent², A. Marin⁴, S. Herrera⁴, E. Carreras², H. Hector¹, J. Casademont⁴, J. Malouf⁴

¹Rheumatology, Santa Creu i Sant Pau Hospital, ²Pediatrics, Santa Creu i Sant Pau Hospital, ³Rheumatology, Vall d'Hebrón Hospital, ⁴Internal Medicine, Santa Creu i Sant Pau Hospital, Barcelona, Spain

Objective: Pediatric low bone mass (LBM) is a disorder of unknown prevalence, due to the lack of clinical manifestations until it develops fractures (fx). Our aim was to describe clinical and densitometric characteristics of the pediatric population with risk factors to develop LBM.

Methods: We collected prospectively demographic and clinical data of patients aged 2–20 y, with at least one risk factor for LBM. Calculated their daily calcium intake and performed bone densitometry (DXA) and vertebral morphometry

Results: We present 90 patients, average age of 9'9 years, 53% female. Age distribution and calcium intake can be seen in Table 1.

Age group	N, % age group	Average calcium intake (mg/d)±SD	Recommended Calcium Daily Amount (RDA) (mg/d)	% that reach RDA
Prescholar (2-3 y)	8, 8.9%	847±271	700	50%
Scholar age (4-9 y)	29, 32.2%	671±238	1000	27.6%
Teenagers (10-17y)	47, 52.2%	660±348	1300	8.7%
Young (18-20 y)	6, 6.7%	726±156	1100	0%

There was a significant decrease in the compliance of the RDA with calcium with increasing age ($p=0.01$). The most frequent diagnoses were: malabsorption: 44.4%, JIA: 20%, nephropathies: 17.8%, haematological diseases: 7.8% and vasculitis: 4.4%. 18% of the sample had had a fx (44% of them had more than one). 3 cases met the criteria for fragility fx (vertebral fx)

20% of the patients were on systemic corticosteroids (average dose: 5.9 mg prednisone/day), and another 20% had previously received them. The total cumulative average corticosteroid dose was 7 g of prednisone. 32% were on immunosuppressant treatment. 11% were deficient in vitamin D. 13% of the sample had a LBM for their age assessed by DXA. The results can be seen in Table 2.

DXA results	Minimum Z-score	Maximum Z-score	% with Z-score ≤ -2
Vertebral Z-score	-3	2	13.3%
Whole body Z-score	-3	1.8	9.2%
Total femoral Z-score	-4.8	2.3	10.7%
Femoral neck Z-score	-4.8	3	12%

Conclusions: Calcium intake in pediatric population with risk factors for LBM is lower than recommended, especially in the groups with the highest requirements. Up to 13% of this population have a LBM for their age and a 33% meets Ped OP criteria

P841

THE RATE AND PROBABLE REASONS FOR DIFFERENCE OF ABOVE 1 SD T-SCORE BETWEEN 2 ADJACENT VERTEBRAE IN DXA SCANS

K. Sirakova¹, N. Temelkova¹, A. Gerganova¹, P. Popivanov¹

¹University Hospital "Aleksandrovska", Sofia, Bulgaria

Objective: According to the guidelines of ISCD, it is assumed that the difference of >1 SD T-score between 2 adjacent vertebrae is a criterion for the exclusion of the "different" vertebra from the final analysis. The clinical value of this criterion and its frequency are not clearly evident and are not thoroughly studied. The aim of this study is to examine the rate and the probable reasons for a difference of >1 SD in T-score between 2 adjacent vertebrae at the lumbar spine (L1-L4).

Methods: In a retrospective cross-sectional study the lumbar spine scans of 3001 women between 50-65 years of age were analyzed according to the ISCD Official Positions. These scans were performed on a DXA machine - Hologic Discovery A. In the observed group were not included any patients with data from the anamnesis and/or from the clinical evaluation for any oncological diseases, bone metastasis and hemangioma, secondary osteoporosis, etc. The results were collected and analyzed with the statistics program SPSS v.19.0.0.

Results: In 90 (3%) out of 3001 women a difference of >1 SD in T-score between 2 adjacent vertebrae was discovered. Clearly visible with DXA abnormalities, which reasonably explain such kind of a difference in BMD, were found in 80 of these patients (89%). A probable reason was

absent in 10 of them (11%). The findings, which are visible with DXA and are explanatory for this difference in BMD, were classified according to the present lumbar pathology.

Conclusion: The difference of >1 SD between two adjacent vertebrae was detected in 3% of the examined women. In 89% of the cases a clearly evident lumbar abnormality was found, which could acceptably explain this difference. In 0.3% of the 3001 analyzed women no clearly densitometrically visible reasons for the difference of T-score were found. The clinical value of these cases still remains unclear.

P842

CLINICAL AND LABORATORY ASSOCIATIONS BETWEEN SERUM IRISIN LEVELS AND OSTEOPOROSIS IN RHEUMATOID ARTHRITIS

D. Lavrova¹, B. Zavadovsky², Y. Akhverdyan², L. Sivordova², J. Polyakova², T. Kvlivdze¹, E. Zagorodneva¹

¹Volgograd State Medical University, Volgograd, Russian Federation, Volgograd, Russia, ²Federal State Budgetary Institution «Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovsky», Volgograd, Russian Federation, Volgograd, Russia

Objectives: Recent studies suggested, that adipokines and myokines may be implicated in bone metabolism and osteoporosis (OP) pathogenesis. In vitro data suggest that myokine irisin may affect bone metabolism by promoting osteoblast differentiation while inhibiting osteoclast differentiation. Our aim was to investigate the serum level of irisin in patients with rheumatoid arthritis (RA) complicated with OP.

Methods: We observed 170 people: 110 RA patients (mean age 53.58 $\pm$ 12.32; hereinafter $M \pm SD$) and 60 healthy controls. All patients with RA were examined using DXA using Lunar DPX-Pro densitometer. All patients underwent the complex clinical and laboratory examination using standard methods, including N-terminal propeptide of procollagen type I, C-telopeptide of type I collagen, level 25(OH)-vitamin D. Serum irisin levels were measured by indirect solid-phase enzyme immunoassay using the commercial test system Irisin ELISA (BioVender, Cat No. RAG018R) according to the instructions attached to the kit.

Results: We revealed that mean concentration of irisin in RA group was 14.48 $\pm$ 7.07 ug/ml, which was significantly lower than of healthy controls - 20.49 $\pm$ 4.82 ug/ml ($p < 0.001$). We divided the RA patients into two groups: the first group ($n=44$) included patients with reduced serum irisin levels (<10.85 ug/mL), the second group ($n=66$) consisted of patients with normal irisin level (>10.85 ug/ml). Reduced serum irisin levels in RA patients were linked with higher activity degree (DAS-28), presence of extra-articular manifestations, disease duration >5 years and III class of functional joints disability. We did not note any significant relationships between serum irisin level and BMD at any site and between irisin with either lean or fat mass. We did not found any difference of bone turnover markers (serum C-terminal telopeptide of type I collagen, serum N-terminal propeptide of type I procollagen (PINP)) between the first and the second group. However, in 1st group we revealed lower level of 25(OH)-vitamin D ($p=0.044$). We observed higher incidence of pathological bone fractures in this group too ($p=0.047$).

Conclusions: Thus, we noted relationship between decreased serum irisin level, 25(OH)-vitamin D concentration and higher incidence of pathological bone fractures in RA patients, but did not reveal any

connection between serum irisin level and BMD at any site and body composition. We suppose, that irisin level may reflect bone quality or increased fall risk.

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P843

RESULTS OF REHABILITATION TREATMENT ON FUNCTIONAL STATUS AND QUALITY OF LIFE IN PATIENTS WITH HIP OSTEOARTHRITIS

I. R. Marcu¹, S. Patru¹, D. Matei¹, A. C. Bighea¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objectives: The main purpose of this observational study was to evaluate the efficacy of physical and kinetic treatment on patients with hip osteoarthritis and to analyze the influence of the rehabilitation program on functional status and quality of life of these patients.

Methods: The study included 114 patients with hip osteoarthritis, mean age 60.42±10.63 years, randomized in three groups: two control lots with drug therapy (46 patients), respectively with exercises (41 patients) and a test lot with physical therapy and exercises (41 patients). The three groups were comparable in terms of baseline characteristics. All patients were evaluated clinical and functional at the initiation of the study, after 3 months, 6 months and one year using the next parameters: hip joint mobility, Lequesne Index for functional status, pain evaluated on a visual analogue scale (100 mm VAS), and SF-36 Health Survey for the quality of life.

Results: The efficacy of physical and kinetic treatment is reflected by statistically significant improvements ($p<0.05$) of mean scores for functional status (Lequesne Index) and for the quality of life (SF-36), pain (VAS) and hip mobility. Lequesne Index mean value influence on SF-36 improvement is well above 50%; there is a correlation between indicators estimated as moderately high (0.8).

Conclusion: The improvement of clinical functional parameters has a significant impact on increasing the quality of life of patients with hip osteoarthritis.

P844

OSTEOPOROSIS IN PATIENTS WITH SEVERE MOTOR DEFICIT

M. L. Cevei¹, I. Moga², C. Tivadar³, D. L. Stoicanescu²

¹University of Oradea, Faculty of Medicine and Pharmacie, Oradea,

²University of Medicine and Pharmacie, Victor Babes, Timisoara, Timisoara, ³Clinical Medical Rehabilitation Hospital, Baile Felix, Romania

We investigated the presence of osteoporosis in a group of 80 patients with severe motor deficits diagnosed with stroke and tetraparesis or paraparesis from vertebro-basilar traumas, multiple sclerosis, transverse myelitis, infantile encephalitis, brain tumors and lumbar spinal stenosis, treated in Medical Rehabilitation Clinical Hospital Baile Felix, Romania. The inclusion criteria were hospitalized patients with hemiparesis, paraparesis or tetraparesis for >6 months and outpatients with hemiparesis, paraparesis or tetraparesis with onset of a minimum of 6 months, who use walking devices. Essential conditions: no major cognitive changes - MMSE over 15 and without osteoporosis in the past. Exclusion criteria were represented by the presence of other causes of osteoporosis. The evaluation included the standard work sheet, bone and muscle mass evaluation DXA and total body (1/year). Mean age was 40.20 years, ranging between 20-77 years. Out of the total of 80 cases, 20% were diagnosed with stroke, 56.25% with vertebro-basilar traumas, 6.25% cases with craniocerebral trauma, 3.75% had lumbar spinal stenosis, 5% had operated brain tumors, 2.5% transverse myelitis, 2.5% encephalopathy, 1.25% had multiple sclerosis, 1.25% arteriovenous malformation and 1.25% Duchenne muscular dystrophy.

According to the ASIA Impairment scale 12 cases met the criteria for inclusion in ASIA A, 12 cases in ASIA B, 15 in ASIA C and 6 in ASIA D. Following the DXA evaluation 62 patients were also diagnosed with osteoporosis. Osteoporosis was found in 68.75% from cases with stroke, 80% from cases with vertebro-basilar traumas and 60% from patients with craniocerebral trauma. Out of the 62 cases diagnosed with osteoporosis 83.87% had complete deficit of inferior train, movements being done with the aid of a wheelchair. According to the ASIA Impairment scale, 91.66% cases from ASIA A, all from ASIA B, 66.6% from ASIA C and from ASIA D had osteoporosis.

Conclusion: Cases with persistent motor deficits should be investigated for osteoporosis to prevent osteoporotic fractures.

P845

PHYSICAL ACTIVITY RESTRICTION IN PATIENTS WITH CHRONIC FOOT PAIN OF DEGENERATIVE ETIOLOGY

M. L. Cevei¹, R. N. Suci², D. L. Stoicanescu³, I. Moga²

¹University of Oradea, Faculty of Medicine and Pharmacie, Oradea, Romania, ²University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania, ³UNiversity of Medicine and Pharmacy, Victor Babes, Timisoara, Romania

Objective: Chronic painful foot is a condition that affects tarsal and metatarsophalangeal joints by developing osteoarthritis that leads to feet deformities and to development of a long-term algic symptomatology that is difficult to treat due to localization and constant pressure on these joints. Our aim was evaluation of the activity of patients with chronic foot pain using specific questionnaires.

Method: We conducted a prospective study on a group of 220 patients hospitalized in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, 200 women and 20 men, evaluated clinically, paraclinically and by questionnaires. Inclusion criteria: over 60 years of age, talar and plantar pain. Patients had degenerative chronic lesions such as flat feet of varying degrees, plantar fasciitis with calcaneal spur, foot osteoarthritis of different degrees, plantar pain due to sesamoiditis and deforming osteoarthritis of the foot due to hallux valgus of varying degrees. Exclusion criteria: infectious arthritis, rheumatoid arthritis, diabetes mellitus, psoriatic arthritis, trauma. All cases were clinically and radiologically investigated. The tests used were: Foot Function Index, SF-36 Questionnaire and VAS Questionnaire.

Results: Patients mean age was 63.16±8.34 years, with onset of pain on average 91 months ago. The mean FFI score was 51.91. SF-36 questionnaire revealed that general health was generally fair/poor, compared to the previous year much worse at present. Limitations of activities scored 1-2, a very important limitation of social, emotional and physical activities due to pain. The mean VAS score on admission was 60% severe pain, 20% moderate pain and 8% low intensity pain. All these assessments have shown a deterioration in patients' health.

Conclusions: Chronic painful foot, by affecting normal movements and limiting daily activities, contributes to health deterioration. Onset was approximately 10 years ago, with oscillating symptomatology. Common association with other osteoarthritis, especially hip, knee and hand osteoarthritis was noticed. The study also revealed higher frequency in females and association with obesity.

P846

PHYSICAL FUNCTION LIMITATION IN OSTEOPOROTIC CASES

D. L. Stoicanescu¹, M. L. Cevei², N. Guler³

¹University of Medicine and Pharmacy, Victor Babes, Timisoara,

²University of Oradea, Faculty of Medicine and Pharmacy, Oradea,

³Clinical Medical Rehabilitation Hospital, Baile Felix, Romania

The study included 115 cases diagnosed with osteoporosis, admitted to the Rehabilitation Clinical Hospital Baile Felix, Romania. Besides

clinical examination, all cases performed DXA, dynamometry, timed get-up-and-go test. Mean age was 67.61 ± 7.58 years ranging between 50–84. Mean age at menopause 46.65 ± 5.38 years, minimum 35 years, maximum 63 years. BMI ranged between 16.02–39.73, mean 28.24 ± 4.27 . Patient distribution according to physical activity: 56% intense, 35% moderate and 9% minimal physical activity. Distribution of patients according to current physical activity revealed 80% had reduced to a minimum physical activity, 20% still moderate. The reduction occurred 136.60 months ± 102.36 months ago, ranging between 10–360 months. 56.7% of patients reported muscle pain, mean onset 45.375 ± 42.95 months ago, ranging from 3 to 120 months. 64.86% of patients accused subjective decrease in muscle strength, mean onset 53.76 ± 92.12 months ago, range 6 to 516 months. 48.64% had tendency to fall, with a mean of 3.41 ± 3.08 falls, range 1 to 7 falls. Walking difficulties occurred about 36.35 ± 29.41 months ago, ranging between 2 and 120 months. 13% of patients used frames, 16% crutches both inside and outside, 46.21% used walker sticks. The mean time for device use was 11.75 ± 10.19 months, minimum 2 weeks and maximum 24 months inside and 12.57 ± 8.38 months, minimum 4 months and maximum 24 months outside. Mean lumbar spine T-score was -2.15 ± 1.29 , range -5 to 0.9. Mean right hip T-score -1.24 ± 0.90 ranged between -3.9 and 1.1. Mean muscle mass scaled to height squared 5.836 ± 0.726 , ranged between 4.140 to 7.421. Right-hand dynamometer mean 15.81 ± 5.22 kg with limits between 2.66 and 29 kg. Left-hand dynamometer mean 14.72 ± 5.33 with a minimum limit of 0 and maximum 25.33 kg. Timed get-up-and-go test: mean 23.51 ± 10.48 s, ranging from 9.08 to 60 s. Conclusions: Half of the cases diagnosed with osteoporosis had reduced muscle mass, physical function of the lower train and hand grip. In over half of cases, although the muscle mass measured by DXA occurred within normal ranges, physical function determined with timed get-up-and-go test and dynamometry was considerably decreased.

P847

OUR EXPERIENCE WITH RPTH (1,84) IN TWO PATIENTS WITH HYPOPARATHYROIDISM

M. Abu Hadeed¹, R. Pollack¹, I. Gurt¹, R. Dresner-Pollak¹

¹Department of Endocrinology and Metabolism, Hadassah-Hebrew University Medical Center, Jerusalem, Israel

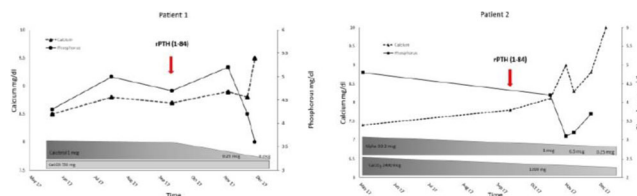
Objective: Hypoparathyroidism is one of the few major hormone deficiency diseases not regularly treated with hormone replacement. Conventional treatment for hypoparathyroidism currently includes activated vitamin D and calcium supplements, however maintaining adequate serum calcium levels can be a challenge. Furthermore, this treatment does not fully replace the functions of PTH and can lead to both short and long term complications. PTH replacement has recently emerged as a new treatment option. We describe our preliminary experience with recombinant human PTH (1,84) in two patients with chronic hypoparathyroidism, ineffectively controlled with conventional therapy.

Methods: Two patients with chronic hypoparathyroidism, inadequately controlled with conventional therapy initiated treatment with rPTH (1,84). Serum calcium and phosphate levels were monitored weekly, as well as 24-h urinary calcium excretion. Doses of activated vitamin D and calcium were subsequently adjusted to target serum calcium levels within the lower half of the calcium reference range.

Results: Both patients experienced significant improvement in their serum calcium and phosphate levels, along with marked decrease in their calcium and activated vitamin D requirements (Figure). Both patients reported improvement in their subjective wellbeing. In the brief follow up period, no significant reduction in urinary calcium was noted, consistent with previous studies.

Conclusion: rPTH (1,84) is effective in improving calcium levels in patients inadequately controlled on conventional therapy. Subjects were

able to significantly reduce oral calcium and active vitamin D supplements, with improvement in their overall wellbeing.



P848

VITAMIN D LEVELS IN MORBID OBESITY

L. Athanassiou¹, I. Kostoglou-Athanassiou², A. Koteli³, C. Mavragani¹, P. Athanassiou⁴, M. Koutsilieris¹

¹Department of Physiology, Medical School, University of Athens, Athens, ²Department of Endocrinology, Asclepeion Hospital, Voula, Athens, ³Department of Biopathology, St. Paul's Hospital, Thessaloniki, ⁴Department of Rheumatology, St. Paul's Hospital, Thessaloniki, Greece

Objective: Vitamin D has been found to be associated with multiple chronic diseases, including diabetes mellitus type 1 and 2, rheumatoid arthritis, systemic lupus erythematosus and other autoimmune diseases. Low vitamin D levels have also been observed in patients with obesity. The aim was to study vitamin D levels in patients with morbid obesity.

Methods: In a group of 32 patients with morbid obesity, BMI 41.77 ± 1.15 (mean $\pm$ SEM), range 27.76–51.99, weight 112.05 ± 3.18 kg, range 85–150 kg, 25(OH)D₃ levels were measured. Observations were also performed in a group of 32 patients with BMI and weight in the normal range, within the same age group, of the same sex, serving as controls.

Results: In the group of obese patients 25(OH)D₃ levels were 10.77 ± 0.51 ng/ml as opposed to 24.51 ± 1.35 ng/ml in the control group, ($p < 0.001$, Student's t-test). A negative correlation was observed between 25(OH)D₃ levels and BMI, standardized β coefficient -0.87, $p = 0.001$. A negative correlation was also observed between 25(OH)D₃ levels and weight, standardized β coefficient -0.345, $p < 0.001$.

Conclusions: Very low vitamin D levels were observed in a group of morbidly obese patients. A negative correlation was observed between 25(OH)D₃ levels, BMI and weight, meaning that low vitamin D levels were correlated with high BMI and weight. Vitamin D has been found to be a negative index of the acute inflammatory response (1). We propose that vitamin D is a negative indicator of the inflammatory environment which characterizes morbid obesity.

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P849

TROMSOPOROSIS: SECONDARY FRACTURE PREVENTION PROGRAM RESULTED IN HIGH ADHERENCE TO ANTI-OSTEOPOROTIC DRUGS IN TROMSØ, NORWAY

C. Andreassen¹, V. G. Rogli², J. Elvenes¹, R. M. Joakimsen¹, T. T. Borgen³, L. B. Solberg⁴, F. Frihagen⁴, L. Nordsletten⁴, E. F. Eriksen⁴, T. Basso⁵, C. Dahl⁶, T. K. Omsland⁶, A. Bjørnerem¹

¹University Hospital of North Norway, Tromsø, ²The Arctic University of Norway, Tromsø, ³Vestre Viken Hospital Trust, Hospital of Drammen, Drammen, ⁴Oslo University Hospital, Oslo, ⁵St. Olav University Hospital, Trondheim, ⁶University of Oslo, Oslo, Norway

Objective: Secondary fracture prevention is important, but often suboptimal. Adherence to treatment is crucial to achieve proper prevention of new fractures. We evaluated the adherence to

prescribed anti-osteoporosis drugs (AOD) in fracture patients who are included in a nurse led fracture liaison service.

Methods: Tromsoporosis is a quality assurance study, and part of Norwegian Capture the Fracture® Initiative (NoFRACT) at the Department of Orthopedic Surgery, University Hospital of North Norway. Women and men, aged >50 years with fragility fractures are offered evaluation and treatment. According to the NoFRACT protocol, AOD is recommended in patients with i) hip fracture, vertebral fracture or ≥ 2 low-energy fractures (regardless of FRAX estimate or BMD T-score) or ii) one low-energy fracture (and FRAX 10 year probability of major osteoporotic fracture $\geq 20\%$ or BMD T-score < -1.5). Self-reported adherence was assessed by phone at 3 and 12 months after prescription of AOD. We present results on those who have completed 3 and 12 months follow-up from October 2015 through August 2017.

Results: Of 260 patients: 75% were females, aged 69 ± 11 years and BMI 26 ± 5 kg/m² (mean $\pm$ SD). Fractures distribution was: hip 21%, forearm 29%, proximal humerus 10%, vertebrae 2% and 38% had other fractures. Of 260 patients, 195 (75%) fulfilled the criteria for treatment with AOD. Of those, only 16 (8%) were already on treatment, 180 (92%) started taking AOD (71% alendronate, 3% zoledronic acid, 18% denosumab and 6% calcium and vitamin D only). Of 180 patients, 10 and 47 were lost to follow-up after 3 and 12 months, while 116 (64%) and 97 (54%) patients reported adherence to AOD after 3 and 12 months, respectively. In fact, 15 (28%) patients whom were nonadherent at 3 months were restarted on AOD and were adherent at 12 months follow-up. There was no significant difference in age, sex, fracture types, FRAX estimate or BMD T-score between those who were adherent vs. non-adherent to AOD at 12 months **Conclusion:** Of those recommended AOD, 90% were treatment-naïve at the time of fracture, the close follow-up resulted in high adherence rates, which seems promising for future fracture prevention in NOFRACT.

P850

IMPACT OF AGN1 LOCAL OSTEO-ENHANCEMENT PROCEDURE (LOEP) ON THE BIOMECHANICS OF CADAVERIC FEMURS

J. Shaul¹, D. Favell¹, B. Huber², J. Howe¹, R. Hill¹, M. Bouxsein³

¹AgNovos Healthcare, Rockville, ²Copley Hospital, Morrisville, ³Harvard Medical School, Boston, USA

Objectives: This study evaluated the biomechanical effects of AGN1 local-osteo enhancement procedure (LOEP) on human cadaveric femurs.

Methods: 45 pairs of female cadaveric femurs were obtained from anatomic gift registries. One femur from each pair underwent AGN1 LOEP. The other femur was an untreated control. Femoral neck (FN) and total hip aBMD (g/cm²) and T-scores were obtained by DXA. As part of AGN1 LOEP treatment, the novel, triphasic, calcium-based AGN1 implant material was injected into proximal femurs under low pressure. Femurs were mechanically tested in sideways fall condition 24 $\pm$ 3 hours later. Failure load, yield load, work to failure, and stiffness were measured. We used paired t-tests to determine differences between the AGN1 LOEP and control femurs, with $p < 0.05$ considered significant.

Results: Average donor age and FN T-scores were 77.8 ± 8.8 years and -2.8 ± 1.3 , respectively. On average, AGN1 LOEP increased failure load 20.5% ($p < 0.0001$) compared to controls. Notably, in osteoporotic femurs ($N = 25$ pairs, T-score < -2.5), AGN1 LOEP significantly increased mean failure load by 26.0%, yield load by 25%, and work to failure by 45% compared to the contralateral control femurs ($p < 0.01$ for all). In osteopenic femurs ($N = 16$, T-score -1.0 to -2.5) failure load increased by 20.6% ($p < 0.001$), yield load was not increased, and work to failure increased by 17.5% ($p < 0.05$) compared to control. Femurs with normal BMD ($N = 4$) showed no differences in tested variables. AGN1 LOEP did not significantly affect stiffness in any group.

Conclusions: Treatment with AGN1 local osteo-enhancement procedure (LOEP) increased mean fracture load and work to failure in sideways fall in both osteopenic and osteoporotic femurs, the groups at highest risk for

hip fracture. AGN1 LOEP is a promising treatment to locally improve the biomechanical properties of proximal femurs.

Disclosures: M.B. consults AgNovos Healthcare. B.H. consults, owns stock AgNovos. J.S., D.F., J.H., and R.H. employees, own stock AgNovos.

P851

EVALUATION OF BMD CHANGES IN POSTMENOPAUSAL WOMEN TREATED WITH INTRAVENOUS IBANDRONATE

B. Rexhepi¹, S. Rexhepi¹, M. Rexhepi¹, V. Sahatçiu-Meka²

¹Rheumatology Clinic, University Clinical Centre of Kosova, ²Medical Faculty, University of Prishtina, Prishtina, Albania

Objective: Osteoporosis is metabolic disease characterized by low bone mass and loss of bone tissue and disruption in skeletal microarchitecture. The aim of the study was to evaluate the BMD changes in postmenopausal women in 1-year treatment with intravenous ibandronate dosage of 3mg/3ml every three months.

Methods: We investigated 100 postmenopause women in the period from September 2015 to October 2017 in Private Clinic "Rheuma". BMD was measured at lumbar spine and hip at 0 and 12 month, by using DXA scanner Stratos 800. Clinical and demographic data like age, BMI, menstrual status, vitamin D, calcium level, phosphorus were measured. Exclusion criteria were osteoporotic fractures, hysterectomy, previous treatment with bisphosphonates, renal impairment, hyper or hypocalcaemia, treatment with corticosteroids and other drugs known to influence bone turn metabolism.

Results: Study consisted of 100 patients treated with intravenous ibandronate who were of mean age 64 ± 12 years. BMD of lumbar spine and femoral neck showed significant increase of BMD after one year treatment with intravenous ibandronate. Lumbar spine BMD at baseline T-score was -2.1 ± 0.9 and at femoral neck T-score was -2.6 ± 0.8 . After one year we had improvement in both areas, lumbar spine BMD improved with T-score of -1.7 ± 0.8 and at femoral neck T-score was -2.1 ± 0.6 . Although iv administration is associated with a higher incidence of flu-like symptoms, headache, etc., in our group of patients no serious adverse events were observed.

Conclusion: Administration of iv ibandronate may be beneficial in patients intolerant of oral bisphosphonates and may avoid the problems of poor adherence and might be good choice for treatment of osteoporosis. Our study suggests that intravenous ibandronate given in postmenopausal women with osteoporosis was effective in terms of BMD improvement and well tolerated from patients.

P852

ESTABLISHING A FRACTURE LIAISON SERVICE: EXPERIENCE OF A PORTUGUESE RHEUMATOLOGY CENTER

M. Guerra¹, S. Ganhão^{2,4}, F. Aguiar^{2,4}, G. Terroso², R. Vieira¹, D. Gonçalves², T. Meirinhos³, M. T. Rocha^{2,4}, A. Águeda^{3,4}, R. Ferreira^{2,4}, C. Vaz^{2,4}, L. Costa²

¹Rheumatology Department, Centro Hospitalar Vila Nova de Gaia/Espinho, Vila Nova de Gaia, ²Rheumatology Department, Centro Hospitalar São João, Oporto, ³Rheumatology Department, Centro Hospitalar Baixo Vouga, Aveiro, ⁴Faculty of Medicine of Oporto University, Oporto, Portugal

Objective: To describe the results of a fracture liaison service (FLS) created by the Rheumatology Department of a tertiary referral hospital.

Methods: In March 2015, a FLS was established at Centro Hospitalar São João, Portugal. Patients ≥ 65 years old with proximal femur fragility fracture, hospitalized at the Orthopaedics Department, were evaluated/referred to the rheumatology outpatient clinic. After clinical/laboratory assessment, bone densitometry and spine x-ray, anti-osteoporotic therapy

was started, with regular follow-up. This is a description of the population observed in the first 25 months.

Results: 522 inpatients were referred to the outpatient clinic, with median age (min-max) of 84 years (65-103); 79.7% (N=416) were female. Ninety-seven (18.6%) had a known previous fragility fracture and 53 (10.2%) were treated for osteoporosis in the past. Forty-five (8.6%) had chronic kidney disease, 31 (5.9%) premature menopause, 21 (4.0%) exposure to corticoids, 3 (0.6%) primary hyperparathyroidism and 2 (0.4%) were hyperthyroid. A total of 233 (44.6%) never attended the outpatient clinic: 62 died (33 still during hospitalization), 171 missed the appointment. From the remaining 289, 137/237 (57.8%) had ≥ 1 vertebral fractures on x-ray; 163/235 (69.4%) had T-score ≤ -2.5 (147 femoral neck, 7 lumbar spine, 9 wrist); 167/219 (76.3%) had serum 25hydroxyvitaminD ≤ 30 ng/m. Treatment was started in 186/289 (64.4%): 100 zoledronate, 60 alendronate, 17 denosumab, 7 teriparatide and 2 pamidronate. About follow-up, 33 (11.4%) died, 113 (39.1%) were lost to follow-up and only 143 (49.5%) maintained regular attendance. New fragility fracture occurred in 47 (9.6%) of the 489 patients that survived hospitalization (in 13 in spite of regular follow-up).

Conclusion: FLS ensure correct treatment of patients with fragility fractures. In this study, despite the efforts, adherence to follow-up was suboptimal. Additional measures to increase compliance will be adopted.

P853

PERSISTENCE WITH THE BUFFERED SOLUTION OF ALENDRONATE 70 MG: PROSPECTIVE OBSERVATIONAL STUDY

A. Giusti¹, G. Bianchi¹, A. Barone², J. Hruska³, D. M. Black⁴

¹La Colletta Hospital, Genova, ²Galliera Hospital, Genova, Italy, ³EffRx Pharmaceuticals SA, Freienbach, Switzerland, ⁴University of California San Francisco, San Francisco, USA

Objective: Alendronate 70 mg effervescent (ALN-EX) was developed to improve upper gastrointestinal (GI) tolerability of alendronate tablets (ALN-T)¹. It is associated with a lower frequency of GI adverse reactions (AR) than ALN-T², potentially leading to increased persistence with ALN-EX. Our aim was to evaluate persistence and reasons for discontinuation in patients treated with ALN-EX, and to compare the outcomes with a historical cohort of patients on ALN-T.

Methods: Postmenopausal women (PMW) from a standardized Clinical Database with BMD T-score < -2.5 , or between -2 and -2.5 and at least one vertebral fracture, starting ALN-EX between July 2015 and June 2016 were included. A historical cohort comprised of randomly selected and age-matched PMW on ALN-T was used as a control. Persistence at 6- and 12-month and reasons for discontinuation were compared between the ALN-EX and ALN-T groups. Reasons for discontinuation including the occurrence of AR were recorded prospectively (ALN-EX) or retrieved from the database (ALN-T). Efficacy data (BMD and bone ALP) are reported separately.

Results: 144 PMW on ALN-EX and 216 PMW on ALN-T (144 ALN, 72 ALN plus cholecalciferol) were analyzed. The two groups were comparable with respect to baseline characteristics (previous fractures, baseline BMD and use of PPIs). Persistence at 6- and 12-months was 91% and 81% in ALN-EX group vs. 75% and 69% in ALN-T. The difference was significant at both time points: 6-month $P < .001$ and 12-month $P = 0.009$. Significantly higher% of PMW receiving ALN-T discontinued treatment due to GI AR or patient preference: GI AR, 4% ALN-EX vs. 11% ALN-T ($P = 0.027$); patient preference, 6% ALN-EX vs. 13% ALN-T ($P = 0.016$).

Conclusion: This is the first report indicating that ALN-EX is associated with higher persistence than ALN-T. ALN-EX is a well tolerated oral bisphosphonate and a viable alternative option in the management of osteoporosis, being able to improve persistence.

References:

1. Hodges LA et al. Int J Pharm 2012.
2. Hruska J et al. J Bone Miner Res 2017.

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Disclosures: Dr Giusti has received consulting fees from bisphosphonate manufacturers: Abiogen, Internis Pharma, Labatec, Merck & Co, Chiesi, EffRx Pharmaceutical. Dr Bianchi has received consulting fees from bisphosphonate manufacturers: Abiogen, Novartis, Roche, Merck & Co, Chiesi. Dr Hruska is an employee of EffRx Pharmaceuticals SA. Dr Black has received consulting fees from EffRx Pharmaceutical and Asahi-Kasei.

P854

CHRONIC RECURRENT MULTIFOCAL OSTEOMYELITIS: FOUR TERTIARY SPANISH HOSPITALS EXPERIENCE: A MULTICENTRIC STUDY

A. García Fernández¹, J. Arroyo Palomo¹, D. Clemente Garrulo², B. Serrano Benavente³, J. Novoa Medina⁴, J. C. Nieto González³, S. Machín García⁴, A. M. Brandy García⁵, J. C. López Robledillo², I. Monteagudo Sáez³, A. L. Boteanu¹

¹Department of Pediatric Rheumatology, Ramón y Cajal University Hospital, Madrid, ²Department of Pediatric Rheumatology, Niño Jesús University Child Hospital, Madrid, ³Department of Pediatric Rheumatology, Gregorio Marañón General University Hospital, Madrid, ⁴Department of Pediatric Rheumatology, Insular Maternity Child University Hospital of Gran Canaria, Las Palmas de Gran Canaria, ⁵Rheumatology, Central University Clinic Hospital of Asturias, Oviedo, Spain

Objectives: Chronic recurrent multifocal osteomyelitis (CRMO) is a rare autoinflammatory polygenic bone disease characterized by aseptic bone inflammation in pediatric population. Its management, clinical, radiological findings and treatment have not yet been standardized.

Methods: Retrospective, descriptive multicentric study of patients diagnosed of CRMO in four tertiary level hospitals' pediatric rheumatology section. There were 16 patients included. The clinical, radiological characteristics were analyzed as well as response to treatment options.

Results: The median age at diagnosis was 10.5 years, female:male ratio 62.5:37.5%. The delay in the diagnosis had a median of 4.5 months, being less than one year in 11 patients. Bone pain was the first symptom in 100% of the patients accompanied by fever in 25% of them. The median number of locations at debut was 2.5 (range 1-14), with multifocal involvement in 75%. The most frequent location was tibia (56%), followed by pelvis (44%) and vertebrae (31.25%). Biopsy was performed in 14/16 patients. MRI was the radiological test of suspected diagnosis in 15/16 patients. NSAIDs were the initial treatment. 5 patients received different antibiotic therapy regimens, without clinical or radiological improvement. 56.25% of patients required other treatments. Systemic corticosteroids were used in 12.5% of patients and bisphosphonates in 43.75% (100% of patients with axial involvement). After 6 months of treatment with BF, 57.14% had complete remission, 28.57% partial remission and 14.28% worsening. 12.5% of the patients had a torpid evolution, receiving sequential therapies with multiple DMARDs, and another 12.5% required surgery.

Conclusions: The diagnosis of CRMO is a challenge in the absence of pathognomonic features which leads to delay in diagnosis and the initiation of treatment. In our centers the bisphosphonates were the treatment strategy used in patients with spinal involvement with 85.67% response at 6 months.

P855

HIGHER LEVELS OF SERUM URIC ACID WERE ASSOCIATED WITH LOWER RISK OF VERTEBRAL FRACTURE INDEPENDENTLY OF BONE DENSITY AND RENAL FUNCTION: FUJIWARA-KYO OSTEOPOROSIS RISK IN MEN (FORMEN) COHORT STUDY

M. Iki¹, Y. Fujita¹, A. Yura¹, K. Kouda¹, T. Tachiki¹, Y. Sato², J. Tamaki³, E. Kajita⁴, J. S. Moon⁵, N. Okamoto⁶, N. Kurumatani⁷

¹Department of Public Health, India University Faculty of Medicine, Osaka-Sayama, ²Jin-ai University, Echizen, ³Osaka Medical College, Takatsuki, Japan, ⁴Nagoya University Graduate School of Medical Sciences, Nagoya, ⁵Kio University, Koryo-cho, ⁶Hyogo University of Teacher Education, Kato, ⁷Nara Medical University, Kashihara, Japan

Objectives: Uric acid (UA) accounts for approximately half of the antioxidant properties of human plasma, and higher level of UA is reportedly associated with lower risk of osteoporotic fractures. However, this association has not yet been examined for morphometric vertebral fracture or for Japanese people. We examined whether serum UA levels are associated with the risk of morphometric vertebral fractures after adjusting for BMD and renal function.

Methods: 2012 Japanese men aged 65 years and over completed the baseline study of the Fujiwara-kyo Osteoporosis Risk in Men study comprising serum UA level measurement and X-ray absorptiometry-based vertebral fracture assessment. We conducted a follow-up study for them to identify incident vertebral fracture which was defined as the vertebra which showed reduction in any of its anterior, central, and posterior heights by 20% or more during the follow-up, and satisfied grade one or higher fracture criteria in Genant's method on a follow-up image.

Results: 1538 men participated in the follow-up study and 45 vertebral fractures were identified in 40 men during 7063 person years of follow-up. Mean UA level was 5.7 (geometric SD, 1.3) mg/dl and the UA levels were significantly correlated with age ($r=-0.105$), BMD at the spine ($r=0.081$) and estimated glomerular filtration rate (eGFR) ($r=-0.298$). Age-adjusted odds ratio (OR) of incident vertebral fracture for one SD increase in UA levels was 0.69 (95%CI: 0.55, 0.86). The age-adjusted OR for the highest quartile of UA levels compared to the lowest quartile was 0.14 (95%CI: 0.04, 0.47). This OR remained significant when further adjusted for BMI and spine BMD (0.18, 95%CI: 0.05, 0.62) and did not change when further adjusted for eGFR.

Conclusions: Higher levels of serum UA were associated with lower risk of morphometric vertebral fracture independently of bone density and renal function in Japanese elderly men.

Disclosures: None

P856

IMPACT OF HEMODIALYSIS ON MUSCLE MASS AND FUNCTION

R. Abdala¹, E. Del Valle¹, A. Negri¹, M. Zanchetta¹

¹IDIM, Buenos Aires, Argentina

Objective: Sarcopenia is a well-known complication of protein energy wasting seen in hemodialysis (HD) patients. Its diagnosis requires measurements of muscle mass and muscle function. Few studies have reported its prevalence in HD patients. Our aim was to assess the impact of HD on muscle mass and function.

Methods: In this cross-sectional study we evaluated 103 adult patients on chronic HD (>6 months). Body composition was evaluated by DXA: appendicular muscle mass (MMA), skeletal muscle mass index (IMME=appendicular muscle mass/height² [kg/m²], and fat percentage (%). Hand grip strength was evaluated at the arm without fistula. Physical performance was evaluated by 5 repetitions of sit-stand test and gait speed (4 m). Low muscle mass was defined as IMME <7.26 kg/m² for men (M) and IMME <5.5 kg/m² for women (W); low handgrip strength was

defined as <30 kg for M and <20 kg for W. Sarcopenia was defined according to the European consensus.

Results: 61 of the patients were M (mean age 53.7 years) and 42 were W (mean 57.7 y). Time in dialysis was 4.5 y for M, and 3.9 y for W. Two or more falls during the last year were reported by 29% of the patients. Among M, 58% had low handgrip strength and 28% had sarcopenia (low muscle mass and low hand grip or physical performance). Among W, 76% had low hand grip strength and 31% had sarcopenia. Patients over and under 50 years of age showed no differences in muscle mass or hand grip strength. The muscular impact of HD was similar at all ages.

Conclusion: HD contributes to the loss of skeletal muscle mass and its function. More than 50% of our patients had muscle strength equal or less than the lower limit of normal, and there was a high prevalence of sarcopenia event at younger ages. HD patients should be considered as a population at risk of sarcopenia; this will allow future strategies to prevent this condition.

P857

EFFECT OF BUFFERED SOLUTION OF ALENDRONATE 70 MG ON BMD AND BONE ALP: PROSPECTIVE OBSERVATIONAL STUDY

A. Giusti¹, G. Bianchi¹, A. Barone², J. Hruska³, D. M. Black⁴

¹La Colletta Hospital, Genova, Italy, ²Galliera Hospital, Genova, Italy, ³EffRx Pharmaceuticals SA, Freienbach, Switzerland, ⁴University of California San Francisco, San Francisco, USA

Objectives: Alendronate 70 mg effervescent (ALN-EX) is administered as buffered solution of fully dissolved ALN1. While registration studies have demonstrated bioequivalence of ALN-EX to ALN tablets (ALN-T)1, BMD and BTM data are lacking. Our aim was to evaluate the effect of ALN-EX on BMD and bone-ALP (b-ALP), and to compare the outcomes with a historical cohort of patients on ALN-T.

Methods: A standardized clinical database has been used for the study. 42 postmenopausal women (PMW), presenting with BMD T-score < -2.5, or between -2 and -2.5 and at least one vertebral fracture, starting ALN-EX between July 2015 and June 2016 were enrolled. BMD at femoral neck (FN-BMD), total hip (TH-BMD), and b-ALP were measured at baseline and after 12-month. 54 PMW on ALN-T were randomly selected for the historical cohort. Mean% changes ($\pm$ SD) of FN-BMD, TH-BMD and b-ALP from baseline to 12-month were compared between the two groups (ALN-EX and ALN-T).

Results: The two groups were comparable at baseline, including previous history of vertebral/femoral fractures, and baseline BMD. The two groups had comparable mean% increases in FN-BMD and TH-BMD after 12-month of treatment: in ALN-EX group by 1.5% $\pm$ 2.8% (FN-BMD) and 2.1% $\pm$ 2.6% (TH-BMD), in ALN-T group by 1.4% $\pm$ 3.3% (FN-BMD) and 2.2% $\pm$ 3.5% (TH-BMD). Also the absolute decrease (mean U/L $\pm$ SD) of b-ALP was comparable between ALN-EX group (-6.0 $\pm$ 2.8 U/L) and the ALN-T group (-6.9 $\pm$ 4.4 U/L). There was no significant difference in BMD or BTM change between ALN-EX and ALN-T.

Conclusion: To the best of our knowledge, this is the first report comparing BMD and a marker of bone turnover between PMW treated with ALN-EX and PMW treated with ALN-T. Given the limits of the trial design (e.g., lack of randomization), the results of our study demonstrated that ALN-EX is as effective as traditional ALN-T on surrogate anti-fracture efficacy outcomes.

Reference: Binosto SPC. www.medicines.org.uk; accessed 22. Jan 2018. **Acknowledgement:** The study was supported by EffRx Pharmaceuticals, Switzerland.

Disclosures: Dr Giusti has received consulting fees from bisphosphonate manufacturers: Abiogen, Internis Pharma, Labatec, Merck & Co, Chiesi, EffRx Pharmaceutical. Dr Bianchi has received consulting fees from bisphosphonate manufacturers: Abiogen, Novartis, Roche, Merck & Co, Chiesi. Dr Hruska is an employee of EffRx Pharmaceuticals SA. Dr Black has received consulting fees from EffRx Pharmaceutical and Asahi-Kasei.

P858

THE RESULTS OF TOTAL HIP ARTHROPLASTY IN PATIENTS WITH OSTEOARTHRITIS AND INCREASED BMI

I. Akhtyamov¹, S. Ardashev², S. Lapshina¹, L. Myasoutova³¹Kazan State Medical University, ²Republic Clinical Hospital, ³Clinical Hospital #7, Kazan, Russia

Objective: Patients with osteoarthritis (OA) with obesity are often denied of joints replacement due to excessive body weight. It is believed that in this group of patients there is a pronounced pain syndrome after the operation for a long time, and a sufficient function of the joint is not restored. The aim of the study was to perform a comparative analysis of clinical and functional disorders in patients with hip pathology having an increased BMI in the perioperative period.

Methods: The study included 43 patients (13 men and 30 women) aged 44-78 years (mean 58.8) with OA and elevated BMI who had indications for joint replacement due to aseptic necrosis of the femoral head and coxarthrosis 3-4 X-Ray stages. The growth of patients was 137-179 cm (average 160.7), body weight 74-128 kg (92.2% average), BMI: 29-50 kg/m² (average 35.8). Alimentary-constitutional obesity: I degree in 24 patients, II degree in 8 patients, III degree in 9 patients, IV degree in 2 patients. The survey included detailed localization of the Harris index and VAS pain before and after surgery. Before the surgery, Harris's index was 20-70 (average 40.9), VAS pain: 70-95 mm (average 82.1). Concomitant pathology: arterial hypertension, ischemic heart disease, type 2 diabetes. The correlation analysis method was used for statistics.

Results: All patients were classified according to the BMI. A high connection was found between growth, BMI and the need for a complete hip replacement. In the early postoperative period, patients with obesity had no complications. The evaluation of the results was conducted on a gender basis. The main indicators: the patients' age averaged 59 years, BMI in men was 10% higher than that of women. The duration of the operation for hip replacement in patients with normal BMI is 40 min on average, in patients with elevated BMI this time increases by 20%, in men by 40%. The blood loss was measured intraoperatively and by drainage during the day. It was found that obesity increases the amount of intraoperative blood loss in women more than in men. This may be due to the fact that in men the majority of excess weight is concentrated around the waist, and in women it is around the thighs, which makes the operation longer. The need for analgesic therapy for duration (+2 days) and the dose of NSAIDs (by 30%) was higher in women than in men. Reduction of VAS pain 10 days after the operation compared with the original was 56.3%, improvement in the function of the joint on a Harris scale of 28.1%. The average bed-day did not differ from the standard one and depended on the postoperative time taken in this hospital.

Conclusion: Hip joints replacement is an effective method of improving the functional state, relief of pain and helps to increase the physical activity of patients suffering from excessive body weight.

P859

QUANTITATIVE ULTRASOUND OF BONE AND HANDGRIP STRENGTH ARE RELATED TO FRACTURE RISK IN HEMODIALYSIS PATIENTS

A. Catalano¹, M. Morabito¹, F. Bellone¹, M. M. La Fauci¹, A. Lacquaniti², V. Cernaro², M. Buemi², A. Lasco¹¹Geriatric Unit, Department of Clinical and Experimental Medicine, University Hospital of Messina, ²Department of Clinical and Experimental Medicine, University Hospital of Messina, Messina, Italy

Objective: Quantitative ultrasound (QUS) measurements of bone provide surrogate information on bone quality and were previously reported to be associated with fractures. Bone fragility is a common occurrence in chronic kidney disease and hemodialysis patients. Aim of our research was to assess bone status by phalangeal and tibial QUS, and to evaluate their associations with fracture risk in hemodialysis.

Methods: 45 hemodialysis patients were considered (mean age 74.23 ±11.7 yr.; mean time since dialysis 4.5±4.03 yr.). Amplitude dependent speed of sound (AD-SoS), Bone transmission time (BTT) and ultrasound bone profile index (UBPI) at phalangeal site by Bone Profiler (Igea), cortical thickness and density index (DI) at proximal tibia by Bindex (Hologic), handgrip strength by dynamometer, FRAX derived 10-year probability of major fractures and hip fractures were measured.

Results: Phalangeal AD-SoS was significantly related with tibial cortical thickness and DI ($r=-0.36$, $p=0.02$ and $r=-0.49$, $p=0.004$, respectively). Significant associations were found between other phalangeal and tibial QUS measurements ($p<0.05$). The 10-years probability of major fractures and hip fractures were significantly associated with QUS measurements; in particular, AD-SoS was associated with probability of major osteoporotic fractures ($r=-0.374$, $p=0.018$), whereas DI was associated with probability of hip fracture ($r=-0.368$, $p=0.022$). Handgrip strength was significantly associated with FRAX scores ($r=-0.579$, $p<0.001$ for major fractures; $r=-0.530$, $p<0.001$ for hip fracture), and with AD-SoS values ($r=0.369$, $p=0.023$).

Conclusions: Phalangeal and tibial QUS appeared useful tools to evaluate bone health in hemodialysis patients; moreover, handgrip strength has been able to discriminate patients at high fracture risk.

P860

NOVEL TRIPHASIC CALCIUM-BASED IMPLANT MATERIAL DELIVERED BY A MINIMALLY-INVASIVE LOCAL OSTEO-ENHANCEMENT PROCEDURE INCREASES LONG-TERM PROXIMAL FEMUR TRABECULAR DENSITY IN OSTEOPOROTIC WOMEN AS ASSESSED BY QCT

K. Engelke¹, R. Hill², T. Fuerst³, B. Huber⁴, M. Chin², J. Howe², H. Genant³¹Bioclinica Germany, Hamburg, Germany, ²AgNovos Healthcare, Rockville, USA, ³Bioclinica, Inc., Newark, USA, ⁴Copley Hospital, Morrisville, USA

Objectives: Interest is growing in alternatives to complement medications for fragility fracture reduction¹. This study examined the effects on BMD, as measured by QCT, of injecting a novel triphasic calcium based implant (AGN1) via a minimally-invasive local osteo-enhancement procedure (LOEP) on proximal femurs of osteoporotic women.

Methods: In this IRB-approved study, 12 postmenopausal women (age 56-89; hip T-score left -3.1 ± 0.5 ; right -3.0 ± 0.7) underwent AGN1 LOEP on left proximal femurs; right was control. Total hip integral BMD (intBMD), trabecular (trBMD) and BMD (agBMD) and volume of the AGN1 implant VOI were measured by QCT (MIAF, U. of Erlangen) pre-LOEP, 12 and 24 weeks and 315 weeks post LOEP (N=10 or 12 based completed scans).

Results: Low agBMD (mean 26 ± 32 mg/cm³) within the implant region in all patients pre-AGN1 LOEP confirmed initial compromised bone strength. Total hip intBMD and trBMD increased significantly in treated femurs at all time points: intBMD 176 ± 32 , $290\pm35^*$, $257\pm21^*$, and $235\pm33^*$ and trBMD 22 ± 21 , $217\pm56^*$, $161\pm18^*$, and $121\pm37^*$ at 0, 12, 24 and 315 weeks ($*p<0.05$). Increases were due to changes in agBMD within the implant region as trBMD surrounding the implant was not increased at 315 weeks (data not shown). Initial AGN1 implant volume (17 ± 5 cm³) was 81%, 97% and 100% resorbed at 12, 24 and 315 weeks. The implant region remodeled over time as shown by qualitative changes in newly mineralized tissue, BMC and BMD.

Conclusions: AGN1 LOEP rapidly and durably increased proximal femur BMD. The increased BMD was localized within the original implant region demonstrating that AGN1 provided a template for new bone formation. This increase in proximal femur BMD in osteoporotic femurs would be expected to correlate with increased bone strength and fracture resistance.

Reference: 1. Ferrari S et al. Arch Osteoporos 2016;11:37

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P861

VITAMIN D AND PROSTATE MALIGNANCY

I. Kostoglou-Athanassiou¹, L. Athanassiou², N. Mourmouras³, S. Topalidis⁴, A. Filios³, A. Karafotias³, O. Mascha⁴, D. Delakas³

¹Department of Endocrinology, Asclepeion Hospital, ²1st Department of Medicine, Asclepeion Hospital, ³Department of Urology, Asclepeion Hospital, ⁴Department of Biopathology, Asclepeion Hospital, Voula, Athens, Greece

Objective: Vitamin D deficiency has been found to be associated with multiple chronic diseases, including diabetes mellitus type 1 and 2, rheumatoid arthritis and other autoimmune diseases. However, the relationship between vitamin D and cancer remains controversial. Vitamin D deficiency is widely prevalent in the general population. In accordance, vitamin D deficiency was found to be prevalent in Scotland. In a study performed in Scotland vitamin D deficiency was observed, however, no relationship with specific cancers was found. Additionally, a relationship between vitamin D receptor mutations and cancer of the prostate has been observed. The aim was to estimate the relationship between vitamin D and cancer of the prostate.

Methods: In a group of 31 patients suffering from prostate cancer 25(OH)D3 levels, PTH levels and calcium levels were measured. Observations were also performed in 31 patients, male, in the same age group serving as controls.

Results: Vitamin D, 25(OH)D3 levels, were found to be 25.32±1.9 ng/ml and 20.21±2.37 ng/ml in the group of prostate cancer patients and the control group, respectively, ($p < 0.001$).

Conclusions: The relationship between vitamin D and cancer remains controversial. A relationship has been observed between mutations of the vitamin D receptor and cancer of the prostate. However, the relationship between vitamin D deficiency and cancer is controversial. In the present study higher vitamin D levels were observed in prostate cancer patients as compared to a control group of men within the same age group. Therefore, when administering vitamin supplementation as well as vitamin D treatment for osteoporosis or osteomalacia caution should be exercised in order to keep vitamin D levels within the normal range. It should also be noted, that 25(OH)D₃ exerts its effects by binding to its receptor within the core of the cell, thereby exerting powerful, important and as yet unknown effects in the human organism.

P862

FREE VITAMIN D AS COMPARED TO TOTAL VITAMIN D MAY BE BETTER PREDICTORS OF INSULIN RESISTANCE IN INDIVIDUALS WITH NORMOGLYCEMIA AND PREDIABETES

M. Kumar¹

¹Jaypee Hospital, Noida, India

Objective: This study aimed to evaluate the relation between total, free, bioavailable 25OHD and vitamin-D binding protein (DBP) with waist circumference, hip circumference, neck circumference, insulin resistance (IR), high sensitivity c-reactive protein (hsCRP), inflammatory cytokines [IL-6, IL1 β , soluble TNF receptor (sTNFR)-1, sTNFR2] across the spectrum of glycemia.

Methods: The above mentioned parameters were evaluated in 34 individuals with normoglycemia (NGT), 64 prediabetes (preDM) and 38 newly diagnosed treatment naïve type 2 diabetes (T2DM) patients, selected from the eastern India vitamin D in prediabetes study (CTRI/2011/091/000192). Serum insulin was estimated using CLIA (Immunit-1000, Gwynedd, UK). 25OHD was measured using ¹²⁵I radioimmunoassay kit (Catalogue number: REF68100E, Diasorin, USA). DBP was measured using sandwich ELISA (Catalog number: MBS161429; My Biosource; San Diego, CA, USA), having detection range 5-1000 ng/L, with sensitivity 2.51 ng/L. Intra- and interassay coefficient of variation was <10% and <12%, respectively. IL6, IL1b, sTNFR1 and sTNFR2 were estimated

using sELISA. IR was estimated using HOMA2-IR (homeostatic model of insulin resistance).

Results: NGT (age: 50.29±13.2 years), prediabetes (age: 46.9±12.3 years) and T2DM (age: 49.73±13.4 years) patients had significant difference in mean serum DBP (276.42±32.69, 318.18±62.65 and 279.41±49.01 ug/ml, $P=0.001$), total 25OHD (30.50±18.37, 31.95±23.25, 42.07±20.23 ng/ml, $P=0.075$), free 25OHD (9.04±5.33, 8.44±5.91 and 13±6.78 pg/ml, $P=0.005$) and bioavailable 25OHD (3.52±2.08, 3.29±2.32, 5.08±2.64 ng/ml, $P=0.005$). Free 25OHD had significant inverse correlation with HOMA2-IR in NGT ($r=-0.532$, $P=0.007$) and prediabetes ($r=-0.36$, $P=0.010$). DBP had positive correlation with HOMA2IR in prediabetes ($r=0.349$, $P=0.013$) only. 25OHD had inverse correlation with HOMA2IR only in NGT ($r=-0.468$, $P=0.021$). Regression analysis revealed free 25OHD to be best predictor of HOMA2IR at baseline ($\beta=-2.024$, $P=0.007$) and after adjusting for IL6, IL1b, sTNFR1 and sTNFR2 ($\beta=-2.620$, $P=0.003$). Free 25OHD was predictor of HOMA2IR in NGT only after adjusting for model-1 variables ($\beta=-0.872$, $P=0.039$). Free, total 25OHD and DBP were not predictive of HOMA2IR in T2DM

Conclusion: Free 25OHD, in contrast to 25OHD may be a better predictor of insulin resistance in normoglycemia and prediabetes among Indians. Further studies are warranted to study the impact of changes in serum free 25OHD following vitamin D supplementation on glycemic outcomes in prediabetes.

P863

THERAPY EFFICACY AND SQSTM1 MUTATIONS IN HUNGARIAN POPULATION OF PAGET'S DISEASE OF BONE

J. Donáth¹, M. Pálkás¹, R. Rásonyi¹, G. Vastag², B. Larraz Prieto³, M. Vallet³, S. Ralston³, G. Poór¹

¹National Institute of Rheumatology and Physiotherapy, Budapest, Hungary, ²Szechenyi University, Győr, Hungary, ³Edinburgh Clinical Trials Unit, University of Edinburgh, Western General Hospital, Edinburgh, Scotland

Objective: Paget's disease of bone (PDB) is a common disorder of bone remodeling that may affect one or more locations of the skeleton and can occur with various clinical symptoms. Genetic factors play an important role in pathogenesis, particularly mutations that affect osteoclast activity. Following related international research projects, the occurrence of sequestosome 1 (SQSTM1) gene mutations in patients with Paget's disease of bone (PDB) was investigated in a Hungarian sample. We evaluated the effect of SQSTM1 mutation on the measures of age at the diagnosis, gender, bone pain on visual analog scale (VAS), disease extent determined from bone scintigraphy, and response to bisphosphonate (BP) treatment.

Methods: The sample consisted of 82 patients with PDB described, among others, by age, age at the diagnosis, gender, disease extent as determined from bone scintigraphy. Mutational analysis was performed on 82 pagetic patients and 100 controls. 67 patients were examined before and after receiving bisphosphonate treatment. Serum alkaline phosphatase levels (SAP) and bone pain on visual analog scale (VAS) were measured.

Results: The mean age of the cohort was 61.4 years (ranging from 39-86 years), 47 were men (57.5%), 35 women 42.5 (%). In this sample, nine patients had P392L mutations (10.98%). No significant differences between patients with or without SQSTM1 mutation were observed concerning age at diagnosis, and male/female ratio. We found that patients who carried SQSTM1 mutation had significantly wider extent of the disease than those without mutations (56% more). BP treatment responses on SAP showed significant differences between SQSTM1 mutation carriers and non-carriers but no significant differences were detected in the pain scale.

Conclusions: Our results confirmed that SQSTM1 mutations represent about 10% in sporadic Paget cases in Hungary, similarly to other countries. We found that SQSTM1 mutations may be associated with disease

severity. Further studies will be required to determine the role of mutations in bone pain sensations.

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P864

ANXIETY SEVERITY AS A PREDICTOR OF OSTEOPOROSIS

F. Bellone¹, M. Morabito¹, G. Martino², A. Lasco¹, A. Catalano¹

¹Geriatric Unit, Department of Clinical and Experimental Medicine, University Hospital of Messina, ²Department of Cognitive Sciences, Psychology, Education and Cultural Studies, University of Messina, Messina, Italy

Objective: Several psychiatric disorders have been correlated to fracture risk, but limited data are available on the association between anxiety and osteoporosis. Our aim was to investigate the influence of anxiety severity on bone health.

Methods: Multiple clinical risk factors (CRFs) for fractures and the 10-year probability of a major fracture (hip, clinical spine, humerus or wrist fracture) and the 10-year probability of hip fracture as measure by FRAX score, BMD at lumbar spine and femur by DXA, X-ray vertebral morphometry, Hamilton Anxiety Rating Scale (HAMA) for anxiety levels, Beck Depression Inventory-II edition (BDI-II) for depressive symptoms and the SF-36 Health Survey for quality of life were considered in a setting of postmenopausal women referred for osteopenia/osteoporosis in accordance with the WHO definition.

Results: Of the 192 recruited women (mean age 67.5±9.5 yr.), patients allocated in the tertile of lower HAMA score (HAMA-1) showed lower probability of fracture compared with patients in the highest one (HAMA-3) (20.44±9.3 vs. 24.94±13%, respectively, $p=0.01$), and the same trend was observed when comparing HAMA-2 with HAMA-3 tertiles. Women in HAMA-3 exhibited lower T-score values at lumbar spine in comparison with women in HAMA-1 (-2.84±1.4 vs. -2.06±1.2 SD, respectively, $p<0.001$), and lower T-score values at femoral neck (-2.21±0.9 vs. -1.93±0.6 SD, respectively, $p<0.05$); lower T-score values were observed in HAMA-3 compared with HAMA-2. Vertebral fractures were more often observed in HAMA-3 vs. HAMA-1 ($p<0.05$). Anxiety levels were significantly related with age, menopausal age, years since menopause and depressive symptoms, and at a multiple regression analysis were predictive of reduced BMD ($\beta=-0.03407$, $SE=0.012$, $p=0.012$).

Conclusion: Levels of anxiety were significantly associated with BMD at lumbar spine and femoral neck.

P865

FEATURES OF REHABILITATION AFTER HIP ARTHROPLASTY IN OSTEOARTHRITIS PATIENTS WITH EXCESSIVE BODY WEIGHT

I. Akhtyamov¹, S. Ardashev², S. Lapshina¹, L. Myasoutova³

¹Kazan State Medical University, ²Republic Clinical Hospital, ³Clinical Hospital #7, Kazan, Russia

Objective: To evaluate long-term results of hip joints replacement in patients with osteoarthritis (OA) and overweight, depending on the degree of weight gain.

Methods: The study included 43 patients (13 men and 30 women) aged 44-78 years (mean 58.8) with OA and elevated BMI who had indications for joint replacement due to aseptic necrosis of the femoral head and coxarthrosis 3-4 X-Ray stages. The growth of patients was 137-179 cm (average 160.7), body weight 74-128 kg (92.2% average), BMI: 29-50 kg/m² (average 35.8). Alimentary-constitutional obesity: I degree in 24 patients, II degree in 8 patients, III degree in 9 patients, IV degree in 2 patients. Two groups of patients were identified depending on BMI: 1 group - 24 patients with BMI 30-34.9 kg/m², 2 group - 19 patients with

BMI ≥ 35 kg/m². The survey included detailed localization of the Harris index and VAS pain before and after surgery. Before the surgery, Harris's index was 20-70 (average 40.9), VAS pain: 70-95 mm (average 82.1). Concomitant pathology: arterial hypertension, ischemic heart disease, type 2 diabetes. The correlation analysis method was used for statistics

Results: All patients showed positive dynamics after the operation: a significant (>0.01) decrease in VAS pain intensity in 12 months (an average of 20 times), indices of the Harris scale index were in the positive range (in all patients >80 units through 1 year). Reduction of VAS pain - 3 months after surgery compared with the initial one was 55.7% in Group 1, 56.9% in Group 2; in 12 months - 97% and 95%, respectively. In a comparative aspect before the operation, the Harris index and the VAS scale have an inverse correlation between these indices at a 1-year term. The dynamics of joint function on the Harris scale 3 months after the operation in relation to the initial one was 27.6% in the 1st group, 28.3% in the second group, one year after operation - 8.5% in the 1st group, 7.5% in the second group. At the same time, in the first 3 months after surgery, a tendency to decrease the body weight and perform the rehabilitation program was observed, later the change in the patient's body weight was less significant, and the load on the joint increased. In the late postoperative period, obesity patients did not experience complications or aggravation of concomitant pathology.

Conclusion: Hip joints replacement in OA patients with overweight is an effective method of improving the functional state, relief of pain and promotes increased physical activity in the long-term. Active postoperative rehabilitation of patients with body mass correction, dispensary observation and prospective evaluation at a period of 1.5 years after the completion of complete rehabilitation are required.

P866

WNT/ β -CATENIN AND RANK/RANKL/OPG SIGNALLING MODULATES EFFECTS OF PULSED ELECTROMAGNETIC FIELDS ON BONE IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

A. Catalano¹, M. Morabito¹, F. Bellone¹, C. Pecora², S. Loddo³, A. Lasco¹

¹Geriatric Unit, Department of Clinical and Experimental Medicine, University Hospital of Messina, ²Vertebral Surgery Section, Carmona Clinic, ³Department of Clinical and Experimental Medicine, University Hospital of Messina, Messina, Italy

Objective: Pulsed electromagnetic fields (PEMFs) have been used as a noninvasive alternative method to promote bone healing usually in fresh and nonunion fractures of long bones. It was previously proven that PEMFs enhance in vitro and in vivo osteogenesis, with unknown mechanism. Our aim was to investigate whether RANK/RANKL/OPG and Wnt/ β -Catenin pathways may participate to bone response to PEMFs in a setting of women affected from postmenopausal osteoporosis.

Methods: Forty-three women (mean age 62.8±4.5 yr.) were randomized into two groups. PEMFs group received PEMFs treatment (50 min treatment session/day, 6 treatment sessions/week, for a total of 25 times), by wearing a specific gilet applied to the trunk and connected to the electromagnetic device (Biosalus, by HSD Srl, Serravalle RSM), while women assigned to control group received sham PEMFs with the same device. BSAP and CTX, exploring bone formation and bone resorption respectively, RANKL, OPG, β -Catenin, DKK-1 and sclerostin were obtained at baseline, after 30 and 60 days.

Results: Only in PEMFs group, BSAP levels were significantly increased after 30 and 60 days ($p<0.05$) in comparison with baseline values, while CTX concentrations decreased at day 60 ($p<0.05$). A significant reduction of RANKL levels was observed after 60 days, but RANKL/OPG ratio significantly decreased even after 30 days. DKK-1 levels decreased and β -catenin concentrations increased after 30 and 60 days ($p<0.05$). In PEMFs group, at day 30, Δ SCL was significantly associated with Δ RANKL/OPG ratio ($r=-0.5$, $p=0.03$) and Δ DKK-1 was associated with Δ β -Catenin ($r=-0.47$, $p=0.02$).

Conclusion: In women with postmenopausal osteoporosis, our data provide convincing evidences of a PEFs modulation of RANK/RANKL/OPG and Wnt/ β -Catenin signaling pathways able to explain metabolic effects on bone.

P867

MALE OSTEOPOROSIS CAUSES IN A DEVELOPPING COUNTRY

R. Clapauch¹, S. Buksman², Y. Schrank³

¹Universidade do Estado do Rio de Janeiro, ²Instituto Nacional de Traumatologia, ³Diagnósticos da America, Rio de Janeiro, Brazil

Objective: To investigate causes of male osteoporosis in Brazil, a multi-racial country with a developing economy, according to WESP World Economic Situation and Prospects 2017 (United Nations).

Methods: Men diagnosed as osteoporotic through a spontaneous demand densitometry campaign were referred to a tertiary center where identification data, medical history and laboratorial exams were collected.

Results: 110 consecutive men were analyzed. Mean age was 68 ± 8 years and mean BMI 24 ± 4 kg/m². Constitutional factors were present in 83% of the osteoporotic patients (more than one can apply): being white (73%), age ≥ 70 years (41%) and familiar history of osteoporosis (22%, among which 14% from their mother). However, only 2 men (1, 8% of the sample) showed only constitutional causes for their osteoporosis. Lifestyle factors were present in 76% of the sample: 67% were longtime smokers, with a mean 750 cigarettes/day/years; 40% reported drinking and 21% assumed more than one dose of alcohol per day, during >50 years; 32% of all men were simultaneously smokers and drinkers. Hypogonadism was diagnosed in 28% of the osteoporotic men; prolonged use of corticosteroids in 16%; malabsorption in 10%; rheumatoid arthritis in 7%; primary or secondary hyperparathyroidism in 6%.

Conclusions: The majority of our sample (81, 2%) showed mixed constitutional and acquired (related to lifestyle) causes for osteoporosis. Hypogonadism was prevalent in more than one fourth of these men, but it can also be related to lifestyle habits, such as drinking. Incident medications and diseases were minor osteoporosis causes in our setting. In a multiracial country with a developing economy and upper middle per capita income, constitutional factors still represented an important determinant of future osteoporosis. Screening as they age and especially lifestyle preventive measures should be emphasized to white men with a familiar history of osteoporosis in a developing country.

P868

EFFECTS OF LONG-TERM USE OF UNFRACTIONATED HEPARIN (UFH) OR LOW-MOLECULAR-WEIGHT HEPARIN ON BMD IN PATIENTS WITH NEPHROTIC SYNDROME

S. Monov¹, D. Monova², R. Shumnalieva¹

¹Medical University - Sofia, Department of Internal Medicine, Clinic of Rheumatology, ²Medical University - Sofia, Medical Institute, Department of Internal Medicine, Sofia, Bulgaria

Objectives: Osteoporosis is a systemic skeletal disease characterized by decreased bone mass and micro- and macroarchitectural tissue alterations, resulting in bone fragility and increased fracture risk. Generalized osteoporosis is a result of different causes and pathogenic mechanisms, which often combine forces to become clinically relevant. Among the different exogenous factors, several drugs have been associated with increased risk of osteoporosis, when used chronically. The aim of this study is to determine the effects of UFH or LMWH therapy of at least 1 year duration on BMD in patients with nephrotic syndrome (NS).

Methods: All patients undergoing native renal biopsy for NS between 2006-2017 yielding a diagnosis of primary glomerulonephritis were identified. Baseline serum albumin, proteinuria, estimated glomerular filtration rate, date of biopsy and histological diagnosis were recorded. 465

(238 male, 227 female) patients with nephrotic syndrome received the prophylactic anticoagulation regimen were included. Mean age at biopsy was 43.8 ± 19.2 years. Median follow-up was 5.3 ± 2.4 years. In addition to the prophylactic anticoagulation regimen, patients received treatment for their underlying glomerulopathy. This included optimizing blood pressure control, renin-angiotensin system blockade, and prescribing immunosuppressive therapy if indicated. Patients received corticosteroid treatment or with renal failure were excluded from the study. 312 patients (67.1%) received treatment with UFH and 153 - with LMWH at some point in the course of their disease. There was no difference in mean age, sex, or disease duration between both groups. 276 patients were switched from UFH or LMWH to acenocoumarol as a result of protracted hypoalbuminemia (serum albumin <2.0 g/dl) at a median time of 24.3 ± 9.3 weeks treatment. The anticoagulant control achieved in these patients was good. BMD was measured at the lumbar spine and total hip region with DXA. **Results:** Results of Poisson regression analysis showed that LMWH therapy was associated with a lower risk of osteoporosis compared with UFH (0.7 vs. 1.1 per 100 person-years). No statistically significant increase in the risk of fractures at 12 months was found for patients (RR=1.03; 95% CI: 0.27-3.34). UFH for 24 months decreased mean BMD by 2.6-3.5% (depending on the BMD site) compared to mean BMD decreases of 1.9-2.9% with LMWH. BMD of the spine and hip is significantly lower in patients with LMWH therapy than in subjects with UFH therapy, which is independent of age, sex, menopause, low BMI and altered body composition.

Conclusions: LMWH most likely have less effect on bone turnover when compared to UFH. LMWH for 6 months may not increase the risk of osteoporosis, but longer exposure for up to 24 months may adversely affect BMD. Clinicians should consider monitoring BMD in adults on long-term heparin therapy who are at increased risk of bone loss or fracture.

P869

TERIPARATIDE USE AMONG POSTMENOPAUSAL WOMEN: A META-ANALYSIS

C. C. Morales¹, H. G. Cañizares¹

¹Philippine Heart Center, Quezon City, Philippines

Objectives: In the most recent guideline on the management of osteopenia and osteoporosis published by the American College of Physicians, teriparatide was excluded as a treatment option. This exclusion has sparked a controversy among specialty groups involved in the management of the disease. This meta-analysis evaluated the efficacy of teriparatide as treatment for patients with low bone mass and osteoporosis. Its potential in decreasing fractures was compared to placebo and to bisphosphonates. Other outcomes of interest were increase in BMD at the lumbar spine, femoral neck, and the total hip.

Methods: Published reports of randomized controlled trials (RCTs) in English from August 2007 to August 2017 were sought via PubMed and Google Scholar. Twenty-one studies were identified, of which 7 were included in the meta-analysis. Data from these studies were pooled to determine the efficacy of teriparatide in decreasing incident fractures and increasing BMD.

Results: Teriparatide reduced the risk of fractures and improved the BMD at the lumbar spine, femoral neck and total hip. Pooled data from 1535 postmenopausal women showed that teriparatide reduces the risk of fractures [risk ratio=0.35 (95%CI, 0.41, 0.80)] with an overall effect, Z, of 3.31 (P=0.0009). Greatest improvement was seen at the lumbar spine with a mean difference of 6.03% (Z=6.82; P<0.00001). More modest improvements at the femoral neck of 2.79% (Z=2.29; P=0.02) and total hip 0.64% (Z=1.67; P<0.0001) were also noted.

Conclusion: Teriparatide may be considered as a pharmacologic option among patient with decreased BMD, especially at the lumbar spine, and/or at high risk for fractures.

P870

NUMERICAL INVESTIGATION OF MENISCAL TEARS AND THE EFFECTS OF MENISCECTOMIES ON SECONDARY DEGENERATIVE ARTHRITIS

K. V. Acharya¹, K. Devaraj², R. Adhikari²¹KMC Manipal, Manipal Academy of Higher Education, ²Mechanical & Mfg. Eng. Dept., Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal, India**Objective:** To study the effect of longitudinal meniscal tear on the compressive stresses in the knee joint.**Methods:** 3D reconstruction of the human knee joint was performed considering the bones, cartilages, ligaments, menisci and tendons from MRI of healthy individuals. The longitudinal tear in the posterior horn of the medial meniscus was modelled using 3-matic software. The finite element analysis was performed to determine the distribution of compressive stresses in the knee joint. A force of 1150 N corresponding to the gait cycle for the full extension position was applied on the top surface of the femur.**Results:** The results of the analysis of knee joint with simulated meniscal tear was compared with that of the knee joint with intact meniscus. The results indicate that the longitudinal tear in the posterior horn of the medial meniscus caused a significant increase in the compressive stresses in the cartilage.**Conclusion:** Meniscal tears eventually lead to the progressive degeneration of the cartilage, due to significance increase in the compressive stresses. This study provides pointers to salvage the meniscus, depending on its location and type of tear on an experimental model, made using patients MRI data.

P871

EFFICACY AND SAFETY OF ETORICOXIB IN PATIENTS WITH OSTEOARTHRITIS AND COMORBIDITY

S. Lapshina¹, L. Myasoutova², T. Nuryakhmetova¹, M. Afanasieva³, E. Myasoutova¹¹Kazan State Medical University, ²Clinical Hospital #7, ³Republic Clinical Hospital, Kazan, Russia**Objective:** There are conflicting data in the literature about the increase of the relative risk of cardiovascular complications and the worsening of control of arterial hypertension in the treatment with etoricoxib, developed in the 1990s to reduce the risk of serious gastrointestinal side effects of nonselective nonsteroidal anti-inflammatory drugs (NSAIDs). Some sources pointing out, that the negative influence of coxibs on arterial hypertension control is observed both with their constant application and with admission on demand. However, in our clinical practice, it was noted that treatment with etoricoxib rarely leads to an increase in mean arterial blood pressure (BP) or the occurrence of cardiovascular disasters. Our aim was to assess the effectiveness of the analgesic effect of etoricoxib, the incidence of undesirable events and the decompensation of concomitant diseases in patients with osteoarthritis (OA).**Methods:** 52 patients with significant OA (12 men and 14 women) aged 53-70 years (mean age 60.38±5.48) with an average duration of the disease of 7.62±5.8 years were observed. All patients had pain syndrome in the knee joint, 76.9% had a hip joint pain, 76.9% had back pain. At the same time, 84.6% of patients had concomitant arterial hypertension and 30.7% - diseases of the gastrointestinal tract. All patients previously received NSAIDs (diclofenac, nimesulide, ketoprofen, meloxicam, aceclofenac, ibuprofen) with an unsatisfactory (69.2%) or minimal effect (23.07%). All patients received etoricoxib on demand in a dose of 60 or 90 mg / day. At the beginning and within 1 month of treatment, the severity of the pain syndrome was assessed according to the visual analogue scale (VAS), the condition of concomitant pathology, and the level of blood pressure.**Results:** The average time interval between the two examinations was 22.3 ±8.05 days. At the time of the second visit, 84.6% of the patients adhered to the prescribed therapy, with a good tolerability of the drug (76.9% excellent, 23.07% satisfactory). The intensity of the pain syndrome according to the VAS at the time of the first examination was 6.84±0.98, at the second - 2.53±1.05, the greatest decrease of this indicator was observed in the group of patients with a long course of the disease (>3 years) 7±1.08 to 2.5±0.97. A total pain relief was noted in 23.1% of patients with knee pain and 50% of patients with hip pain, a pain reduction of >50% was detected in 76.9% with knee pain and 35.78% of patients with pain in back. There were no cases of peptic ulcer exacerbation and a significant increase in BP on the background of therapy. In 9.6% of patients there was a short-term increase of blood pressure at the beginning of etoricoxib usage, in the future, blood pressure was stable. In general, patients with hypertension had a tendency to decrease blood pressure during the observation period and a direct correlation between the decrease in blood pressure and the reduction of pain in VAS was observed.**Conclusion:** The use of etoricoxib in OA patients leads to a significant reduction in the pain syndrome, as well as in the long course of the disease, without increasing the average BP and exacerbation of chronic comorbidities. Reducing the pain syndrome can help to reduce BP in people with hypertension.

P872

SELF PERCEPTION OF FRACTURE RISK, EDUCATIONAL ATTAINMENT AND ANTI-OSTEOPOROSIS MEDICATION USE AMONG POSTMENOPAUSAL WOMEN

A. E. Litwic¹, K. A. Jameson¹, K. A. Ward¹, C. Cooper¹, E. M. Dennison¹¹MRC Lifecourse Epidemiology Unit, Southampton, UK**Objectives:** Self-perception of fracture risk (SPR) has been shown to be a predictor of fracture risk, independent of traditional fracture prediction tools such as FRAX. SPR may be associated with many factors, including educational attainment or prior fracture experience; we explored these associations, and relationships with use of anti-osteoporosis medication (AOM), among postmenopausal women who participated in the UK arm of GLOW, a multinational study**Methods:** We studied 2423 women who had been recruited to the UK arm of the GLOW study, through their primary care physicians. Women completed annual questionnaires for 5 years, which detailed demographic factors, educational attainment, use of AOM and SPR. BMD was available in a subset (n=344).**Results:** The median age of participants was 65.5 (IQR 60.1-72.4) years; the median BMI was 25.1 (IQR 22.6-28.2). 1211 (50%) women had been educated to GCSE or equivalent; 536 (22.1%) to A level and 676 (27.9%) to degree level. 720 (30.4%) women rated their SPR relative to women of the same age as much or a little lower; 1321 (55.7%) rated it the same and 331 (13.9%) rated it a little or much higher. SPR was a major determinant of use of AOM; women who rated their SPR much higher than women of the same age had an OR of being on calcium or vitamin D supplements of 12.25 (95%CI 5.66, 26.51, p<0.001) after adjustment for age, BMI, alcohol consumption, current smoker, activity, self-rated health, years since menopause, falls in last year and fracture and an OR of 41.45 (95%CI 15.52, 110.72, p<0.001) of taking AOM, after adjustment. Femoral neck and lumbar spine BMD were weakly associated with SPR, but these associations were removed by adjustment. Educational attainment was weakly associated with use of calcium and vitamin D supplements, OR 1.72 (95%CI 1.20, 2.47, p=0.003) but these associations were removed by adjustment for confounders and BMD, and prior fracture**Conclusions:** These results highlight the use of AOM among women with a high SPR. Educational attainment was a less strong predictor of AOM use

P873

VITAMINE D LEVELS IN CHRONIC BACK PAIN AMBULATORY PATIENTS

A. A. Popov¹, N. V. Izmozherova¹, O. Y. Sannikova², M. A. Shambatov¹, V. M. Bakhtin¹, A. A. Vikhareva¹¹Urals State Medical University, ²Sverdlovsk Regional Clinical Hospital 1, Ekaterinburg, Russia

Objective: Vitamin D insufficiency has been reported to frequently occur in people living at higher latitudes and related to increased risk for osteoporosis, cardiovascular events, infections, several types of cancers and other causes of multimorbidity and premature death [1]. As the Middle Urals (Sverdlovsk) region is situated between 56° and 61° of the northern Latitude, clinical significance of timely vitamin D deficiency diagnosis cannot be overestimated [2]. Our aim was to assess serum 25OH-cholecalciferol levels in tertiary Regional Outpatient Consulting Department patients referred by primary care physicians and local rheumatologists due to chronic back pain. All subjects who had consented and allowed to use their depersonalized data were included into the study. No exclusion criteria were specified. Blood samples were drawn at baseline visit before primary clinical diagnosis verification.

Methods: 184 consequent ambulatory patients (142 females, 42 males) aged from 22-85 (median 62) have been included in a cross-sectional study starting 01 November 2016 till 31 March 2017. Serum vitamin D (ng/ml) levels were classified as sufficient >30-100; insufficient 20-30; deficient >10-20 and severely deficient <10 [3].

Results: Only 22 patients (12%) had normal serum 25OH-cholecalciferol levels, 44 subjects (24%) had vitamin D insufficiency, 56 persons (30%) were vitamin D deficient and 62 patients were (34%) severely deficient. Sex and age distribution reflected the increase of vitamin D deficient and severely deficient subjects among elderly population.

Conclusion: In the Sverdlovsk region of Russia overwhelming majority of the tertiary Regional Outpatient Consulting Department patients referred due to chronic back pain need urgent vitamin D evaluation and supplementation.

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P874

CIRCULATING IGFBP2 LEVELS INCREASE AFTER VITAMIN D STATUS IMPROVEMENT AMONG ADULTS 2 WITH OBESITY: AN INTEGRATED SERUM PROTEOMICS OBSERVATIONAL AND 3 ONE-ARM INTERVENTIONAL STUDY

N. Al-Daghri¹, A. Manousopoulou², M. Alokail¹, S. Yakout¹, A. Alenad¹, D. Garay-Baquero², M. Fotopoulos², J. Teng², O. Al-Attas¹, Y. Al-Saleh³, S. Sabico¹, G. Chrousos⁴, S. Garbis²¹King Saud University, Riyadh, Saudi Arabia, ²Centre for Proteomic Research, Institute for Life Sciences, University of Southampton, Southampton, UK, ³King Abdulaziz Medical City, Riyadh, Saudi Arabia, ⁴Athens University, Athens, Greece

Objective: Subjects with low vitamin D status have an increased risk of developing type 2 diabetes mellitus (T2DM). The aim of this study was to identify a novel serological marker linking vitamin D status and insulin physiology in adults with overweight/obesity, a population group at-risk for both vitamin D insufficiency and T2DM.

Methods: For the discovery phase, we used quantitative serum proteomics in sex-, age- and BMI-matched subjects with overweight/obesity [BMI: 25-35 kg/m²] and low [25(OH)D <50 nmol/L] vs. high vitamin D status [25(OH)D >80 nmol/L] (n=16). For the validation phase, we performed ELISA in subjects with low vitamin D status [25(OH)D <50 nmol/L] (n=128) with overweight/obesity that participated in a six-month

vitamin D intervention (50,000 IU/week for two months; 50,000 IU/fortnight for two months; 1000 IU/day for two months).

Results: In the cross-sectional phase, we identified 21 proteins differentially expressed in the high vs. low vitamin D groups independent of sex. Of these, increased levels of insulin-like growth factor binding protein 2 (IGFBP2), of relevance to insulin physiology, were associated with higher vitamin D status. In the vitamin D intervention, 75 subjects improved their vitamin D status [25(OH)D >50 nmol/L] (responders group) whereas 53 subjects did not (nonresponders group). ELISA measurements showed a significant increase in IGFBP2 levels at six months vs. baseline in the responders group (paired t-test, p=0.001). Change in IGFBP2 levels (follow-up minus baseline) was significantly higher in responders compared to non-responders (unpaired t-test, p=0.01).

Conclusions: Increased serum IGFBP2 levels were associated with higher vitamin D status 51 in a cross-sectional study of adults with overweight/obesity. Furthermore, IGFBP2 52 significantly increased after vitamin D status improvement in a one-arm interventional study. 53 IGFBP2 can be further examined as a potential serological marker linking vitamin D status 54 improvement to reducing T2DM risk.

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SEVERE OSTEOPOROSIS WITH VERTEBRAL FRACTURE IN A 59-YEARS OLD MAN WITH MODERATE CHRONIC KIDNEY DISEASE

A.-S. Patronea¹¹Military Hospital, Cluj-Napoca, Romania

Fractures across the stages of chronic kidney disease (CKD) could be due to osteoporosis, renal osteodystrophy or chronic kidney disease-mineral and bone disorder (CKD-MBD). Management of fractures in stages 1-3 CKD does not differ in persons with or without CKD with osteoporosis assuming there is no evidence for CKD-MBD, clinically suspected by elevated PTH, hyperphosphatemia or fibroblast growth factor 23 due to CKD. Vertebral body compression fractures due to osteoporosis often lead to pain and disability.

Case presentation: A 59 year-old man had a D12 vertebral fracture due to falling down. Physical examination revealed local severe pain and tenderness, without any neurologic deficits or bowel and bladder dysfunction. He underwent surgical treatment with D11-L1 osteosynthesis. He was referred to the endocrinology service, and specific tests were performed. He was diagnosed with vertebral osteoporosis (BMD measured at AP spine L2-L4=0.821 g/cm³, T-score of -3.2). The femoral BMD is 0.989 g/cm³ (-0.2 T-score, total left) and 0.947 g/cm³ (-0.5 T-score, total right). Laboratory results showed CKD stage 3A (GFR=51 mL/min/1.73m²), PTH=17.3 pg/mL, calcium=10.26 mg/dL, 25-OH vitamin D=26.3 ng/dL, alkaline phosphatase=72.20 U/L, β-Ctx=0.39 ng/mL, osteocalcin=19.9 ng/mL, cortisol 8AM=285.13 nmol/L, total testosterone=3.01 ng/mL, TSH=2.29 μU/mL, FT4=1.14 ng/dL. No other causes of secondary osteoporosis were identified. He was started on treatment with daily subcutaneous 20 μg teriparatide, oral vitamin D, and calcium supplements.

Conclusions: The management of patients with fragility fractures across the spectrum of CKD should not differ between persons without reductions in eGFR as compared with persons with stages 1 and 3 CKD. Biochemical markers of bone turnover, in particular serum PTH and tissue-specific alkaline phosphatase, may provide differentiation between biopsy-proven adynamic, hyperparathyroid and/or osteomalacia.

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EFFICACY OF DIFFERENT MODES OF VITAMIN D SUPPLEMENTATION STRATEGIES IN SAUDI ADOLESCENTS

N. Al-Daghri¹, M. Ansari¹, S. Sabico¹, Y. Al-Saleh², N. Aljohani³, H. Alfawaz¹, M. Alharbi⁴, A. Al-Othman¹, M. Alokail¹, S. Wimalawansa⁵
¹King Saud University, ²King Abdulaziz Medical City, ³King Fahad Medical City, ⁴Diabetes Centers and Units Administration, Riyadh, Saudi Arabia, ⁵Department of Medicine, Endocrinology & Nutrition, Cardio Metabolic Institute, New Jersey, USA

Objective: Vitamin D deficiency is rampant in the Middle East, even in children and adolescents. This study was designed to investigate the effects of different vitamin D repletion strategies commonly used on serum vitamin D levels of Saudi adolescents.

Method: A 6-month multicenter, controlled, clinical study, involving 34 schools in the central region of Riyadh, Saudi Arabia. Different strategies of vitamin D supplementation were tested 200 ml fortified milk of different brands or vitamin D tablet (1000 IU). Anthropometrics were taken and fasting blood samples withdrawn at baseline and after intervention for the quantification of serum glucose, lipid profile and 25(OH) vitamin D. **Results:** A significant increase in 25(OH)D level was observed in subjects supplemented with vitamin D tablet, milk brand 2 and milk brand 4, whereas subjects supplied with fortified milk brands 1 and 3 respectively, exhibited a significant decrease in 25(OH)D levels. Analysis of covariance showed that after adjusting for baseline 25(OH)D, age, gender and BMI, the mean 25(OH)D levels of children who were taking vitamin D tablet (9.1 ± 0.8 nmol/l) and milk brand 4 were significantly higher (7.3 ± 1.1 nmol/l) than children taking milk brand 2 (1.6 ± 1.0 nmol/l). Subjects supplied with milk brands 1 and 2 exhibited a significant increase in total cholesterol level, while it dropped significantly in subjects taking milk brand 3, while no changes were observed in other groups.

Conclusion: Different strategies in vitamin D supplementation used in this clinical study elicited varying degrees of improvement in serum 25(OH)D level. The observed outcomes were dependent on the strategy and gender in the Saudi adolescent population, with oral tablet supplementation being favored in boys.

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TOPICAL ATORVASTATIN AS A POSSIBLE CHONDROPROTECTIVE AGENT IN PATIENTS WITH KNEE OSTEOARTHRITIS

M. Elkasabi¹

¹Mansoura University, Mansoura, Egypt

Objective: Osteoarthritis is considered the leading cause of musculoskeletal disability in the elderly population worldwide. Several studies have shown a potential role of statins as an alternative treatment option for OA, beyond their cholesterol-lowering properties. Topical application of atorvastatin had proved to induce more anti-inflammatory and hypocholesterolemic effect in rats with OA as compared to other used anti-inflammatory drugs such as diclofenac. Therefore, atorvastatin was prepared in a topical-gel form to be compatible for human use.

Methods: The study was held at the Rheumatology and Rehabilitation Department in Mansoura University Hospitals. 60 patients with chronic knee OA were involved in a randomized controlled trial for a period of 12 months. Each patient underwent full history taking, full clinical examination, necessary laboratory investigations, and radiological investigations. The patients were divided equally into 3 groups of each receiving different drug regimen as follows: Group 1 was the control group receiving the ordinary regimen provided by the department staff members (piascladine 300 mg tablet once/day + diclofenac sodium 75 mg tablet twice/day). Group 2 (atorvastatin gel 5% + diclofenac). Group 3 (atorvastatin gel + diclofenac + glucosamine)

Results: All patients underwent a clinical assessment via WOMAC index twice during the whole period of study; pretreatment and 12 months post

treatment. The collected data were coded, processed and analyzed using SPSS program. P values <0.05 were considered statistically significant. Group 1 showed a minimal stiffness reduction with an average score of 0.9 pretreatment down to 0.79 post treatment. Whereas Group 2 showed a significant reduction in the WOMAC index from 0.92 pretreatment to 0.44 post treatment. However, adding glucosamine to Group 3 did not prove to improve the patients' scores as expected compared to results obtained from Group 2 with a reduction from 0.86 to only 0.53, which contributed to about 38.3% of stiffness reduction as compared to basal level. Whereas Group 2 showed a major improvement in the patients' WOMAC index in the form of approx. 52.1% stiffness reduction along the 12 months period of supervised drug regimen.

Conclusion: The results obtained by the use of topical atorvastatin showed to super pass some commercially widely used chondroprotective agents. Topical atorvastatin may be used safely and effectively for patients with knee OA.

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SARCOPENIA DETECTION IN OSTEOPOROTIC PATIENTS

D. L. St¹, M. L. Cevei², R. N. Suciu², I. Moga²

¹University of Medicine and Pharmacy, Victor Babes, Timisoara,

²University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: We report 51 cases diagnosed with sarcopenia from 115 cases with osteoporosis admitted to the Rehabilitation Clinical Hospital Baile Felix, Romania. Besides clinical examination, all cases performed DXA, dynamometry, timed get-up-and-go test and Sarqol test.

Results: 44.34% of the women with osteoporosis met all diagnostic criteria for sarcopenia. Patients' mean age was 67.31 ± 8.54 years, range from 50 years to 83 years. 14.28% of the patients were between 50-59 years, 17.33% between 60-69 years, 17.33% between 70-79 years and 3.6% were between 80-89 years of age. Mean value for BMI was 24.98 ± 3.89 . Menopause was installed at a mean age of 46.31 ± 5.37 years, minimum 35 years and maximum at 57 years. All patients also had comorbidities, the mean number of associated disorders was 5.9 ± 2.4 , ranging from 2-12. Sarqol test results revealed a mean of 57.07 ± 14.36 out of 100, range from 22.7-91.7. Mean lumbar spine T-score was -2.41 ± 1.42 , range from -5 to 0.8. Mean right hip T-score was -1.49 ± 0.93 , ranging between -3.7 and 1.1. Mean left hip T-score was -1.59 ± 0.84 , range from -3.4 to 0.4. Mean muscle mass scaled to height squared was 5.194 ± 0.41 . Right-hand dynamometer mean was 15.22 ± 5.5 kg. Left-hand dynamometer revealed a mean of 14.10 ± 5 kg. Timed get-up-and-go test had a mean of 23.55 ± 9.73 seconds.

Conclusions: The mean age of patients with sarcopenia is much lower than reported in the literature. The quality of life of the patients is reduced to almost half the normal value.

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UTILITY OF VERTEBRAL FRACTURE ASSESSMENT (VFA) COMBINED WITH BMD MEASUREMENT

D. Diacinti¹, C. Cipriani², J. Pepe², F. Biamonte², D. Pisani³, S. Minisola²

¹University Sapienza of Roma, Department of Radiology, ²University "Sapienza" of Rome, Department of Clinical Sciences, ³University "Sapienza" of Rome Sant' Andrea Hospital, Department of Clinical and Molecular Medicine, Roma, Italy

Objective: To evaluate prevalence of vertebral fractures (VF) in postmenopausal women referred to bone densitometry using VFA. with DXA technique.

Methods: In 550 asymptomatic postmenopausal women (age range 46-84 yrs) consecutively referred at our Mineral Metabolism Centre, were performed bone densitometry and VFA. An experienced skeletal radiologist identified VF on the spine DXA images using at first the

algorithm-based qualitative approach (ABQ) to discriminate true vertebral fractures from non-fracture vertebral deformities and then the visual semi-quantitative (SQ) method to classify the VF as mild (20–25% reduction), moderate (25–40% reduction) or severe (>40% reduction) evaluating the vertebral height reduction. The software performed vertebral morphometry starting at L4 and continuing through the thoracic spine up to vertebra T8. The same radiologist, corrected manually the automatic vertebral height measurements when he considered that the point placement was not correct and he measured manually also the heights of vertebrae from T7 to T4 if they were adequately visualized.

Results: 411/7060 (4.6%) vertebrae analyzed resulted fractured, most of them were localized at T7–T8 and T11–L1 spine levels; 220/550 (40%) subjects had at least one VF. According to the lower T-score of BMD obtained in either lumbar or femoral site in each subject we recognized 303 (55%) subjects with osteopenia, 111 (37%) of them with VF; 192 (35%) with osteoporosis, 100 (52%) with VF; 55 (10%) had normal BMD values, but 9 (16%) of them had VF.

Conclusion: VFA combined with BMD measurement allows to detecting unknown VF also in subjects with osteopenic or normal BMD with significant impact on management. We suggest considering VFA in all new patients referred for BMD measurement. However, it should be recommended to integrate the advanced DXA technology with operator adequately experienced in DXA images interpretation to achieve high accuracy in vertebral fracture identification.

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MUSCULOSKELETAL DISORDERS AMONG GREEK COMPETITIVE ROAD CYCLISTS

P. Gkriilas¹, A. Koumpetis¹, A. Zavvos¹, C. Matzaroglou¹, E. Tsepis¹

¹Technological Educational Institute (TEI) of Western Greece, School of Health and Welfare, Department of Physical Therapy, Aigio Achaia, Greece

Objectives: The highly repetitive nature of professional road cycling associated with overuse injury¹. The purpose of this study was to record the musculoskeletal symptoms in each anatomical body region in Greek competitive road cycling athletes.

Methods: The Greek version of the Standardized Nordic Questionnaire² (SNQ) was given to participants mainly during the 2017 Pan-Hellenic Road Cycling Championship. Participants in SNQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulder, elbow, wrist/hand, upper back, lower back, hip/thigh, knee and ankle/foot) during the preceding 12 months and if those symptoms impeded their normal activity during the last year as well as the 7 previous days. Analysis consists of descriptive statistics.

Results: 74 Male cycling athletes (age: 30.8±9.2 years, height: 1.76±0.1 m, weight: 71.8±7.6 kg, BMI: 23.1±2.3 kg/m², training age: 10.9±6.2 years, training hours/week: 14.4±5.1 h) competed in 3 different age categories (Under 23, Men, Master) and completed the SNQ. The 12-month prevalence rate of pain/discomfort was 44.6% in neck followed by the lower back (39.2%), shoulders (33.8%), hips/thighs (28.4%), knee (21.6%), wrists/hands (14.9%), upper back (9.5%), ankles/feet (6.8%) and elbow (4.1%). Those symptoms impeded athletes' normal activity (functionality) during the last 12 months with different prevalence rate per anatomical body region (neck: 37.8%, lower back: 31.1%, shoulders: 25.7%, hips/thighs: 20.3%, knees: 14.9%, wrists/hands: 12.2%, upper back: 5.4%, ankles/feet: 5.4% and elbows: 4.1%).

Conclusions: The high prevalence of musculoskeletal pain/discomfort (in specific body regions) in competitive road cycling athletes highlights the need for specific injury prevention programs.

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ASSOCIATIONS OF SERUM NITRIC OXIDE WITH VITAMIN D AND OTHER METABOLIC FACTORS IN APPARENTLY HEALTHY ADOLESCENTS

N. Al-Daghri¹, I. Bukhari¹, S. Sabico¹, S. Yakout¹, M. Khattak¹, M. Alokail¹

¹King Saud University, Riyadh, Saudi Arabia

Objective: Nitric oxide (NOx) is an important biomolecule which interacts with other molecules including 25(OH)D to mediate various metabolic pathways. Interactions and associations of NOx with 25(OH)D have been well studied in both *in vitro* and *in vivo*, yet associations in apparently healthy adolescents have never been studied.

Methods: Here, we collected 740 (245 boys and 495 girls) apparently healthy Saudi adolescents aged 10–17 years, for current cross sectional study, to determine the associations of NOx with 25(OH)D and other biomarkers in Saudi adolescents. Serum NOx, 25(OH)D and other biochemical parameters were determined by following standard protocols and manufacturers' guidelines.

Results: NOx level was significantly higher in boys than girls ($p<0.001$). In all subjects, NOx showed a significant inverse correlation with 25(OH)D. After stratification according to sex however this significant association was observed only in boys and not in girls. NOx also showed significant positive associations with BMI, serum triglycerides and systolic blood pressure in all subjects.

Conclusion: The significant inverse association of NOx and 25(OH)D among apparently healthy adolescents are influenced by sex and further strengthens the extraskelatal role of 25(OH)D in maintaining endothelial homeostasis in this age group, particularly in boys. Whether vitamin D correction can influence NOx production over time among adolescents remains to be proven.

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PHYSIOTHERAPY TREATMENT FOR KNEE OSTEOARTHRITIS

P. Rivas¹, F. Rivas²

¹Physiotherapy Department, CEU San Pablo University, Madrid, ²Rheumatology and Physiotherapy Clinic, Segovia, Spain

Objective: Patients with knee osteoarthritis (OAK), even in low grades and with minimum symptoms and signs, had muscle weakness and functional limitation comparing them with healthy subjects. Quadriceps weakness is common in patients with OAK, and some authors and the ACR recommended strength training and aerobic exercise for the treatment. The purpose of this study was to investigate the therapeutic effects of strengthening the quadriceps muscle in patients with symptomatic medial OAK, Kellgren-Lawrence grade II, using isometric and isokinetic exercise.

Methods: Forty patients (aged 45–80) were recruited and separated into two groups, the control group ($n=20$) without pain (G1) and the treatment group ($n=20$) in patients with knee osteoarthritis, were composed with 3 weekly sessions of 30 min with isokinetic and isotonic muscle-strengthening exercises during three months (G2). They were assessed before starting the treatment and at the end with an isokinetic dynamometer, the visual analogue scale (VAS), walking speed, disease severity, Lequesne index and WOMAC Index.

Results: The results between pre and post treatment demonstrated the significant improvement in pain, disability, function, WOMAC, and quadriceps strength ($p<0.05$) for G2 at the end of the treatment. Walking speed did not change significantly ($p>0.05$).

Conclusions: The physiotherapy programme tested in this trial reported positive effects on pain and disability in OAK and improve muscle power. These data suggest that isokinetic training and isotonic exercises improve joint stability and increase the range of movement.

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OSTEONECROSIS OF THE JAW LEADING TO SEPSIS IN A PATIENT WITH PAGET'S DISEASEE. S. Daia-Iliescu¹, C. Buzatu², R. Ionescu³¹Carol Davila University of Medicine and Pharmacy, ²Sfanta Maria Clinical Hospital, ³Sfanta Maria Clinical Hospital, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania**Objective:** osteonecrosis of the jaw (ONJ) may develop in patients with Paget's disease especially receiving bisphosphonates. We present a case of ONJ followed by septic shock in an old patient with Paget's disease.**Method:** An 81-year-old woman, known with Paget's disease for 11 years receiving intravenous bisphosphonates-zoledronic acid treatment (the last infusion in an oncology unit), was admitted for evaluation.**Results:** The clinical examination reveals painful palpation of the right sinus points with signs of local inflammation. The patient is treated in the ENT Department for acute sinusitis, osteonecrosis involving the upper jaw, mechanical debridement and triple parenteral antibiotic therapy is administered, with a clinically and biologically good response: normalization of the inflammatory syndrome, normal leukocytes, and sterile repeated cultures. Two weeks later, still receiving antibiotic therapy, acute renal failure occurs, followed by respiratory failure. Sepsis and multiple organ dysfunction syndrome develop with slow favourable recovery in the Intensive Care Unit.**Conclusion:** Given the treatment with bisphosphonates IV (zoledronic acid) for Paget's disease, the 'immunosenescence' of the elderly, the lack of scarring of the alveolar processes after dental extractions, multiple fistula pathways, and the diagnosis was osteonecrosis of the jaw after bisphosphonate treatment. Local infection, including osteomyelitis may lead to septic shock and prompt local and systemic therapy, along with close long time follow-up should be considered.

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SARCOPENIC POSTMENOPAUSAL WOMEN HAVE INCREASED SALIVARY CORTISOL NADIR IN THE POPULATION COHORT OSTEOLAUSE. Gonzalez Rodriguez¹, G. Papadakis², P. Vollenweider³, M. Preisig⁴, G. Waeber⁵, D. Hans⁶, P. Marques-Vidal³, O. Lamy⁶¹Center of Bone Diseases, Rheumatology Unit, Bone and Joint Department; and Endocrinology, Diabetology and Metabolism Unit, Internal Medicine Department; CHUV, ²Endocrinology, Diabetology and Metabolism Unit, Internal Medicine Department, CHUV, ³Internal Medicine Unit, Internal Medicine Department, CHUV, ⁴Epidemiology and Psychopathology Research Unit, Psychiatric Department, CHUV, ⁵Center of Bone Diseases, Rheumatology Unit, Bone and Joint Department, CHUV, ⁶Center of Bone Diseases, Rheumatology Unit, Bone and Joint Department; and Internal Medicine Unit, Internal Medicine Department, CHUV, Lausanne, Lausanne, Switzerland**Introduction:** Aging is associated with a decrease in muscle and bone mass, and a gain in fat mass. Similar changes are more pronounced in hypercortisolism. We previously demonstrated that high 8 PM salivary cortisol is independently associated with increased prevalence of radiologic vertebral fractures. We wanted to determine whether salivary cortisol circadian rhythm played also a role on sarcopenia development.**Methods:** Cross-sectional study including 538 women >50 years old (mean age 63.6±7.5) from the OsteoLaus cohort. Included participants had: body composition assessment by DXA, salivary cortisol circadian rhythm measures (awakening, 30 min thereafter, 11 AM and 8 PM) and assessment of handgrip. Sarcopenia as defined by the EWGSOP group was the primary outcome (appendicular lean mass by height squared (ALMI)<5.5 kg/m² and muscle strength<20 kg).**Results:** Salivary cortisol at 11 AM and 8 PM increased with age. The 15 sarcopenic participants were older (67.5±7.5 yo) and had lower BMI (20.4±2.8 kg/m²) than the 523 non sarcopenic participants (63.4±7.5 yoand 26.2±4.6 kg/m²). Neither total lean mass, nor ALMI were separately associated with salivary cortisol measures; handgrip was associated with salivary cortisol at 11 AM (p=0.026) but not at 8 PM (p=0.084) in multivariate analysis. Sarcopenia was positively associated to 11 AM and 8 PM values in monovariate analysis and after adjustment to age and BMI (adjusted p-values 0.021 and 0.044, respectively). Sarcopenic participants had significantly higher values of salivary cortisol than not sarcopenic participants at 11 AM (13.1±6.5 vs. 9.2±4.5 mmol/l) and 8 PM (5.1±5.1 vs. 3.3±2.1 mmol).**Conclusions:** Highest salivary cortisol values at nadir time points 11 AM and 8 PM are associated to sarcopenia as defined by the EWGSOP group, independently of age and BMI. If these results are confirmed in other studies, the measurement of salivary cortisol at 8 PM may play a role in the assessment of sarcopenia.

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SUSTAINED EFFICACY OF DRY NEEDLING THERAPY IN A 12-WEEK TRIAL IN FIBROMYALGIA PATIENTSP. Rivas¹, F. Rivas²¹Physiotherapy department, CEU San Pablo University, Madrid,²Rheumatology and Physiotherapy Clinic, Segovia, Spain**Objective:** Dry needle stimulation is a treatment modality used worldwide as part of the complex treatment of musculoskeletal pain. The purpose of this study was to evaluate the efficacy of dry needling stimulation of tender points in patients severely affected by fibromyalgia and the time that the improvement persists.**Methods:** 120 FM patients were randomly divided into two groups, the control group, 60 patients, and the dry needling group, 60 patients who underwent weekly one-hour session of dry needling over 18 FM tender points for a 6-week period. They were assessed at the start, after eligibility (at week 0), at the end of the 6-week intervention period and then they were at week 12 after the onset of the study.**Results:** At the end of the intervention, dry needling treated patients showed reduction in the number of symptoms (p: 0.03), VAS of pain (p: 0.002), MPQ (p: 0.02), VAS of fatigue (p: 0.02), pain of SF-36 (p: 0.0007), vitality of SF-36 (p: 0.0001), FIQ (p: 0.02), myalgia score (p: 0.0005), and pressure pain threshold (p: 0.002). Six weeks after the end of the treatment, the dry needling group still showed significant differences in VAS of pain (p: 0.01), VAS of fatigue (p: 0.02), pain of SF-36 (p: 0.01), myalgia score (p: 0.0001) and pressure pain threshold (p: 0.0004).**Conclusion:** Patients severely affected by FM obtain long-term improvement following weekly dry needling for 6 weeks.

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PRELIMINARY DATA OF LATVIAN FIRST NATION-WIDE TRANSLATION AND VALIDATION OF SARQOL[®], A QUALITY OF LIFE QUESTIONNAIRE SPECIFIC FOR SARCOPENIAS. Upmale¹, M. Mukane¹, R. Engels², I. Leite³, E. Spaka⁴, I. Rasa¹¹Riga East Clinical University Hospital, Riga Stradins University, Latvian Osteoporosis and Bone Metabolism Diseases Association, ²Hospital of Traumatology and Orthopedics, University of Latvia, Riga Stradins University, Riga East Clinical University Hospital, Latvian Osteoporosis and Bone Metabolism Diseases Association, ³Pauls Stradins Clinical University Hospital, Riga Stradins University, Latvian Osteoporosis and Bone Metabolism Diseases Association, ⁴Riga Stradins University, Riga, Latvia**Objectives:** Translation of SarQoL (a quality of life questionnaire specific for sarcopenia) into Latvian and validation of the questionnaire.**Methods:** The questionnaire was translated from English to Latvian according to the SarQoL standards and a final version was synthesized by a Local Expert Committee. 20 subjects were enrolled in the study in an

outpatient setting. They filled in the form, grip strength was measured by a Hand Dynamometer Jamar Plus Digital (Homecraft Rolyan). 2 weeks later the responders filled in the form for the second time. In order to validate the Latvian SarQoL, we assessed the discriminative power, internal consistency, test-retest reliability, constructed validity and floor-ceiling effects. All the data were statistically analyzed according to the SarQoL standards.

Results: A total of 20 responders (all female, median age 66.5 (CI 95% 67.1–75.9) (min 48; max 80) were included in the study. Median BMI was 24.9 kg/m² (CI 95% 24.7–29.3). Mean SarQoL result was 70.3 (CI 95% 57.6–82.9). Mean hand grip strength assessed by a hand dynamometer was 28.3 kg (CI 95% 23.9–33.6). All responders were divided into 2 groups depending on the average grip strength between both hands (Group 1 <30 kg and Group 2 ≥30 kg). In group 1 there were 13 responders, in Group 2 – 7 subjects. The results indicated good discriminative power as in Group 1 mean SarQoL was 68.3 (CI 95% 53.9–82.7), in Group 2 mean SarQoL was 73.9 (CI 95% 65.6–82.3) [*p*=0.35]. Cronbach's α between SarQoL domains was 0.81 indicating excellent internal consistency. We found a good positive correlation between SarQoL and SF-36 (using Spearman's Correlation test *r*=0.82; *p*<0.0001) and EQ5D questionnaire results. There was an excellent agreement between the test-retest reliability with an ICC of 0.98 (CI 95% 0.92–0.99). No floor nor ceiling results were detected.

Conclusion: Validation of SarQoL is still in progress. Based on the preliminary data we are to believe that a valid Latvian SarQoL questionnaire will be available in the near future to assess sarcopenic patients' quality of life and to monitor treatment.

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EFFICIENCY AND SAFETY ASSESSMENT OF COMBINED GLUCOSAMINE AND CHONDROITINE SULFATE IN TREATMENT OF PATIENTS WITH OSTEOARTHRITIS AND COMORBIDITY

S. Lapshina¹, L. Myasoutova², E. Myasoutova¹

¹Kazan State Medical University, ²Clinical Hospital #7, Kazan, Russia

Objective: The prevalence of osteoarthritis (OA) is increasing every year, with most patients having comorbid diseases that worsen quality of life and prognosis. Among them, the most common is arterial hypertension. In turn, analgesic therapy (NSAIDs) itself can have a negative effect on arterial hypertension control. Therefore, according to the recommendations in the initial therapy of OA, slow-acting symptomatic drugs (symptomatic slow acting drugs for osteoarthritis (SYSDOA)) are used. Our aim was to assess the efficacy and tolerability of chondroitin and glucosamine sulfate in the treatment of patients with osteoarthritis and arterial hypertension.

Methods: 50 patients with a reliable diagnosis of OA and arterial hypertension 1-2 degrees were examined: women - 38 (76%), men - 12 (24%), average age - 58.3 years (from 47-75 years). X-ray stage of gonarthrosis: 2nd - in 28 (56%), 3rd-22 (44%) patients. Arterial hypertension of first degree was detected in 38 (76%), second degree in 12 (24%) pts. Mean arterial blood pressure (BP) was 148.9±16.3 / 84.3±11.6 mmHg. Concomitant pathology: ischemic heart disease in 9 (18%), chronic gastroduodenitis in 23 (46%). All patients had severe pain syndrome: walking VAS pain was 59.6±14.6 mm, VAS pain 67.2±11.4 mm, travel time of 15 m 24.3±10.5 s, the WOMAC index - 986.2±212.4. Analgesic therapy included NSAIDs in stable doses and paracetamol on demand. Two groups of patients were identified, comparable in terms of the main demographic, clinical parameters and the treatment received. The first group of patients (n=30) in addition to NSAIDs received glucosamine hydrochloride 500 mg in one capsule and chondroitin sodium sulfate 400 mg in a dose of 2 capsules per day. The second group (n=20) received only analgesic therapy (NSAIDs). The efficacy of the therapy was assessed by the indices of the joint syndrome, the WOMAC index after 3 months of therapy.

Results: After 3 months of treatment in the first group, there was a significant (*p*<0.05) reduction in pain during movement (according to VAS=26.2±8.4 mm), painful joints during palpation (VAS=21.2±9.2 mm), the transit time of 15 m (14.2±3.6 s), the WOMAC index (564.3±129.0). The dynamics of the pain syndrome was significantly lower (*p*<0.05) in the second group of patients (walking VAS 35.6±10.8 mm, VAS pain 31.6±10.3 mm, travel time of 15 m 19.2±6.4 s, WOMAC 719.0±180.0). After 3 months of therapy, 17 patients (56.7%) of the first group and 4 (20%) of the second group did not need NSAIDs, and the dose was reduced by 50% of the initial dose: 9 (30%) of the first group and 7 (35%) of the second group; continued to take NSAIDs at the previous dose - 4 (13.3%) of the first and 9 (45%) of the second group. In the group receiving glucosamine and chondroitin sulfate, after 3 months, a decrease in blood pressure (139.8±12.4 / 82.1±5.5 mmHg) was noted without an increase in antihypertensive therapy. In the second group BP was 145.5±11.3 / 85.8±6.9, while 30% of patients increased the doses of drugs that lowered blood pressure. There was a tendency to a direct correlation between a decrease of VAS pain syndrome and a decrease of blood pressure.

Conclusions: The use of combined glucosamine and chondroitin sulfate (SYSDOA group) in the treatment of patients with OA shows a pronounced analgesic effect, improvement of joint function, and also favorably affects to the profile of blood pressure in patients with arterial hypertension.

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RETROSPECTIVE COHORT STUDY OF PATIENTS AFFECTED BY CHRONIC HYPOPARATHYROIDISM

G. Marcucci¹, G. Gronchi¹, L. Cianferotti¹, L. Masi², S. Parri¹, F. Giusti¹, C. Fossi¹, F. Cioppi², L. Vannucci¹, C. Signorini¹, M. L. Brandi¹

¹Bone Metabolic Diseases Unit, Department of Surgery and Translational Medicine, University of Florence, ²Bone Metabolic Diseases Unit, University Hospital of Florence, AUOC-Careggi, Florence, Italy

Objectives: Chronic hypoparathyroidism is a rare endocrine disorder caused either by deficient or absent production of the PTH. The standard therapy includes calcium and calcitriol supplementations, or other active vitamin D analogs. However, in some countries it is possible to use hormone replacement therapy in not well controlled cases. Regarding natural history of this disease and the impact of its treatments, few studies have been published so far. Therefore, a retrospective cohort study on hypoparathyroid patients was conducted, in order to increase the limited knowledge on this issue.

Methods: All patients affected by chronic hypoparathyroidism, seen at least twice at our Metabolic Bone Diseases Unit from 2007-2017, were identified through a clinical database. Among these patients were selected those who had low serum calcium level associated with low or inappropriately normal PTH level for >12 months. Analysis of frequencies and descriptive statistics were performed.

Results: A total of 82 patients with chronic hypoparathyroidism were identified, of these 78 treated with standard treatment. The follow-up ranged between 1 and 10 years. The largest percentage of cases consisted of postsurgical hypoparathyroidism. Most patients, treated with conventional treatment, showed mean serum and urinary calcium and phosphorus levels within the normal range. Kidney stones were reported in 10% of cases after a mean duration of disease very variable and in most cases had mean levels of high urine calcium level. Only a small percentage of cases required large doses of calcium and calcitriol supplementation. No fragility fractures were reported. The mean values of BMD showed high-normal values.

Conclusions: This study contribute to describe the clinical impact of a chronic disease that is still not well studied as regards its natural history and the complications related to the disease itself and its treatment.

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speaker: Abiogen, Alexion, Amgen, Bruno Farmaceutici, Eli Lilly, Kyowa Kirin, MSD, NPS, Servier, Shire, SPA; she has received honoraria from: Amgen, Bruno Farmaceutici, Kyowa Kirin.

P889

PREDICTING TOTAL HIP REPLACEMENT FOR SYMPTOMATIC OA USING RADIOGRAPHS OR CLINICAL CT

I. S. Burkov¹, G. M. Treece², A. H. Gee², T. D. Turmezei³, F. Johannesdottir⁴, S. Sigurdsson⁵, T. Aspelund⁶, T. B. Harris⁷, H. Jonsson⁸, V. Gudnason⁹, K. E. S. Poole¹

¹Department of Medicine, University of Cambridge, Addenbrooke's Hospital, Cambridge, UK, ²Department of Engineering, University of Cambridge, Cambridge, UK, ³Department of Medicine, University of Cambridge, Addenbrooke's Hospital & Department of Radiology, Norfolk and Norwich Hospital University Hospital, Cambridge, UK, ⁴University of Cambridge, Cambridge, UK, ⁵The Icelandic Heart Association, Kopavogur, Iceland, ⁶Public Health Sciences, University of Iceland & The Icelandic Heart Association, Kopavogur, Iceland, ⁷Laboratory of Epidemiology and Population Sciences, Intramural Research Program, National Institute on Aging, NIH, Maryland, USA, ⁸Landsþítalinn University Hospital & University of Iceland, Reykjavik, Iceland, ⁹Faculty of Medicine, University of Iceland & The Icelandic Heart Association, Reykjavik, Iceland

Objectives: To present how 2D radiographic measurements and 3D clinical CT measurements of OA features predict THR in symptomatic older patients, compared with hip pain alone, and how well structural features of OA associate with hip pain.

Method: A prospective nested case-control study (from the AGES-Reykjavik data) of 258 individuals (mean age 74 years $\pm$ 4.7 years, range 67–89, of whom 74 individuals had 90 total hip replacements (14 bilateral) within an average of 3 years). Baseline assessment included pelvic CT and validated hip pain specific questions. All study participants that eventually underwent THR were identified as cases, with each matched by age and sex to two controls. A radiologist made several measurements and cortical bone mapping (CBM) [1] was used to assess each proximal femoral surface in cases and controls. The location and magnitude of patches of bone thickening associated with later THR were highlighted using statistical parametric mapping (SPM).

Results: Baseline hip pain of >1-month duration was weakly associated with undergoing a THR, AUC 0.70. K&L grading of the baseline 2D radiograph for OA features was AUC 0.87 for THR irrespective of whether patients had hip pain or not. 2D minimum joint space width gave AUC 0.80 combined with hip pain. Combining all assessments (hip pain, 2D and 3D measurements) gave optimal prediction AUC 0.90. Using CT, hip osteoarthritis was associated with a 3D crescent of focal thickening of femoral head bone (up to 70% thicker than controls). This thickening coincided with contact areas between acetabular labrum and femur and correlated well with the osteophyte load. Irrespective of whether a patient was or was not destined for a THR within the study duration, worsening grade of OA (whichever 2D or 3D method was used) was associated with worsening hip pain.

Conclusion: Imaging findings unequivocally predicted THR for clinical osteoarthritis in these people, whether or not pain had become apparent. The sites of bone thickening lend strong support to the 'wear and repair' hypothesis of osteoarthritis causation. Our findings in the hip contradict the expert guidance [2]. We recommend that x-rays are formally graded when investigating OA, but also highlight the potential of automated and 3D methods for evaluating hip osteoarthritis.

References:

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P890

THE USE OF PHYSICAL PROCEDURES IN GONARTROZA THERAPY

N. Mandić¹, S. Stanojević¹, D. Mitic²

¹Dom Zdravlja, Nis, Serbia, ²Opšta Bolnica, Krusevac, Serbia

Objective: Gonartroza (GO) belongs to the most common degenerative rheumatic diseases of the peripheral joints. Osteoarthritis (OA) joints, which often involve the knee and hip joint, is a chronic, progressive, primary degenerative illness of the sinew joints. It is seen in the focal loss of joint cartilage, changes in the subchondral bone, synovia, and periarticular structures. Over 50% of people over 60 years of age suffer from OA. In the clinical picture of the OA, the knee is dominated by pain, which is enhanced by movements, loss of mobility in the knees, and decreased muscle strength of the knee stabilizer. Our goal was to determine the clinical efficiency of physical therapy in patients with GO.

Methods: In ambulatory conditions of the Health Center Nis, during the period September-December 2017, 80 patients of both sexes (56 women and 24 men) were treated, aged 43-75 years. All patients were diagnosed with OA knee. The diagnosis was based on anamnesis, clinical examination, rtg knee (patients were level II according to the Kellgren Lawrence scale). The first group (40 patients) was treated with physical procedures: DDS, KT (exercise program that increases the volume of movements in the knee joint and strengthens the knee stabilizer muscles.) The second group was treated with combined physical therapy: DDS, IFS, KT. applied series of 10 therapies. Estimation of the effectiveness of physical therapy was done by measuring the pain visually by analogue scale (VAS), knee joint mobility by measuring the volume of motion by a goniometer and testing the gross motor power (MMT). Measurements were made at the beginning and after 10 days of treatment.

Results: Results were processed by the SPSS program. After 10 days of therapy, all three parameters tested were improved. Comparison of pain reduction and increase in knee movement after treatment in both groups showed a statistically significant reduction in pain in the second group (VAS 7 before treatment and VAS 3 after phys. th.). The volume of movement in the second group was before phys.th. a 75% flexion, increased to 97% (p<0.05). GMS in the first group was 3 $\pm$ 0.75MMT and in the second group 4 $\pm$ 0.25 (<0.05), MMT.

Conclusion: The application of combined physical therapy DDS, IFS, KT, contributes to the reduction of subjective problems and the increase in the volume of knee joint movements in the OA knee.

P891

VITAMIN D RECEPTOR (VDR) FOKI POLYMORPHISM, VITAMIN D AND BMD IN PATIENTS WITH INFLAMMATORY BOWEL DISEASES

A. Szymczak-Tomczak¹, I. Krela-Kaźmierczak¹, M. Kaczmarek-Rys², M. Skrzypczak-Zielińska², M. Szalata³, N. Drwęska-Matelska³, L. Łykowska-Szuber¹, P. Eder¹, M. Michalak⁴, A. Dobrowolska¹, R. Słomski⁵

¹Department of Gastroenterology, Human Nutrition and Internal Medicine, Poznan University of Medical Sciences, ²Institute of Human Genetics Polish Academy of Sciences, ³Department of Biochemistry and Biotechnology, Poznań

University of Life Sciences, ⁴Department of Computer Sciences and Statistics, Poznań University of Medical Sciences, ⁵Department of Biochemistry and Biotechnology, Poznań University of Life Sciences; Institute of Human Genetics Polish Academy of Sciences, Poznań, Poland

Objectives: Osteoporosis is one of the most important medical problems facing patients with inflammatory bowel diseases (IBD). The aim of the study was to analyse an association between FokI polymorphism in the VDR gene and vitamin D and BMD in patients with IBD.

Methods: Study included 172 IBD patients (85 with Crohn's disease (CD) and 87 with ulcerative colitis (UC)) and 39 healthy volunteers (CG). Densitometric measurements were conducted by DXA of the lumbar vertebrae and femoral neck (FN). Serum concentrations of 25-hydroxyvitamin D were determined. Polymorphisms were determined by PCR (polymerase chain reaction) and RFLP (restriction fragment length polymorphism).

Results:

Table 1. Distribution of FokI polymorphism genotypes

	CD	UC	CG
FF	n=32 (37.65%)	n=31 (35.63%)	n=11 (28.21%)
Ff	n=44 (51.76%)	n=38 (43.68%)	n=22 (56.41%)
ff	n=9 (10.59%)	n=18 (20.69%)	n=6 (15.38%)

There were no differences between FokI polymorphism genotypes distribution in studied groups ($\chi^2=4.56$ df=4 $p>0.05$). From FF homozygotes CD patients had a significantly lower FN BMD than CG ($p<0.05$). CD patients being FF homozygotes has significantly lower FN T-scores than CG ($p<0.05$). CD patients being Ff homozygotes had significantly lower T-scores of the lumbar spine and femoral neck than the heterozygotes from the CG ($p<0.05$). CD patients being ff homozygotes having significantly lower T-scores for lumbar spine and femoral neck than CG ($p<0.05$). No significant differences in vitamin D concentrations between individuals carrying different FokI polymorphic variants of the VDR gene was found.

Conclusion: Differences in BMD observed between patients suffering from different conditions but having the same genetic background suggest that bone density is determined by the condition. Further studies including other polymorphisms and large sample number are needed.

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P892

HOSPITALIZED GERIATRIC PATIENTS: A DESCRIPTIVE STUDY

K. Bülow¹, T. Christiansen¹, A. Duborg Back Jørgensen¹, S. Teljigović¹
¹University College Absalon, Physical Therapy Department, Næstved, Denmark

Objectives: To study the profile of hospitalized geriatric patients in terms of health, functioning and quality of life (QoL), and to present the differences between sex, age (<80 and ≥80 years) and referral units.

Material and Methods: A random sample of 53 (♀=34) hospitalized patients aged 82.5±7.2 were tested using SF-36, New Mobility Score (NMS), PRISMA-7, body-composition (Tanita-BC 545n), grip strength, regular or modified chair stand, and 2-minute walk test (2mwt).

Results: 38 patients were referred from the medical unit and 15 from the orthopedic unit. The mean for diagnoses was 8.3±3.6 with lung disorders and fractures as the most prevalent reasons for admission. The means for body-composition were: BMI 24.4±6.4, fat% 33.5±9.1, bone mass 2.2±0.5kg. In physical tests, the means were: 8.5±2.9 in chair-stand, 2.7±2.3 in modified chair-stand, 70.5±47.1m in 2mwt, and 16.7±9kg in grip strength. The median of PRISMA-7 was 3 (IQR 2-4) with 72% scoring

≥3, indicating frailty. The median of NMS was 5.5 (IQR 2-8) with 67% scoring ≤6, indicating limited mobility. In SF-36, the mean physical component summary was 33.3±11.6 and the mental component summary (MCS) was 50.3±12.6.

Differences were observed in bone mass and grip strength in favor of men ($p<0.001$). However, in MCS women scored significantly better ($p=0.03$). One difference was found between age groups where patients aged ≥80 scored significantly worse in PRISMA-7 ($p<0.04$). One difference was found between referral units where the medical unit performed significantly better in 2mwt ($p<0.001$).

Conclusion: The patients had many comorbidities, low physical scores, limited mobility, indications of frailty, and impaired QoL. Men scored better in two physical tests, however MCS were lower. Patients aged ≥80 had a higher indication of frailty. Furthermore, this study indicates that the differences between referral units are minimal which questions the validity of rehabilitation programs based on the type of referral unit.

P893

LIFESTYLE FACTORS AND BONE MASS ACCUMULATION IN LATE ADOLESCENCE: THE TROMSØ STUDY, FIT FUTURES

O. A. Nilsen¹, T. Christoffersen¹, A. Winther², L. A. Ahmed³, N. Emaus¹

¹Department of Health and Care Sciences, UiT The Arctic University of Norway, Tromsø, Norway, ²Division of Neurosciences, Orthopedics and Rehabilitation Services, University Hospital of North Norway, Tromsø, Norway, ³Institute of Public Health, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, United Arab Emirates

Objective: Osteoporotic-related fractures constitute a major health burden in western societies. Adolescence is an essential period for bone development and peak bone mass is a key determinant of future bone health. Although genetics explain a substantial proportion of the variance of an individual's bone mass, several lifestyle factors may influence skeletal dynamics. The aim of this population-based study was to explore associations between lifestyle factors and changes in bone mineral content (ΔBMC) over 2 years in Norwegian adolescents aged 15-17 years at baseline.

Methods: In 2010-2011, we invited all first year upper-secondary school students to participate in the Fit Futures study and 1038 adolescents attended (93%). The survey was repeated two years later providing 688 repeated measures (66% of baseline). We measured total body (TB), total hip (TH), femoral neck (FN) BMC (g) and body composition by DXA (GE Lunar prodigy). Lifestyle variables were collected by self-administered questionnaires. Baseline information on use of alcohol, snuff, soft drinks, vitamin/mineral supplements, smoking habits and screen time (>4 hours a day) were dichotomized. Their association with percent ΔBMC were explored in sex specific linear regression models adjusted for age, height, lean and fat mass, Δheight, Δlean- and Δfat mass, baseline BMC, sexual maturation, time between measurements and physical activity level. We included 354 girls and 296 boys in the analysis.

Results: Mean follow-up time were 1.9 (SD 0.2) years. Mean percentage increase for FN, TH and TB BMC was 0.6, 1.1, 3.2 in girls and 3.6, 2.8 and 8.3 in boys, respectively ($p<0.05$). In both sexes, reported snuff use was associated with reduced bone accumulation at femoral sites, with -0.8% in girls (FN: $\beta=-0.841$, $p=0.037$, TH: $\beta=-0.839$, $p=0.030$) and -1.4% in boys (FN: $\beta=-1.356$, $p=0.048$, TH: $\beta=-1.465$, $p=0.017$). Smoking was also negatively associated with ΔBMC TH in boys ($\beta=-1.497$, $p=0.035$) and borderline for ΔBMC FN in girls ($\beta=-0.876$, $p=0.069$). Moreover, in girls, screen time>4 hours a day was negatively associated with ΔBMC TH ($\beta=-0.988$, $p=0.006$).

Conclusion: Our results indicate that tobacco use and excessive screen time in late adolescence may be detrimental to bone development at femoral sites and may be a signal of increased fracture risk in adult life.

P894

ASSOCIATION BETWEEN PARITY AND BMD IN PATIENTS WITH PREMATURE MENOPAUSE

A. Mirica¹, R. Petris¹, R. Mirica², S. Paun³, D. Paun¹¹C.I. Parhon, National Institute, ²Saint John Emergency Hospital,³Clinical Emergency Hospital, Bucharest, Romania

Objectives: Epidemiological studies have shown controversial results on the relationship between parity and the risk of postmenopausal osteoporosis. In addition, premature menopause is a recognized risk factor for the development of postmenopausal osteoporosis. This study aims to study the impact of number of pregnancy on BMD in women with premature menopause

Methods: We performed a retrospective analytical study, collecting data from patients hospitalized in our institute. We analyzed the records for a group of 40 women diagnosed with premature menopause Reproductive personal history were registered from the medical records. Women were divided into groups according to the number of pregnancies in: nulliparity, normal parity (1 to 3 live childbirths) and multiparity (≥ 4 live childbirths). The measurements of the femoral neck and lumbar spine BMD were performed with DXA, using the WHO criteria of diagnosis.

Results: The distribution of the parity groups was 10% nulliparity (n=4), 85% (n=34), normal parity and 5% (n=2) multiparity. Median femoral neck BMD was 0.802 ± 0.16 g/cm², with differences in BMD values between different parity groups: nulliparity with a median BMD of 0.723 ± 0.05 g/cm², normal parity with a median BMD of 0.812 ± 0.142 g/cm² and multiparity with median BMD of 0.800 ± 1.41 g/cm², with a significant semnificance ($p < 0.01$) between nulliparity and multiparity. Median lumbar spinal L1-L4 BMD was 0.931 ± 0.12 g/cm², with median value of BMD of 0.776 ± 0.19 g/cm² in nulliparity group, 0.948 ± 0.15 g/cm² for normal parity and 0.900 ± 0.14 g/cm² for multiparity, with a significant semnificance regarding nulliparity vs. multiparity ($p < 0.05$).

Conclusions: Nulliparity is associated with a significant decrease in BMD in both sites, at femoral neck and lumbar spine, comparative with women with >4 live childbirths, in the context of premature menopause.

P895

FACTORS ASSOCIATED WITH OSTEOPOROSIS AND BMD LOSS IN A COHORT OF WOMEN WITH BREAST CANCER TREATED WITH AROMATASE INHIBITORS

J. Loarca-Martos¹, W. A. Sifuentes-Giraldo¹, L. V. Maldonado-Romero¹, M. Ahijón-Lana¹, C. Velázquez-Arce¹, N. Martínez-Jañez¹, M. Vázquez-Díaz¹¹Hospital Universitario Ramón y Cajal, Madrid, Spain

Objectives: To estimate BMD loss over three years and assess factors associated with osteoporosis (OP) in a cohort of women diagnosed with breast cancer treated with aromatase inhibitors (AI).

Methods: The authors conducted a cohort type study in postmenopausal patients treated with AI, followed during a period of three years. BMD was assessed with DXA of lumbar spine (LS) and femoral neck (FN) at baseline and at three years visit, and patients were classified in who groups: OP group, defined by a T-Score ≤ -2.5 standard deviations (SD) either on LS of FN, and Non-OP group, defined by a T-Score > -2.5 SD on LS and FN. For analysing factors associated with OP, we performed the following analytical determinations at baseline and after two years of AI treatment: blood levels of calcium, phosphorus, vitamin D, PTH, C-terminal and N-terminal propeptides of type I procollagen, triglycerides, low density lipoproteins, high density lipoproteins, total cholesterol, total proteins and creatinine level; also, calciuria and tubular phosphate reabsorption were determined.

Results: A total of 54 postmenopausal patients diagnosed with BC attended in our hospital between August 2011 and December 2014 were included, 31 patients in OP group and 23 in non-OP group. There was a BMD loss in the 3 years of follow-up of 0.020 g/cm² ($p = 0.108$) for LS

and 0.022 g/cm² for FN ($p = 0.026$). There was not any incident fracture in the three years of follow up in our cohort. Regarding demographic characteristics, we observed that OP patients receive more calcium and vitamin D supplements compared with non-OP group ($p = 0.041$). We did not find differences on the other baseline characteristics between the two groups. Regarding analytical variables at baseline, triglycerides levels were significantly higher in OP group ($p = 0.026$). We did not find any other significant differences among the two groups.

Conclusions: During the 3 years of follow up, there was a significant loss in femoral neck BMD. Calcium and vitamin D supplementation were more frequent in OP group, related to clinical practice use of supplementation in patients with osteoporosis. TG levels were higher at baseline determination in OP group.

P896

APPROACH TO DIAGNOSIS AND TREATMENT OF HYPERCALCEMIA: A CASE SERIES

Y. Cherif¹, S. Hamrouni¹, M. Mrouki¹, F. Ben Dahmen¹, M. Abdallah¹¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Hypercalcemia is a common and potentially serious clinical finding. The aim of our study was to describe clinical characteristics and etiologies of hypercalcemia in our Department of Internal Medicine.

Methods: A descriptive retrospective study was performed from January 2015 to December 2017. The medical records of hospitalized patients diagnosed with hypercalcemia (calcium level > 2.65 mmol/l) have been analyzed.

Results: Twenty-three patients were included. The mean age was 57 years (20-82 years). The gender ratio was 0.35. It was incidentally diagnosed in 19 cases. The clinical signs were: polyuropolydipsic syndrome in 11 patients, digestive signs in 7 patients with vomiting, constipation and pancreatitis. Four patients had dehydration, 2 other patients had a short QT space, 1 patient had lipothymia. Eight patients had renal failure and 3 others had nephrolithiasis. The average rate of calcemia was 2.94 mmol/l (2.65 - 3.68 mmol/l). Fourteen cases had mild hypercalcemia, 8 had moderate hypercalcemia and 1 severe hypercalcemia. The cause of hypercalcaemia was malignancy in 2 cases (lymphoma n=1, multiple myeloma n=1). 4 patients had primary hyperparathyroidism and 1 had tertiary hyperparathyroidism. Ten patients had hyperparathyroidism secondary to vitamin D deficiency. Other causes such granulomatoses disorders were found in 3 patients. Two patients had sarcoidosis, 1 had toxoplasmosis. The cause of hypercalcemia was unknown. Fifteen patients had benefited from hyperhydration associated with bisphosphonate in 3 cases, furosemide in 2 cases, and corticosteroids in 2 cases. The etiological treatment was instituted according to the cases.

Conclusion: Among all causes of hypercalcemia, hyperparathyroidism and malignancy are the most common. It is a potentially severe metabolic disorder. Prompt diagnosis and management of hypercalcemia is based on symptomatic treatment and especially the treatment of the etiology.

P897

TRADITIONAL DXA UNDERESTIMATES BMD OF THE SPINE IN AXIAL SPONDYLOARTHROPATHY

G. Fitzgerald¹, T. Anachebe¹, K. Mccarroll², F. O' Shea¹¹Department of Rheumatology, St. James's Hospital, ²Department of Medicine for the Elderly, St James's Hospital, Dublin, Ireland

Objective: Axial spondyloarthropathy (axSpA) is an inflammatory arthritis causing new bone formation (syndesmophytes) and fusion of the spine. Osteoporosis is a recognised feature of axSpA, but is difficult to diagnose. DXA in the antero-posterior (AP) projection of the spine can overestimate BMD due to syndesmophytes. We aimed to: 1. investigate different projections of DXA of the lumbar spine; and 2. assess the effect of syndesmophytes on spine BMD.

Methods: AxSpA patients were assessed with clinical exam, questionnaires and laboratory investigations. The burden of syndesmophytes on x-ray was assessed with the validated mSASSS score, which ranges from 0-72 (higher scores indicate more severe disease). DXA was performed of the spine in both the AP and lateral projections, the hip and the radius.

Results: 100 patients with axSpA were recruited: 78% (n=78) male, mean (SD) age 52 (12) years, disease duration 26 (13) years. The median (IQR) mSASSS score was 10 (33). Lumbar spine BMD was lower when measured by lateral DXA rather than AP (0.76 v 1.11 g/cm², $P<0.01$). Lateral DXA detected more cases of spinal osteopenia or osteoporosis than AP (21% v 44%, $p<0.01$). Lateral spine BMD reduced with longer duration of disease ($r=-0.3$, $p=0.02$), whereas AP spine BMD increased with age ($r=0.3$, $p=0.01$). Women had significantly more cases of osteoporosis at the lumbar spine than men when measured by lateral DXA (32% v 12%, $p=0.02$), but not by AP DXA. A higher mSASSS, reflecting more syndesmophytes/new bone formation, was associated with a rising AP spine BMD ($r=0.5$, $p<0.01$), but had no effect on lateral spine BMD. The gap between AP and lateral spine BMD, i.e., when AP BMD was higher than lateral BMD, increased significantly ($p<0.05$) with increasing age ($r=0.38$), disease duration ($r=0.37$) and mSASSS ($r=0.52$). mSASSS was the strongest independent predictor of a difference between AP and lateral BMD measurements, suggesting that syndesmophyte formation interferes with AP DXA assessment of the spine.

Conclusion: AP DXA of the spine is affected by a higher burden of syndesmophytes (new bone formation), raising concerns that traditional DXA assessment may miss cases of osteoporosis. We suggest that lateral DXA of the spine may be more accurate in axSpA patients.

P898

VITAMIN D RECEPTOR (VDR) BSMI POLYMORPHISM, VITAMIN D AND BMD IN PATIENTS WITH INFLAMMATORY BOWEL DISEASES

A. Szymczak-Tomczak¹, I. Krela-Kaźmierczak¹, M. Kaczmarek-Rys², M. Skrzypczak-Zielińska², M. Szalata³, N. Drwęska-Matelska³, L. Łykowska-Szuber¹, P. Eder¹, M. Michalak⁴, A. Dobrowolska¹, R. Słomski⁵

¹Department of Gastroenterology, Human Nutrition and Internal Medicine, Poznań University of Medical Sciences, ²Institute of Human Genetics Polish Academy of Sciences, ³Department of Biochemistry and Biotechnology, Poznań University of Life Sciences, ⁴Department of Computer Sciences and Statistics, Poznań University of Medical Sciences, ⁵Department of Biochemistry and Biotechnology, Poznań University of Life Sciences; Institute of Human Genetics Polish Academy of Sciences, Poznań, Poland

Objectives: Growing evidence indicates that the vitamin D receptor (VDR) gene is an important candidate gene for influencing the development of osteoporosis. Inflammatory bowel disease (IBD) comprises a group of chronic inflammatory conditions of the digestive system, which include Crohn's disease (CD) and ulcerative colitis (UC). Both genetic and environmental factors play important role in etiology of IBD and osteoporosis. The aim of the study was to evaluate the potential association between BsmI polymorphism of VDR gene, vitamin D and BMD in IBD patients.

Methods: The study included 172 IBD patients (85 with Crohn's disease (CD) and 87 with ulcerative colitis (UC)) and 39 healthy controls (CG). The BMD of lumbar spine and femoral neck was evaluated using DXA. Serum concentrations of 25-hydroxyvitamin D were determined. Restriction fragment length polymorphism (RFLP) analysis of BsmI was performed on DNA samples.

Results:

Table 1. Distribution of BsmI polymorphism genotypes

	CD	UC	CG
BB	14 (16.47%)	22 (25.29%)	3 (7.69%)
Bb	45 (52.94%)	34 (39.08%)	23 (58.97%)
bb	26 (30.59%)	31 (35.63%)	13 (33.33%)

There were no differences between BsmI polymorphism genotypes distribution in studied groups ($\chi^2=7.98$ $p>0.05$). Heterozygous (Bb) CD patients has a significantly lower FN BMD and T-score than heterozygous controls ($p<0.01$). Homozygous (bb) CD patients having a significantly lower L2-L4 BMD than CG ($p<0.05$). CD patients being bb homozygotes had significantly lower L2-L4 and FN T-scores than homozygous CG ($p<0.01$, $p<0.05$). We found no significant differences in vitamin D concentrations between individuals carrying different BsmI polymorphic variants of the VDR gene.

Conclusion: Differences in BMD observed between patients suffering from different conditions but having the same genetic background suggest that bone density is determined by the illness.

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P899

LEUKOCYTE MARGINATION AFTER EFFORT: ITS IMPACT IN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS

R. A. Ionescu¹, L. M. Pana², D. N. Costea³, A. Dima⁴, C. R. Baicus⁵

¹"Carol Davila" University of Medicine and Pharmacy, Bucharest, Colentina Clinical Hospital, 3rd Internal Medicine Dept., Bucharest, Romania, ²Colentina Clinical Hospital, 3rd Internal Medicine Dept., Bucharest, Romania, ³Colentina Clinical Hospital, 3rd Internal Medicine Dept., Bucharest, Romania, ⁴"Carol Davila" University of Medicine and Pharmacy, Bucharest, "Dr. Carol Davila" Central Military Clinical Hospital, Bucharest, Romania, ⁵"Carol Davila" University of Medicine and Pharmacy, Bucharest, Colentina Clinical Hospital, Internal Medicine Clinic, Bucharest, Romania

Objective: To assess the importance of leukocyte margination (migration of leukocytes to the vessel walls) in the evaluation of systemic lupus erythematosus (SLE) patients, since leukocyte and lymphocyte counts are important in SLE patients' assessment, as markers of disease activity, and, also, leukocyte levels lower than 4000/ μ L and lymphocyte levels lower than 1000/ μ L are classification criteria of the disease.

Methods: We analyzed the leukocyte count before and after effort: the 6 min walk test (6MWT) was performed in all patients. 15 SLE patients (13 females/2 men) and 7 control subjects (all females) were included, with a median age of 50.7 and 54.3 years, respectively.

Results: In SLE patients, the median differences between the leukocyte, neutrophil and lymphocyte counts after the 6MWT compared to the values at rest were the following: 1405 (296; 2082), 1590 (92.5; 2220) and -60 (-243; 255)/ μ L respectively. On the contrary, the differences observed in controls were negative for leukocytes and neutrophils: -65 (-1350; 1625), respectively -810 (-1812; 245)/ μ L. The leukocyte and neutrophil counts were higher after effort in SLE patients, however the median differences did not reach statistical significance: 5990.0 (4200.5; 7687.5) vs. 6555.0 (5370.0; 10562.0)/ μ L; $p>0.05$, and 3523.0 (2270.0; 5065.0) vs. 4805.0 (2960.0; 7747.5)/ μ L; $p>0.05$, respectively. There were three SLE patients in which the leukocytes or lymphocytes fulfilled the SLE SLICC 2012 criteria. In all three, the values after the 6MWT were higher than the diagnosis criteria limits as follows: 3280/ μ L vs. 5220/ μ L, 3812/ μ L vs. 4120/ μ L, respectively 770/ μ L vs. 1100/ μ L.

Conclusion: All three patients that had criteria of leucopenia or lymphopenia at rest, lost the SLE diagnosis criteria after the 6MWT. Leukocyte

margination should probably take into account when using SLICC 2012 SLE classification criteria. There is need for further studies in this area.

P900

EFFICACY OF BISPHOSPHONATES IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS IN PATIENTS WITH A DIFFERENT DURATION OF MENOPAUSE AND A DIFFERENT STATUS OF VITAMIN D

I. Aleksic¹, S. Milenkovic², B. Stamenkovic¹, S. Stojanovic¹, V. Zivkovic¹

¹Rheumatology Department Institute for Treatment and Rehabilitation Niska Banja, ²Rheuma Medica, Nis, Serbia

Objectives: Postmenopausal osteoporosis is the most common form of osteoporosis. A key factor of the pathogenesis of postmenopausal osteoporosis is estrogen deficiency. The estrogens protect bone against osteoporosis indirectly, stimulating the synthesis of calcitonin than inhibiting bone resorption and directly, by estrogen (E2) receptors activity as well as increasing the synthesis of osteoprotegerin (OPG) in osteoblasts and stimulating the osteoblastic activity. Osteoclastogenesis is related to menopause as well as the increase secretion of PTH. Our aim was to determine the effect of bisphosphonate therapy on osteoporosis in postmenopausal women with different duration of menopause; and to determine the correlation of vitamin D status and duration of menopause in women with postmenopausal osteoporosis.

Method: Our investigation consist of 136 women with newly diagnosed postmenopausal osteoporosis without previous vitamin D treatment. Bone density was measured by DXA Hologic densitometer at L1-L4 spine and proximal femur in all patients before and after one year. According to the duration of menopause, respondents were divided into 3 groups. The first group consisted of subjects with a duration of menopause of up to 5 years (47 subjects), the second group of 6-10 years (43 subjects) and the third group of subjects with a duration of menopause of 11 years or more (46 subjects).

Results: The mean value of 25(OH)D was highest in subjects with menopause of up to 5 years and amounted to 53.21 ± 13.15 nmol/L, followed by women with menopause of 6-10 years (47.17 ± 16.12 nmol/L), and the smallest in subjects whose menopause lasted 11 years or more (38.44 ± 14.48 nmol/L). ANOVA and Danet's test showed that the mean value of 25(OH)D in subjects with menopause of up to 5 years was statistically significantly higher than subjects with menopause over 11 years ($p < 0.01$), while it was not statistically significant differences in comparison with the group whose menopause lasted from 6-10 years. The mean T-score and BMD on the lumbar spine was the highest in subjects with menopause of up to 5 years and amounted to -2.81 ± 0.29 (0.729 ± 0.031 g/cm²), followed by subjects with menopause lasting from 6 to 10 years: -2.98 ± 0.47 (0.722 ± 0.061 g/cm²) and the smallest in group with menopause 11 years or more: -3.12 ± 0.48 (0.711 ± 0.058 g/cm²). The mean value of T-score and BMD after 12 months of therapy was the highest in subjects with menopause of up to 5 years and amounted to -2.51 ± 0.32 (0.772 ± 0.038 g/cm²), followed by subjects with menopause lasting from 6-10 years: -2.68 ± 0.59 (0.758 ± 0.062 g/cm²), and the smallest in women with menopause 11 years or older: -2.86 ± 0.49 (0.732 ± 0.052 g/cm²). T-scores were highest in subjects with the shortest menopause length - up to 5 years (0.30 ± 0.18), followed by subjects with menopause of 6-10 years (0.27 ± 0.19), and at least in men with menopause of 11 years and over (0.25 ± 0.22), but ANOVA and Danet's test did not indicate a statistically significant difference in the increase in bone density among the groups after therapy. BMD values were also highest in subjects with menopause of up to 5 years (0.043 ± 0.023 g/cm²), followed by subjects with menopause of 6-10 years (0.038 ± 0.026 g/cm²) and at least The woman with menopause was the longest - 11 years or more (0.031 ± 0.024 g/cm²), but without a statistically significant difference between the groups.

Conclusion: After 12 months of bisphosphonate treatment we found statistically significant increasing in BMD in all three groups of our examinees with different menopausal duration.

The effect of bisphosphonate therapy was highest in women with shortest menopausal duration (5 years), but without statistical significance as compared to the other groups. The mean value of 25(OH)D was statistically significantly higher in subjects with menopause lasting up to 5 years compared to respondents with menopause over 11 years.

P901

VITAMIN D RECEPTOR (VDR) APAI POLYMORPHISM, VITAMIN D AND BMD IN PATIENTS WITH INFLAMMATORY BOWEL DISEASES

A. Szymczak-Tomczak¹, I. Krela-Kaźmierczak¹, M. Kaczmarek-Rys², M. Skrzypczak-Zielińska², M. Szalata³, N. Drwęska-Matelska³, L. Łykowska-Szuber¹, P. Eder¹, M. Michalak⁴, A. Dobrowolska¹, R. Słomski⁵

¹Department of Gastroenterology, Human Nutrition and Internal Medicine, Poznań University of Medical Sciences, ²Institute of Human Genetics Polish Academy of Sciences, ³Department of Biochemistry and Biotechnology, Poznań University of Life Sciences, ⁴Department of Computer Sciences and Statistics, Poznań University of Medical Sciences, ⁵Department of Biochemistry and Biotechnology, Poznań University of Life Sciences; Institute of Human Genetics Polish Academy of Sciences, Poznań, Poland

Objectives: Osteoporosis is very important problem in patients with inflammatory bowel diseases (IBD). Polymorphism and allelic variations in the vitamin D receptor gene (VDR) have been found to be associated with BMD. The aim of the study was to evaluate the potential association between Apai polymorphism of VDR gene, vitamin D and BMD in IBD patients.

Methods: The study group comprised of 172 IBD patients (85 Crohn's disease patients (CD) and 87 colitis ulcerosis patients (CU)) and 39 healthy volunteers (CG). Polymorphism was determined by PCR (polymerase chain reaction) and RFLP (restriction fragment length polymorphism). BMD was measured at the lumbar spine (L2-L4) and the femoral neck (DXA). Serum concentrations of 25-hydroxyvitamin D were determined.

Results:

Table 1. Distribution of Apai polymorphism genotypes

	CD	CU	CG
AA	25 (29.41%)	31 (35.63%)	15 (38.46%)
Aa	41 (48.24%)	39 (44.83%)	14 (35.90%)
aa	19 (22.35%)	17 (19.54%)	10 (25.64%)

There were no differences between Apai polymorphism genotypes distribution in studied groups ($\chi^2 = 2.22$ df=4 $p > 0.05$). Heterozygous (Aa) CD patients had significantly lower L2-L4 BMD and T-scores than heterozygous CG ($p < 0.05$ for both). Heterozygous CD patients had significantly lower FN BMD and T-scores than Aa heterozygotes from the CG ($p < 0.05$). CD patients being aa homozygotes has significantly lower L2-L4 T-scores than homozygous CG ($p < 0.05$). CD patients being aa homozygotes having FN T-score and Z-score significantly lower than homozygous CG ($p < 0.05$). No significant differences were found in vitamin D concentrations between individuals carrying different Apai polymorphic variants of the VDR gene.

Conclusion: The effect of the VDR genotype on bone mass is negligible in IBD patients, other factors may play role.

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P902

ASSOCIATION BETWEEN BMD AND SERUM URIC ACID IN POSTMENOPAUSAL WOMEN WITH DIABETIC NEPHROPATHY

D. Monova¹, S. Monov², R. Shumnalieva²¹Medical University - Sofia, Medical Institute, Department of Internal Medicine, ²Medical University - Sofia, Department of Internal Medicine, Clinic of Rheumatology, Sofia, Bulgaria

Objectives: Oxidative stress has been implicated in the pathogenesis of osteoporosis. Uric acid, a potent antioxidant substance, has been associated with BMD. The objective of the study was to examine the association between serum uric acid and BMD in postmenopausal women with diabetic nephropathy.

Methods: This cross-sectional study involved 78 postmenopausal women with diabetic nephropathy, 48-65 years of age. BMD measured at the lumbar spine and total hip region with DXA (annual rate of change in BMD (A%ΔBMD) was calculated. The serum uric acid (SUA) levels were obtained at each DXA visit. Partial correlation and regression analyses were applied to determine the associations.

Results: Cross-sectional data analyses revealed that BMD was positively correlated with SUA in postmenopausal women with diabetic nephropathy after adjustment for age, BMI, systolic blood pressure, diastolic blood pressure, hip circumference, cigarette smoking, alcohol consumption, milk intake, physical activity, fracture history, years after menopause, total protein, total bilirubin, triglycerides, total cholesterol, high-density lipoprotein cholesterol, fasting blood glucose, HbA1c, plasma C-reactive protein, serum alkaline phosphatase serum calcium, and estimated glomerular filtration rate.

Conclusion: The BMD was linearly associated with SUA levels within the normal physiologic range of postmenopausal women with diabetic nephropathy. Higher SUA levels had a protective effect on bone loss in postmenopausal osteoporosis.

P903

VITAMIN D RECEPTOR (VDR) TAQI POLYMORPHISM, VITAMIN D AND BMD IN PATIENTS WITH INFLAMMATORY BOWEL DISEASES

A. Szymczak-Tomczak¹, I. Krela-Kaźmierczak¹, M. Kaczmarek-Ryś², M. Skrzypczak-Zielińska², M. Szalata³, N. Drwęska-Matelska³, L. Łykowska-Szuber¹, P. Eder¹, M. Michalak⁴, A. Dobrowolska¹, R. Słomski⁵¹Department of Gastroenterology, Human Nutrition and Internal Medicine, Poznań University of Medical Sciences, ²Institute of Human Genetics Polish Academy of Sciences, ³Department of Biochemistry and Biotechnology, Poznań University of Life Sciences, ⁴Department of Computer Sciences and Statistics, Poznań University of Medical Sciences, ⁵Department of Biochemistry and Biotechnology, Poznań University of Life Sciences; Institute of Human Genetics Polish Academy of Sciences, Poznań, Poland

Objectives: Osteoporosis and inflammatory bowel diseases (IBD) are a polygenic diseases, whose determining loci have not yet been identified. Vitamin D receptor (VDR) gene polymorphisms have been inconsistently associated with BMD. The aim was to find association between BMD and VDR TaqI polymorphism and vitamin D in IBD patients.

Methods: Study included 172 IBD patients (85 with Crohn's disease (CD) and 87 with ulcerative colitis (UC)) and 39 healthy volunteers (CG). Densitometric measurements were conducted by DXA of the lumbar vertebrae and femoral neck (FN). Serum concentrations of 25-hydroxyvitamin D were determined. Polymorphisms were determined by PCR (polymerase chain reaction) and RFLP (restriction fragment length polymorphism).

Results:

Table 1. Distribution of TaqI polymorphism genotypes

	CD	UC	CG
TT	28 (32.94%)	31 (35.63%)	13 (33.33%)
Tt	43 (50.59%)	36 (41.78%)	23 (58.97%)
tt	14 (16.47%)	20 (22.99%)	3 (7.69%)

There were no differences between TaqI polymorphism genotypes distribution in studied groups ($\chi^2=5.66$ df=4 $p>0.05$). Among UC patients, tt homozygotes had a significantly higher femoral neck BMD than Tt heterozygotes ($p<0.05$). We found no significant differences in vitamin D concentrations between individuals carrying different TaqI polymorphic variants of the VDR gene.

Conclusion: tt variant of VDR TaqI polymorphism may play protective role for BMD in patients with colitis ulcerosa. Properly designed molecular diagnostics based on analysing allelic variants of candidate genes potentially associated with secondary osteoporosis in IBD patients, would allow estimating predisposition to and the actual risk of developing osteoporosis long before the first symptoms appear.

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P904

TRABECULAR BONE SCORE (TBS) AND FRACTURE RISK PREDICTION IN ASIAN TYPE 2 DIABETIC (T2DM) FEMALES AND IN SUBJECTS WITH PRIOR FRACTURES.

C. K. T. Hew¹, L. F. Lee¹, K. Feiza¹, H. K. Lim¹, S. S. Yeap¹, F. L. Hew¹¹Puchong Medical Specialist Centre, Petaling Jaya, Malaysia

Objectives: 1. To compare TBS, BMD and FRAX (with and without TBS-adjustment) scores in T2DM patients compared with their non-diabetic (nonDM) controls. 2. To compare the same parameters in patients who had a previous fracture with matched controls who had no prior fractures.

Methods: This retrospective study enrolled female patients who had a BMD measured in the facility between January 2014 and January 2018. The first analysis was between T2DM and nonDM subjects. The second analysis was with subjects who had a previous fracture matched with 2 controls. All those with conditions that could affect bone or calcium metabolism, or on medications that could affect bone were excluded. BMD was measured using DXA. TBS was obtained using the TBS iNsight software program (Med-Imaps, Pessac, France) with BMD DXA images.

Results: For the first analysis, there were 45 T2DM and 45 nonDM subjects. Median duration of T2DM was 10.5 years (interquartile range [IQR] 12.75). There was no difference in BMD at all sites, TBS values, and calculated FRAX scores between the 2 groups. For the second analysis, there were 16 patients with previous fractures and 32 matched controls. Lumbar spine BMD was not significantly different between the fracture/no fracture groups but both femoral neck and total hip BMD were significantly lower in the fracture group. Calculated FRAX scores were significantly different between the fracture and no fracture group but not significantly altered with the use of TBS.

Conclusion: Our study shows that the FRAX scores calculated with and without TBS were not significantly different in T2DM patients to nonDM patients. As expected, the FRAX scores calculated were both significantly higher in patients with a prior fracture but TBS did not alter the FRAX score significantly. This suggests that TBS does not add further to the fracture risk assessment of the T2DM patients and those who have had a previous fracture. BMD and the FRAX score remain major predictors of risk in those who have a previous fracture.

P905

FIRST YEAR OF A FRACTURE LIAISON SERVICE: IMPACT ON MORTALITY AND RE-FRACTURE RATES IN ELDERLY HIP FRACTURE PATIENTS

D. González Quevedo¹, D. Bautista Enrique¹, V. Pérez Del Río¹, I. Tamimi Mariño¹, M. Bravo Bardaji¹, D. García de Quevedo Puerta¹

¹Department of Orthopedic Surgery and Traumatology, Regional University Hospital of Málaga, Málaga, Spain

Objectives: Hip fractures are a clinical manifestation of osteoporosis and these patients are at risk of premature death and subsequent fracture. Fracture liaison service (FLS) is an approach for secondary fracture prevention by identifying patients with fragility fractures and initiating the appropriate treatment with the aim of avoiding future fractures.

Methods: We conducted a retrospective cohort study on mortality and re-fracture rates of patients over 60 years with hip fractures who were treated between January 2016 and December 2016 (no-FLS group) and January 2017 and December 2017 (FLS group). Patients' information was withdrawn from our local computerized database. The patients were followed for one year after fracture. Mortality and re-fracture rates were compared between the two groups using a Multivariate Cox proportional hazard model.

Results: A total of 724 individuals were included in this study, 407 patients belong to no-FLS group (the mean age was 81.8 years) and 317 patients formed part of FLS group (the mean age was 82.6 years). There was an increased prescription of anti-osteoporotic treatment with an odds ratio of 6.6 (4.2-9.1) ($p < 0.01$). 137 patients (18.9%) [no-FLS 99 (24.3%), and FLS 38 (12.0%), $p < 0.01$] died during the follow-up period and 25 patients (3.5%) [no-FLS 20 (4.9%), and FLS 5 (1.6%), $p = 0.02$] underwent a second fracture. After adjustment for age, sex, type of fracture and anti-osteoporotic drug treatment, patients in FLS group had a lower mortality risk [adjusted hazard ratio: 0.65; 95%CI: 0.44-0.95].

Conclusions: The introduction of an intensive FLS model has a beneficial effect on mortality and second fracture prevention in elderly hip fracture patients, by increasing prescription of anti-osteoporotic drugs.

P906

ULTRASONOGRAPHY: A PREDICTION TOOL FOR THE EVOLUTION OF PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

R.-I. Gutiu¹, P.-A. Sulea², A. Scarlat², I. C. Filipescu¹, M. Copotioiu²

¹Iuliu Hatieganu University of Medicine and Pharmacy Cluj-Napoca, Cluj-Napoca, ²University of Medicine and Pharmacy of Tirgu-Mures, Tirgu-Mures, Romania

Objective: To create a clinical score, which integrates the paraclinical imagistic evaluations (the ultrasonography) with other clinical risk factors, as a prediction tool for the evolution of the disease.

Methods: This prospective study included 53 patients diagnosed with systemic lupus erythematosus, that were in the evidence of the rheumatology department from the Clinical Emergency Hospital of Tirgu-Mures. The study was conducted for 10 months. Ultrasound was used for the following: the metacarpophalangeal joints, the interphalangeal joints and the radiocarpal joint of the dominant hand, to evaluate the flexor and the extensor tendons, using a 18MHz linear transducer. Also, the intima-media thickness (IMT) of the common carotid artery was measured using a 10MHz linear transducer. Other data collected for this study were: the comorbidities, SLEDAI score, vices (smoking, alcohol, coffee), blood tests (blood count, metabolic panel, lipid panel), anti-double-stranded DNA, antinuclear and anticardiolipin antibodies.

Results: The mean age of the patients was 49.17 ± 9.918 years old with a mean elapsed time from the onset of the disease of 8.736 ± 7.370 years. The majority of the patients had a SLEDAI score between 6-10, with a moderate activity of the disease. The overall value of the IMT was 0.916

± 0.2422 mm (subclinical atherosclerosis). Coffee consumption was present for 34% of the patients and dyslipidemia for 41.51%. Applying the linear regression, different scores were obtained regarding the SLEDAI score (maximum 0.3316), the IMT (maximum 3.6857), dyslipidemia (maximum 3.8636) and coffee consumption (maximum 2.1809), in correlation with grade 3 synovitis at the second and third metacarpophalangeal joints and tenosynovitis at the radiocarpal joint. A total score of 10.06 represents the highest risk of a poor evolution of the disease. No statistically significant results were obtained for other data.

Conclusions: The musculoskeletal ultrasonography for the second and third metacarpophalangeal joints and tenosynovitis at the radiocarpal joint is an important step in the evaluation of patients with SLE as it could predict the future development of the disease and could guide the physician in the treatment process.

P907

TERIPARATIDE TREATMENT IN EIGHT PATIENTS WITH PREGNANCY AND LACTATION-ASSOCIATED OSTEOPOROSIS

K. Lampropoulou-Adamidou¹, G. Trovas¹, I. Triantafyllopoulos¹, M. Yavropoulou², A. Anastasilakis³, K. Toulis³, K. Makris⁴, A. Balanika⁵, S. Tournis¹

¹Laboratory for the Research of Musculoskeletal System "Th. Garofalidis", Medical School, University of Athens, KAT Hospital, Athens, ²Division of Endocrinology and Metabolism, 1st Department of Internal Medicine, AHEPA University Hospital, Aristotle University of Thessaloniki, ³Department of Endocrinology, 424 General Military Hospital, Thessaloniki, ⁴Biochemistry Department, KAT Hospital, Athens, ⁵Department of Radiology, Asklepion Voulas Hospital, Athens, Greece

Objectives: Pregnancy- and lactation-associated osteoporosis (PLO) is an uncommon disease. In some patients, the clinical symptoms of PLO resolve spontaneously, while others have severe, prolonged and disabling back pain caused by vertebral fractures (VFs). Because of the rarity of the disease and consequently the lack of controlled trials, there is no consensus to date on how to treat PLO.

Methods: We report the outcome of teriparatide (TPTD) treatment in 8 cases with severe PLO treated for a mean of 20 months (range, 12-24). The patients sustained an average of 6 VFs (range, 3-10). The mean patients' age at the time of fracture was 36 years (range, 31-40). All women were at their first pregnancy. Seven patients complained of back pain during the postpartum period (immediately after delivery to 2 months postpartum) and one patient at the 8th month of pregnancy. The duration of lactation varied from 2 weeks to 5 months.

Results: Baseline mean BMD at the lumbar spine (LS) was 0.677 g/cm^2 (range, 0.595-0.926) with Z-score -3.9 (range, -2.1 to -4.4) and at the total hip (TH) was 0.551 g/cm^2 (range, 0.36-0.685) with Z-score -3.6 (range, -2.4 to -4.9). All patients completed the first year of treatment and had a mean BMD increase of 31.8% (range, 11.6% to 44%) at the LS and 17.5% (range, 9.3-30.4%) at the TH. Three patients completed 24 months of treatment and had a mean BMD increase of 44.6% (range, 36-51%) at the LS and 28.3% (range, 16.2-43.1%) at the TH. PINP levels (from 4 patients) during TPTD treatment seem to correlate with BMD response. Possible secondary causes of osteoporosis were presented in two patients (previous anorexia nervosa and hyperthyroidism). Four cases had a positive family history of osteoporosis and three cases had received low molecular weight heparin during pregnancy. After the initiation of TPTD treatment, no new fractures were observed and all patients were gradually relieved of severe back pain within 2 to 3 months.

Conclusions: TPTD treatment along with weaning and calcium and vitamin D supplementation considerably increases BMD, improves severe back pain and quality of life and prevents further occurrence of VFs in women with PLO.

P908

DETERMINANTS OF CLINICAL AND RADIOLOGICAL PROGRESSION OF HAND OSTEOARTHRITIS OVER 2 YEARSA. Neuprez¹, A. H. Neuprez¹, E. Maheu², O. Bruyère¹, J.-F. Kaux³, J.-Y. Reginster¹¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Belgium, Liège, Belgium, ²Rheumatology Department, AP-HP, Saint-Antoine Hôpital, Paris, France, ³Rehabilitation and Sports Traumatology Department, University Hospital of Liège, Belgium, Liège, Belgium**Objective:** The objectives of this prospective observational study were to assess the clinical and radiological changes in hand osteoarthritis (HOA) and to identify the determinants of these changes, over a two year period.**Methods:** 203 patients were included in Liège Hand Osteoarthritis Cohort (LIHOC) and followed during 2 years. They met the ACR x-ray/clinical criteria for HOA. At baseline, demographic and clinical characteristics of the population were recorded. Various radiological and clinical parameters were selected to investigate progression.**Results:** The general health measures remained stable over time. The number of nodes increased significantly over 2 years while the other clinical parameters did not vary significantly over time (number of painful joints at rest or at pressure and swollen joints). The pinch force decreased over time and the grip strength remained stable. The two tools assessing function (FIHOA and AUSCAN), showed a progressive deterioration over time (statistically significant for FIHOA ($p<0.05$) and borderline ($p=0.17$) significant for the AUSCAN). Almost all patients showed radiologic change during follow-up. Thus, the radiological scores deteriorated significantly over 2 years. An increase in Verbruggen and KL scores was present in 162 (92.04%) and 174 (98.86%) patients, respectively. 39 patients (22.16%) had new erosive joints. From a clinical perspective, using backward logistic regression, diabetes (OR 2.67 – 95%CI 1.13–6.33, $p=0.03$), high degree of radiologic severity (OR 1.23 – 95%CI 1.09–1.39, $p<0.01$) and age between 40 and 60 (OR 2.67 – 95%CI 1.21–5.90, $p=0.02$) at baseline are predictors of FIHOA worsening over time. The predictors of AUSCAN progression included the pain intensity (OR 0.98 – 95%CI 0.97–0.99, $p<0.01$) and the degree of radiologic severity (OR 1.06 – 95%CI 1.01–1.12, $p=0.03$) at baseline. The following factors are associated with radiological deterioration: symptomatic HOA (OR 2.17 – 95%CI 1.04–4.51, $p=0.04$) and the number of severely affected joints at baseline (OR 1.11 – 95%CI 1.04–1.18, $p<0.01$). In contrast, a high number of erosive or remodeled joints (OR 0.89 – 95%CI 0.81–0.98, $p=0.02$) reduce the risk of radiological disease progression.**Conclusion:** These results help to better understand the clinical and radiologic progression of HOA, as well as the determinants that have resulted in them.

P909

MOTHER-CHILD ARE OF GREATER MAGNITUDE THAN FATHER-CHILD DXA BONE ASSOCIATIONS: RESULTS FROM THE SOUTHAMPTON WOMEN'S SURVEYC. Holroyd¹, S. Crozier¹, H. Inskip¹, K. Godfrey¹, C. Cooper¹, N. Harvey¹¹MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK**Objectives:** We investigated the independent relationships between indices of bone mass in childhood and corresponding parental measures, using the Southampton Women's Survey (SWS).**Methods:** The SWS is a cohort of 12,583 initially non-pregnant women aged 20–34 years, from which 3158 pregnancies were followed. In a subset of participants, DXA assessment of bone mass was obtained in the child (age 8–9 years) and in both parents. Measurements included bone area (BA), bone mineral content (BMC), areal BMD (aBMD) andsize-corrected BMC (BMC adjusted for BA, height and weight; scBMC) at whole body minus head (WB), lumbar spine and total hip sites. Linear regression methods were used to assess relationships. β coefficients represent SD change in outcome per 1 SD change in predictor. Differences between β coefficients were tested to establish whether there was a significant difference between parental effects.**Results:** Data were available for 255 parent-offspring trios. Strong positive associations were observed between parental WB, total hip and lumbar spine measures (BA, BMC, BMD) and the corresponding indices in the offspring (maternal: $\beta=0.10$ –0.33; all $p<0.001$; paternal: $\beta=0.08$ –0.16; all $p<0.01$). Associations for scBMC at each site were weaker, but remained statistically significant ($p<0.001$). These remained robust after adjustment for the other parent's bone indices (mother-child $\beta=0.11$ –0.28, $p<0.001$; father-child $\beta=0.08$ –0.15, $p<0.05$). Statistically significantly larger effect sizes were observed for maternal- than paternal-offspring relationships for WB BA, WB BMC, hip BA and all measured bone indices at the lumbar spine (difference between β , $p<0.05$).**Conclusions:** We observed differential parent-child associations for DXA bone indices, with mother and child associations being of greater magnitude than those between father and child for measures of bone size and mineral content at the whole body site, and additionally for indices of bone mineralisation at the spine. Further work will be required to elucidate whether these observations reflect genetic effects or in utero environmental influences.

P910

CORRELATION OF VITAMIN D, CALCIUM AND BMD IN POSTMENOPAUSAL WOMEN IN MONTENEGROM. Vukovic¹, S. Nejkovic¹, Z. Skaric-Karanikic¹, V. Bokan-Mirkovic¹, D. Popovic²¹Center of Physical Medicine and Rehabilitation, Clinical Center of Montenegro, ²Primary Health Care Center Podgorica, Podgorica, Montenegro**Objectives:** To examine the correlation of vitamin D (25(OH)D) level and blood calcium level (Ca) with BMD in postmenopausal women and to assess correlation between BMI and BMD in postmenopausal women in Montenegro.**Methods:** 20 postmenopausal women with mean age of 61.75 ± 6.09 were evaluated. The 25(OH)D was considered sufficient where ≥ 50 nmol/l, insufficient between 30–50 nmol/L and deficient <30 nmol/l. Reference range for Ca was 2.15–2.55 mmol/l. BMD was considered normal when T-score total of hip or lumbar spine was >-1 , osteopenia between -1 and -2.5 and osteoporosis <-2.5 . The BMI is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m^2 .**Results:** 2 women had normal BMD, 11 had osteopenia and 7 had osteoporosis. One woman had deficit, 4 had insufficient and 15 had sufficient level of 25(OH)D. Mean level of 25(OH)D was 65.21 ± 24.88 , of calcium 2.33 ± 0.28 . We found significant moderate positive correlation between level of 25(OH)D and value of T-score of hip (Pearson's correlation coefficient=0.562, $t=2.881$, $df=18$, $p\text{-value}=0.001$). There is a statistically significant difference in 25(OH)D in the groups (normal, osteopenia, osteoporosis) (ANOVA, $F=4.899$, $DF=2, 17$; $p=0.0209$). It was found statistically significant difference of mean of 25(OH)D between osteoporosis (mean 48.06 ± 17.28) and normal (mean 96.35 ± 30.90) ($p=0.02$) groups. There is no correlation between level of Ca and T-score of hip (Spearman's rank correlation coefficient=0.292, $S=941.89$, $p\text{-value}=0.212$). There is significant strong positive correlation between BMI and T-score of hip (Pearson's correlation coefficient=0.746, $t=4.754$, $df=18$, $p\text{-value}<0.001$).**Conclusions:** Postmenopausal women with osteoporosis have a significantly lower level of vitamin D compared to patients with normal BMD. The vitamin D level and BMI correlates positively with T-score on the hip.

P911

SEVERE COMPLICATIONS OF A THERAPEUTICALLY NEGLECTED OSTEOPOROSIS: CASE REPORTS. Botezatu¹, N. Ciuca¹, O. Hincu¹, G. Mologhianu^{1,2}¹National Institute of Rehabilitation, Physical Medicine and Balneoclimatology, ²Carol Davila University of Medicine, Bucharest, Romania.

Objectives: Osteoporosis is a pathology with a multifactorial etiopathogenesis, characterized by an abnormal reduction of the bone mass, both of the mineral and osteoid components, as well as micro-architectural alterations of the bone, which fragile and makes the bones more exposed to the risk of fracture. Severe fractures are able to occur in osteoporosis and worldwide osteoporosis causes >8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds. Several factors are involved in its pathogenesis including heredity, elderly, race, ethnicity, hormones, physical inactivity, anorexia, sunlight exposure, vitamin D deficiency, smoking, certain drugs, alcoholism.

Methods: We present the case of a 73 years old woman with severe osteoporosis therapeutically neglected that finally led to paraplegia secondary to T11-T12 vertebrae pathological fracture. The patient's medical history includes bilateral total hip arthroplasty (2005 – Jan: right hip, May left hip), cemented total left knee arthroplasty (May 2015) followed by periprosthetic femur fracture (Aug 2015). The T11-T12 fracture was a compression vertebral fracture and was presented with Frankel B incomplete neurological injury and was treated surgically by vertebroplasty. For evaluating the patient we used FRAX and DXA bone density test. FRAX was introduced by the WHO to estimate the 10-year probability of osteoporotic fractures in untreated patients with osteopenia. The DXA measures BMD by capturing X-ray images of hip or lower spine, expressed by T-score.

Results and conclusion: The patient scored 18% risk for major osteoporotic fracture and 8.7% risk for hip fracture and a -3.4 T-score. The particularity of the case was that DXA was performed on forearm due to the bilaterally hip arthroplasty and the patient's severe locomotor impairment and self-care deficiency.

P912

THE FREQUENCY OF RECURRENT INFLAMMATORY PROCESSES IN JOINTS AS A CRITERION FOR THE EFFECTIVENESS OF REHABILITATION MEASURESA. V. Aleksandrov¹, N. V. Aleksandrova¹, I. A. Zborovskaya¹¹Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovsky, Volgograd, Russia

Objective: Osteoarthritis (OA) is the most common disease among all joint pathologies and in all age groups. Numerous studies have convincingly proved that various technologies of non-drug exposure have certain effectiveness in the medical rehabilitation of patients with OA. Our aim was to study the possibility of using the data on the incidence of relapses in the inflammatory process in OA patients to assess the duration of the effect of a three-component rehabilitation complex.

Methods: A total study group consisted of 83 patients with OA (67 women and 16 men aged 28 to 73 years). According to the randomization procedure, all OA patients were randomly divided into two groups, which are comparable in gender, age, duration, disease activity, and background therapy factor (main and control). Patients OA from the main group (n=50) for 3 weeks spent three-part program of rehabilitation procedures: kinesitherapy (morning hygienic gymnastics, dosed walking), hydrokinetic therapy (therapeutic swimming in the sea water pool for 20-40 min, at a water temperature of 26°C, a course of 18-20 daily procedures) and low-frequency magnetotherapy (0.3 to 100 Hz, up to 5 mT, duration of exposure 30 min, 10 procedures every other day). All clinical studies were conducted in compliance with the principle of voluntary informed consent, ethical standards and evidence-based medicine.

Results: After the end of treatment course relapses of the inflammatory process in the affected joints of different degrees were noted in all OA patients (according to the amnesic data in 10-12 months). In the first 3 months after the rehabilitation complex completed, relapses of the inflammatory process among the patients from the main group were noted in 5 patients (10%), and in 10 patients from the control group (30.3%), three of them repeatedly. In the period from 4 to 9 months relapses of the inflammatory process in the affected joints were noted in 21 patients from the control group (63.6%), and in 36 patients the main group (72%), the duration of remission was >6 months in the overwhelming number of them (28 patients). Evaluation of the results obtained in the more distant time allowed us to establish the duration of remission for >9 months in 9 (18%) patients from the main group, whereas in patients with OA from the control group only 2 (6.1%).

Conclusions: Evaluation of treatment results using a three-component rehabilitation complex in the main group of OA patients showed that in 10-12 months of prospective observation the number of recurrences of the inflammatory process in affected joints compared to the same period of time the previous year decreased 1.8-fold, the number of calls to a rheumatologist 1.65-fold.

P913

SPONTANEOUS RIB FRACTURES CERTIFIED BY NECROPSY AND ASSOCIATED PATHOLOGIESC. Rebeleanu¹, C. C. Radu², F. Cioara², D. Perju-Dumbravă¹¹Institute of Legal Medicine Cluj-Napoca, Cluj-Napoca, ²University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objectives: The spontaneous rib fractures occur through apparently healthy rib, without traumatic injury, frequently during a severe sneeze or cough episode. This type of fractures are sometimes found during medico-legal autopsies and must be differentiated from traumatic fractures. The study aims to analyse the correlation between the risk factors for pathological fractures and spontaneous rib fractures diagnosed by the necropsy findings.

Methods: Seven patients who have been diagnosed during the autopsy with recent spontaneous rib fractures between January 2012 and January 2015 have been studied. The spontaneous rib fracture diagnostics have been based on the lack of external traumatic mark and of haemorrhagic infiltrate of the nearby soft tissues. The cause of death and the associated diseases were analysed and stratified for age and sex.

Results: The age of the patients were between 42-75 years. Their average age were 60.29 years. Five patients (71.43%) were women. Only two (28.57%) of the patients presented more than one rib fractured. The cause of death was bronchopneumonia (28.57%), interstitial pneumonia (14.29%), cardiac insufficiency (42.86%) and metastatic pancreatic cancer (14.29%). Smoking history was revealed for five of the patients. Osteoporosis was diagnosed and medical documented at three of the patients; bones fragility was certified by autopsy at all the patients. The main associated diseases were diabetes (28.57%), rheumatoid arthritis (42.86%) and chronic renal insufficiency with haemodialysis (14.29%).

Conclusion: The spontaneous rib fracture diagnosed by necroptic finding could be correlated with respiratory pathology, with mature adult or elderly age, with chronic diseases that affects the bones resistance with smoker or ex-smoker status and with fragile status of bones, certified by the necropsy.

P914

OSTEONECROSIS OF THE JAW: A COMPLICATION OF ANTIRESORPTIVE TREATMENT IN A WOMAN WITH POSTMENOPAUSAL OSTEOPOROSISA. W. Wawrzyniak¹, J. D. Dytfeld¹¹Department of Family Medicine, Karol Marcinkowski University of Medical Science, Poznan, Poland

Objective: Osteonecrosis of the jaw (ONJ) is diagnosed when necrotic bone is exposed in the oral cavity for at least 8 weeks in patients with no history of head or neck radiotherapy. Current or previous exposure to bisphosphonates is also mandatory for diagnosis. We present a case of a woman in whom ONJ revealed after 10 years of therapy, including oral bisphosphonates, strontium ranelate and denosumab.

Methods: An 81-year-old woman reported dental problems on a routine visit in Osteoporosis Outpatient Clinic in June 2016. Osteoporosis was diagnosed at the age of 69. At the time of diagnosis with no prior fractures, smoking (40 pack years), no family history of fractures, coexisting dyslipidemia and nephrolithiasis. Hip T-score was -1.65 SD, L1-L4 -4.0 SD. She denied falls, was moving independently, and able to self-serve. Treatment with alendronate 70 mg 1x per week, vitamin D and calcium were introduced. After 5 years, alendronate was changed to risedronate, and later - as part of a clinical trial - to strontium ranelate (for 1 year). In 2012, the X-ray of the thoracic spine, performed due to back pain, revealed significant wedge distortion of the Th8, smaller in Th4 and Th5. She presented decrease in height (-11 cm). Due to the ineffectiveness of previous treatment, in 2013 she began therapy with denosumab.

Results: In 2015, the lower left molar was extracted, and dental events occurred repeatedly in this area. In mid-2016, the patient presented to emergency room because of mandibular pain. Physical examination showed purulent secretion in the area, antibiotic was given and the patient was referred to craniofacial CT. It showed the disruption of the cortical continuity with the widening of medullary cavity and randomly dissected bone fragments within. Moreover, obliteration of the trabecular bone structure and secondary inflammatory cortical reactions were described. Sequestrum removal and debridement were performed. Because of dental events anti-resorptive therapy was abandoned. Currently, patient is treated with vitamin D (4000j) and calcium carbonate. Calcium balance presents normal: Ca 9.85 mg/dl, osteocalcin 24 ng/ml, 25(OH)D 51 ng/ml, PTH 54.23 pg/ml. Inaccessibility of anabolic drugs in Poland currently makes it difficult to continue proper therapy.

Conclusions: Extraction of a tooth had probably a triggering effect, but scrupulous oral hygiene and non-smoking could reduce the risk of ONJ. Bisphosphonates/denosumab therapy should be carefully monitored in terms of possible dental events in all patients.

P915

EFFECTS OF AN EXERCISE TRAINING PROGRAM ON LEAN MASS IN OBESE PATIENTS UNDERGOING ROUX-EN-Y GASTRIC BYPASS

G. Boppre¹, F. Diniz-Sousa¹, H. Santos-Sousa², V. Devezas², J. Preto², L. Machado³, J. P. Vilas-Boas³, J. Oliveira¹, H. Fonseca⁴

¹Research Centre in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto, ²General Surgery Department, São João Medical Center, ³Centre of Research, Education, Innovation and Intervention in Sport (CIFID2), Faculty of Sport, University of Porto, ⁴Research Centre in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto, General Surgery Department, São João Medical Center, Porto, Portugal

Objective: To evaluate if an exercise training program prevents the loss of lean mass after gastric bypass (GB).

Methods: One month after GB, 18 women (45.7±9.4 years) with obesity grade III (BMI=41.2±3.8 kg/m²) were randomized into two groups: exercise (EG, n=7) or control group (CG, n=11). One month after surgery, EG participants received standard medical care and started an exercise training program (EX), consisting of 3 weekly sessions, each one with a duration of 70min, for 22 weeks. The EX was organized in multidirectional jumps, balance and strength exercises. On average the session attendance rate in EG was 82.3±6.3%. CG patients received only the standard medical care. Body weight (BW), whole body lean mass (WBLM), appendicular lean mass (ALM), upper limb lean mass (ULLM) and lower limb lean mass (LLLM) were assessed by DXA at

1 and 6 months after GB. The ANOVA for repeated measures (interaction group x time) was used for statistical analysis.

Results: From the 1st to the 6th month after surgery a significant decrease on BW (-20.66±3.69 kg; Δ=-20.7%, p<0.001), WBLM (-2.09±1.52 kg; Δ=-4.8%, p<0.001), ALM (-1.01±1.16 kg; Δ=-5.4%, p=0.007), ULLM (-0.34±0.35 kg; Δ=-7.7%, p=0.008), and LLLM (-0.67±1.00 kg; Δ=-4.6%, p=0.003) was observed in CG. Regarding the EG, from the 1st to the 6th month, it was also observed a significant decrease in BW (-20.39±7.17 kg; Δ=-20.6%, p<0.001), WBLM (-2.56±1.31 kg; Δ=-5.6%, p<0.001), ALM (-1.34±0.94 kg; Δ=-6.9%, p=0.005), and LLLM (-1.14±0.56 kg; Δ=-7.5%, p=0.021), but not on ULLM (-0.21±0.40 kg; Δ=-4.4%, p=0.163). The group x time interaction shows no significant differences between groups on BW (p=0.917), WBLM (p=0.514), ALM (p=0.530), ULLM (p=0.474), and LLLM (p=0.277).

Conclusions: Twenty-two weeks of supervised exercise training did not prevent losses on lean mass in patients undergoing to GB.

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P916

EFFECTIVENESS OF HOME BASED EXERCISE PROGRAM TAUGHT BY PHYSIOTHERAPIST ON PAIN AND FUNCTION IN KNEE OSTEOARTHRITIS

M. Yilmaz¹, M. Sahin¹, C. Algun¹

¹Istanbul Medipol University, Istanbul, Turkey

Objective: To search the effectiveness of home based exercise program taught by physiotherapist on pain and function in knee osteoarthritis.

Methods: The study was conducted on 80 volunteers with knee osteoarthritis, aged between 50-75. The patients, who met the inclusion criteria, were randomized into two groups. First group given home exercise brochure directly by orthopedist while second group given home exercise by taught by physiotherapist. The study was conducted with thirty nine patients in the group one and forty one patients in the group two. Both treatment groups did home exercise with 15 repetitions in 7 days a week for 8 weeks. Visual analog scale (VAS) was used to evaluate the pain status; Universal Goniometer was used to measure range of motion of knee joint (ROM); Myometer device was used to measure strength of Hamstring and Quadriceps muscles; WOMAC Index was used to evaluate severe of clinical signs and clinical condition; SF-36 was used to evaluate quality of life of patients. Statistical analysis of the data was performed using Statistical Package for the Social Sciences (SPSS) 16.0 program.

Results: Pre- and post-treatment evaluations were done. When the groups were compared in terms of pretreatment ROM, VAS, WOMAC, SF-36, strengths of hamstring, quadriceps muscles, no statistical significance was found between the two groups (p>0.05). A statistically significant improvement was found in the post-treatment ROM, VAS, WOMAC and SF-36 values in both groups (p<0.05). When the change values before and after the treatment were compared, it was statistically found that the evaluation results of the second group were better than the first group.

Conclusion: This study proved that home exercise program was effective patients with knee osteoarthritis. However, it is found that home exercises taught by physiotherapist were more useful for patients with knee osteoarthritis. When giving home exercise program, the role of physiotherapist has emerged.

P917

BMD CHANGES IN DIFFERENT SKELETAL SITES, FROM THE PRE-OPERATIVE PERIOD TO ONE-YEAR AFTER ROUX-EN-Y GASTRIC BYPASS

F. Diniz-Sousa¹, G. Boppre¹, H. Santos-Sousa², V. Devezas², J. Preto², L. Machado³, J. P. Vilas-Boas³, J. Oliveira¹, H. Fonseca⁴

¹Research Centre in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto, ²General Surgery Department, São João Medical Center, ³Centre of Research, Education, Innovation and Intervention in Sport (CIFID2), Faculty of Sport, University of Porto, ⁴Research Centre in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto, General Surgery Department, São João Medical Center, Porto, Portugal

Objective: Bariatric surgery has been associated with bone mass losses. The aim of this study was to examine the changes in BMD at different skeletal sites, from the pre-operative period to 12-month after Roux-en-Y gastric bypass (RYGB).

Methods: Twelve class II-III obese patients (45.0±7.8years, 45.2±4.4kg/m², 75% females) referred to RYGB, were assessed pre-surgery, 1, 6, and 12 months after surgery for BMD determination at the femoral neck (FN), total hip (TH), lumbar spine (LS) and one-third radius (1/3 radius) by DXA. The analysis of BMD changes and comparison of BMD rate of change among skeletal sites was performed by repeated-measures ANOVA.

Results: From the pre-surgery to 1-month and from pre-surgery to 6 months after RYGB, BMD did not change significantly at any skeletal site. From the pre-surgery to 12 months after RYGB, BMD decreased at the FN (-0.073±0.072 g/cm²; Δ=-7.9%, *p*<0.001), TH (-0.075±0.049 g/cm²; Δ=-7.1%, *p*<0.001) and LS (-0.043±0.051 g/cm²; Δ=-3.9%, *p*=0.037), but not at the 1/3 radius (-0.006±0.020 g/cm²; Δ=-0.9%, *p*=1.000). From the 6th to 12th month, BMD decreased at the FN (-0.046±0.036 g/cm²; Δ=-5.3%, *p*<0.001), TH (-0.048±0.032 g/cm²; Δ=-4.6%, *p*<0.001), LS (-0.031±0.029 g/cm²; Δ=-3.0%, *p*=0.006), but not in 1/3 radius (-0.019±0.023 g/cm²; Δ=-2.6%, *p*=0.226). From the pre-surgery to 12-months after RYGB, comparisons among different skeletal sites showed that BMD decreasing rate at the FN (-6.9%, *p*=0.014) and TH (-6.3%, *p*=0.029) was higher compared to changes at the 1/3 radius.

Conclusion: BMD did not change significantly during the first six months after RYGB. Decreases were only evident during of the second semester after surgery at the FN, TH and LS. At the end of the first year after RYGB, BMD at the 1/3 radius seems to be spared compared to the other skeleton regions analyzed.

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P918

GROWTH RATE OF HUMERUS IN RATS AFTER IMPLANTATION OF BIOGENIC HYDROXYAPATITE INTO TIBIA AND PER OS APPLICATION OF CALCIUM DRUGS

A. Koch'Yan¹, V. Luzin², L. Chistolina², I. Belik²

¹Rostov State Medical University, Rostov-on-Don, Russia, ²LPR SE "St. Luke State Medical University of Lugansk", Lugansk, Ukraine

Objective: To analyze growth and formation rates of humerus in rats after implantation of biogenic hydroxyapatite in tibia and *per os* application of calcium drug "Biomim MK" in dosage of 90 mg per kg of body weight.

Methods: The study involved 210 male rats with initial body weight of 135-145 g. The 1st group comprised intact animals, the 2nd group comprised animals with 2.2 mm defect in the tibia between proximal metaphysis and diaphysis, and the 3rd group comprised the animals with the same 2.2 mm defects filled with biogenic hydroxyapatite implants OK-015. In the 4th group, the animals with empty defects received second generation calcium drug "Biomim MK" in dosage of 90 mg/kg of body weight, and in the 5th group, the animals with OK-015 fillings received "Biomim MK" in the same dosage. The animals were withdrawn from the experiment by the 7th, the 15th, the 30th, the 60th, the 90th, and the 180th days. The humeri were measured according to conventional method; the data were analyzed by means of variation statistics using standard software.

Results: A plain defect in tibia resulted in slowing of humerus growth; the alterations started manifesting from the 7st day of observation and

persisted throughout the whole experiment. In the 3rd group, alterations in comparison with the 2nd group continued manifesting up to the 60th day.

Application of calcium drug "Biomim MK" to the animals with both empty and OK-filled defects substantially reduces fracture effects in about 30 days. In the 4th group midshaft width of the bone increased as compared to the 2nd group values from the 30th to the 90th days by 4.56%, 3.86% and 4.50% and shaft thickness from the 60th to the 90th days – by 4.55% and 4.43% (here and below *p*<0.05 in all cases). In the 5th group, mid-shaft width increased as compared to the 3rd group values from the 30th to 60th days by 5.00% and 6.25%, length of humerus by the 30th day by 4.05% and thickness of shaft by the 60th day by 6.12%.

Conclusions: Administration of calcium drug "Biomim MK" under conditions of tibia fracture significantly reduces adverse fracture effects on growth rate of humerus.

P919

COMPLEX CORRECTION OF STRUCTURAL AND FUNCTIONAL CHANGES IN THE MUSCULOSKELETAL SYSTEM USING KINESITHERAPY

O. Ignatyev¹, M. Turchin¹, T. Yermolenko¹

¹Odessa National Medical University, Odessa, Ukraine

Objective: Increasing the effectiveness of therapy osteoporosis and osteopenia through the use of kinesitherapy in combination with osteotropon drugs.

Methods: There were presented the results of studies of the functional state of the musculoskeletal system obtained by the method of ultrasonic osteodensitometry, complex recording and processing of biosignals "Insight TM" and biochemical markers of bone metabolism in 250 patients with osteoporosis and osteopenia after of treatment (kinesitherapy and standard medical treatment).

Results: The dependence of the clinical manifestations and disorders of the musculoskeletal system, depending on the degree of loss of BMD was determined. There were proved changes of algometry, inclinometry, surface electromyography, thermography, analysis of cardiac activity parameters, depending on the changes in the indices of ultrasonic densitometry, which gives a possibility to create regression models of time lines to estimate the index of neuro-spinal function (NSF Index) with the least number of factors obtained without the use of complex recording and processing biosignals "Insight TM". This allows to evaluate the musculoskeletal system and predict the dynamics of treatment in patients with osteoporosis and osteopenia. It is scientifically proven that the administration of kinesitherapy together with a standard medical treatment provides the greatest positive impact on the clinical condition of the patients and the processes of bone remodelling.

Conclusions: Application of complex kinesitherapy and a standard medical treatment is recommended for patients with low BMD.

P920

VITAMIN D AND BIOCHEMICAL MARKERS OF BONE REMODELING IN ARTERIAL HYPERTENSION AND OBESITY WOMEN WORKING AT UNFAVORABLE INDUSTRIAL

O. Ignatyev¹, T. Prutian¹, O. Dobrovolskaya¹

¹Odessa National Medical University, Odessa, Ukraine

Objective: Modern data point out at common pathogenical mechanisms of arterial hypertension (AH), obesity and osteoporosis development with vitamin D deficiency leading position (Lucas RM, Ponsonby AL, 2013). Factors of industrial environment are triggers in vitamin D deficiency (Ignatiev AM, 2016). The aim was to investigate the interrelation between vitamin D level and bone remodeling markers in AH and obesity women working at unfavorable industrial conditions.

Methods: 60 women (mean age 53.1 ± 1.5) with obesity and AH working at unfavorable industrial conditions have been examined. Length of work is 21.7 ± 2.06 . Clinical examination included collection of complaints, medical history, arterial blood pressure, height and body mass measurement, calculation of BMI; laboratory examination included determination of C-terminal telopeptide (CTx), osteocalcinine (OK), osteoprotegerin (OPG), 25-hydroxyvitamin D (25(OH)D)).

Results: Analysis of vitamin D level highlighted its deficiency in 84.4% of the women under examination, and its insufficient level in 13.3% of women and only 3.3% of the persons its level corresponded optimal indexes. Correlational analysis showed that 25(OH)D level has a direct negative tie between CTx ($r = -0.61$; $p < 0.01$) level, level of OK ($r = -0.55$; $p < 0.01$) and positive correlation between level of OPG ($r = 0.78$; $p < 0.01$). There was positive correlation between BMI and level of CTx ($r = 0.54$; $p < 0.01$), BMI and level of OK ($r = 0.38$; $p < 0.01$). There was negative correlation between BMI and level of OPG ($r = -0.54$; $p < 0.01$), BMI and 25(OH)D ($r = -0.71$; $p < 0.01$). Thus, in AH and obesity women working at unfavorable industrial conditions vitamin D deficiency and its insufficient level is met at 97.7% of cases. Vitamin D level associates with the indexes of biochemical markers of bone remodeling and BMI. The data obtained prove the necessity of timely diagnosis and correction of vitamin D deficiency, decreased density of bone tissue and obesity therapy.

Conclusions: In AH and obesity women working at unfavorable working conditions vitamin D level is associated with the indexes of biochemical markers of bone remodeling and BMI. 25(OH)D has a direct positive correlation with OPG ($p < 0.01$) level and negative correlation with CTx ($p < 0.01$), OK ($p < 0.01$) and BMI ($p < 0.01$).

P921

RISK FACTORS PREDICTING DIFFICULTIES WITH DISCHARGE TO OWN HOME IN PATIENTS WITH FRAGILITY HIP FRACTURES

F. Aguiar¹, M. Guerra², S. Ganhão¹, D. Rosa-Gonçalves³, S. Machado¹, R. Vieira², I. Brito¹, R. Matos¹

¹Centro Hospitalar São João, Porto, ²Centro Hospitalar Gaia/Espinho, Gaia,

³Centro Hospitalar de Trás-os-Montes e Alto Douro, Vila Real, Portugal

Objective: To investigate possible predictive factors of difficulties with discharge to home in patients with fragility proximal femur fracture.

Methods: Retrospective study including patients with low trauma proximal femur fracture admitted in our hospital from March 2015 to March 2017 who were living at home before the injury. Patients were divided into those who were discharged to home (home discharge group) and those who were discharged to rehabilitation or short/medium-term care facilities or died in hospital (non-home discharge group). Charlson comorbidity index (CCI), which accounts for most major medical comorbidities, was calculated for each patient. Multivariate analysis was conducted to determine predictive factors of non-home discharge.

Results: 470 patients were included, 373 (79.4%) females. Median age at injury was 84.0 years [range 65–104]. The most frequent fracture type was femoral neck fracture (42.3%), followed by transtrochanteric fracture (37.5%). There were 315 patients (67.0%) in the home discharge group and 155 patients (33.0%) in the non-home discharge group. In the univariate analysis, the factors significantly associated with non-home discharge were male gender (27.1% vs. 17.4%, $p = 0.009$), higher CCI score (5.73 ± 1.86 vs. 5.16 ± 1.65 , $p = 0.001$), higher length of hospital stay (36.5 ± 27.0 vs. 11.4 ± 13.5 days, $p < 0.0001$) and longer time to intervention (3.8 ± 5.5 vs. 2.7 ± 3.3 days, $p = 0.047$). Multivariate analysis showed that higher CCI score (Odds ratio (OR)=1.19, $p = 0.01$) and higher length of hospital stay (OR=1.087, $p < 0.001$) were independent predictors of not achieving the goal of discharge to home.

Conclusions: In this study, the risk factors that could predict difficulties with discharge to home included length of hospital stay and higher CCI score. However more studies, with larger sample sizes and prospective design, should be undertaken to better assess this subject.

P922

EXERCISE CAN PREVENT THE LOSS OF BMD ON LUMBAR SPINE IN OBESE PATIENTS 6 MONTHS AFTER ROUX-EN-Y GASTRIC BYPASS

F. Diniz-Sousa¹, G. Bopp¹, H. Santos-Sousa², V. Devezas², J. Preto², L. Machado³, J. P. Vilas-Boas³, J. Oliveira¹, H. Fonseca⁴

¹Research Centre in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto, ²General Surgery Department, São João Medical Center, ³Centre of Research, Education, Innovation and Intervention in Sport (CIFID2), Faculty of Sport, University of Porto, ⁴Research Centre in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto, General Surgery Department, São João Medical Center, Porto, Portugal

Objective: Bariatric surgery leads to significant bone mass losses. Our aim was to determine if an exercise training program prevents the loss of bone mass in obese women, after a gastric bypass (GB).

Methods: One month after GB, 18 obese women were randomized to either an exercise group (EX, $n = 7$) or to a control group (CG, $n = 11$). EX patients underwent a supervised multicomponent exercise training program (3x/week; 70 min/session) that included multidirectional jumps, balance and strength exercises for 5 months (all participants attended more than two thirds of the sessions). CG patients received only standard medical care. BMD, assessed by DXA, was evaluated in both groups 1 and 6 months after surgery at the femoral neck (FN), total hip (TH), lumbar spine (LS) and one-third radius (1/3 radius). To determine the effect of exercise training on BMD (interaction group $\times$ time), a repeated-measures ANOVA was used.

Results: At baseline, there were no differences between groups regarding age (CG: 48.2 ± 7.7 years vs. EX: 41.9 ± 11.1 years; $p = 0.172$) or BMI (CG: 41.7 ± 4.2 kg/m² vs. EX: 40.4 ± 3.3 kg/m²; $p = 0.496$). Comparison of BMD at 1 and 6 months after surgery has showed that the CG group had a significant decrease in FN (-0.023 ± 0.049 g/cm²; $\Delta = -2.3\%$, $p = 0.047$), TH (-0.036 ± 0.041 g/cm²; $\Delta = -3.5\%$, $p = 0.005$) and LS (-0.029 ± 0.012 g/cm²; $\Delta = -2.7\%$, $p < 0.001$), while the EX had a significant decrease only in TH (-0.030 ± 0.021 g/cm²; $\Delta = -3.3\%$, $p = 0.038$). In the EX group no significant changes were observed in FN (-0.014 ± 0.016 g/cm²; $\Delta = -1.8\%$, $p = 0.297$) and LS (-0.010 ± 0.015 g/cm²; $\Delta = -1.1\%$, $p = 0.076$). In both groups, BMD at 1/3 radius did not changed significantly from the 1st to the 6th month after GB. Furthermore, the results showed that only the decrease in LS BMD was significantly higher in the CG compared to EX ($p = 0.010$).

Conclusion: A five-month supervised exercise training program prevented the decrease in LS BMD in women who underwent GB.

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P923

FACTORS CONTRIBUTING TO ANAEMIA IN HIP FRACTURE PATIENTS DURING THE POSTOPERATIVE PHASE: A RETROSPECTIVE STUDY

S. Naraen¹, D. Burke¹, I. Pemble¹, S. Middleton¹, O. Ward¹, A. Temperton¹, S. Baird¹, R. Torrance¹, A. Maddison¹, G. Austin¹, H. Davis¹, M. Sameul¹, M. Brezezinska¹, S. Shamim¹, L. Isaac¹, J. Attwood¹, S. Lee¹, A. Khare¹

¹Aintree University Hospital, Liverpool, UK

Objective: Anaemia following hip fracture is common. On admission 30–45% patients are anaemic. The cause of anaemia in older patients with hip fracture is multifactorial. 20% of women between 80–85 years have anaemia of chronic disease. These patients represent the majority of the hip fracture population. Combined with intraoperative blood loss, it could result in further anaemia. We investigated the factors contributing to post-surgical anaemia. This study looked into the preoperative medication, comorbidities and postoperative complications at a teaching hospital over one year to.

Method: Data were collected for patients with a fractured neck of femur (NOF) followed by surgical correction between 1 January 2016 and 1 January 2017. 328 patients were studied. Preoperative and postoperative factors which could influence the fall in haemoglobin level were studied.

Results: 229 patients admitted with NOF were female and 144 of these were aged between 81–90 years. The majority of surgeries were done within 48 h. Preoperative anaemia was found in 45% (n=149). 3% (n=9) required preoperative transfusion and 9% (n=21) were on nutritional supplements. Preoperative haematinics were done in 2% (n=5). 95% (n=314) developed postoperative anaemia and 38% (n=126) had a haemoglobin between 70–90 mg/L. Of the 90 patients who were on anti-platelet therapy, 56 (62%) went to develop postoperative anaemia. Of the 48 patient that were on anticoagulants, 18 (33%) went on to develop postoperative anaemia. Volume loss intraoperatively was recorded in 3% (n=9). 39 of 328 (12%) patients had a haemoglobin between 50–60 mg/L, that was the lowest range recorded in the sample. Of the 149 patients with preoperative anaemia, 46% required postoperative blood transfusion. Of the 328 patients, 96 (29%) were given a blood transfusion postoperatively. 31% (n=101) had postoperative infection and of these, 46% (n=46) had postoperative anaemia.

Conclusion: Postoperative anaemia was found in 95% of sample. 29% required a blood transfusion. Preoperative anaemia played a large role in the need of a postoperative blood transfusion. Intraoperative blood loss, medication and postoperative complications also contributed to postoperative anaemia.

P924

THE LONG-TERM RESULTS OF ASSESSMENT OF LOW-FREQUENCY MAGNETOTHERAPY METHOD FOR MEDICAL REHABILITATION OF PATIENTS WITH OSTEOARTHRITIS

N. V. Aleksandrova¹, A. V. Aleksandrov¹

¹Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy, Volgograd, Russia

Objective: The search for new effective and safe methods of medical rehabilitation of patients with osteoarthritis (OA), capable of controlling the course of the multifactorial pathological process, is still an urgent problem and it is aimed at prolonging the period of remission, reducing the frequency of relapses, and reducing the dosage of maintenance medication. Purpose of the study is to estimate the long-term results of using the low-frequency magnetotherapy (LFM) method in the treatment of patients with osteoarthritis.

Methods: 83 patients with OA (16 men and 67 women aged from 28–73 years) were examined. The studies were conducted in compliance with the principle of voluntary informed consent. According to the randomization procedure, OA patients were randomly divided into two groups that are comparable in gender, age, duration, activity, and background therapy: the main group (n=50) and the comparison group (n=33). Patients from the main group received standard therapy and 10 daily sessions of LFM (frequency from 0.3–100 Hz, no >5 mT, duration of exposure 30 min) to the area of the affected joints (knee or hip). Patients OA from the control group received similar standard therapy, as well as 10 single sessions of LFM, but without the device – a placebo group. To assess the efficacy of the treatment, the Lequesne index, visual analogue scale pain (VAS), and the frequency of nonsteroidal anti-inflammatory drugs (NSAIDs) were studied.

Results: Before the onset of the treatment, the study groups of OA patients did not differ statistically significantly in the Lequesne index and VAS scores (p>0.05). In the course of treatment, a significant reduction in pain according to the VAS was observed both in the main (p=0.032) and in the control group (p=0.041), and the Lequesne index only in the main group (p<0.001). In the main group, the analgesic effect at the end of the treatment was more pronounced than in the control group (p=0.009), but when tracking the long-term results of treatment after 10–12 months the

differences between the two groups were unreliable (p>0.05); the decrease in the Lequesne index was also significantly more frequent in the main group than in the control group (58.7% and 30.2%, respectively). All patients with OA used NSAIDs (frequency of reception 100%). After the sanatorium-and-spa treatment, the frequency of NSAID use in the study groups did not differ significantly (in the main group – 76%, in the control group – 82%). At the end of the follow-up period (10–12 months), most patients in the main group (46%) were able to significantly reduce the incidence of NSAIDs, and 10% completely abandoned them. Patients of the control group not only failed to refuse to take NSAIDs (51.5% without changes, 27.3% – increase in dose), 5 of them (15.2%) were forced to increase the dose of the drug. Thus, LFM not only perfectly combines with the use of medications, but often enhances their action, allows you to reduce the dose of medications, reduces the possibility of side effects emergence.

Conclusions: The use of LFM corresponds to the conditions of purposeful rehabilitation of patients with OA and allows to improve the long-term results of therapy of patients of this type.

P925

INVESTIGATION OF THE EFFICACY HIGH INTENSITY LASER THERAPY IN LOW BACK PAIN DUE TO LUMBAR DISC HERNIATION

D. Kutlu¹, C. Algun¹, D. Tarakci¹

¹Istanbul Medipol University, Istanbul, Turkey

Objective: To investigate the efficacy of high-intensity laser therapy (HILT) instead of transcutaneous electrical nerve stimulation (TENS) in lumbar disc herniated low back pain (LBP).

Methods: Forty patients aged between 18–60 were included. (19 female, 21 male) The patients were randomized into two groups. The severity of pain was measured by visual analog scale (VAS), and the range of motion (ROM) of the joint was measured by goniometer. The Oswestry disability questionnaire (ODQ) was used to assess the effect of low back pain on daily living activities, and the Beck depression inventory (BDI) was used to assess depression. All patients were taken into physical therapy program for 5 days in a week for a total of 20 sessions. Patients in the traditional treatment group received ultrasound, hot pack, and TENS; while the patients in the HILT group received ultrasound, hot pack, and HILT. Both groups were given home exercises. Statistical Package for Social Sciences (SPSS) Version 20.0 (SPSS Inc. Chicago, IL, USA) statistical program was used to analyze the data of the study.

Results: Pre- and post-treatment evaluations were done. There was statistically significant difference in VAS values after treatment in both groups (p<0.05). There was statistically significant difference in ODQ scores after treatment in both groups (p<0.05). There was statistically significant difference between both groups after treatment in flexion, extension, right/left lateral flexion scores (p<0.05). Significant results were obtained in Group II after treatment with BDI scores (p<0.05). There was no significant difference in Group I (p> 0.05). In the comparison of post-treatment improvements, among all parameters only VAS score had a significant difference in favor of HILT group (p=0.031).

Conclusions: HILT application in patients with low back pain due to lumbar disc hernia achieved significant improvement in pain, daily living activities, range of motion. It was determined that HILT is more effective than TENS in terms of pain reduction and HILT can be used as an alternative to TENS.

P926

HIP FRACTURE: AND NOW WHAT?

V. Brás da Silva¹, M. Silva¹, J. Rodrigues¹, S. Boaventura¹, A. C. Miguéns¹, P. Soares Branco¹

¹Physical and Rehabilitation Medicine Department, Central Lisboa Hospital Centre, Lisbon, Portugal

Objective: Characterize a group of women with recent hip fracture regarding osteoporosis therapy status, fall risk factors, number of previous falls, and fractures.

Methods: A cross-sectional study was performed in a group of women with recent hip fracture during their stay at an orthopaedics ward. It was conducted for one year by applying a questionnaire and consulting the clinical records of women aged 65 or over, with no language barriers, consciousness impairment, or cognitive deficit.

Results: 192 women were evaluated, 69 of which had cognitive deficits. 95% of the respondents met FRAX criteria for treatment before the current fracture but only 5.26% were correctly medicated (treatment gap 94.74%). The overall prevalence of previous osteoporotic fracture was 42%. Of these, only 7.14% were medicated. A relation between the number of previous falls and fragility fractures, and fall prevention measures and the occurrence of falls was found. No clear relationship between pharmacological and non-pharmacological treatment of osteoporosis and the number of fractures was shown. Yet, there was a strong association between some nonpharmacological measures for osteoporosis treatment and the number of falls (e.g., calcium intake, alcohol, tobacco, and caffeine consumption).

Conclusion: Our results support the current knowledge on the relation between fall prevention, fall occurrence, and osteoporotic fractures. The possible association between some nonpharmacological measures for osteoporosis and falls should be confirmed in future research. Current data indicate a treatment gap of 37% for Portugal but we found a 94.74% treatment gap in our group which could be related to a population selection bias. Despite this, osteoporosis is still probably insufficiently recognised and treated by the Portuguese medical community as far as primary and secondary fracture prevention are concerned.

P927

INTRAOPERATIVE USE OF SELF-ADHERENT WRAPS IN DEEP VEIN THROMBOSIS PROPHYLAXIS AT TOTAL HIP ARTHROPLASTY

S. Toshie¹, K. Takao²

¹Department of Orthopedic Surgery, Tokyo Metropolitan Health and Medical Treatment Corporation Ohkubo Hospital, Tokyo, ²Department of Orthopedic Surgery, JCHO Saitama Medical Center, Saitama, Japan

Objectives: Deep vein thrombosis (DVT) is one of severe complications after total hip arthroplasty (THA) and many methods are reported in preventing DVT. We use sterile self-adherent wraps as intraoperative lower limb bandage. Our aim was to evaluate the clinical efficacy of self-adherent wraps in the operating room, we reviewed 239 patients who underwent primary THA in our institute from May 2009 to August 2013. There were 25 men and 214 women with a mean age at surgery of 65.1 (32 to 85). The original disease is 199 osteoarthritis, 20 osteonecrosis, 12 rheumatoid arthritis, 6 rapidly destructive hip coxarthropathy and 2 femoral neck fracture.

Methods: Intraoperative intermittent pneumatic compression is one of methods in preventing DVT in our institute. From May 2011, we add self-adherent wraps in the operating room for venous insufficiency. Patients were divided into two groups: A group is patients who were performed THA without self-adherent wraps and B group is patients who were performed THA with self-adherent wraps. We took their blood test in the next day after operation (1POD) and check soluble fibrin monomer complex (SFMC). Patients (SFMC >35 µg/ml) were suspected to affect DVT and were treated with fondaparinux or enoxaparin.

Results: Patients (SFMC >35 µg/ml) are 32/117 (27.3%) in A group and 12/122 (9.8%) in B group. There was no symptomatic DVT.

Conclusions: Echo, computed tomography, and venography are screening tests for DVT after operation but these methods are difficult and expensive. Because of simplicity, SFMC in 1POD is our screening tests and a cutoff value of 35 µg/ml with sensitivity of 80% and specificity of 85.7%. From this result, 27.3% in A group were suspected to affected

DVT and 9.8% in B group were suspected to affected DVT. The prevalence of DVT was less after intraoperative use of self-adherent wraps. Intraoperative use of self-adheres is simple and has significant benefit in preventing DVT.

P928

THE ROLE OF BIPHOSPHONATES IN THE TREATMENT OF AVASCULAR NECROSIS IN PATIENTS WITH DREPANOCYTOSIS (SICKLE CELL ANEMIA)

E. Rapushi^{1,2}, T. Backa¹, A. Zoto³, V. Salko¹, L. Nuhaj¹, I. Harizi⁴, E. Zicishti¹, I. Xhemali⁵, F. Shira⁵

¹UHC "Mother Theresa", ²Hygeia Hospital, ³UHC "Mother Theresa", ⁴Harrison Medical Center, ⁵German Policlinic, Tirana, Albania

Objective: Sickle cell anemia is a hereditary blood disorder, characterized by a genetic mutation in the gene that codes for hemoglobin. The involvement of the bone in this pathology varies from acute manifestation as: painful vaso-occlusive crisis or osteomyelitis, to chronic and disabling disease as: osteonecrosis, osteoporosis, osteopenia, growth inhibition and chronic infections. Main mechanism of bone involvement are: bone and bone marrow infarction, bone marrow compensatory hyperplasia, secondary osteomyelitis and secondary growth defect. Avascular necrosis (AVN) is a situation resulting from death of bone tissue due to lack of blood supply. AVN mostly occur in femoral head and less in humeral neck, in proximal part of tibia, etc. Sickle cell anemia with its vaso-occlusive crisis represent all opportunities to develop AVN. The efficacy of bisphosphonates in the treatment of AVN in sickle cell anemia patients.

Method: In this study were included 54 sickle cell anemia patients diagnosed with AVN with mean age 28.5±3.2 y.o. All patients undergo CT after 6 and 12 month, also was measured seric level of CRP (<5.0 UI/ml) and IL-6 (<5.0 pg/ml). They were all established under treatment with Alendronic acid 35 mg twice in week and vitamin D3 800UI/d.

Results: From 54 patients included in this study, 36 present AVN of caput femoris, 14 AVN of caput humeri and 4 patients AVN of proximal part of tibia. The CT data showed that patients were mainly in I and II stage of AVN and only 9 patients were in the III stage of AVN. 5 patients were excluded from the study because they did not tolerate the drug (allergic reaction or gastric intolerance). Seric level of CRP and IL-6 resulted high in the beginning of the study, respectively 11±2.3 UI/ml and 13.3±3.2 pg/ml, and later the seric level decrease. After 6 months 8.3±2.4 UI/ml and 9.0 ±1.1 pg/ml and after 12 months 5.03±0.8 UI/ml dhe 4.4±1.3pg/ml. All 49 remaining patients presented decrease of the episodes of vaso-occlusive crisis and also a significant reduction of the pain and improvement of daily activities (P<0.001). The CT data showed improvement of bone structure with sclerosis and incentive of bone formation after 6 months and stabilization of this structure after 12 months. More stabilization presented patients which in the first CT represented stage I-II of AVN. Notable improvement presented the patients with lower level of CPR and IL-6.

Conclusion: Bisphosphonates through stimulation of bone formation affect in increasing bone density in patients with sickle cell anemia leading to improvement of bone structure and pain reduction. They present and alternative in treatment of AVN in patients with sickle cell anemia.

P929

JOINT PAIN IN RHEUMATOLOGY PATIENTS: THE ROLE OF ANXIETY-DEPRESSIVE DISORDERS

O. Sirenko¹, O. Kutayata¹, T. Lysunets², N. Grechanik², N. Tarnavska²

¹SE Dnipropetrovsk Medical Academy, ²Dnipropetrovsk Regional Clinical Hospital, Dnipro, Ukraine

Objective: To determine the clinical course of chronic pain syndrome in rheumatoid arthritis in combination with secondary osteoarthritis and the effectiveness of pain control depending on the correction of anxiety-depressive disorders in these patients.

Methods: We examined 99 patients with rheumatoid arthritis in combination with secondary osteoarthritis (median age 53.7 [44.8, 61.3] years). All patients underwent general clinical examination, assessment of pain intensity in VAS at rest and under physical exertion, general and biochemical examination of blood with determination of ESR, rheumatoid factor, C-reactive protein; X-ray of the joints with the determination of the X-ray stage of the disease, assessment of the level of anxiety and depressive state using the PHQ questionnaire, the Hamilton HARS-14 scale at the beginning of the observation and the dynamics of treatment. When symptoms of anxiety, depressive disorders and patient consent were detected, treatment was received aimed at correcting the psychosomatic status.

Results: Depressive disorders were detected in 85 (85.9%) patients in the main group and in 22 (59.5%) patients in the comparison group ($p < 0.05$). Among the patients of the main group, persons with a moderate-severe degree of depression predominated, significantly higher by 22.1% than in the comparison group ($p < 0.05$). The dynamics of pain intensity decrease on the VAS scale at rest and under physical exertion is more pronounced among patients receiving additional treatment aimed at correcting the psycho-emotional state. A more significant reduction in VAS was noted among patients with correlated anxiety-depressive disorders.

Conclusion: In patients with rheumatoid arthritis in combination with secondary osteoarthritis, the severity of the pain syndrome does not fully correspond to the degree of organic changes in the musculoskeletal system. In conditions of correction of depression on standard scales $>50\%$, the most pronounced dynamics of pain syndrome improvement was established against the background of treatment in this category of patients.

P930

COMMON SYSTEMIC POSTOPERATIVE COMPLICATIONS IN PATIENTS WITH A FRAGILITY HIP FRACTURE: CLOSING THE LOOP

A. Bitzidis¹, N. Samaras¹, M. Kyrou¹, A. Koundoudis¹

¹Orthopaedic Department, Mpodosakeio General Hospital Ptolemaida, Ptolemaida, Greece

Objective: In a previous study, we evaluated the most common systemic postoperative complications in patients with a fragility hip fracture. According to our results urine tract infection (UTI) was the commonest, increasing the mean hospitalisation time in comparison with the no complications group. Several measures were proposed by the researchers. Given these, 2 years later we want to close the loop and check if the proposed measures had an impact on the UTI's prevalence and the mean in hospital stay time.

Methods: We reviewed the medical notes of 192 consecutive patients admitted in our Hospital in Northern Greece between January 2016 and December 2017 with a fragility hip fracture treated operatively regarding the UTI's prevalence.

Results: All the 192 patients were treated by the same team of surgeons and received the same therapeutic peri-operative protocol. 54 patients with a mean age of 78.4 years developed at least one postoperative systemic complication. This group of patients had a mean hospitalisation time of 18.2 days. A total of 31 patients developed a UTI with a mean in hospital stay of 14.6 days (9-22).

Conclusion: This study indicates that UTI is still the commonest postoperative systemic complication in patients with a fragility hip fracture in our department. The measures proposed previously have improved slightly the prevalence of the UTI (57.4 from 61.7%) and new policies have to be applied in order to improve its incidence and the mean in hospital stay time for this group of patients.

P931

EFFECTIVENESS OF KINESIOLOGY TAPE ON NONSPECIFIC CHRONIC LOW BACK PAIN

B. Jesenšek Papež¹, V. Bojnec¹, D. Lonžarič¹

¹Institute for Physical and Rehabilitation Medicine, University Clinical Centre Maribor, Maribor, Slovenia

Objective: To evaluate the effect of kinesiology tape (KT) on nonspecific chronic low back pain in patients, enrolled in the physical therapy programme of hydrokinesiotherapy.

Methods: 123 patients with non-specific chronic low back pain were enrolled in the study. The exclusion criteria were operative treatment of the lumbar spine in the past, acute low back pain and neurologic deficits. The patients were randomized into two groups, 86 patients in the first group were treated with hydrokinesiotherapy only (T0 group), and 37 patients in the second group were treated with combination of hydrokinesiotherapy and KT (T1 group). The patients in both groups were performing exercise for low back pain in the therapeutic pool under the guidance of the physical therapist (10x, 5 visits per week). KT was applied to the patients in T1 group 3x during the hydrokinesiotherapy programme: before the therapy, at the end of the first week of the therapy and at the end of the programme. The KT was always applied for a total of three days and it has not been used during the hydrokinesiotherapy programme. The standard 5 centimeter wide KT was used. Pain intensity was assessed with visual analogue scale at baseline (VAS 1) and after two-weeks of intervention (VAS 2). Student t-test and Pearson correlation coefficient were used for the correlation between the groups. To compare VAS scores before and after the intervention analysis of variance (ANOVA) for repeated measures was used. The results were statistically significant with $p < 0.05$.

Results: There were no statistically significant differences between groups regarding gender ($p = 0.568$) and age ($p = 0.631$). Mean VAS 1 score in T0 group was 4.9 ± 1.6 (range 3-7) and 4.8 ± 1.8 (range 3-8) in T1 group. Mean VAS 2 score in T0 was 2.7 ± 1.6 (range 0-4) and 2.6 ± 1.7 (range 0-5) in T1 group. The analysis of variance has showed that VAS 2 scores in both groups were statistically significantly lower ($p < 0.001$) while the difference of change of VAS scores between the groups was not statistically significant ($p = 0.05$).

Conclusion: We were not able to prove a positive effect of KT on non-specific chronic low back pain in patients, enrolled in the programme of hydrokinesiotherapy.

P932

DENOSUMAB FOR PREVENTION OF FRACTURES IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

S. T. J. Tofilovska¹, T. B. P. Bajraktarova Prosheva², S. J. Jordanova³

¹Clical Internal Hospital Shtip, ²Clinical Internal Hospital, ³Clinical Internal Hospital, Shtip, Macedonia

Objective: Denosumab is a fully human monoclonal antibody of the nuclear factor- κ B ligand (RANKL) receptor activator that blocks its binding to RANK, inhibits the development and activity of osteoclasts, reduces bone resorption, and increases bone density. Given its unique effects, denosumab may be useful in the treatment of osteoporosis

Methods: For 3 years, 12 women aged 51-60 years were observed who had mineral bone density T-score of -2.5 to -4.0. Patients were assigned to receive 60 mg denosumab subcutaneously every 6 months for 36 months. The primary endpoint was to monitor each year the BMD in patients and the secondary endpoint was monitoring the risk of vertebral fracture and fractures of nonvertebral and hip.

Results: After the first year of treatment with denosumab in 12 patients, in 5 patients there was an increase in BMD T-score from -2.0 to -3.0 in the

lumbar spine or total hip, while in the remaining 7 women the mineral density of the mineral bones remained the same level. After 3 years of treatment, all 12 patients improved T-score of -1.2 to -2.4, thereby reducing the risk of a new vertebral fracture and the risk of hip fracture. There was no increase in the risk of cancer, infection, cardiovascular disease, delayed treatment of fractures or hypocalcaemia, and there were no cases of osteonecrosis of the jaw and adverse reactions to the injection of denosumab.

Conclusions: Denosumab, subcutaneously twice a year, 36 months, was associated with an increase in BMD and at the same time reducing the risk of fractures of vertebral, nonvertebral and hip in women with osteoporosis.

P933

PRIMARY IMMUNODEFICIENCY: AN EMERGING RISK FACTOR FOR OSTEOPOROSIS

R. Sullivan¹, O. J. Hannigan¹, V. Sahni¹, C. Greene¹, M. Rafferty¹, N. Fallon¹, A. Sloane¹, K. Mccarroll¹, M. C. Casey¹, B. Mccarthy¹, J. B. Walsh¹, R. Lannon¹, N. Conlon¹

¹St James's Hospital, Dublin, Ireland

Objective: Primary Immunodeficiency (PID) is an umbrella term for inherited immunological disorders leading to impaired antibody production. Its incidence is estimated at 1/2000 live births, and >300 distinct disorders have been identified, such as common variable immunodeficiency (CVID) and X-linked agammaglobulinemia (XLA). It may manifest as failure to thrive in children, diarrhoea and malabsorption and recurrent severe respiratory tract infections leading to bronchiectasis. It is also associated with autoimmune conditions. These conditions are all risk factors that contribute to decreased BMD. Osteoporosis is an emergent health problem in patients with CVID1, a type of PID. This review aimed to investigate the incidence of osteoporosis amongst the cohort of patients with PID in a tertiary referral centre.

Method: A retrospective chart review was carried out on the 80 patients attending a specialist PID clinic. BMD as measured by T-score on DXA scan were obtained, and the number of patients with a diagnosis of osteoporosis/osteopenia identified.

Results: 78 patients with a diagnosis of Primary Immunodeficiency were identified. 14 of these patients had a DXA scan. 5 demonstrated osteoporosis; 1 male, 4 female, average T-score hip -2.8, spine -2.75 average age of 61years. 8 were Osteopaenic; 2 female, 6 males, average T-Score hip -1.34, spine -1.4, average age 53years. Only 1 patient had normal BMD.

Conclusion: This small preliminary review supports evolving evidence that PID is linked with higher risk of reduced BMD. The majority of our PID patients are young, falling below the recommended age profile for a DXA as per the ISCD. This cohort appears to need DXA at an earlier age, but more evidence is needed to support this. We intend to review all patients with PID at a specialist bone health clinic, and to assess if any particular PID subgroups, such as CVID or XLA, carry higher risks of developing reduced BMD.

Reference: Baris S et al. *Pediatr Allergy Immunol* 2011;22:676

P934

VITAMIN D DEFICIENCY/INSUFFICIENCY AND HIM OF CORRECTING IN WOMEN WITH ARTERIAL HYPERTENSION IN PREMENOPAUSAL AND EARLY POSTMENOPAUSAL PERIODS

L. Kezhun¹, L. Yakubova¹

¹Grodno State Medical University, Grodno, Belarus

Objective: To assess the serum level of 25(OH)D in women with arterial hypertension (AH) in premenopausal and early postmenopausal periods as well as to evaluate the efficacy of its correction.

Methods: We investigated 102 women with AH stage II risk 3 aged 50(48;53) years: 50 females in premenopausal period – group I, and 52

females in early postmenopausal period – group II. Serum level of 25(OH)D were determined by the immunoenzymatic assay. In groups I and II we identified subgroups with the level of 25(OH)D <30 ng/ml: subgroup IB (n=25) and subgroup IIB (n=21) respectively, in which antihypertensive therapy was supplemented with cholecalciferol 2000 IU/d for 3 months. In subgroups IA (n=25) and IIA (n=31) cholecalciferol was not administered.

Results: At baseline the level of 25(OH)D was lower ($p<0.05$) in subgroups IB (19.3 ± 8.5 ng/ml) and IIB (18.2 ± 9.5 ng/ml) than in the comparable subgroups IA (26.7 ± 11.5 ng/ml) and IIA (27.4 ± 10.5 ng/ml). In subgroup IB 60% of women had vitamin D deficiency, and 40% vitamin D insufficiency. In subgroup IIB 61.9% of women had vitamin D deficiency, 38.1% insufficiency. After supplementation of cholecalciferol the level of 25(OH)D increased ($p<0.001$) in subgroup IB (37.28 ± 11.97 ng/ml) and in subgroup IIB (36.4 ± 10.0 ng/ml), and became higher ($p<0.001$) than in the comparable subgroups IA and IIA. Optimal level of 25(OH)D was achieved in 80% of women in subgroup IB and 76.2% in subgroup IIB. The level of 25(OH)D remained insufficient in 12% patients from subgroup IB and 14.3% from subgroup IIB, 25(OH)D deficiency was observed in 8% and 9.5% of patients, respectively.

Conclusion: Women with AH stage II in premenopausal and early postmenopausal periods demonstrated high incidence of vitamin D deficiency/insufficiency –76.5%. Intake of cholecalciferol 2000 IU/d for 3 months allows to obtain its optimal level of 25(OH)D in 80% of women with AH in premenopausal period and 76.2% of women in early postmenopausal period.

P935

ASSESSMENT OF BONE ALTERATIONS IN OSTEOPOROSIS AND VARIABLES LINKED WITH HIGH SUSCEPTIBILITY FOR FRAGILITY FRACTURES: A PQCT STUDY

D. Economopoulos¹, I. Triantafyllopoulos¹, I. Dontas¹, N. Papaioannou¹, G. P. Lyritis¹

¹Laboratory of Research of the Musculoskeletal System, Athens, Greece

Objective: To underline the variables related with the prevalence of osteoporotic fractures via pQCT measurements of the left tibia.

Methods: We investigated 268 postmenopausal women from July 2004 until July 2007. They were divided into 2 groups, osteoporotic (OP) and control (C), depending on the history of prior osteoporotic fracture. Measurements of tibial cross-sectional areas corresponding to 4% (slice1), 14% (slice2), 38% (slice3), and 66% (slice4) of its length, were essential for the separate assessment of cortical and trabecular bone. Cortical density (crt den), cortical content (crt cnt), trabecular density (trb den), trabecular content (trb cnt), total density (tot den), total content (tot cnt), cortical area (crt area), cortical thickness (crt thck) and stress strain index (SSI_p) were measured at their representative slices using the indicated regions of interest. Age, BMI, age of menopause (agemenop) and years since menopause (yrsmenop) were also documented. SSI_p depicts bone resistance against bending and torsional stresses. Women prescribed with anti-osteoporotic agents or medication affecting bone metabolism were excluded from the study. Statistical analysis comprised of student t-test and multivariate logistic regression analysis.

Results: 68 women were identified as OP and the remaining 200 as C. Comparing C to OP, BMI was 26.1 ± 4.3 and 27.1 ± 4 ($p:0.08$), mean age $61.9\text{yrs}\pm 7$ and $63.4\text{yrs}\pm 8$ ($p:0.1$), agemenop 47.4 ± 4.6 and 47.9 ± 5.3 ($p:0.45$), while yrsmenop 14.2 ± 7.8 and 14.7 ± 8.3 ($p:0.67$), respectively. In slice1, fracture risk reduced by 1.9% for every 1 mg/cm³ increase of tot den. In slice2, unary accretion of trb cnt and crt den was linked with 1.3% and 0.9% decrease of the risk for fracture whilst increments of crt den and SSI_p by 1 unit in slice3, were associated with 2% and 0.2% lower risk. Moreover, 1cm² increments of crt area in slice4 were linked with 1.3% lower fracture risk.

Crtcnt (mg)	CvsOP	142,7±22,9 vs. 127,5 ±27,9 (slice2) 261, 7±34 vs. 238,8±40,6 (slice3)	P<0,0005
Crtcen (mg/cm ³)	CvsOP	1059,5±49 vs. 1024,1 ±56,5 (slice2) 1122,8 ±36,3 vs. 1088,5 ±47,4(slice3)	P<0,0005
Crtarea (mm ²)	CvsOP	134,2±17,8 vs. 123,7 ±22,5 (slice2) 233,1 ±29,1 vs. 219 ±33,4(slice3) 282,2±40 vs. 254,5±49,6 (slice4)	P<0,0005 (slice2, slice 4) P:0,001(slice3)
Crtthk (mm)	CvsOP	1,9±0,3 vs. 1,8±0,3 (slice2) 4,3±0,5 vs 4±0,6(slice3)	P:0,001 (slice2) P<0,0005(slice3)
Totcnt(mg)	CvsOP	258,8±38,6 vs. 233,5 ±41,1 (slice1) 204,2±25,6 vs186,8±32,8 (slice2) 292,1±34,6 vs. 273,9±38,6(slice3)	P<0,0005
Totden(mg/cm ³)	CvsOP	245,5±36,2 vs. 219,7 ±38,2 (Slice1) 449,7±74,4 vs. 411,2 ±73,2 (slice2) 799,4±76 vs. 748,5±90(slice3)	P<0,0005
Trbcnt(mg)	CvsOP	91±19,6 vs. 80,9±17,7 (slice1) 197,6±43,3 vs. 172,1±57,7 (slice2)	P<0,0005
Trbden	CvsOP	245,5±36,2 vs. 219,7 ±38,2 (slice1) 436±100,3 vs. 383,8 ±119,1 (slice2)	P<0,0005
SSI _p (mm ³)	CvsOP	1222,1±216,6 vs. 1125,2 ±204,8 (Slice2) 1310,5±230 vs 1207 ±204,2 (slice3)	P:0,002

Conclusions: Our results stress that apart from trabecular bone, cortical bone undergoes changes that have a significant impact on bone integrity. Furthermore, pQCT is a reliable tool for the investigation of bone properties and the estimation of an individual's fracture risk.

P936

FACTORS CONTRIBUTING IN THE DEVELOPMENT ACUTE KIDNEY INJURY FOLLOWING EMERGENCY SURGERY FOR FRAGILITY HIP FRACTURE

S. Naraen¹, D. Burke¹, S. Shamim¹, L. Isaac¹, J. Attwood¹, S. Lee¹, A. Khare¹, M. Brezezinska¹, M. Sameul¹, H. Davis¹, G. Austin¹, A. Maddison¹, R. Torrance¹, S. Baird¹, A. Temperton¹, O. Ward¹, S. Middleton¹, I. Pemble¹, B. Pandya¹

¹Aintree University Hospital, Liverpool, UK

Objective: Femoral neck fracture in elderly can be debilitating or even fatal. Acute kidney Injury represents frequent complication after hip fracture surgery. The reported incidence of acute kidney injury in elderly patients undergoing hip fracture surgery ranges from 15.3-24.4% according to the definition of acute kidney injury. 7-11% of patients undergoing orthopaedics surgery will experience acute kidney injury. AKI following hip fracture has multi-factorial causes. Baseline renal function, age, comorbidities, dehydration, nephrotoxic drugs, and

malnutrition are documented risk factors for AKI. Our aim was to identify the preventable risk factor in perioperative period so that we can decrease the incidence of acute kidney Injury in patient going for emergency hip surgery

Methods: A retrospective data was collected for all the patients with hip fracture who underwent emergency surgery above 60 years of age between January 2016 and January 2017. Total of 328 patients were included in the analysis.

Result: 99 Male and 229 females were admitted with Fracture Neck of femur. Most of them had the surgery within 48 h. Hypertension was the most common comorbidity in both Non AKI 39% (n=108) and AKI group 44% (n=24). Whereas in Non AKI, CKD was 9.5% (n=26) and 12.7% (n=35) were diabetic. 23.3% (n=64) patients were on ACE inhibitors, 8.3% on angiotensin II receptor blockers (ARB), 7.2% were on 7.2% furosemide. In AKI group hypertension was found in 44% (n=24) patients, CKD in 12% (n=9) patients and 16% (n=9) were diabetic. 18.5% (n=10) on ACE inhibitor, 9.2% on ARB and 14.4% (n=8) were on furosemide. The mean creatinine in Non AKI group is 96 and in Non AKI group is 156. 10% of patients AKI did not resolved and 70% (n=7) of the patients died. 50% of those patients had hypertension and heart disease.

Conclusion: Most of the patients with unresolved AKI died. Double the percentages of patients were on furosemide in AKI group. Pre-operative CKD as comorbidity was not statistically significant risk factor (p=0.4580) however the pre-operative creatinine value was an important factor responsible for the development of AKI (p≤0.0001).

P937

OSTEOPOROSIS PREVALENCE IN POSTMENOPAUSAL PATIENTS TREATED WITH AROMATASE INHIBITORS USING BMD VALUES FROM A SPANISH POPULATION

J. Loarce-Martos¹, W. A. Sifuentes-Giraldo¹, L. V. Maldonado-Romero¹, M. Ahijón-Lana¹, C. Velázquez-Arce¹, N. Martínez-Jañez¹, M. Vázquez-Díaz¹

¹Hospital Universitario Ramón y Cajal, Madrid, Spain

Objective: To assess the prevalence of osteoporosis (OP) in postmenopausal patients diagnosed with breast cancer and treated with aromatase inhibitors (AI) using BMD values obtained from a local cohort for T-Score calculation.

Methods: We performed a cross-sectional study with postmenopausal women diagnosed with breast cancer and treated with AI attended in our hospital between August 2011 and December 2014. We estimated BMD in lumbar spine (LS) and femoral neck (FN) using DXA. We estimated the prevalence of OP in our cohort, using BMD reference values from the Spanish cohort of Diaz-Curiel, which included some group of 2442 healthy patients from both sexes stratified by age, and compared it with OP prevalence obtained using clinical practice reference values used in our country, which are obtained from the NHANES III cohort (National Health and Nutrition Examination Survey) in FN and those proportionated by the commercial brand Hologic for LS.

Results: A total of 54 patients were included. The mean age at diagnosis was 61.50 ± 6.50 years. The AI used in both groups was letrozole. For LS we didn't find statistically significant differences between both groups. For FN we found 13 patients (24%) with OP according to NHANES/Hologic, and 8 patients (14.8%) according to Diaz-Curiel values. These values are summarized (Table 1).

Conclusions: In our study, we observe statistically significant differences in osteoporosis prevalence for FN, and around 10% of patients could be reclassified using our local BMD values, which highlights the relevance of using local values of BMD for T-score calculation.

Table 1. Osteopenia and osteoporosis prevalence

	(NHANES/Hologic)	Number of patients (%)	(Díaz Curiel cohort)	Number of patients (%)	p-value
Lumbar spine (L2-L4)	Normal	10(18.6%)	Normal	10(18.6%)	0.110
Osteopenia	16(29.6%)	Osteopenia	15(27.7%)		
Osteoporosis	28(51.8%)	Osteoporosis	29(53.7%)		
Mean T-score=-2.16	Mean T-score=-2.28				
Femoral neck	Normal	17(32%)	Normal	15(27.8%)	0.018*
Osteopenia	24(44%)	Osteopenia	31(57.4%)		
Osteoporosis	13(24%)	Osteoporosis	8(14.8%)		
Mean T-score: -1.77	Mean T-score: -1.57				

P938

THE FEATURES OF ANGULAR MEASUREMENTS AND ALIGNMENT SUBTYPES OF CERVICAL SPINE IN PATIENTS WITH HIGH BLOOD PRESSURE: THE IMPACT ON BLOOD FLOW IN NECK VESSELS

O. Dolynna¹, Y. Liskov¹, P. Kolisnyk¹, S. Kolisnyk¹

¹National Pirogov Memorial Medical University, Vinnytsya, Department of Medical Rehabilitation and Medical-Social Expertise, Center Medical Rehabilitation and Sports Medicine, Vinnytsya, Ukraine

Objective: There are five subtypes alignment of the cervical spine (ACS): lordosis, kyphosis, straight, sigmoid, and reverse sigmoid. The change in physiological cervical spine lordosis negatively affects the biomechanics of the spine, causes deformation of the vertebral arteries and segmental nerve structures, disturbance of the blood flow in the vertebrobasilar basin (VBB). Our aim was to study the features of ACS in patients with high blood pressure (HBP) and their effect on blood flow in brachiocephalic vessels.

Methods: 31 patients with HBP and 33 normotensive subjects were examined. On X-rays, ACS was determined by the centroid method and the modified Takeshima/Herbst method, using the Cobb method, the measured angle of the scoliosis of the cervical spine (CS). For the analysis of X-ray images, the RadiAnt DICOM Viewer. The thickness of the intima-media complex, the systolic and diastolic blood flow velocity, the pulse index, and the index of resistance in the carotid and vertebral arteries were determined by duplex ultrasound scanning (Voluson 730 PRO) using a linear sensor.

Results: The found peculiarities of lordosis could not be classified in any of the methods. Therefore, the distances from the line C2-C7 to the centers and the back surface of the bodies of vertebrae C3-C4 are additionally calculated. On the basis of revealed regularities, a hyperlordosis (HL) subtype is proposed. Patients with HBP dominated right scoliosis (63%) and HL CS (85%). The Cobb angle was higher in the subjects with HBP ($t=4.1$, $p<0.01$). The connection between the velocity values of the blood flow in VBB and the Cobb angle ($r=0.76$, $p<0.01$) was detected. Atherosclerotic plaques and thickening of the intima-media complex in the carotid basin were more often diagnosed in patients with pathological alignment types and scoliosis (OR=5.3, CI=2.6-18.7).

Conclusions: Depending on the X-ray image processing method, the structure of the alignment types was different. On the basis of additional calculations, a hyperlordosis centering subtype was proposed. Most patients with HBP had HL and right scoliosis. The connection between the pathological form of CS and changes in blood flow in brachiocephalic vessels, as well as atherosclerotic changes in the carotid artery basin, has been revealed.

P939

CIRCULATING COLLAGEN AND ANGIOGENIC BIOMARKERS IN BMD IN IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

E. Kochetkova¹, L. Ugai¹, Y. Maistrovskaia¹, V. Nevzorova¹

¹Institute of Therapy, Vladivostok, Russia

Objective: To evaluate the relationship between specific circulating biomarkers of collagen metabolism, extracellular matrix and vascular remodeling with BMD in patients with idiopathic pulmonary arterial hypertension (iPAH) NYHA class III-IV.

Methods: Pulmonary and hemodynamic parameters, BMD Z-scores at the lumbar spine (LS) and femoral neck (FN), serum C-terminal telopeptide of type I collagen (CITP), metalloproteinase-9 (MMP-9) and its tissue inhibitor (TIMP-1), and complex MMP-9/TIMP-1, osteoprotegerin (OPG), endothelin-1 (ET-1), vascular endothelial growth factor (VEGF), and soluble VEGF receptor-1 (sVEGFR1) were evaluated in 38 patients with iPAH NYHA class III-IV and 30 healthy volunteers.

Results: Circulating CITP, MMP-9, TIMP-1 and MMP-9/TIMP-1 complex ET-1, VEGF and sVEGFR1 levels were higher in the patients with iPAH than in healthy subjects (specific p values adjusted for multiple comparisons) while OPG levels were not statistically different compared to that of healthy subjects. The univariate analysis revealed a positive correlation between BMD Z-scores at both sites and 6-min walk test (FN: $r=0.555$, $p=0.000$; LS: $r=0.463$, $p=0.003$), and inverse relation with pulmonary vascular resistance (PVR) (FN: $r=-0.541$, $p=0.0005$; LS: $r=-0.467$, $p=0.003$) and mean pulmonary arterial pressure (mPAP) (FN: $r=-0.433$, $p=0.007$). CITP, MMP-9 and TIMP-1 had positive correlations with mPAP and PVR, and negative associations with BMD LS and FN Z-scores. Circulating ET-1 related to the mPAP ($p=0.001$), cardiac index ($p=0.004$) and PVR ($p=0.000$), whereas VEGF and sVEGFR1 correlated with mPAP ($p=0.006$ and $p=0.02$, respectively) and PVR ($p=0.000$ and $p=0.000$, respectively). Negative correlation was observed between the ET-1, sVEGFR1 levels and the FN BMD Z-scores ($p=0.004$) as well as the LS BMD Z-scores ($p=0.035$). VEGF solely indirectly correlated with FN BMD Z-scores ($p=0.000$). Positive correlations have revealed between increased levels of MMP-9, TIMP-1, MMP-9/TIMP-1 complex, VEGF and sVEGFR1 increased production of CITP.

Conclusion: Our results provide further evidence that worsening endothelial dysregulation is associated with increased levels of osteopenia in iPAH and we speculate that endothelial dysfunction may significantly contribute to osteopenic syndrome development through mechanistic pathways associated with elevated secretion of endothelin-1 and angiogenic factors such as VEGF and sVEGFR1 increased activation of connective-tissue matrix degradation.

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P940

VITAMIN D AND BODY COMPOSITION IN POSTMENOPAUSAL WOMEN

M. Vuksanovic¹, B. Arsenovic², M. Marjanovic Petkovic², T. Beljic Zivkovic³¹Faculty of Medicine, University of Belgrade, "Zvezdara" University Medical Center, Department of Endocrinology, Diabetes and Metabolic Disorders, ²"Zvezdara" University Medical Center, Department of Endocrinology, Diabetes and Metabolic Disorders, ³Faculty of Medicine, University of Belgrade, "Zvezdara" University Medical Center, Department of Endocrinology, Diabetes and Metabolic disorders, Belgrade, Serbia**Objectives:** In climacterium, women experience a change in body composition, increases in central adiposity and weight gain. The decline of ovarian function in that period favors central abdominal fat accumulation. Women with higher BMI have inadequate levels of vitamin D. It was found 45% more visceral fat in women with hypovitaminosis D, compared to women with normal vitamin D levels.**Methods:** This was observational, analytical study of postmenopausal women aged 45-70 years. The assessed parameters were: BMI, waist circumference (WC), 25-hydroxyvitamin D (25OHD) status, BMD, total fat mass (FM), fat mass index (FMI) and skeletal muscle mass (SMI) measured by DXA.**Results:** The average age of women was 57.16±5.71 years. Start menopausal patients was 49.59±4.02 with the years. Duration of menopause was 7.51±4.99 years. According to the obtained BMI 28.03±4.65 kg/m², postmenopausal woman was excess body weight with waist circumference (WC) 91.56±10.85 cm. The average value of 25(OH)D was 39.43±16.73 nmol/L. There were no patients with normal concentrations of vitamin D insufficiency of vitamin D had 76.2%. All patients had osteopenia. Average BMD on lumbar spine was 0.862 g/cm² and 0.668g/cm² on femoral neck. There was a very weak correlation between serum 25-OHD and BMD at lumbar spine ($\rho=0.167$; $p=0.35$) and femoral neck ($\rho=0.228$; $p=0.20$). Average FM found in postmenopausal women was 32.8±8.2 kg or 43.5% (fat%). Most patients by FMI classification (kg/m²) was observed in group with excess fat 45.4%. Lowest level of 25-OHD in postmenopausal women, classified by FMI, was found in obese class II (25-OHD 32.10 nmol/L). Percentage of body fat was statistically significant higher in insufficient 25-OHD group (39.6%) and deficit 25-OHD group (48.2%) than maximum permitted body fat of 35% for female ($t=-22.63$; $p<0.002$). Sarcopenia was not found in tested group because the SMI was 6.72±0.91 kg/m². Muscle mass and FMI positively correlated with BMD. While no significant correlation was found with AMM, significant correlation was found for FMI and total hip BMD ($R=0.289$; $p<0.003$) and neck BMD ($R=-0.249$; $p<0.012$).**Conclusions:** Low vitamin D level in climacterium is associated with higher BMI and waist circumference, osteopenia and higher body fat percentage. Considering all the aforementioned postmenopausal women belong to the group of risks for the occurrence of metabolic syndrome and the development of sarco-osteopenia as a result of vitamin D deficiency.

P941

COMPARATIVE STUDY IN THE TREATMENT OF OSTEOPOROSIS BETWEEN ALENDRONIC ACIDUM + COLECALCIFEROL AND ALENDRONIC ACIDUM + ALFACALCIDOL

S. Birsan¹, I. Mircea¹¹Faculty of Medicine Oradea, Oradea, Romania**Objective:** Alendronic acidum is a bisphosphonate that prevents bone loss by helping bone reconstruction by reducing vertebral column and hip fractures. Vitamin D is required for calcium absorption and bone health, the body can normally absorb calcium from food only if it has enough vitamin D. Alfalcidol is part of the vitamin category being an analogue of vitamin D increasing the absorption of calcium and phosphorus.**Methods:** A retrospective study was conducted on 60 women with osteoporosis who completed a study file and performed densitometry by examining DXA in the lumbar spine and the proximal femur. Group 1 of 46 patients received oral therapy with alendronic acid 70 mg + cholecalciferol 5600UI compared to group 2 receiving alendronic acid 70 mg + alfalcidol 50 µg.**Results:** In group 1 treated with alendronic acid + cholecalciferol after 1 year, a positive T-score of 58.7% was obtained compared to only 30.2% of the patients in group 2.**Conclusion:** The combined administration of alendronic acid + cholecalciferol proved to be the most effective prescription formula.

P942

ASSESSMENT OF THE QUALITY OF LIFE OF WOMEN WITH OSTEOPOROSIS TREATED WITH DENOSUMAB 60 MG

C. S. Strugala¹, R. L. Laskowska¹, S. S. Strugala¹, A. H. Hadamus²¹Copernicus Memorial Outpatient Clinic, Grudziadz, ²Medical University of Warsaw, 2nd Medical Faculty, Department of Physiotherapy, Division of Rehabilitation, Warsaw, Poland**Objective:** Assessment of the quality of life of women with osteoporosis treated with denosumab 60mg, given every 6 months subcutaneously.**Method:** The study included 108 patients over 60 years of age with osteoporosis treated in Copernicus Memorial Outpatient Clinic in Grudziadz. QUALEFFO-41 and VAS were used for the assessment of quality of life. The questions of the questionnaire concerned the wellbeing of patients before the basic statistics and taking into account the assessment of the normality of the distribution were used.**Results:** Among patients treated with 2 doses of denosumab every 6 months, there was a significant reduction in pain intensity on the VAS scale from an average of 5.7 (Me 6, IQR 4-8) to 4.4 (Me 4, IQR 3-6) ($p<0.005$). On the QUALEFFO-41 scale, an improvement was achieved in all scale categories ($p<0.05$) and in the assessment of the total scale from an average of 82.7 points to 73.7 points ($p<0.005$). In individual categories a statistically significant improvement was also achieved: in the area of pain with 14.5 points to 11.8 points, in terms of efficiency of physical activities during the day from 11.2 points to 9.0 points; in the assessment of performing housework from 15.7 points to 14.3 points; in the assessment of mobility from 13.7 points to 12.3 points; in terms of free time and social activity 11.1 points to 10.6 points.**Conclusions:** The use of denosumab in the treatment of osteoporosis in women over 60 has a positive effect on their quality of life and a reduction in the intensity of pain.

P943

EFFECTIVENESS OF MULLIGAN MOBILIZATION ON RANGE OF MOTION AND FUNCTION IN INDIVIDUALS WITH SUBACROMIAL IMPINGEMENT SYNDROME

B. Menek¹, C. Algun¹, D. Tarakci¹¹Istanbul Medipol University, İstanbul, Turkey**Objective:** To search the effectiveness of Mulligan mobilization on range of motion and function in individuals with subacromial impingement syndrome.**Methods:** The study was conducted on 60 volunteers with subacromial impingement syndrome, aged between 30-70. Two groups, 30 control groups and 30 study groups, were randomized to work as single-double numbers. Conventional physiotherapy was done in control group while conventional physiotherapy and Mulligan mobilization (mobilization with movement) was done in study group. Conventional physiotherapy contain Codman exercises, Wand, shoulder wheel, finger ladder, cold pack, TENS, US and stretching and strengthening exercises. Mobilization with movement technique of Mulligan mobilization techniques was performed in the directions of flexion, abduction, external rotation and internal rotation. Home exercises were given for each patient. Patients were assessed before and after treatment with visual analog scale (VAS), goniometric measurement, upper extremity disorders hand,

shoulder and hand problems questionnaire (DASH). When the groups were compared in terms of pretreatment and post treatment, there is a statistical significance was found between the two groups ($p < 0.05$). Statistical analysis of the data was performed using Statistical Package for the Social Sciences (SPSS) 16.0 program.

Results: When the groups were compared in terms of pretreatment range of motion of shoulder, VAS, DASH, no statistical significance was found between the two groups. When the groups were compared in terms of post treatment, there is a statistical significance was found between the two groups ($p < 0.05$). When the change values before and after the treatment were compared, it was statistically found that the evaluation results of the Mulligan mobilization group were better than the control group.

Conclusion: Mulligan's mobility technique has been found to be more effective in pain, functionality and range of motion than conventional physiotherapy methods. Mulligan mobilization in patients with subacromial impingement is recommended for treatment.

P944

EFFECTS OF ALFACALCIDOL IN THE TREATMENT OF FIBROMYALGIA

S. Birsan¹

¹Faculty of Medicine Oradea, Oradea, Romania

Objective: To investigate the effect of alfacalcidol in fibromyalgia. Fibromyalgia syndrome causes pain all over the body, patients with fibromyalgia have: fatigue, muscle stiffness, difficulty sleeping, increase sensitivity to pain.

Methods: We have recruited 32 cases, the patients come with symptomatology of fibromyalgia reported visual analog score VAS at 6-9. Their blood vitamin D level was tested to be below the normal limit. Totally 32 female were included in this study. They were advised to take alfacalcidol 0,5 ug for 16 weeks.

Results: 21 patients report at least 55% improvement of the pain among which 11 patients reported no relief.

Conclusion: Alfacalcidol has benefits in fibromyalgia syndrome and should be screened in the patients who have this disease.

P945

EFFECT OF PULSED HIGH PEAK POWER ELECTROMAGNETIC FIELD (DIAPULSE) TREATMENT FOR CLOSED BONE FRACTURE OF HAND

S. Birsan¹

¹Faculty of Medicine Oradea, Oradea, Romania

Objective: To investigate the efficacy of pulsed high peak power electromagnetic field (Diapulse) in the treatment of closed bone fracture. The closed bone fracture of hand is usually remedied by the cast, splint or medication but it is less to cure the fracture area directly.

Methods: 9 subjects with closed bone fracture without surgery were recruited from June 2017 to November 2017. The diapulse were performed for two weeks. We evaluated the pain (VAS), functional disability (questionnaire) and user satisfaction before and after treatment.

Results: After two week diapulse treatment, swelling and pain of the recruited patients with closed bone fracture were reduced significantly.

Conclusion: The efficacy of diapulse had pain relief and beneficial result to treat closed bone fracture of hands.

P946

FACTORS ASSOCIATED WITH SYNOVITIS AND JOINT EFFUSION IN KNEE OSTEOARTHRITIS

V. Mukuchyan¹, V. Vardanyan², A. Kirakosyan¹

¹Erebouni Medical Center Rheumatology Department, ²Internal Medicine Department, Yerevan State Medical University, Yerevan, Armenia

Objective: Osteoarthritis (OA) of the knee is the most common cause of knee pain in middle-aged and older persons. Although OA is considered a non-inflammatory condition, synovial inflammation is common and could play an important role in the pathophysiology of OA. Moreover, secondary inflammation of knee is one of the most common causes of referral to doctor. The importance of synovitis in knee OA has been supported by several studies that showed an association of synovitis with cartilage deterioration and pain. The main objective of the study was the determination of factors associated with synovitis and joint effusion in knee osteoarthritis.

Methods: 294 patients (277 female, 17 male, mean age 55.09 ± 8.56 years) with newly diagnosed mild to moderate primary knee OA were investigated. All patients with severe osteoarthritis (IV⁰ grade by Kellgren-Lawrence classification), inflammatory joint diseases, receiving any kind of OA treatment were excluded. X-ray and ultrasound examinations of knee joints were performed. The presence of synovitis, joint effusion, tendinitis, osteophytes, Baker's cysts, tear of meniscus, as well as thickness of cartilage and synovial layer were determined. For determination of factors associated with development of synovitis and joint effusion both univariate and multivariate analyses were performed. The data is introduced as odds ratios (OR) with 95%CI. The results were considered significant when $p < 0.05$.

Results: From included 294 patients synovitis was observed in 88 (29.9%) patients, tendinitis in 38 (12.9%), osteophytes in 273 (92.9%), Baker's cysts in 93 (31.6%), tears of meniscus in 93 (31.6%) patients. Expressed thinning of cartilage (≤ 2 mm) was observed in 216 (73.5%), thickening of synovial layer (≥ 3 mm) - in 76 (25.9%) patients. According to the results of univariate analysis and multivariate logistic regression, development of synovitis was significantly ($p < 0.05$) and independently associated with thinning of cartilage ≤ 2 mm (OR /95%CI = $2.7 / 1.3-5.6$, $p < 0.05$), presence of tendinitis (OR /95%CI = $7.7 / 3.3-17.8$, $p < 0.01$) and popliteal (Baker's) cysts (OR /95%CI = $2.4 / 1.3-4.3$, $p < 0.01$).

Conclusion: A positive association of synovitis and joint effusion with cartilage loss, presence of different types of tendinitis and popliteal cysts is detected. While cartilage loss and meniscal damage are not yet clearly treatable, treatments targeting inflammation within the joint are available. Thereby, forehanded treatment of secondary inflammatory conditions (synovitis, tendinitis, popliteal cysts) of joint can decrease expression of pain, cartilage loss and structural damage in OA.

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P947

OUTCOMES OF HYALURONIC ACID JOINT INJECTION

S. Birsan¹

¹Faculty of Medicine Oradea, Oradea, Romania

Objective: To evaluate the effects of hyaluronic acid for subjects with knee osteoarthritis.

Methods: Twenty subjects with symptomatic knee osteoarthritis with grade II-III on Kellgren-Lawrence scale were collected., they received intra-articular injection of hyaluronic acid. All of the assessments were performed before and after injection. Assessment included evaluation of range of motion over knees, visual analog pain scale, and questionnaire of functional status including Lequesne index and WOMAC.

Results: The short term results showed knee osteoarthritis subjects had moderate knee pain before the intra articular hyaluronic acid injection and the pain significantly decreased after the injection, but there was no significant improvement in lower limb range of motion after the injection.

Conclusion: Hyaluronic acid provided the subjects of knee osteoarthritis with not only pain relief but also functional abilities improvement in short term effects.

P948

DIFFUSE RIB AND VERTEBRAL BONE LESIONS IN A PATIENT WITH TUBEROUS SCLEROSIS COMPLEXY. Cherif¹, Z. Tayeb¹, M. Mrouki¹, F. Ben Dahmen¹, S. Mezghani², M. Abdallah¹¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, ²Department of radiology, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Tuberous sclerosis complex (TSC) is a rare autosomal dominant disorder. It is a neuro-cutaneous disease that affects the skin and different organs. The most common reported symptoms are lesions of the skin, central nervous system, heart and renal angiomyolipoma. Skeletal lesions are rarely described in TSC in literature. We present a case of TSC with multiple bone lesions.

Case report: A 46-year-old women with a medical history of renal angiomyolipoma was admitted to our department of Internal Medicine to treat an acute pyelonephritis. Physical examination showed multiple hypomelanotic macules over the abdomen, angiofibromas over the face. Palpatory findings of her abdomen were normal. The patient did not show any features of cardiovascular, pulmonary, or musculoskeletal disorders. Laboratory tests revealed blood an elevated serum creatinine at 130 $\mu\text{mol/l}$. Complete blood count and electrolytes levels were within the normal ranges. The chest X-rays was normal. In addition, le lumbar X-rays showed a diffuse bone condensation. Abdominal ultrasonography showed bilateral renal angiomyolipomas. Echocardiography was normal. Thoraco-abdominal scan ascertained the diagnosis of renal angiomyolipomas and revealed also bilateral pulmonary angiomyolipomas. Moreover, it identified multiple sclerotic bone lesions in the thoracic and lumbar spine and ribs and sternum. It detected also an angiofibroma of the second lumbar vertebra. The association of renal and pulmonary angiomyolipomas, skin and bone lesions led to the diagnosis of TSC. The urinary infection was treated and all lesions are stable 6 months after.

Conclusion: The skeletal involvement in TSC is rare. This case reported multiple bone lesions in an asymptomatic patient with TSC. X-rays and CT scan may detect these lesions and help in their early diagnosis and management and may avoid complications.

P949

REHABILITATION AND ISOKINETICS STRENGTH IN THE ELDERLY POPULATIONS. Birsan¹¹Faculty of Medicine Oradea, Oradea, Romania

Objective: To explore the relationships of isokinetics strength, fall efficacy and fall in the elderly population.

Methods: We used the knee extension and flexion strength of the dominant leg which occurred at a speed of 60 degree angular velocity.

Results: Were reported the mean score of peak torque, total work and power of the knee like tension and flexion. Strength differences were identified between genders and exercises frequencies. The strength of the knee extension had a stronger impact than knee flexor.

Conclusion: The knee extensor was found to have a more important role than the knee flexor. This implied training for quadriceps strength will decrease the fall tendency among aged adults.

P950

MICROCT MEASUREMENTS: A TOOL FOR ASSESSING CHANGES IN BONE TISSUE OF RATS TREATED WITH MANGIFERINA. Nikodem¹, B. Nowak², M. Tomanik¹, A. Matuszewska², A. Matkowski³, D. Woźniak³, A. Szeląg², J. Filipiak¹¹Department of Biomedical Engineering, Mechatronics and Theory of Mechanisms, Wrocław University of Science and Technology,²Department of Pharmacology, Wrocław Medical University,³Department of Pharmaceutical Biology and Botany, Wrocław Medical University, Wrocław, Poland

Objective: Computer microtomography (microCT) is a modern technique that gives new possibilities to quantify even small changes in bone diseases. Changes in structural properties are associated with changes in the mechanical properties of the tissue, that in case of osteoporosis lead to loss of bone tissue and increased risk of fractures [1]. The MicroCT with resolution of 5 μm , allows to accurately measure the structural properties, which makes it an excellent tool for assessing new therapies that are subjected to animals at the stage of preclinical trials. The main goal of this study was to determine the effect of mangiferin (M) on ovariectomy (OVX)-induced changes in the structural properties of bone tissue in rats.

Methods: The experiment was carried out on 12-week-old Wistar female rats (N=24), divided in 4 groups: SHAM (sham-operated rats), OVX-C - ovariectomized control, OVX-ML and OVX-MM – ovariectomized rats receiving mangiferin 10 mg/kg and 30 mg/kg, respectively. OVX and SHAM operation were done on day 1. Mangiferin used in the experiment was extracted from *Belamcanda chinensis*, and was administrated for 3 months since day 91. Analyzed material consist on femur and tibia bones. The measurement of structural properties was carried out using the SkyScan1172, Bruker X-ray MicroCT.

Results: The results indicate the impact of OVX on the architecture as well as the structural values of bone tissue (Fig.1). The highest BV/TV value was obtained for the SHAM group (28%), whereas for OVX-C it decreased dramatically to 8%. Mangiferin administration (MM group) increased BV/TV value to 13%. The geometry of the trabeculae has also changed: the number (Th.N), thickness (Th.Th) and their character (SMI). It is also important to note, that also the number of connections changes it is particularly important for the integrity of the tissue. The results show positive influence of mangiferin on OVX-induced osteoporosis in rats [2].

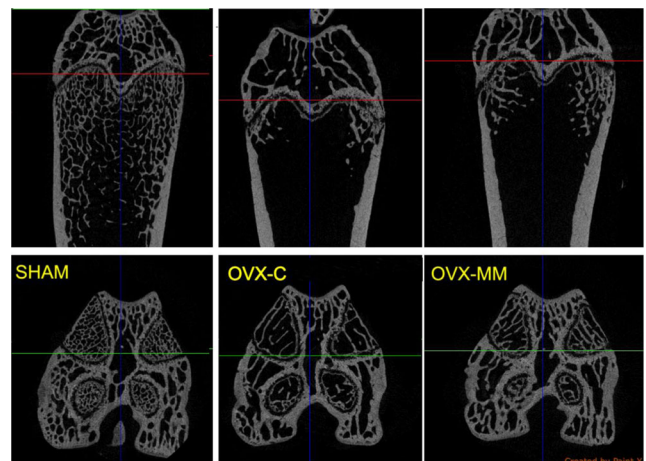


Fig.1. MicroCT reconstructions of rats' femoral sections for SHAM, OVX-C, OVX-MM groups.

Conclusion: MicroCT technique is therefore not only a great measurement tool for assessing even small changes occurring in tissues, but in the future it might become a great diagnostic tool, an alternative to DXA.

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P951

IMPORTANCE OF SONOELASTOGRAPHY IN ASSESSMENT OF RUPTURED AND CONTRALATERAL ACHILLES TENDONS: PREDICTION OF FUTURE INJURIES

I. Dumic-Cule¹, G. Ivanac¹, D. Lemac², B. Brkljacic¹

¹Department of Diagnostic and Interventional Radiology, Clinical Hospital Dubrava, ²Department of Orthopaedic and Trauma Surgery, Clinical Hospital Dubrava, Zagreb, Croatia

Objective: Assessment of mechanical properties of the Achilles tendon after reconstruction using ultrasound shear wave elastography (SWE) has been recently introduced in the clinical practice. It was demonstrated that about 6% of patients with ruptured Achilles tendon experience the rupture of contralateral tendon in the future (1). Therefore, the aim of this study was to estimate the risk for rupture of contralateral tendon in patients who underwent surgical reconstruction of ruptured Achilles tendon by using subjective questionnaires and ultrasound SWE.

Methods: Twenty-four patients who underwent surgical repair of the ruptured Achilles tendon and twelve aged matched healthy controls were examined with ultrasound SWE. Functional outcomes were assessed with American Orthopedic Foot and Ankle Society (AOFAS) scoring system and subjective rating system which we introduced and validated.

Results: The elasticity of injured tendon was markedly decreased (by 42%, $P < 0.01$) compared to contralateral tendon of the patient, as expected. Both AOFAS score and our novel subjective assessment scale positively correlate with ultrasound SWE values in ruptured Achilles tendons. The elasticity of contralateral Achilles tendons in patients was 23% lower than among healthy individuals ($P < 0.05$).

Conclusion: Irrespective of the lack of difference in the subjective feeling assessed by AOFAS, the contralateral tendon in the patients with reconstructed Achilles tendon has significantly lower elasticity than healthy individuals. Therefore, contralateral tendons in patients who suffered from rupture are more prone to future ruptures.

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P952

FEATURES OF MORPHOLOGICAL CHANGES OF SARCOPENIA IN HIP OSTEOARTHRITIS

S. Smiyan¹, R. Bodnar¹, Y. Bodnar¹

¹I.Ya. Horbachevsky Ternopil State Medical University, Ternopil, Ukraine

Objective: Muscular remodeling has not been sufficiently studied, despite the facts that severity of articular contractures and quality of patients' life depend on morphological changes. Our aim was to characterize the structural changes in muscles in hip osteoarthritis of stages I-IV.

Methods: Light optical and morphometric study of muscle necrosis was done in 8 cadavers who had been suffering of hip osteoarthritis. Muscle biopsies were taken in 12 patients with stage III-IV of the disease while undergoing hip replacement. The micropreparations were studied using a trinocular microscope with an image processing software, morphometry and polarization of SEO.

Results: Structural changes of articular cartilage, subcutaneous bone tissue and skeletal muscle were found in all biopsy samples. In hip osteoarthritis of stages I-II, heterogeneous changes in both muscle fibers and interstitial matrix were detected. A combination of type 1 and 2 of contracture remodeling was observed. At stages III-IV, types 2 and 3 of contracture remodeling with myofibril folding and cytoplasm lysis cytoplasm were predominant. Morphological changes of microcirculatory bed were similar in both groups. The arteriolar walls were thickened, while permeability and lumen diameter were not altered. The endothelial cells were swollen and sometimes desquamated. The intima was thickened. Fibrosis and lipodosis were noticed in perivascular tissue. The lipocytes of different sizes were located not only in vessels, but also between muscle fibers. The phenomena of lipodosis were manifested not only in overweight patients, but also in subjects without obesity. The relative volume of adipose tissue at stage I-II was $12.23 \pm 1.34\%$ and at stage III-IV $16.12 \pm 1.24\%$ vs. $6.09 \pm 0.98\%$ in the control group (dead in accidents) without signs of hip injury. The average diameter of muscle fibers with osteoarthritis of the hip at stage I-II was $29.32 \pm 0.64 \mu\text{m}$, and at stage III-IV it was $26.23 \pm 1.45 \mu\text{m}$ vs. $33.45 \pm 0.67 \mu\text{m}$ in controls.

Conclusion: The intensity of sarcopenia in hip osteoarthritis depends on the degree of structural changes in the cartilage and subchondral tissue of the bone, it is manifested by the atrophy of muscle fibers and lipodosis combined with contracture-necrotic muscular remodeling.

P953

SERUM FERRITIN AS A PROGNOSTIC AND DIAGNOSTIC FACTOR OF BONE INFECTION

I. Triantafyllopoulos¹, D. Economopoulos¹, N. Papaioannou¹

¹Laboratory of Research of the Musculoskeletal System, Athens, Greece

Objective: To assess serum ferritin levels in threatening, occult or clinically present bone infections and investigate its significance as prognostic factor.

Methods: In this prospective clinical and laboratory study, 114 patients (68 male and 46 female) were classified into 7 groups according to the treatment method they received and the presence of bone infection. Average age was 51 years (range: 15-90 years). The 7 study groups were: group-1 (fracture + surgical treatment), group-2 (elective surgery), group-3 (fracture + conservative treatment), group-4 (acute infection treated successfully), group-5 (persistent infection despite treatment), group-6 (patients from groups-1,2 that developed infection) and group-7 (patients from groups-1,2 that never developed infection). Groups -3,4,5 were considered as control.

Nine biochemical factors were studied for one year: serum ferritin as well as other eight variables associated with inflammatory processes and tissue injury (ESR, CRP, SGOT, SGPT, LDH, CPK, WBC and Hb). Statistical analysis was performed based on the time dependent changes of the measured variables in terms of peak and normalization values.

Results: ESR, CRP, and WBC confirmed their role as inflammatory indexes. SGOT, SGPT, LDH, CPK also confirmed their role as indexes of tissue damage. Hb had an opposite to serum ferritin reaction which was based on the pathogenesis of anaemia of chronic disease. The most impressive findings were related to serum ferritin. The persistence of high serum ferritin levels (plateau) or the rapid and great increases of its values were significantly related with the onset or the subclinical course of bone infection. Furthermore, serum ferritin values remained high (plateau) or increased earlier than the clinical manifestation of bone infection.

Conclusions: Serum ferritin monitoring can be an additional prognostic and diagnostic tool enhancing the diagnostic accuracy for early detection of bone infection. Early and appropriate treatment of this detrimental orthopaedic complication will be time and cost effective as well as will reduce patients' hospitalization time and improve their quality of life. Furthermore, this study demonstrated the value of the measurement of

the percentage changes during the monitoring of patients with threatening occult or clinically present bone infections.

P954

INVESTIGATIONS OF CHANGES IN STRUCTURAL AND MINERAL PROPERTIES OF BONE TISSUE AROUND SUBCHONDRAL CYSTS IN ADVANCED STAGE OF OSTEOARTHRITIS

A. Nikodem¹, K. Rebizant², M. Gąsior-Głogowska³

¹Department of Biomedical Engineering, Mechatronics and Theory of Mechanisms, Wrocław University of Science and Technology, ²Interdepartmental Student Research Group of Biomechanics, Wrocław University of Science and Technology, ³Department of Biomedical Engineering, Wrocław University of Science and Technology, Wrocław, Poland

Objective: Osteoarthritis (OA) is a mechanical disease in which changes occur within the entire joint. The pathomechanism of this disease has not been precisely defined. However, it is known that changes in cartilage, which undergoes slow degradation, cause changes in the biomechanical conditions. As a result of increased loads in the joint, and thus the pressure of the synovial fluid, in such a hard structure as the bone, free spaces are formed which are then filled with subchondral cysts. Thus, the tissue metaplasia and the formation of a fibrous tissue filled with synovial fluid. In these regions, therefore, intensive bone remodeling takes place [1,2]. The main objective of the project was a comparative analysis of the degree of mineralization and structural parameters of bone tissue from regions around subchondral cysts.

Methods: The research material consisted of 8 femoral heads, at the late stage of OA, from hip arthroplasty. The structural properties were determined using the microCT SkyScan1172, Bruker. The measurement of the degree of tissue mineralization was performed using FT-Raman spectroscopy (Nicolet NXR 9650 FT-Raman Spectrometer, Thermo Fisher Scientific).

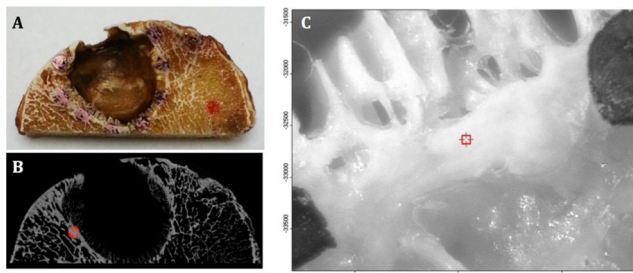


Fig.1. Example of one of the femoral heads, A. preparation; B. Bone reconstruction with microCT; C. Image of the specimen in the analysis using FT-Raman spectroscopy

Results: Depending on the experimental region, BV/TV values for cysts regions was (42–64%) for reference samples (8–28%). The results indicate an increase in the values of structural parameters (Tb.N, Tb.Th and character of bone trabeculae, SMI), but also an increase in the degree of mineralization (DM). For the bone tissue of the cyst region the value of DM was (1.71–1.99), while for the reference samples (0.63–1.77).

Conclusion: The results of the study indicate a significant increase in the value of structural parameters and the DM of bone in the region of subchondral cysts. Bone tissue changes are associated with negative remodeling processes, which are manifested by the hypertrophy of the bone tissue within the subchondral layer, thus changing its properties adapting them to the “new” biomechanical load conditions of the pathologically changing joint.

Reference:

1. Nikodem A. Acta Bioeng Biomech 2012;14:37
2. Tomanik M et al. J Mech Behav Biomed Mater 2016;64:86

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P955

CALCIUM, VITAMIN D AND SOME OTHER MINERAL FOOD INTAKE IN WOMEN FROM THE REPUBLIC OF MOLDOVA

E. Deseatnicova¹, G. Soric¹, I. Berlinschi², L. Groppa¹, O. Deseatnicova²

¹State Medical and Pharmaceutical University Nicolae Testemitanu,

²Technical University of Moldova, Chisinau, Moldova

Objectives: To determine food energy value, calcium, vitamin D and some other macro- and micronutrient food consumption in women from the Republic of Moldova.

Methods: We interviewed 218 women, according to their willingness to participate in the study. Women younger than 57 were interviewed at their places of work (3 enterprises), and those who retired were interviewed by outpatient physician. A special questionnaire, including general data and osteoporosis risk factors was filled in at the day one. Food ratio in the day following to primary interview was recorded by participants (measuring food in grams, ml and mentioning fat% of some foods where applicable). Recorded data were presented to the study staff. All the data were analyzed using web based platform “My healthy diet”, as well as FRAX was calculated in persons over 40 y.o. All the data were analysed statistically.

Results: Mean age of interviewed women made 40.01±12.5 y.o., [18–80]. Women aged 18–30 y.o. constituted 28.1%, 30–45 y.o. 34.2%, 45–60 y.o. 31.5%, over 60 y.o. 7.3%. Mean BMI was 23.5±4.6 kg/m² [17.1–48.7]. Mean food energy intake value was 1516.58±382.54 kcal, proteins made 61.37±25.12 g, lipids made 66.7±21.52 g, carbohydrates 176±63.6 g, fibers 22.05±10.72 g. Mean calcium food consumption was 387.63±296.86 mg [160.96–592.1], mean vitamin D food consumption was impressively low 0.92±0.7 ug. Mean Fe food level was 11.2±3.12 mg, P food level was 627.7±168.24 mg, Mg food level was 175.0±51.1 mg, iodine food level made 22.5±16.2 mg. In persons over 40 y.o. mean total fracture risk by FRAX made 5.34±3.8%, hip fracture risk was 0.97±1.7%. We found moderate negative correlation between calcium food intake and BMI, R=0.42; and moderate negative correlation between calcium food intake and hip fracture risk by FRAX in persons over 40 y.o.

Conclusions: Mean calcium as well as other micronutrient food intake was rather low, showing deficit while comparing with recommended daily values up to 50%. At the same time vitamin D food intake was extremely low, being in average about 10% from recommended daily value. All this raises the question of food quality and food fortification necessity. The study is ongoing having as a target 500 participants.

P956

INCREASED CORTICAL POROSITY AND REDUCED CORTICAL THICKNESS OF THE PROXIMAL FEMUR ARE ASSOCIATED WITH NONVERTEBRAL FRACTURE INDEPENDENT OF FRAX AND GARVAN ESTIMATES IN POSTMENOPAUSAL WOMEN

R. Kral¹, M. Osima¹, T. T. Borgen², R. Vestgaard³, E. Richardsen¹, A. Bjørnerem¹

¹UiT The Arctic University of Norway, Tromsø, ²Hospital of Drammen, Drammen, ³University Hospital of North Norway, Tromsø, Norway

Objectives: The Fracture Risk Assessment Tool (FRAX) and Garvan Calculator have improved the individual prediction of fracture risk. However, additional bone measurements that might enhance the

predictive ability of these tools are the subject of research. Neither FRAX nor Garvan include measurements of cortical architecture, important for bone strength, and providing independent information beyond the conventional approaches. We tested the hypothesis that cortical parameters are associated with fracture risk, independent of FRAX and Garvan estimates.

Methods: This nested case-control study included 211 postmenopausal women aged 54–94 years with nonvertebral fractures, and 232 controls from the Tromsø Study in Norway. We assessed FRAX and Garvan 10-year risk estimates for fragility fracture, and quantified femoral subtrochanteric cortical porosity, thickness, and area from CT images using StrAx software.

Results: Per standard deviation higher cortical porosity, thinner cortices, and smaller cortical area, odds ratio (95%CI) for fracture was 1.71 (1.38–2.11), 1.79 (1.44–2.23), and 1.52 (1.19–1.95), respectively. Cortical porosity and thickness, but not area, remained associated with fracture when adjusted for FRAX and Garvan estimates. Adding cortical porosity and thickness to FRAX or Garvan resulted in greater area under the receiver operating characteristic curves. When using cortical porosity (>80th percentile) or cortical thickness (<20th percentile) combined with FRAX (threshold >20%), 45.5% and 42.7% of fracture cases were identified. When using cortical porosity or thickness combined with Garvan (threshold >25%), 51.2% and 48.3% were identified. Specificity for all combinations ranged from 81.0–83.6%. Measurement of cortical porosity or thickness identified 20.4% and 17.5% fracture cases missed by FRAX, and 16.6% and 13.7% fracture cases missed by Garvan.

Conclusions: Cortical parameters may help to improve identification of women at risk for fracture.

P957

LOW MUSCLE POWER AND MUSCLE FATIGUE ARE ASSOCIATED WITH SLOWER GAIT SPEED AMONG FRAIL OLDER ADULTS

N. C. Rodrigues¹, J. M. Porto², L. T. Marques², E. O. Angeluni², F. Pessanha³, N. M. C. Alves³, R. C. F. Junior², E. Ferriolli³, D. C. De Abreu²

¹Department of Health Sciences Biomechanics, Medicine and Rehabilitation of Locomotor System, University of São Paulo, School of Medicine, ²Department of Biomechanics, Medicine and Rehabilitation of Locomotor System, University of São Paulo, School of Medicine, ³Department of Clinical Medicine, School of Medicine of Ribeirão Preto, University of São Paulo, Ribeirão Preto, Brazil

Objective: To evaluate which aspect of muscle function between muscle power and muscle fatigue is associated with lower gait speed in frail older adults.

Methods: Twenty older adults aged 65 years or older were divided into 2 groups: non-frail group (n=10) and frail group (n=10). Frail individuals are selected according to frail phenotype¹. Knee extensor and flexor muscle power and muscle fatigue; and ankle dorsiflexor and plantarflexor muscle power and muscle fatigue were assessed using the isokinetic dynamometer (180°/s). Gait speed was made through the Platinum 26^o GAITRite Portable Walkway System.

Results: The results showed that frail group had significant lower gait speed ($p=0.003$) than non-frail group. In the univariate analysis, the adjustment of gait speed variable was organized into different sets: first each variable of muscle function (power and fatigue) from knee and ankle was used individually to perform adjustment in gait speed; second with model 1, knee extensor and flexor muscle power and ankle dorsiflexor and plantarflexor muscle power; and third with model 2, knee extensor and flexor muscle fatigue and ankle dorsiflexor and plantarflexor muscle fatigue. In the first analysis the difference between groups remained,

showing that muscle power or muscle fatigue from both joints does not interfere in the gait speed if they are analyzed individually. The models 1 and 2 adjusted by muscle power and muscle fatigue variables explain the differences encountered between frail and non-frail groups, suggesting that not one muscle group but the decrement of all muscle power and muscle fatigue from knee and ankle joints in frail older adults lead to low gait speed.

Conclusion: Slower gait speed is associated to high risk of falling in frail older adults² and sarcopenia is one of factors that contribute to frailty³. Thus, the results from this study show that low muscle power and muscle fatigue are both responsible for the low gait speed in frail older adults and treatment must include physical training of knee flexor and extensor, and ankle plantar flexor and dorsiflexor muscle power and muscle fatigue.

References:

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2. Villacampa-Fernández P et al. Maturitas 2017;95:31
3. Cesari M et al. Eur J Int Med 2016;35:1

P958

EVALUATION OF INTERFERENTIAL CURRENTS IN THE TREATMENT OF COMPLEX REGIONAL PAIN SYNDROME AFTER DISTAL RADIUS FRACTURE

I. Dimitrijevic¹, M. Kocić², M. Lazović³, D. Mancić⁴, R. Filipov¹

¹Institute for Treatment and Rehabilitation “Niška Banja”, ²Clinic for Physical Medicine and Rehabilitation, Clinical Center Niš, ³Institute for Rehabilitation Belgrade, ⁴Department of Electronics, Faculty of Electronic Engineering, University of Niš, Niš, Serbia

Objective: In complex regional pain syndrome (CRPS), substance P in addition to being responsible for hyperthermia and edema, also plays a role in the development of localised patchy osteoporosis. The aim of this study was to evaluate, the effects interferential currents in the treatment patients with CRPS type I after distal radius fracture.

Methods: The prospective randomized study included 14 patients with unilateral CRPS type I after distal radius fracture, that had been diagnosed clinically on the basis of the modified research diagnostic criteria defined by the Budapest consensus group. In all patients, radiographic findings were shown a localised loss of bone density in the affected extremity. Patients were treated with interferential currents and kinesiotherapy at the Clinic of Physical Medicine and Rehabilitation of the Clinical Center Nis (Serbia). Bipolar interferential current therapy was applied, with 90 Hz frequency, for 15 min with electrodes positioned locally on the painful and swollen part. The following parameters were assessed before and after the 20 therapeutic procedures had been applied: a) temperature asymmetry between the symmetrical regions of interest (ROIs) by using infrared thermography (Varioscan high resolution 3021) b) the circumference of the affected part of the extremity using a figure-of-eight measurement. Temperature asymmetry was calculated as the temperature difference in maximal temperature values, between ROIs of unaffected and affected lower extremity ($\Delta T_{\max}$). Hand edema (ΔO -hand) was expressed as the difference between hand circumference of both hands.

Results: The quantitative analysis of the thermograms, before the applied therapy, was measured the mean $\Delta T_{\max}$ $1.19 \pm 0.48^\circ\text{C}$, which after the applied therapy was statistically significant reduced to $0.62 \pm 0.33^\circ\text{C}$ ($t=5.842$; $p<0.01$). Before the applied therapy was measured the mean ΔO -hand 2.86 ± 0.77 cm, which after the applied therapy was statistically significant reduced to 1.39 ± 0.65 cm ($t=10.988$; $p<0.001$).

Conclusion: Interferential current therapy might be effective in the treatment of post-traumatic CRPS type I.

P959

BURDEN OF MUSCULOSKELETAL DISORDERS IN MEXICO AT NATIONAL AND STATES LEVELS, 1990-2016: ESTIMATES FROM THE GLOBAL BURDEN OF DISEASE STUDY 2016P. Clark¹, E. Denova-Gutiérrez², C. Razo-García³, M. J. Rios-Blancas³, R. Lozano⁴¹Unidad de Investigación en Epidemiología Clínica, Hospital Infantil de México Federico Gómez, Mexico, Mexico, ²Centro de Investigación en Nutrición y Salud, Instituto Nacional de Salud Pública, Cuernavaca, Mexico, ³Instituto Nacional de Salud Pública, Cuernavaca, Mexico, ⁴Institute for Health Metrics and Evaluation, University of Washington, Seattle, USA**Objective:** To describe the burden of musculoskeletal (MSK) disorders in Mexico at national and state level from 1990 to 2016 using data from the global burden of disease study 2016 (GBD 2016 Study).**Methods:** In Mexico and its 32 states, burden estimates of years lived with disability (YLDs) and disability-adjusted life years (DALYs) of MSK disorders (osteoarthritis, rheumatoid arthritis, gout, neck pain, low back pain and "other MSK") from 1990-2016 were made. For YLDs: first, DisMod-MR 2.1, Bayesian meta-regression procedure was used to assess prevalence by cause and sequelae; second, prevalence was multiplied by the disability weight, in this point, we defined mutually exclusive sequelae for each disorder; third, micro-simulation to adjust for comorbidity; and fourth, to aggregate to cause level were made. For DALYs, were added YLDs and years of life lost (YLL, the sum of each death multiplied by the standard life expectancy at each age). We compared subnational burden according to states grouped by sociodemographic index.**Results:** At national level, MSK were the sixth greatest cause of DALYs in 2016, accounting for 1.95 million (95% UI: 1.4-2.5%). Among all MSK, low back and neck pain had the highest all-age DALYs rate and signified 3.6% of total DALYs. At national level the YLDs of MSK disorders were higher in females (1677.9, 95% UI: 1213.5- 2209.4) than in males (1224.7, 95% UI: 887.2 to 1608.3). At the national level, only 16% of YLDs caused by all MSK disorders could be attributed to the risk factors currently assessed in GBD 2016.**Conclusion:** In Mexico, MSK conditions are an important cause of disability. Involving researchers and policy makers should be a priority in order to create preventive actions to be promoted by health systems to reduce the burden of MSK disorders.

P960

MEAN AND CUTOFF VALUE OF HAND GRIP STRENGTH FOR HEALTHY INDONESIAN YOUNG ADULTSA. Kurniawan¹, D. Widjaja², N. P. H. Lugito¹¹Internal Medicine, Faculty of Medicine, Pelita Harapan University,²Faculty of Medicine, Pelita Harapan University, Tangerang, Indonesia**Objectives:** To know gender specific distribution of the hand grip strength (HGS) value and to determine cutoff values for low muscle strength of HGS of Indonesian population.**Methods:** This study was conducted in our institution on January 2018. Healthy young adults with age 16-40 years old were included. BMI <18.5 kg/m² was excluded. Participants were randomly selected from the faculty data base. HGS was measured using a digital hand dynamometer JAMAR. Grip strength was measured in a standing position with the forearm away from the body at the level of the thigh. Participants were asked to apply the maximum grip strength three times. It was defined as maximal measured grip strength of the dominant hand. The cutoff values for low muscle strength was defined at 2 standard deviations below the mean reference value. All statistical analysis was done using the statistical package SPSS version 20.0 for Mac.**Results:** A total of 282 eligible participants were enrolled to this study. Twenty subjects were excluded because of BMI <18.5. Most of them were female 181 (64.18%). The median of age was 19.0 (16-38) year

old. The median of BMI was 23.35 (18.6-41.73). The mean of HGS were 23.90±4.64 for female and 37.37±8.29. The cut off for lower muscle strength were 14.62 for female and 20.79 for male.

Conclusion: The mean of HGS were 23.90±4.64 for female and 37.37±8.29. The lower muscle strength cutoff for Indonesian was 14.62 for female and 20.79 for male. Further study need to be done to confirm this result.**References:**

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2. Yoo J et al. J Korean Med Sci 2007;32:868
3. Chen LK et al. J Am Med Dir Assoc 2014;15:95

P961

BMD IN CHILDREN AND ADOLESCENTS WITH CEREBRAL PALSY IN RELATION TO THE BMIA. Delalić¹, M. Zonić-Imamović¹, A. Čičkušić¹¹Department of Physical Medicine and Rehabilitation, University Clinic Center Tuzla, Tuzla, Bosnia-Herzegovina**Objective:** Cerebral palsy (CP) is the most common cause of childhood disability. Physical inactivity and malnutrition are important secondary health problems that affect the general health and wellbeing of people with CP and their families. Our aim was to determine the BMD in children and adolescents with CP in relation to the BMI.**Methods:** The BMD has been analyzed at 82 children and adolescent with CP, average age 10.8±3.6 years (age between 5-19.4 years). The BMD was measured in lumbar spine region with DXA and results are determined as Z-score. The evaluation of the level of nutrition was performed based on BMI percentiles established according to sex and chronological age, based on the national norms "2000 Centers for Disease Control and Prevention Growth Charts for the USA." Relation between variables has been used by Pearson correlation, with statistical significant p<0.05.**Results:** Reduced bone density defined as BMD Z-score ≤ -2.0 was recorded in 45.1%, and as BMD Z-score -1.0 to -2.0 in 25.6% of subjects. The average BMD Z-score of the subjects is -1.72. Deviations from normal nutrition were recorded in 41.5% of subjects, of which 22% were malnourished (BMI<5.percentil), 11% were overweight (BMI of 85. to 95.percentile) and 8.5% obese (BMI> 95th percentile). A high prevalence of decreased BMD of 94% was reported in the malnourished, compared to 40% of those with normal weight and 20% in the overweight, while none of those who were obese had a reduced BMD (p<0.001). The average BMD Z-score in the malnourished was -2.66, normally-feeding -1.63, overweight -0.87 and obese -1.06, indicating a statistically significant correlation between BMD and BMI (p<0.001).**Conclusion:** Most children and adolescents with CP have reduced bone density, especially undernourished children. Malnutrition is one of the important predictors of bone density reduction, which should be the basis for interventional bone health measures for people with disabilities.

P962

DIAGNOSTIC ACCURACY OF FRAX AND DIAGNOSTIC PERFORMANCE OF FRAX THRESHOLDS TO IDENTIFY PATIENTS WITH FRACTURES AS ELIGIBLE FOR ANTIOSTEOPOROTIC TREATMENT AMONG PATIENTS WITH AND WITHOUT TYPE 2 DIABETES MELLITUST. Yalochkina¹, N. Tarbaeva², L. Rozhinskaya², G. Melnichenko², K. Dzerabova², Z. Belaya²¹City Polyclinic No. 219 Moscow City Health Department, ²The National Research Centre for Endocrinology, Moscow, Russia**Objective:** To evaluate the diagnostic accuracy of Russian FRAX algorithm and diagnostic performance of Russian and surrogate European thresholds of the 10-year probability of major osteoporotic fracture evaluation to select patients with any fracture and/or vertebral fracture for

antiosteoporotic treatment among patients with and without type 2 diabetes mellitus (T2DM).

Methods: We enrolled 498 patients (249 suffered from T2DM) older than 45 who were under observation in an outpatient clinic of Moscow without documented medical history of osteoporosis. The patients were invited to calculate individual ten year probability of fracture (FRAX) using the Russian model. T2DM or DXA were not entered as an additional risk factor. After that all subjects underwent lateral radiograph of vertebrae Th4-L5 via standardized protocol assuming that the presence of vertebral fracture is as a gold standard to diagnose osteoporosis. Vertebral fracture was diagnosed if visual inspection perceived at least a 20% reduction in vertebral height. The ten year probability of major osteoporotic fracture (%) was registered to decide whether the patient needs to be treated according to Russian [1] or surrogate European [2] age-dependent intervention thresholds.

Results: The enrolled population (n=498) was 65 (95%CI 64-67) years old, 93 males and 406 females; 108 patients reported non-vertebral fractures as a result of a fall from a standing height; none of the subjects reported vertebral fractures. However, typical osteoporotic fractures of one or more vertebrae were found in 78 subjects. In total 168 patients had any fractures, multiple fractures were registered in 52 cases and in 21 cases patients had both nonvertebral and vertebral fractures. Female patients with T2DM had more non-vertebral fractures compared to female subjects without diabetes, no other differences were found. All patients with T2DM had an appropriately controlled diabetes with mean HbA1c 7.46 (95%CI 7.46-7.96) ROC- analysis demonstrated AUC = 0.884 (95%CI 0.851-0.917) for FRAX to indicate patients with any fractures and AUC = 0.553 (95%CI 0.486-0.621) to indicate patients with vertebral fractures only, which were unknown at the time of FRAX calculation. Among patients with any low-traumatic fractures only 42 patients (12.6%) were selected for treatment using Russian intervention threshold [1] (sensitivity 25% (95%CI 19-33%)) and among them only 6 patients out of 78 with confirmed vertebral fractures were recommended for treatment (sensitivity 7.7% (95%CI 3.5-15.8)). Surrogate European intervention threshold [2] selected 88 patients with any fractures for antiosteoporotic treatment (sensitivity 52.4% (95%CI 44.9-58.8)) and among them 14 patients with confirmed vertebral fractures (sensitivity 16% (95%CI 11.0-27.9%)).

Conclusion: FRAX tool demonstrates an appropriate diagnostic accuracy to differentiate Russian patients with low-traumatic fractures independently of the T2DM. However, the existing intervention thresholds most likely underestimates the immediate needs for antiosteoporotic treatment. Regarding vertebral fracture different approach should be used for preselection of patients who needs vertebral radiograph and the following antiosteoporotic treatment.

References:

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2. Kanis JA et al. Osteoporos Int 2013;24:23

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IS THERE PREVENTABLE MORTALITY IN THE POSTOPERATIVE PERIOD OF HIP FRACTURE PATIENTS?

A. Naraen¹, C. Roberts¹, L. Hamlet¹

¹St. Helens and Knowsley Hospitals NHS Trust, Prescott, UK

Objective: To identify the risk factors leading to increased risk of mortality in patients with neck of femur fracture treated surgically in a district hospital in UK.

Method: Retrospective study of records of patients with neck of femur fracture admitted between 1 January 2017 to 31 December 2017 was made.

Results: 475 patients with neck of femur fracture were admitted between January to December 2017. During the first quarter of the year, 99

patients were admitted. According to review of records, the average time to surgery was 32.2 h from the time patient presented to the Emergency Department. The 30 day mortality was 8.9% in the first quarter of 2017. The mortality then was compared within the period of August to October 2017. There was significant improvement noted in the mortality rates to 7.2%. Time to surgery was 33.6 h.

Conclusion: Review of records revealed co-morbidities including COPD, hypertension, atrial fibrillation, diabetes mellitus and ischaemic heart disease in our patients leading to poor outcome, higher than national mortality rate, increased post-operative stay in hospital. To help identify the risk factors and improve mortality rate and subsequently best practice tariff performance, the following implementations were made within the trust:

- NOF BPT education programme
- New NOF lead nurse
- 5 day Ortho-Geriatrician cover
- Implementation of NOAC policy
- Monthly NOF forum

Conclusion: The improved performance was seen within the trust with implementation of new policies. Comorbidities did play a significant role in the incidence of high mortality, but did not show any increase in avoidable mortality.

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AGE AND GENDER-SPECIFIC REFERENCE VALUES OF MUSCLE STRENGTH AND APPENDICULAR LEAN BODY MASS IN MEXICAN CHILDREN AND ADOLESCENTS

A. Almiray-Soto¹, E. Denova-Gutiérrez², D. López-González³, M. Medeiros Domingo⁴, P. Clark³

¹Clinical Epidemiology Research Unit, Hospital Infantil de México Federico, México, ²Nutrition and Health Research Center, National Institute of Public Health, Cuernavaca, ³Clinical Epidemiology Research Unit, Hospital Infantil de México Federico Gómez, México, ⁴Department of Research in Nephrology, Hospital Infantil de México Federico Gómez, México, Mexico

Objective: The evaluation of muscle strength and appendicular lean body mass is an useful tool to assess children's health and nutrition status. Our aim was to develop age- and gender-specific reference values of muscle strength and appendicular lean body mass (ALBM) in Mexican children and adolescents.

Methods: The present project is a cross-sectional study in children and adolescents aged 5-20 years, clinically healthy, residents of Mexico City. Muscle strength of upper limbs were measured by dynamometry (JAMAR PLUS digital), and ALMB by DXA (Lunar iDXA GE)). BMI was obtained from standardized measurements of weight and height. Trained nurses performed all measurements according to standardized procedures. A descriptive analysis was carried out stratifying by age and gender in order to obtain the reference values of strength and ALMB. Finally, the relationship between both measurements was evaluated using Pearson correlation coefficients.

Results: A total of 550 children (299 men, and 215 women) were measured, the average values of muscle strength ranged from 6.4-35.6 kg in boys, and 5.7-22.7 kg in girls. The correlation between strength and ALMB of upper limbs was $r=0.82$ to 0.60 in boys and girls, respectively.

Conclusion: A gradual increase in strength and appendicular lean body mass was observed in both genders, the increase being more noticeable in boys after the pubertal outbreak. There is a high correlation between muscle strength and appendicular lean body mass of upper limbs in healthy children and adolescents. The evaluation of muscle strength and appendicular lean body mass in this age group will allow early detection of musculoskeletal disorders.

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IMPROVED PREDICTION OF REGIONAL TRABECULAR BONE VOLUME FRACTION IN THE VERTEBRAL BODY BY APPLICATION OF REGIONAL BMD AND TBS MEASUREMENT IN LATERAL PROJECTION

P. Milovanovic¹, A. Vom Scheidt¹, E. F. G. Seifert¹, C. Pokrant¹, K. Püschel¹, M. Amling¹, B. Busse¹

¹University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Objective: To improve clinical assessment of vertebral fracture risk, our objective was to determine if DXA-based 2D parameters (BMD, TBS) can reflect regional variability in 3D bone volume fraction of the vertebral body.

Methods: T12 vertebrae from 31 women postmortem (12 young: 32±6 years, 19 aged: 71±5 years) were subject to DXA in anterior-posterior (AP) and lateral projections, providing global BMD and TBS values for both. Regional BMD and TBS were measured for three horizontal (superior, middle, inferior – on AP and lateral scans) and three vertical regions (anterior, middle, posterior – on lateral scans) of the vertebra. High-resolution quantitative CT assessed trabecular bone volume fraction (BV/TV) of the entire vertebra, three horizontal (superior, middle, inferior) and three vertical segments of the vertebral body (anterior, middle, posterior).

Results: BV/TV of the entire vertebra was best predicted by lateral BMD in young persons ($R^2=0.92$, $p<0.001$), while in aged cases variability in BV/TV was best reflected by a combination of lateral BMD and AP TBS ($R^2=0.68$, $p<0.001$). In young, all segmental BV/TV were predicted perfectly by the corresponding regional BMD in the lateral projection (R^2 : 0.84–0.94, $p<0.001$), while superior lateral TBS additionally improved prediction in the superior segment. Segmental analysis in aged individuals showed that regional BMD values in lateral projection were the strongest predictor of the corresponding segmental BV/TV (R^2 : 0.48–0.80, $p<0.01$), with an additional improvement when including regional AP TBS for superior, anterior and middle vertical segment ($R^2=0.66$, 0.60, 0.60, respectively), or lateral regional TBS for inferior segment ($R^2=0.62$).

Conclusions: Since vertebral fracture patterns depend on regional variations in trabecular bone volume fraction, assessment of regional BMD in lateral projection combined with AP or lateral TBS may improve the prediction of vertebral bone strength and fracture susceptibility.

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FACTORS INFLUENCING BMD IN PATIENTS WITH CHRONIC STROKE

K. Bošković¹, D. Simić Panić¹, S. Tomašević Todorović¹, A. Knežević¹, S. Pantelinac¹

¹Medical Faculty of Novi Sad, Department for Medical Rehabilitation, Clinical Center of Vojvodina, Novi Sad, Serbia

Objective: To determine the effect of gait pattern, balance and muscle strength on hip BMD of the hemiparetic side in patients 12–24 months post stroke.

Methods: Sixty-two participants (male; 46.3%), mean age 57.4±12.9 with motor impairments (hemiparesis) underwent DXA scan. In all patients we analyzed gait characteristics (step length, gait symmetry) and balance (Berg Balance Scale). We also measured isometric muscle strength of ankle dorsiflexors on the hemiparetic side.

Results: Low total hip BMD on the hemiparetic side was found in 45.3% participants. In patients with low BMD, 82.1% had asymmetric gait indicating greater reliance on the non-paretic leg for weight bearing. 86.5% participants with low BMD had impaired balance, and 76.2% had impaired balance. After logistic regression analysis was performed we found that predictors of low hip BMD were low strength of hemiparetic-side ankle dorsiflexors, impaired balance and gait asymmetry.

Conclusion: Decreased BMD of the hemiparetic side hip is present in almost half of patients with lower limb motor impairments. These stroke

patients are also at greater risk of falls due to balance impairment. Balance, gait pattern and muscle strength of ankle dorsiflexors can be improved by extensive rehabilitation treatment. Therefore rehabilitation is important part of treating the patient with chronic stroke.

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DOES COMBINED OSTEOPENIA/OSTEOPOROSIS AND SARCOPENIA CONFER GREATER RISK OF FRACTURE THAN EITHER CONDITION ALONE IN OLDER MEN? THE CONCORD HEALTH AND AGEING IN MEN PROJECT

D. Scott¹, M. Seibel², R. Cumming², V. Naganathan², F. Blyth², G. Le Couteur², J. Handelsman², M. Waite², V. Hirani²

¹Monash University, Clayton, ²University of Sydney, Sydney, Australia

Objectives: To determine whether older men with combined osteopenia/osteoporosis and sarcopenia (so called “osteosarcopenia”) are at greater risk of falls and fractures than older men with either condition alone.

Methods: 1575 community-dwelling men aged ≥70 years had appendicular lean mass, total hip and lumbar spine BMD determined by DXA, and completed hand grip strength and gait speed tests. Osteopenia/osteoporosis was defined as a T-score at any site ≤−1.0SD. Sarcopenia was defined using the European Working Group on Sarcopenia algorithm. Participants were contacted every four months for 6±2 years to ascertain incident fractures (confirmed by radiographic reports) and for two years for incident falls. Multivariable negative binomial regressions and Cox proportional hazards regression models examined two-year incident falls rates and hazard ratios for six-year fractures, respectively, for osteosarcopenic men compared with osteopenic/osteoporotic alone, sarcopenic alone and non-osteopenic/osteoporotic non-sarcopenic groups. Analyses were adjusted for age, income, living alone, number of comorbidities, smoking status, psychotropic and corticosteroid use, physical activity and vitamin D levels.

Results: Prevalence of osteosarcopenia was 8%, while 34% of participants had osteopenia/osteoporosis alone and 7% had sarcopenia alone. Men with osteosarcopenia had significantly increased fall (incidence rate ratio: 1.40; 95%CI: 1.02, 1.93) and any fracture rates (hazard ratio: 1.85; 95%CI: 1.06, 3.23) compared to men with neither osteopenia/osteoporosis nor sarcopenia. However, there was no statistical interaction between osteopenia/osteoporosis and sarcopenia, and falls and fracture rates were not different for osteosarcopenia compared to either osteopenia/osteoporosis or sarcopenia alone (all $P>0.05$) after adjustment for potential confounders. In continuous analyses of components of osteosarcopenia, higher baseline total hip BMD (odds ratio: 0.02; 0.01, 0.07 per g/cm²), but not higher lean mass, gait speed or grip strength (all $P>0.05$), was predictive of reduced likelihood of six-year fractures at any site.

Conclusions: Community-dwelling older men with combined osteopenia/osteoporosis and sarcopenia do not have increased falls and fracture risk compared to those with either condition. These findings suggest that the concept of “osteosarcopenia” has limited clinical value for identifying older men who should be targeted for falls and fracture prevention.

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LUMBAR MULTIFIDUS MYOFASCIAL MECHANICAL PHYSICAL PROPERTIES IN HEALTHY ADULTS USING DIFFERENT DEVICES

S. Rodrigues-Manica¹, J. L. Gomes¹, M. Santos¹, S. Ramiro², A. Sepriano², P. Gomes-Alves³, C. Crespo¹, C. Costa⁴, J. C. Branco¹, F. M. Pimentel-Santos¹

¹CEDOC, NOVA Medical School, Faculdade de Ciências Médicas, Universidade NOVA de Lisboa, Lisbon, Portugal, ²Leiden University Medical Center, Leiden, The Netherlands, ³Instituto de Biologia Experimental e Tecnológica, Universidade NOVA de Lisboa, ⁴Instituto de Tecnologia Química e Biológica, Universidade NOVA de Lisboa, Oeiras, Portugal

Objective: Inflammation and aging induce pathological muscle changes characterized by early tissue water changes, and intramuscular fat accumulation in chronic stages. Muscle physical properties might affect disease progression and health-related quality of life. Tools to measure these properties are available but yet poorly studied. Our aim was to provide objective data on mechanical physical properties – stiffness, tone, and elasticity of the lumbar multifidus (LM), the primary stabilizing spinal muscle in healthy subjects.

Methods: This was a pilot study of 16 healthy subjects (aged 18–50 years; n=7 males). Subjects with previous spine surgery or disease were excluded; all participants had right side dominance. Muscle tone, elasticity and stiffness were measured using the MyotonPRO® device. Elasto Mean Pressure and Mean Speed were measured using a Shear Modulus Elastography device. Descriptive statistics are provided, males were compared to females.

Results: Mean (right and left side together) LM stiffness and tone were numerically higher (but not statistically significant: both, $p=0.06$) in males as compared to females. In the dominant side (right), males had significantly higher stiffness (males 297.5 vs. females 211 N/m, $p=0.02$) and tone (male 15.1 vs. 13.2 Hz, $p=0.03$). Elasticity, evaluated by MyotonPRO, and mean pressure and mean speed, evaluated by Elastography, did not differ between genders or side (see Table).

Conclusions: Lumbar multifidus stiffness and tone is greater in males compared to females in dominant side. Gender and side differences might be important to consider when assessing effects of pathological conditions on muscle properties.

Table - Lumbar multifidus mechanical properties measured by MyotonPRO and Shear Elastography

Table - Lumbar multifidus mechanical properties measured by MyotonPRO and Shear Elastography

Mechanical Properties	Males (n=7)	Females (n=9)	p-value
MyotonPRO			
Stiffness (N/m), Median (IQR)			
Total*	291.3 (214–376.5)	204.1 (157.3–265.1)	0.06
Left	285 (203–344.5)	209.8 (187.3–280)	0.20
Right	297.5 (230–346)	211 (194.8–252.3)	0.02
Elasticity (logD), Median (IQR)			
Total*	1.1 (1–1.2)	1.1 (0.9–1.2)	0.49
Left	1.2 (0.9–1.2)	1 (0.9–1.2)	0.64
Right	1.2 (1–1.2)	1.1 (0.9–1.3)	0.69
Tone (Hz), Median (IQR)			
Total*	14.6 (13.6–17)	13.2 (12.7–14.5)	0.06
Left	14.5 (13.6–15.2)	12.9 (12.6–15.2)	0.13
Right	15.1 (13.7–16.9)	13.2 (12.8–14)	0.03
Shear Wave Elastography			
Mean Pressure (kPa), Median (IQR)			
Left	12.8 (11.4–15.6)	15 (12.1–19.3)	0.12
Right	13.6 (13–14.7)	17.4 (12.6–18)	0.44
Mean Speed (m/s), Median (IQR)			
Left	2 (1.9–2.2)	2.2 (2.1–2.5)	0.12
Right	2.1 (2.1–2.2)	2.4 (2.2–4)	0.13

*Total = mean left-right

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EFFECT OF DIVIDED ATTENTION OVER MOTOR PERFORMANCE AND BALANCE IN FRAGILE PEOPLE WITH AND WITHOUT COGNITIVE IMPAIRMENT

L. H. Caamaño-Barrios¹, J. Ibañez Pérez²

¹Gimbernat University School, Physical Therapy Department,

²Gimbernat University School, Cantabria, Spain

Objective: Frailty is a syndrome which consists in the reduction of strength, resistance and physiologic functions, being cognitive impairment associated often. In the present study some factors related with frailty and cognitive impairment (CI) such as: falls, balance and motor performance are revised while a dual or single task is developed. Our aim was to analyze the influence on balance, motor performance and gait due to the fact of develop a concentrated task (single task) or a divided attention task (dual task) in fragile candidates with or without CI.

Method: 1SD years and Frailty with CI 76.1±8.8 SD years ($p>0.05$). The assessment included Tinetti Balance Scale, timed up & go test (TUG) and short physical performance battery (SPPB). The statistical analysis used, were Student's t-test, Mann-Whitney U test and

the Wilcoxon signed rank test. The statistical significance was established in $p\leq 0.05$ with a 95%CI.

Results: All test showed similar start values between groups, in the single task assessment ($p>0.05$) being no significant statistically. However, there have been found significant differences in the same group assessment related with practice of single or dual-task. In Frailty without CI group Tinetti test were 21.6±4.3 SD; 19±5.2 SD ($p=0.000$); SPPB were 8.3±2.4 SD; 5.6±1.4 SD ($p=0.000$); TUG test were 19.57±10.29 SD; 22.62±7.23 SD ($p=0.059$). In frailty and CI, values were: Tinetti 21.5±4.4 SD; 20.8±4.8 SD ($p=0.45$); SPPB 6.8±2.2 SD; 5.5±1.9 SD ($p<0.05$); TUG were 23.04±12.42 SD; 32.06±16.53 SD ($p<0.05$), respectively.

Conclusion: The performance of a task requiring divided attention generates changes in balance and physical performance in fragile people with or without cognitive impairment, what should be taken into consideration to prevent falls and also to eliminate environmental distractions. Rehabilitation programs must adjust demands to achieve improvements in balance or progress in an appropriate manner.

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HORMONE THERAPY, PHYTOESTROGEN AND SERMS FOR OSTEOPOROSIS PREVENTION ON CLIMACTERIC WOMEN: AN INDIVIDUALIZED TREATMENT SELECTION

A. Pedro¹, A. V. Moraes¹, N. Monteiro¹, L. Costa-Paiva¹

¹Department of Obstetrics and Gynecology, School of Medical Sciences, University of Campinas (UNICAMP), Campinas, Brazil

Objective: Postmenopausal osteoporosis affects millions of women, being estrogen deficiency the key factor in the pathogenesis of involutional osteoporosis. Our aim was to assess the effect of hormone replacement therapy (HRT), phytoestrogen and selective estrogen modulators (SERMs) on prevention of osteoporotic fragility fracture in menopausal women.

Methods: An update on efficacy of HRT, phytoestrogen and SERMs on bone based on focused literature reviews.

Results: In women with hypoestrogenism, HRT at different types, doses and routes of administration rapidly normalizes bone turnover, preventing and treating osteoporosis. HRT is able to preserve and even increase bone mass at all skeletal sites, leading to a significant reduction in vertebral and nonvertebral fractures. Tibolone (1.25 mg/d) reduced the risk of vertebral and nonvertebral fracture, vasomotor symptoms without stimulating breast or uterine tissue. SERMs as raloxifene reduces risk for vertebral fractures in postmenopausal women with osteoporosis. Long term use of raloxifene decreases risk for breast cancer among women at higher risk for this condition. Raloxifene may be appropriate initial therapy in some cases where patients requiring drugs with spine-specific efficacy and it may be particularly attractive in patients who are also at high risk of breast cancer. The combination of a SERM with an estrogen has been defined as tissue selective estrogen complex. The bazedoxifene with conjugated estrogen is able to reduce climacteric symptoms, reducing bone turnover and preserving bone mass. Studies investigating the actions of phytoestrogens on bone mass or bone turnover are largely contradictory, making them inconclusive.

Conclusion: Hormone therapy and SERMs may be considered as a primary therapy for prevention of bone loss and fracture in postmenopausal women at elevated risk of osteoporosis or fractures. However, it is important to consider secondary benefits, side effects, contraindications, cost and likelihood of adherence.

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THE PHENOTYPE OF LOCOMOTIVE SYNDROME IN THE ELDERLY AGED 80 YEARS OR MORE

M. Arbex¹, J. E. F. Okazaki¹, D. R. B. Tavares¹, A. L. F. Bersani¹, F. C. Santos¹

¹Federal University of São Paulo (UNIFESP), Discipline of Geriatrics and Gerontology, Pain and Osteoarticular Diseases Group, Sao Paulo, Brazil

Objective: Identify the phenotype of elderly people with 80 years or more, independents, residents of the community of the city of São Paulo, with Locomotive Syndrome (SLo) and trace their clinical, functional, social and metabolic aspects.

Methods: This is an observational, descriptive, cross-sectional epidemiological study of the LOCOMOV Project. In the years 2016-2017, 102 people (mean age 87.2 y, 73.5% female) were examined using questionnaires related to SLo diagnostic (GLFS 25-p), Basic and Instrumental Daily Living Activities (Katz and Lawton, respectively), quality of life (WHOQOL-Bref), social participation (social dimension of WHOQOL-OLD) and physical performance tests (4m Gait Speed-GS4m, 5-Sit and Stand Test - SS5x, Two-Step-test -TSS and Hand Grip-HG). In the statistical analysis, Student's t-tests, chi-square, Wilcoxon and multiple logistic regression (stepwise) were performed. The significance level was set at 0.05 (5%).

Results: A cutoff score of 19 (sensitivity of 0.8681 and specificity of 0.6737) for the GLFS 25-p instrument was identified for the diagnosis of SLo in elderly with 80 years or more, comparing it with other functional mobility tests: GS4m (cutoff point of 0.8 m/s), SS5x (cutoff point of 14.8 s) and TSS (adopted 1.1). SLo had a high prevalence (55%) and was significantly associated with chronic pain (OR 12.04, 95%CI 4.66-31.13), osteoarthritis (OA) of hands (OR 2.78, 95%CI 1.090-7.120), of the spine (OR 2.52, 95%CI 1.100-5.780) and knee (OR 2.346, 95%CI 1.054-5.219), and was also significantly associated with cardiovascular comorbid antecedents such as previous cerebrovascular accident (OR 7.83, 95%CI 0.941-65.15) and acute infarction of the myocardium (OR 3.28; 95%CI 0.647-16.63). Individuals with SLo also presented worse health self-perception and worse performance in the tests that assessed quality of life in all dimensions studied (psychological, environmental and physical).

Conclusion: The SLo had a high prevalence and was associated with important factors such as chronic pain and locomotor osteoarticular disorders as well as cardiovascular comorbidities. Thus, GLFS 25-p was shown to be a simple and fast instrument for the elderly and may be useful for early recognition of SLo, helping to achieve a more active aging and a better quality of life.

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SARCOPENIC FUNCTIONAL DEFICIT IS ASSOCIATED WITH HEALTH-RELATED QUALITY OF LIFE IN OLDER AUSTRALIAN ADULTS

C. Shore-Lorenti¹, P. R. Ebeling¹, K. M. Sanders², G. D. Duque³, D. S. Scott⁴

¹Department of Medicine, Monash University, ²Institute for Health and Ageing, Australian Catholic University, ³Australian Institute for Musculoskeletal Science, Western Health, Melbourne University, ⁴Department of Medicine, Monash University, Australian Institute for Musculoskeletal Science, Melbourne, Australia

Sarcopenia (the age-related loss of skeletal muscle mass and function) may compromise independence in older adults. This study aims to describe the cross-sectional association between components of sarcopenia and health-related quality-of-life (HRQoL) in Australian community-dwelling older adults.

This cross-sectional study recruited adults aged ≥ 50 years from the north-western suburbs of Melbourne, Victoria. Hand grip and knee extension strength (HGS; KES) were assessed by dynamometers, and self-selected usual gait speed was evaluated. Peripheral quantitative computed tomography scans at the 66% site of the tibia assessed calf muscle density. Appendicular lean mass (ALM; kg) was assessed using DXA. An aggregate score was calculated for the EuroQol Group's EQ-5D (with three levels of severity over five domains), and separately for the Australian tool, AqoL-6D (with 20 items over 6 domains). HRQoL was also self-reported using a general health status (GH) question with 5 levels. Physical activity, medication use and medical history were ascertained using questionnaires. Linear regression was conducted in

STATA 15. Sarcopenic functional deficit (SFD) was defined as low hand-grip strength (<20 kg for women; <30 kg for men) and low gait speed (<0.8 m/s) as per the EWGSOP cutoff points.

The 176 participants had a mean age of 67.5 ($\pm$ SD: 8.5) years and over half were women ($n=97$; 55.1%). In univariable analyses, ALM and ALM/height (kg/m^2) were not associated with EQ-5D or AqoL-6D scores, but higher ALM and ALM/height predicted worse self-reported GH (both $p<0.02$). Increased gait speed and KES were very strongly associated with improvements in all the HRQoL outcomes (all $p<0.005$), and higher HGS was associated with better AqoL-6D and EQ-5D (both $p<0.03$), but not GH ($p>0.4$). Participants with SFD had significantly worse AqoL-6D and EQ-5D scores ($p<0.005$ and $p=0.001$, respectively). Indeed, functional domains (e.g.: mobility, self-care, usual and social activities) and pain were poorer in this group (all $p<0.05$). When adjusted for age, vitamin D supplementation, muscle density and pain medication, SFD remained strongly associated with poorer AqoL-6D and EQ-5D scores (both $p<0.01$). This report adds an Australian perspective to quality-of-life in sarcopenia research and supports early screening and prevention to maintain quality-of-life in older adults.

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PATELLAR TENDON ENTHESIS ABNORMALITIES AND THEIR ASSOCIATION WITH KNEE PAIN AND STRUCTURAL ABNORMALITIES IN OLDER ADULTS

S. M. Mattap¹, D. Aitken¹, K. Wills¹, A. Halliday², C. Ding¹, W. Han¹, F. Cicuttini³, G. Graeme¹, L. Laslett¹

¹Menzies Institute for Medical Research, University of Tasmania, Hobart,

²Royal Hobart Hospital, Tasmania, Hobart, ³Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia

Objective: To describe the associations of patellar tendon enthesis (PTE) abnormalities visible on magnetic resonance (MR) images; and knee pain, physical function limitations, osteoarthritic structural abnormalities, and total knee replacement (TKR) cross-sectionally and longitudinally over 10.7 years.

Methods: PTE abnormalities were defined as presence of abnormal bone signal and/or bone erosion. They were measured on T2-weighted fat suppressed fast spin echo MR images at baseline in 961 community-dwelling older adults and followed for 10.7 years. Knee pain and physical function limitation score were assessed using WOMAC. Bone marrow lesions (BMLs), cartilage volume and defects, tibial bone area, and infrapatellar fat pad (IPFP) area were assessed using validated methods. TKR was determined by data linkage. Associations were assessed using hurdle, log binomial, linear, and mixed models, after adjusting for confounders.

Results: 20% of participants had bone signal and/or erosion at PTE. Cross-sectionally, presence of PTE abnormalities were associated with greater intensity of pain while going up and down stairs ($\beta=0.22$ (95%CI: 0.03, 0.41)), greater risk of having a femoral BML (RR=1.46 (1.22, 1.90)), greater lateral tibial bone area ($\beta=25.95$ (1.00, 50.91)), smaller IPFP area ($\beta=-0.26$ (-0.46, -0.05)), and a worse tibial cartilage defects cross sectionally (RR=1.70 (1.16, 2.47), after adjustment of demographic and structural confounders. Longitudinally, presence of PTE abnormalities at baseline predicted an increased risk of deleterious changes in tibial BML size (RR=1.52 (1.12, 2.05)), but not knee pain, function limitation, other structural changes, and incident of TKR over 10.7 years.

Conclusions: Patellar tendon enthesis abnormalities are common in the elderly. The presence of cross-sectional but not longitudinal associations suggests they commonly co-exist with other knee structural abnormalities, but that they are not be a major player in symptom development or structural changes, excepting tibial BMLs.

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complications such as deep vein thrombosis (DVT), surgical site infection (SSI), and urinary tract infection (UTI) and hospital outcomes which include length of hospital stay and patient satisfaction.

Method: The PEPPA framework was adopted as a theoretical framework for this quasi-experimental study. Sixty patients with lower back pain who underwent surgery in a tertiary hospital in Bangkok, from June, 2016 to February 2017, were selected to participate in this study based on the inclusion criteria. The control group (30 participants) received usual care, while the intervention group (n=30) received the advanced practice nurse role integrated with multidisciplinary approach program involving a hospital based intervention following a 4-week follow up after discharge from hospital. Data were analyzed using descriptive statistics, chi-square statistics, and t-test. A significant level was set at 0.05.

Results: The mean score of functional ability and physical performance between the intervention group and control group was statistically significant difference ($p < 0.05$) although the postoperative complications (DVT, SSI, and UTI) between the two groups had not significant difference ($p > 0.05$). Concerning the hospital outcomes, the length of hospital stay was not reach to a significant difference ($p > 0.05$) between the intervention and the control groups, but the intervention group had average length of hospital stay of 6.85 days shorter than in the control group (7.28 days). However, overall patient satisfaction and professional competent aspect between the two groups were statistically significant differences ($p < 0.05$), while the aspect of being sympathy and accessibility to the service and care had not a difference between groups ($p > 0.05$).

Conclusion: The advanced practice nurse role integrated with multidisciplinary approach program seems to be beneficial for patients undergoing spinal surgery. Since some outcomes were not observed the different changes, an adequate long-term follow-up to allow for observation those outcomes is needed.

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MEASURING STRONTIUM IN BONE

A. Pejovic-Milic¹

¹Ryerson University, Toronto, Canada

Objective: In vivo bone strontium analysis is an approach that is not widely available in clinical practices worldwide. Instead of collecting a sample from a person for in vitro analysis, the stored quantity of strontium is determined in vivo. It is desirable that the in vivo strontium analysis is non-invasive, thus no sample is taken and by extension, there is no discomfort to the patient. This presentation will present and review non-conventional, in vivo, radiation based strontium analysis in animal and human bones.

Methods: The in vivo X-ray fluorescence (IVXRF) based diagnostic tool, with I-125 brachytherapy seeds as an excitation source and a radiation detector, is developed for the in vivo measurement of strontium [1, 2]. Furthermore, the tool was adopted for animal measurements, allowing the investigation of different strontium salt bone uptake [3] and furthermore, the element mapping using a 3D dual energy K-edge subtraction X-ray imaging.

Conclusions: The developed non-invasive, in vivo and painless diagnostic tool have been used for both clinical use and research into the long term effects of strontium in healthy and osteoporotic patients as well as in deliberately exposed animals. It allowed the monitoring and modeling of bone strontium uptake due to the administration of strontium ranelate and citrate. As strontium bone levels continued to rise after years of its administration, the importance of monitoring patients over a long-term period, even when the treatment is stopped, and the issue of correcting for BMD test scores in such individuals becomes essential. Research directions on the future extension of the use of IVXRF will be included thus demonstrating the usefulness of the IVXRF diagnostic tool.

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IMPLEMENTATIONS OF ADVANCED PRACTICE NURSE ROLE INTEGRATED WITH MULTIDISCIPLINARY APPROACH PROGRAM IN IMPROVING SURGICAL CARE FOR PATIENTS WITH LOW BACK PAIN

A. Yosakom¹, S. Aree-Ue², P. Polpong³

¹Department of Nursing, Prasat Neurological Institute, ²Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, ³Department of Neurosurgery, Prasat Neurological Institute, Bangkok, Thailand

Objective: The aim of this study was to investigate the effects of the advanced practice nurse role integrated with multidisciplinary approach program on patient outcomes including functional ability and

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IMPLEMENTING MOBILE HEALTH TECHNOLOGY IN THE PATIENT-CENTERED MEDICALLY ORIENTED GYM SETTING TO ACTIVATE PATIENTS WITH LOW BMD: A FEASIBILITY STUDYL. Freeman¹, M. Handt², S. Ochoa³¹Aegis Therapies and Post-Acute Therapeutics and Health Clinical Research Institute, Sammamish, ²Aegis Therapies, Bloomington,³Aegis Therapies, Richfield, USA

Objective: To evaluate feasibility of implementing osteogenic loading (OL) technology and mobile device applications to promote consumer activation through health literacy on minimum dose response of multiple-of-bodyweight (MOB) compressive forces.

Methods: Integration of standard care with accessible mobile health (mHealth) and biotechnology to improve function and fracture risk is a global priority. Forces that compress bone via impact activity can stimulate adaptive response of BMD growth beyond 4.2 MOB. Twenty consumer or provider pairs from a medically oriented gym were recruited. Inclusion/exclusion: 45 years of age or older with osteopenia, sarcopenia and multiple chronic conditions. Participants received an OL session in which they were trained to use integrated mHealth applications to record impact through the lower extremities. These applications were also used to facilitate intervention adoption and fidelity which included holding the smartphone against the hip joint while jumping and absorbing impact.

Results: Tests showed 40 consistent results (20 heel and 20 hip) of 4.34 MOB at the heel, and 3.20 MOB at the hip (ANOVA $p < 0.0001$). Post-intervention survey results showed participants: 1) strongly agree that integrated technology influenced their satisfaction and decision to continue postdischarge; 2) strongly agree that OL therapy impacted confidence/functional mobility; and 3) agree that adoption and scalability is feasible with adaptations. No adverse effects were reported.

Conclusions: We leveraged widespread consumer access to mobile technology to address gaps in knowledge and adherence on dose-response to osteogenic adaptation. These data support preliminary feasibility of implementing mHealth in community-based primary care settings for patient activation for individuals at risk for fracture. Consistent with previous findings, these data support integrative use of standard care OL technology as an effective part of comprehensive bone health program. The data also reflect known level of deceleration between heel and hip loading events.

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OSTEOPOROSIS IN YOUNG FEMALE WITH ANOREXIA NERVOSA: CASE REPORTT. Bajraktarova Prosheva¹, S. Josifovska Tofiloska¹, S. Jordanova¹¹Clinical Hospital Shtip, Skopje, Macedonia

Objective: To present a case of young female with anorexia nervosa (AN) and osteoporosis, with consecutive compressive vertebral fractures on T12, L1, L4.

Case report: A 23 years old female was admitted to the hospital due the collapse during the physical activity. The past medical history showed severe weight loss in the past 5 years and amenorrhea in the past one year. She had 4 previous hospital admissions because of weight loss. A medical investigation for her weight loss was performed and organic cause was not found. Anamnestic data for starving, restricting calorie intake, eating very small amount of food and believing that she is overweight, suggested AN and psychiatrist was consulted. BMI was 15.6 kg/m², weight 41 kg, height 162 cm. During the last hospital admission she complained of mild lower back pain.

Results: Low estrogen level, low FSH, LH and GnRH levels, cortisol slightly elevated, calcium and vitamin D slightly decreased, alkaline phosphatase elevated, PTH and thyroid hormones in normal range, other laboratory findings in normal range. DXA scan was performed with

Z-score: L1 -2,8; L2 -2,6; L3 -3,1; L4 -3,0; left femoral neck -2,0; and right femoral neck -1,8; thoracolumbar X-ray showed compressive fractures of T12, L1 and L4 vertebrae. The goal of the therapeutic strategy was to gain weight, increase the bone density and regulate the menstrual cycle. The patient started with high caloric intake, estrogen replacement with oral contraceptive pills and treatment of osteoporosis with bisphosphonates (alendronate 70 mg weekly), calcium (1000 mg/d) and vitamin D supplementation (800 i.e. per day). The patient adhered to the recommended diet and therapy. After one year following, control DXA was performed with significantly improved result: Z-score of lumbar spine was L1 -2,3; L2 -2,2; L3 -2,4; L4 -2,4; left hip -1,8; right hip 1,7.

Conclusion: One of the complications of AN can be osteoporotic fractures because of low bone density induced with decreased estrogen and progesterone as well as elevated cortisol and low intake of calcium and vitamin D. Although moderate exercise in patients with AN-associated osteoporosis may be beneficial, the intensive physical activity can cause low-energy fracture.

P979

RELATIONSHIP BETWEEN VITAMIN D3 LEVEL AND BMD IN OSTEOPOROTIC PATIENTS WITH PERITROCHANTERIC FEMUR FRACTUREM. I. Majumder¹, S. Anwaruzzaman², M. Harun³, M. Halim⁴, M. Hassan⁵¹Comilla Medical College, Comilla, ²Comilla Medical College, Comilla, ³Chattagram International Dental College, Chittagong, ⁴Noakhali Abdul Malek Ukil Medical College, Noakhali, ⁵Novartis Bangladesh, Comilla, Bangladesh

Objectives: The highest morbidity and mortality in osteoporotic peritrochanteric fracture of hip of the femur gaining increasing importance which is also having relation with hypovitaminosis D. It an urgent need to develop preventive and treatment strategy. The aim of this study was to evaluate the correlation the vitamin D3 level, peritrochanteric fracture of neck of the femur and BMD among the osteoporotic patients.

Method: Total 730 osteoporotic patients with peritrochanteric fracture were included in this study. All patients were evaluated with DXA for BMD and 25-hydroxy chemiluminescent immunoassay for estimated the vitamin D3 level. All data were inserted into the preformed data sheet for data analysis. Pearson chi-square test and correlation test was performed to see the level of significance and see the relationship of Vitamin D3 and BMD of femur with peritrochanteric fracture.

Result: The results of the study showed that, the mean±SD of BMD (T-Score) in <60 years of age group A were -3.253±0.798, -3.293±0.907 and -3.855±1.046 in vitamin D sufficient (37.363±5.767 ng/ml), insufficient (24.08±2.495 ng/ml) and deficient (15.22±3.58 ng/ml) groups respectively. The mean±SD of BMD (T-Score) among >60 years of age group B were -3.215±0.678, -3.472±1.097 and -3.918±1.057 in vitamin D sufficient (37±6.012 in ng/ml) insufficient (24.716±2.841 in ng/dL) and deficient (14.191±3.885 in ng/ml) groups, respectively. Sufficient vitamin D3 level was present in only 14.8% (108) osteoporotic patients with peritrochanteric fracture, among those 98.7% (100) were adequately exposed to sunlight but rest 1.3% (8) were inadequately exposed to sunlight. But 39.04% (285) having insufficient vitamin D and 46.16% (337) of vitamin D3 deficient patients were inadequately exposed to sunlight. In Pearson chi-Square test this was statistically significant (p value=0.0001). There were no significant (p value 0.064) difference of vitamin D3 level in age group (<60 years and >60 years). The value of correlation coefficient (r) between BMD and vitamin D3 was 0.335 which had indicated that both was positively correlated each other.

Conclusion: Insufficient vitamin D3 level is associated and play key role in peritrochanteric fracture specially in those patients with inadequate sunlight exposure. The present study support the positive relationship between the hypovitaminosis D and low BMD in osteoporotic patients with peritrochanteric fracture.

P980

CLINICAL SIGNIFICANCE OF ELEVATED SERUM IMMUNOGLOBULIN G4 LEVEL IN PATIENTS WITH RHEUMATOID ARTHRITISK. Sang-Hyon¹, K. Sung-Soo², H. Seung-Jae³, L. Sang-Heon⁴, S. Chang-Nam¹

¹Division of Rheumatology, Department of Internal Medicine, Keimyung University Dongsan Medical Center, Daegu, ²Division of Rheumatology, Department of Internal Medicine, Ulsan University School of Medicine and GangNeungAsan Hospital, GangNeung, ³Department of Rheumatology, School of Medicine, Keyung Hee University, Seoul, ⁴Department of Rheumatology, School of Medicine, Konkuk University, Seoul, South Korea

Objective: Previous studies indicate that the elevated serum immunoglobulin G4 (IgG4) in rheumatoid arthritis (RA) is common and disproportional to total IgG. The aim of study is to evaluate the level of serum IgG4 and IgG4/total IgG ratio in patients with RA.

Methods: 96 patients with RA and 135 non-RA controls were enrolled between March 2014 and July 2017. All samples were collected before the treatments. The levels of Serum total IgG and IgG4 were determined by nephelometric assay. The cutoff value of serum IgG4 was 135 mg/dL. Data on clinical variables and disease activity markers, such as numbers of tender and swollen joints, levels of acute phase reactants and disease activity score 28 (DAS-28) were recorded in RA patients. We compared the levels of serum IgG4 and the ratio of IgG4/total IgG in rheumatoid arthritis with healthy controls and other rheumatic diseases. This study also investigated the difference the relationship between levels of serum IgG4 and disease activity in RA.

Results: Among 96 RA patients, the mean of serum IgG4 was 48.0±45.4 mg/dL and 6.3% had elevated serum IgG4. The mean serum IgG4/IgG ratio of RA patients was 3.5±2.8% (range 0.2~16.9%). There was no patient with elevated serum IgG4 in ankylosing spondylitis, systemic lupus erythematosus, Sjogren's syndrome, and inflammatory myositis. When the patients were divided according to clinical activity, the percentages of the positive serum IgG4 were 25% in active disease group and 4% in low activity group. However, the serum IgG4 levels of the RA patients with active disease activity were not significantly higher than those of the RA patients with low disease activity (58.3±44.3 mg/dL vs. 39.9±30.1 mg/dL). No significant relationship was observed between the ratio of IgG4/total IgG and disease activity. The IgG4 concentrations and total IgG/IgG4 ratios were similar between RA and the other autoimmune diseases (P>0.05).

Conclusion: Our results showed that elevated serum IgG4 in RA is relatively common. However the presence of the elevated serum IgG4 was not associated with disease activity of RA. Further investigations are needed to explore the clinical significance in a larger study population.

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P981

SELECTIVE EFFECTS OF STRONTIUM RANELATE ON WNT SIGNAL MOLECULES OF HUMAN OSTEOBLASTS: PRELIMINARY RESULTSB. Kovács¹, J. E. Pongrácz², L. Járomi², E. Horváth³, E. Nagy¹

¹Department of Biochemistry and Environmental Chemistry, University of Medicine and Pharmacy, Tirgu Mures, Romania, ²Department of

Pharmaceutical Biotechnology, University of Pécs, Pécs, Hungary, ³Department of Pathology, University of Medicine and Pharmacy, Tirgu Mures, Romania

Objectives: As osteoporosis represents a global health burden, it is of interest to elucidate the role of complex signalling pathways in the disease progression. Osteoblasts, the key cellular elements responsible for bone formation, are stimulated by dual action bone agents. Our study focused on the putative links between Wnt signalling and strontium ranelate's (SR) regulatory actions on human osteoblasts.

Methods: The effect of SR on Wnt signalling was assessed on normal human osteoblast cell culture (Lonza, MD, USA) in the presence of dexamethasone and IWR-1. Separately, lithium chloride (LiCl) was used as a β -catenin pathway activator. Cell culture was performed up to 18 days; RNA extraction and DNA transcription of the samples were carried out on 1, 11, and 18 days of treatment. qRT-PCR analysis was applied to amplify specific target genes (β -catenin, Wnt5a, Wnt7b, and IL-6).

Results: β -catenin presented a 2.39±0.06-fold increase in the case of dexamethasone w/o SR and LiCl treated groups compared to the control group. Similar tendency was observed in the case of Wnt5a expression (1.97±0.16). Both β -catenin (1.07±0.34) and Wnt5a (0.76±0.27) are suppressed in the presence of IWR-1. This process was shifted by SR resulting in a higher expression of the disclosed genes, 1.67±0.33 and 1.95±0.70 for β -catenin and Wnt5a, respectively. Increasing and pronounced gene expression was observed in the case of canonical pathway activator Wnt7b, in both dexamethasone and IWR-1 treated groups in combination with SR. Furthermore, as expected dexamethasone treated groups w/o SR presented lower expression of IL-6 (0.57±0.36) throughout the test period; in contrast to IWR-1 w/o SR treated groups (1.35±1.16); whereas over-expression of IL-6 was observed by day 1 in IWR-1 triggered cells (2.68±0.86).

Conclusions: Alterations in Wnt signalling in the presence of SR could indicate a Wnt-mediated osteo-protective effect of SR, via both canonical and noncanonical pathways. Also, depletion of β -catenin might exacerbate the pathologic process of osteoporosis, by triggering pro-inflammatory cytokines, e.g., IL-6.

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P982

THE IMPORTANCE OF DETERMINATION OF SELECTED BONE MARKERS IN THE DIAGNOSIS AND TREATMENT OF OSTEOPOROSISA. Vanuga¹, I. Sagova², D. Pavai¹, S. Tomkova³, J. Payer⁴, P. Vanuga¹

¹National Institute of Endocrinology and Diabetology, Lubochna, ²Dpt. of Internal Medicine I, University Hospital, Martin, ³Osteocentrum, Hospital Kosice Saca, Kosice, ⁴5th Dept. of Internal Medicine, Comenius University Hospital, Bratislava, Slovakia

Objective: The aim of the study was to determine selected bone markers and local factors in relationship with the various forms of osteoporosis treatment.

Methods: Study group consisted of 120 postmenopausal women (at the age of 49-86) diagnosed with osteoporosis. 60 patients were treated by antiresorptive treatment (bisphosphonates or denosumab) and 60 patients were treated by anabolic treatment (teriparatide) for over 12 month. We provided complete laboratory test twice: at the baseline and after 12 months of treatment. The control group consisted of 60 postmenopausal women at the age of 49-80 years with normal bone density. BMD at lumbar spine and proximal femur was measured before the treatment initiation and after 12 months of treatment.

Results: Differences in basal values of alkaline phosphatase (ALP), skeletal alkaline phosphatase (bALP), β -isomerized C-terminal telopeptides (SCTX), total procollagen type I N-terminal propeptide

(TP1NP), osteocalcin (OCA), sclerostin (SOST) were ambiguous. For RANKL, osteoprotegerin (OPG), cathepsin K (CTSK), dickkopf-1 (DKK-1) significant differences between the control and osteoporosis patients were demonstrated. Anabolic therapy as well as antiresorptive treatment resulted in significant changes in (ALP, bALP, SCTX, TP1NP, OCA) levels after 12 months. We did not find significant differences in levels of specific bone markers (DKK-1, CTSK, OPG, RANK, SOST) before and *after treatment*. Both of the treatment methods which were used may be considered to be effective after 12-month of treatment in terms of significant increase in BMD in lumbar spine and proximal femur.

Conclusion: Although the basal values of the standard osteomarkers (ALP, bALP, SCTX, P1NP, OCA) are not primary in the diagnosis of osteoporosis, changes of these markers are useful in monitoring of treatment effect. According to our results, other bone markers and local factors which were analysed (DKK-1, CTSK, OPG, RANKL, SOST) couldn't be used for the establishment of diagnosis or monitoring of anti-resorptive or anabolic therapy of osteoporosis in clinical practice.

P983

BONE HEALTH AMONG OLDER ADULTS IN TAIWAN

T.-Y. Wu¹, K.-L. Kuo¹, C.-K. Liaw²

¹Department of Family Medicine, Renai Branch, Taipei City Hospital, Taipei City, ²Department of Orthopedics, Shuang Ho Hospital, New Taipei City, Taiwan

Objective: There has been much discussion about the risk factors for osteoporosis, but studies involving elderly population in Taiwan are minimal. We aimed to describe variables related to osteoporosis among community dwelling older people in Taiwan.

Methods: This is a cross-sectional study. The 671 participants were randomly selected from 3680 examinees of the annual Senior Citizens Health Examination in year 2010. Participants were interviewed with a detailed questionnaire, and 91 of them were invited for DXA. Predictor variables included age, gender and clinical risk factors for osteoporosis. The main outcome was osteoporosis confirmed by DXA.

Results: The mean age of the participants was 75.7±6.4 years old. Overall, the most prevalent variables for osteoporosis were height loss in adulthood (41.0%), lack of dairy products or calcium supplements (32.0%) and insufficient physical activity (10.4%). In multivariate models, we found that underweight (OR=9.80) and lack of dairy products/calcium supplements (OR=3.68) were the main variables for osteoporosis. In the subgroup analysis involving only women, underweight (OR=14.60) was the main variable.

Conclusion: Among community-dwelling older people in Taiwan, osteoporosis was mainly associated with underweight and lack of dairy products or calcium supplements. We suggest using the key questions of underweight and dietary pattern in clinical settings to identify high risk people who are candidates for further BMD exam.

P984

CIRCULATING MESENCHYMAL STEM CELLS ARE INCREASED IN PATIENTS WITH ANKYLOSING SPONDYLITIS

C. S. Cho¹, K. J. Ki-Jo², I. W. In-Woon¹, W. U. Wan-Uk³

¹Yeouido St. Mary's Hospital, Division of Rheumatology, The Catholic University of Korea, Seoul, ²St. Vincent Hospital, Division of Rheumatology, The Catholic University of Korea, Suwon, Seoul, South Korea

Objectives: An increased recruitment of circulating mesenchymal stem cells (cMSCs) has been shown to promote fracture healing. However, the role of cMSCs in abnormal bone formation in ankylosing spondylitis (AS) is still elusive.

Methods: 74 male AS patients and 25 age-matched male healthy controls were enrolled, and their peripheral bloods were subjected to flow cytometric analysis to count the number of cMSCs, which are positive for MSCs markers CD13, CD29, and negative for hematopoietic markers CD34 and CD45. The clinical and laboratory data were obtained from medical records, and serum bone specific alkaline phosphatase (BAP) and VEGF levels were measured.

Results: Compared to healthy controls, serum levels of BAP and VEGF were significantly increased in AS patients, respectively (median; 24 vs. 13 µg/L and 1066 vs. 892 pg/mL, both $P<0.001$). Importantly, cMSCs number was significantly higher in AS patients than in controls (median; 428 vs. 227 cells/mL, $P=0.026$), and it was positively correlated with serum BAP ($\gamma=0.323$, $P=0.004$) and VEGF levels ($\gamma=0.279$, $P=0.015$). When patients were divided into 2 groups according to the presence of syndesmophyte, cMSCs number was significantly higher in AS patients with syndesmophyte than in those without (556 vs. 143 cells/mL, $P<0.001$). These differences and associations were not altered by adjusting for age, disease duration, C-reactive protein, and use of medications.

Conclusion: Increased numbers of MSCs in circulation could contribute to abnormal bone formation in AS patients, which are presumably mediated in part by the action of VEGF through enhancing the mobilization and/or osteogenic differentiation of MSCs.

P985

HUNGRY BONE SYNDROME: A RECOGNIZED BUT IGNORED COMPLICATION

V. Arora¹

¹PGIMS Rohtak, Rohtak, India

Objective: Hungry bone syndrome is a recognised postoperative complication in patients operated for primary or secondary hyperparathyroidism. It is characterized by prolonged hypocalcemia which can be threatening if remains unrecognised and untreated. We here present a case of secondary hyperparathyroidism who underwent a 3.5 gland parathyroidectomy and developed severe hungry bone syndrome in postoperative period.

Case report: A 35 year old male presented with chronic kidney disease stage 5 secondary to uncontrolled type 1 diabetes. He had secondary hyperparathyroidism with iPTH 2456 pg/ml (reference range: 11-45 pg/ml), corrected serum calcium 9.5 mg/dl, 25(OH) vitamin D 7.9 ng/ml (reference range: 30-100 ng/ml), serum phosphorus 7.1 mg/dl and alkaline phosphatase was 654 U/L (reference range: 28-110 U/L). He was treated with cinacalcet 30 mg twice a day which reduced his iPTH levels to 1259 pg/ml. In view of persistently elevated iPTH levels, 3 and ½ gland parathyroidectomy was done. Patients iPTH decreased to 10 in postoperative period with fall in serum calcium to 7.8 mg/dl. His ionised calcium levels were even lower (0.7 mmol/L). he had severe symptoms of hypocalcemia and needed combination of oral and intravenous calcium supplementation. His calcium stabilized on 7th postoperative day and he was discharged on oral calcium supplementation, calcitriol and cholecalciferol.

Conclusion: Hungry bone syndrome is a well-known complication but is often overlooked in preoperative period. We need to identify people at increased risk and then take preventive steps to avoid this dreaded complication. In our case high preoperative iPTH and alkaline phosphatase were indicating at his high risk of developing hungry bone syndrome in postoperative period which was avoidable.

P986

BMD DECLINE FOLLOWING DENOSUMAB DISCONTINUATION MIGHT NOT BE ATTENUATED WITH PREVIOUS BISPHOSPHONATE THERAPYM. Japelj¹, G. Vidmar², A. Sabati Rajic³, M. Pfeifer³, T. Kocjan³¹Medical Faculty Ljubljana, ²University Rehabilitation Institute,³University Medical Centre Ljubljana, Dept. of Endocrinology, Diabetes and Metabolic Diseases, Ljubljana, Slovenia

Objective: Limited data suggest that the rebound increase in bone resorption and rapid BMD decline following sudden interruption of denosumab therapy can be avoided in patients previously treated with bisphosphonates. We aimed to compare BMD changes in osteoporotic patients after denosumab discontinuation regarding their previous bisphosphonate (BP) therapy.

Methods: There were 14 women (age 69 years, BMI 23.1 kg/m² on average) with postmenopausal osteoporosis who had been treated between 2011 and 2015 with denosumab for 2.8 (1-4) years at our outpatient clinic and were not prescribed with another antiresorptive after denosumab discontinuation. Before starting denosumab 10 patients were on BP therapy, while the others were treatment naïve. One patient had a history of multiple vertebral fractures and two patients had sustained nonvertebral fractures. There were no fractures during denosumab therapy. BMD was measured at lumbar spine (LS), total hip (TH) and femoral neck (FN) by DXA when denosumab was stopped and 12-18 months later. The data were analyzed using exact nonparametric tests.

Results: At the time of denosumab discontinuation 5 patients (36%) were vitamin D sufficient (25OH vitamin D >75 nmol/L). BMD decreased on average statistically significantly at all sites, (marginally at LS and most clearly at FN). There were no statistically significant differences in average BMD decrease with respect to previous BP therapy. However, there was statistically significantly lower decrease at LS on average among the vitamin D sufficient patients. Off denosumab, one treatment naïve patient and one former BP user (both without previous fractures) sustained five and four vertebral fractures, respectively. Fractures were confirmed with MRI and occurred approximately 13 months after last denosumab dose. The estimated proportion of patients with fractures (adjusted Wald method) was 19% (95%CI 3-41%).

Conclusion: After stopping denosumab BMD similarly decreased in all patients, regardless of previous BP use.

P987

MALE OSTEOPOROSIS AND RHEUMATOID ARTHRITISN. A. Pascalau¹, C. Nistor Cseppento¹, L. Lazăr¹, L. M. Georgescu¹, F. Cioara¹¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: Rheumatoid arthritis is a common inflammatory disease, with a prevalence of approximately 1% in the general population; in Romania there are approximately 200.000 patients with rheumatoid arthritis. The annual incidence of the disease is 0,5 new cases/1000 inhabitants for women and 0,2 new cases/1000 inhabitants for men. Patients with rheumatoid arthritis have an increased incidence of secondary osteoporosis. The aim of the study was to highlight the factors favoring and enhancers osteoporosis in male patients with rheumatoid arthritis.

Methods: The prospective, noninterventive study was conducted in the Department of Rheumatology of Pelican Hospital Oradea. BMD was measured by DXA. 18 male patients with rheumatoid arthritis, aged 45-65 years, with a mean disease duration of 6.9±5.1 years, were evaluated. Patients were grouped into 3 categories: normal BMD (5 patients), osteopenia (9 patients) and osteoporosis (4 patients). Age, weight, lifestyle, the disease duration, corticosteroid treatment doses and duration, calcium and vitamin D treatment doses and duration of administration were

evaluated. The relationship between these parameters and BMD using linear regression models was analyzed. The data collection was prospective and was performed directly by patient examination and anamnesis.

Results: Linear regression models revealed a direct link between low calcium and vitamin D intake, long-term corticosteroid therapy, advanced age, disease duration and BMD. Doses of calcium and vitamin D administered were below the recommended amount, low BMI and prolonged corticosteroid therapy were negatively correlated with BMD.

Conclusions: The study supports the important role of nutritional factors, calcium intake and vitamins and corticosteroid therapy in osteoporosis in male patients with rheumatoid arthritis. In male patients with rheumatoid arthritis the longer disease duration and the more inactive patients are associating a higher osteoporosis risk.

P988

POSTFRACTURE REHABILITATION IN ELDERLY PATIENTS WITH FEMORAL - PROXIMAL EPIPHYSIS AND NECK FRACTURESN. A. Pascalau¹, F. Cioara¹, C. Nistor Cseppento¹, L. Lazăr¹, F. M. Marcu¹, L. M. Georgescu¹, B. Jermendi²¹University of Oradea, Faculty of Medicine and Pharmacy,²Rehabilitation Department, Pelican Hospital, Oradea, Oradea, Romania

Objective: To identify the most efficient post-operative rehabilitation methods for a maximum independence and improving quality of life in patients with femoral fractures.

Methods: We evaluated, postoperative, 21 patients, aged 75-93 years old, with femoral fractures - proximal epiphysis and neck; the following scales were used: visual analog scale (VAS), Beck depression interval, Montgomery-Asberg Test, Morris-Rosenberg Scale, Tinetti Scale, quality of life scale and "get up and go" test.

Results: The femoral fractures were higher in female patients (67%) than in male patients (33%), because osteoporosis, and in 80-90 years age group patients (43%). In our patients group the femoral neck fractures Garden IV is higher than the rest; as surgical therapy the most used was total hip arthroplasty. The patients were evaluated 6 weeks post-operative and they had a favorable rehabilitation therapy.

Conclusion: The tests and the scales suggested that, because the multi-disciplinary postoperative rehabilitation, the independence, the depression and the pains were ameliorated, increasing the quality of life.

P989

SERUM MAGNESIUM LEVELS IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSISL. M. Georgescu¹, O. Straciuc¹, L. M. Luengo Perez², N. A. Pascalau¹¹University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania, ²University Extremadura, Spain, Badajoz, Spain

Objective: To identify serum magnesium and 25(OH)D levels in postmenopausal women with osteoporosis in order to suggest an adequate therapy; we also intended to evaluate a possible correlation between the serum magnesium and 25(OH)D levels with BMD in postmenopausal women.

Methods: The study was performed on 20 postmenopausal women; we evaluated the age, serum magnesium levels, 25(OH)D levels and BMD by DXA at lumbar spine and, bilaterally, femoral neck sites.

Results: Postmenopausal women included in the study were aged 50-87 years, with a mean value of 66.16 years. Serum magnesium levels of the postmenopausal patients were between 0.89-2.44 mg/dl with a mean value of 1.96 mg/dl. The mean value for 25(OH)D was 22.77 µg/dl.

Conclusions: 15% of the patients had reduced magnesium levels; 25(OH)D levels were lower than normal in 85% of the patients. The age

did not influence the serum magnesium and 25(OH)D levels. 50% of the patients diagnosed with osteoporosis had low values of BMD at both lumbar spine and femoral neck sites of examination. BMD values in postmenopausal patients included in the study were not influenced by age. Magnesium and vitamin D deficiency are preventable global public health problems in postmenopausal women.

P990

ABLE & STABLE – GET MORE STABLE, BE MORE ABLE: A REVIEW OF A FALLS PREVENTION PROGRAMME, A FIRST STEP TOWARDS FRAILTY AND OSTEOSARCOPENIA PREVENTION

C. Sun¹, M. Pham², C. Callusso-Craig², E. Legge²

¹St Vincents Hospital, Sydney, Australia, ²Fairfield Hospital, Sydney, Australia

Objective: A falls prevention programme has been running at Fairfield hospital a district hospital in western Sydney. Patients who had a fall or are at risk of falls are referred from hospital emergency department or from local general practice. Multidisciplinary intervention including medical specialist assessment, social worker review of community services needs and address carer stress, physiotherapist review of transfers and mobility, occupational therapist home environment assessment to remove obstacles and trip hazards as well as a 9 week falls prevention Able & Stable programme with focus on functional balance training activities, individualised strengthening training and falls prevention education. The aim of this study is to evaluate the physical, functional and psychological impact of such falls prevention group programme.

Method: Prospective monitoring of patients who participated and completed the falls prevention programme. Measurements include time up and go, walking speed, grip strength and documenting any further falls following the programme and at 3 months follow up. Fear of falls questionnaire was also administered pre- and post-falls intervention programme and at 3 months.

Results: Outcome of 70 participants following 9 week group programme and multidisciplinary intervention enrolled in 2017 will be examined and discussed. Results showed sustained improved strength and balance with reduction in falls incidence following such programme however results show no significant change in the fear of fall scores which may be a result of the patient becoming more aware of hazards and more cautious as a result. The authors acknowledge the programme did not address emotional aspects such as anxiety and fear.

P991

RISK OF OSTEOPOROSIS IN PSORIASIS: SYSTEMATIC REVIEW AND META-ANALYSIS

T. Yung-Chieh¹, C. Ting-Hao², T. Tao-Hsin³

¹Department of Medical Imaging and Radiological Sciences, I-Shou University, Kaohsiung, ²Department of Public Health, Kaohsiung Medical University, Kaohsiung, ³Department of Medical Research and Education, Cheng Hsin General Hospital, Taipei, Taiwan

Objective: Psoriasis was a systemic disease that was known to be associated with cardiovascular disease, renal disease, arthritis, and metabolic syndrome. There were lots of studies to investigate the association between psoriasis and osteoporosis, but the conclusion of present studies was controversial. This study is conducted to assess the risk of osteoporosis in people with psoriasis.

Methods: We performed a systematic review and meta-analysis to assess the risk of osteoporosis, fracture in patients with psoriasis or psoriatic arthritis. We searched PubMed and the Cochrane Library from inception to 31 December 2017 without language limitation. The search terms contained psoriasis and osteoporosis. Any disagreement was resolved by discussion with another author. The fixed effect was used if there was no significant heterogeneity, and the random effect was used if there was significant heterogeneity.

Results: Five studies were included, we found there was no association between psoriasis and osteoporosis (odds ratio [OR] 1.77; 95%CI 0.87-3.60). In the subgroup analysis, we found an increase in male (OR 1.43; 95%CI=1.18-1.72), but there was no increase in female (OR 1.24; 95%CI=0.92-1.90). We also performed the analysis of psoriatic arthritis and fracture; however, there was no significant increase (OR 1.61; 95%CI 0.95-2.72).

Conclusion: The present evidence did not support the association between psoriasis and osteoporosis, only male with psoriasis had an increased risk of osteoporosis. For clarifying whether a subgroup of patients with psoriasis had the risk of osteoporosis, the studies which were different severity and different age group were in need.

P992

BORTEZOMIB INHIBITS OSTEOCLASTOGENESIS AND OVARICTOMY-INDUCED BONE LOSS IN MICE

Y. Lee¹, Y.-G. Kim², S.-Y. Choi³

¹Department of Biochemistry, School of Dentistry, Kyungpook National University, ²Department of Periodontology, School of Dentistry, Kyungpook National University, ³Department of Oral and Maxillofacial Surgery, School of Dentistry, Kyungpook National University, Daegu, South Korea

Bone homeostasis is achieved through coordinated activities of bone-forming osteoblasts and bone-resorbing osteoclasts. When the balance is skewed in favor of osteoclasts due to hormonal or inflammatory issues, pathologic bone loss occurs leading to the conditions such as osteoporosis, rheumatoid arthritis, and periodontitis. Bortezomib is the first in-class of proteasome inhibitors used as an anti-myeloma agent. In the present study, we show that bortezomib directly inhibited the RANKL-dependent osteoclast differentiation of mouse bone marrow macrophages. Bortezomib significantly reduced the induction of osteoclast marker genes and proteins including nuclear factor of activated T-cells, cytoplasmic 1 (NFATc1). The intraperitoneal injection of bortezomib reduced ovariectomy-induced osteoclastogenesis and protected the mice from bone loss. These data propose novel use of bortezomib as a potential anti-resorptive agent.

P993

MORTALITY AND MEDICAL AND SOCIAL CONSEQUENCES IN OSTEOPOROTIC FRACTURES OF THE FRONT OF PERSONS OLDER AGE GROUP

T. A. R. Raskina¹, J. V. A. Averkieva¹, O. S. M. Malysenko¹

¹Federal state Budgetary Educational Institution of Kemerovo State Medical University, Kemerovo, Russia

Objective: To assess the mortality and medico-social consequences in older persons with osteoporotic hip fractures at different observation periods: 0-6 and 12-24 months.

Methods: 432 patients (328 women and 104 men) were included in the study with radiologically confirmed fractures of the proximal femur, obtained with minimal trauma.

Results: It was found that 11 (6.4%) patients had mortal outcomes in the first 6 months after surgical treatment, and 84 (32.2%) with conservative ($\chi^2=6.2$, $p<0.0001$). The main social consequences among surviving patients were traced. In the group of patients with surgical methods of bedridden treatment there were 10 (8.0%) people and 78 (66.7%) in the group with conservative treatment methods ($\chi^2=89.8$, $p<0.0001$). Auxiliary means were used after surgical treatment of 105 (84.0%) patients, after conservative treatment - 34 (29.0%) ($\chi^2=74.6$, $p<0.0001$). Single cases of complete recovery of function in patients with both surgical and conservative treatment were noted ($\chi^2=0.8$, $p=0.5$). In 12-24 months after the injury, the mortality rate in the group of patients with

surgical methods of treatment was 3.5 times lower than after the conservative ones (12.9% and 44.8%, respectively) ($\chi^2=6.8$, $p<0.0001$). When using surgical methods of bedridden treatment, only 1 (0.4%) patient remained and 16 (13.6%) with conservative methods ($\chi^2=18.3$, $p<0.0001$). 38.4% (48 patients) of patients continued to use auxiliary drugs during surgical treatment, and 58.9% (69 people) with conservative therapy ($\chi^2=10.2$, $p=0.002$). Complete recovery of the function was noted in 72 (57.6%) and 32 (27.3%) patients who received surgical and conservative treatment, respectively ($\chi^2=4.6$, $p<0.0001$).

Conclusions: Mortality and medical and social consequences in patients with osteoporotic fractures of the proximal femur depend on the method of treatment. Surgical treatment is the method of choice for the treatment of patients with this type of fracture.

P994

RISK FACTORS OF VITAMIN D DEFICIENCY IN CYSTIC FIBROSIS CHILDREN IN SAINT-PETERSBURG

M. M. Kostik¹, A. A. Pashkevich², M. I. Nikitina², A. V. Orlov², V. V. Dorofeykov³, L. A. Zhelenina¹

¹Saint-Petersburg State Pediatric Medical University, ²City Children's Hospital Saint Olga, ³The Lesgaft National State University of Physical Education, Sport and Health, Saint-Petersburg, Russia

Objectives: The deficiency of vitamin D is a frequent problem of cystic fibrosis (CF) patients. The aim of our study was to evaluate the vitamin D status in CF children in Saint-Petersburg and detected the risk factors of vitamin D insufficiency.

Methods: 92 CF children aged 0-17 years (49 M; 43 F) were included in the study. The sufficiency of vitamin was evaluated with detection of serum 25OHD3 since February to May. We measured routine tests, levels of calcium, phosphorus, PTH, alkaline phosphatase (ALP), anthropometry and speed of sound (SOS) was measured at the non-dominant radius with quantitative bone ultrasonometry (QUS) (Sunlight MiniOmni P, Beam-Med Ltd.) with reference pediatric database.

Results: Deficiency of vitamin D (25OHD3 <30 ng/ml) was detected in 18 (19.6%). Children with normal 25OHD3 value has less age ($p=0.00004$), height ($p=0.00005$), sit height (0.04), percentile of height (0.047), weight ($p=0.00005$), growth failure ($p=0.02$), less frequent usage of inhaled corticosteroids (0.0002). Patients with 25OHD3 <10 ng/ml had more frequent fractures of long bones ($p=0.02$). The main predictors of normal value of 25OHD3 were age ≤ 3 years (OR=10.1 [95%CI:3.0-34.6], $p=0.00004$), weight ≤ 17.6 kg (OR=22.3 [95%CI:2.8-176.6], $p=0.00009$), weight >42.1% (OR=3.3 [95%CI:1.004-11.2], $p=0.04$), weight >0.2SD (OR=3.4 [95%CI:1.0-11.7], $p=0.04$), height ≤ 94.0 cm (OR=10.9 [95%CI:3.2-37.3], $p=0.00002$), height >65.7% (OR=6.6 [95%CI:1.9-23.3], $p=0.00008$), height >0.4SD (OR=6.1 [95%CI: 1.8-20.8], $p=0.002$), Ca >2.38 mmol/l (OR=4.9 [95%CI:1.3-18.1], $p=0.01$), PTH <23.1 ($p=0.00003$), SOS >3702 m/s (OR=10.0 [95%CI:1.3-132.7], $p=0.04$) and SOS-Zscore >-1.0SD (OR=18.0 [95%CI:1.4-262.7], $p=0.009$).

Conclusion: our predictors might be use in detection of CF children with risk of vitamin D deficiency. Further investigation required.

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P995

IMPACT OF RECENT FRACTURE ON 10-YEAR PROBABILITY OF FRACTURE

H. Johansson¹, K. Siggeirsdottir², N. Harvey³, A. Odén⁴, V. Gudnason², E. McCloskey⁴, G. Sigurdsson², J. Kanis¹

¹Institute for Health and Aging, Catholic University of Australia, Melbourne, Australia, ²Icelandic Heart Association Research Institute, Kopavogur, Iceland, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, ⁴Centre for Metabolic Bone Diseases, University of Sheffield, Sheffield, UK

Objectives: A history of fracture approximately doubles the 10-year probability of future fractures, and the risk relationship varies with time. The aim was to determine the population risk of a major osteoporotic fracture (MOF) in the 10 years immediately after an incident ('sentinel') MOF compared to that in the population as a whole.

Methods: The study was based on an Icelandic population-based cohort of men and women born between 1907-1935. Incident fractures were documented over 510,265 person-years of follow-up. We calculated 10-year empirical (i.e., not FRAX) probability of a subsequent MOF for the cohort experiencing a sentinel MOF and compared this to probabilities estimated for age and sex matched individuals in the whole population.

Results: The whole population included 18,872 individuals (mean age 52.8 years, of whom 52% were women). Sentinel hip fractures occurred in 2074 men and women; for clinical spine, forearm and humerus fractures, the respective numbers were 1365, 2364 and 1092. The 10-year probability of MOF was consistently higher in the subgroup with a sentinel fracture than in the whole population of the same age and sex, but the population relative risk (observed/expected probability) varied by age and sex. An example is given in the Figure for a sentinel vertebral fracture, and FRAX fracture probability as a comparison. In men, the probability at the age of 60 years was 6 times higher than that of the whole cohort. For women, the same ratio was 3. Similar effects were noted for other sentinel fractures.

Conclusions: The 10-year empirical probability of MOF was higher in the population with a sentinel fracture than in the whole cohort adjusted for age and sex and higher than that predicted by FRAX. Conventional FRAX probabilities may underestimate fracture risk in men and women with a recent MOF.

10-year probability of MOF (%)

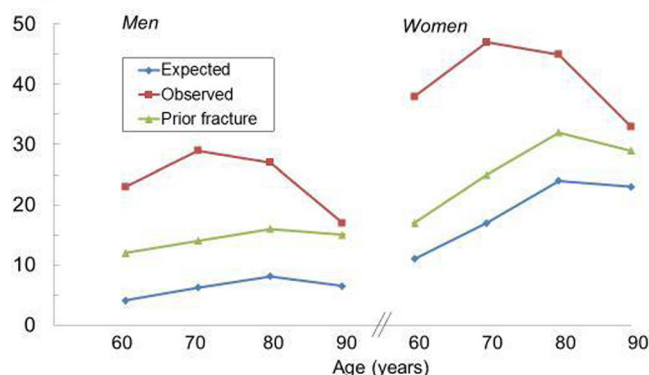


Figure Ten-year probability of a major osteoporotic fracture (MOF) calculated from the whole cohort (expected), that of men and women with a sentinel vertebral fracture (observed), that of men and women using FRAX for Iceland for a person with prior fracture, a BMI of 25 kg/m² and no other clinical risk factors (Prior fracture).

P996

FUNCTIONAL ORTHOTICS: EFFECTS IN SUBTALAR EXCESSIVE PRONATION

N. A. Pascalau¹, F. Cioara¹, C. Nistor Cseppento¹, L. Lazăr¹, F. M. Marcu¹, S. L. Lazar², L. M. Georgescu¹

¹University of Oradea, Faculty of Medicine and Pharmacy, ²University of Oradea, Faculty of Medicine and Pharmacy, Oradea, Romania

Objective: To demonstrate, by functional orthotic method, the relation between the dysfunction and foot biomechanics due to subtalar excessive pronation and painful postural syndromes.

Methods: The study included 30 patients; group I=15 patients with personalized therapeutic program based on foot orthotics; and group II=15 patients with standard therapeutic program with lack of foot orthotics. We use for the evaluation of the patients: Foot Function Index (FFI), Visual

Analog Scale (VAS), Jack's Test, Navicular Drop Test (NDT), Range of Motion (ROM), Foot Posture Index (FPI), Abductor Twist.

Results: Orthotics decreased the discomfort and pain since the first month of therapy; the plantar pressure and the pathological movements decreased. Optimization function and reduced excessive pronation were obtained.

Conclusion: Orthotics facilitates free movement of the joint and overload protect structures by correcting biomechanical foot-; they stabilize and control the excessive subtalar pronation. The correct diagnosis and the correct adaptation of the orthosis influence the efficiency of the therapy. Applied correctly, by a qualified person, orthotics is an effective therapeutic approach.

P997

CLINICAL INVESTIGATION OF PREVALENCE AND ASSOCIATED FACTORS OF OSTEOPOROSIS AMONG THE MALE ELDERLY AGRICULTURAL AND FISHING POPULATION IN TAIWAN

T.-H. Tung¹

¹Department of Medical Research and Education, Cheng-Hsin General Hospital, Taipei, Taiwan

Objective: To explore the prevalence and associated factors of osteoporosis among the male elderly agricultural and fishing population in Taiwan.

Methods: Subjects (n=2758) aged 65 years and over voluntarily admitted to a teaching hospital for a physical checkup were collected in 2010. Osteoporosis was defined as BMD is 2.5 SD or more below the young adult mean (-2.5 SD or lower).

Results: Among these subjects, the estimated prevalence of osteopenia and osteoporosis were 39.0% and 26.4%, respectively. From the multiple logistic regression, age (OR=1.04, 95%CI: 1.01-1.09), waist circumference (OR=1.02, 95%CI: 1.01-1.04), total cholesterol (OR=1.04, 95%CI: 1.01-1.07), uric acid (OR=0.88, 95%CI: 0.84-0.92), and meat intake (yes vs. no, OR=1.44, 95%CI: 1.19-1.78) were statistically significantly related to osteoporosis after adjustment for confounding factors.

Conclusion: Several clinical and dietary factors were indicated pertaining to the prevalence of osteoporosis in the male elderly among fishing and agricultural population.

P998

COMPARISON OF ECLIA VS. LC-MS/MS FOR 25(OH)D MEASUREMENT IN PCOS AND/OR OBESE WOMEN IN REPRODUCTIVE AGE

A. Gateva¹, A. Tsakova², Z. Kamenov¹, D. Svinarov²

¹Medical University Sofia, Internal Medicine Department, University Hospital Alexandrovska, Clinic of Endocrinology, ²Medical University Sofia, Department of Clinical Laboratory and Clinical Immunology, University Hospital Alexandrovska, Central Clinical Laboratory, Sofia, Bulgaria

Objectives: To compare the performance of electrochemiluminescence (ECLIA) with validated liquid chromatography/ mass spectrometry (LC-MS/MS) methods for the quantification of vitamin D (25(OH)D) in patients with polycystic ovary syndrome (PCOS) and/or obesity.

Methods: LC-MS/MS method for the determination of 25(OH)D in human biological samples was developed and compared in terms of accuracy and correlation with a commercially available ECLIA technology for 25(OH)D analysis. The agreement between the two methods for vitamin D measurement was assessed using Bland and Altman method.

Results: 25(OH)D levels were significantly higher when measured by ECLIA than by LC-MS/MS. Median 25(OH)D levels with LC-MS/MS vs. ECLIA were 33.4 nmol/l (8.8-134.1 nmol/l) and 43.1 nmol/L (10.3-132.8 nmol/l) respectively. Correlation between the two methods was 0.85 (p<0.001). Bland and Altman method for inter-assay agreement however showed that there can be considerable discrepancies between the

two methods for 25(OH)D measurement and that the degree of agreement is not acceptable. Regression analysis showed that the difference between the measurements does not depend on the mean values (regression coefficient 0.082, p=0.177).

Conclusion: Acceptable correlation but poor degree of agreement was observed among LC-MS/MS and ECLIA in quantification of 25(OH)D in patients from a reproductive clinic.

P999

BMD IN POSTMENOPAUSAL WOMEN WITH RHEUMATOID ARTHRITIS IN TREATMENT WITH ANTI-TNF α THERAPY

D. Anghel¹, L. Panturu², C. Jurcut¹, M. Negru², E. L. Dilirici¹, A. Manolache¹

¹Central Military Hospital Bucharest, ²Sfanta Maria Hospital, Bucharest, Romania

Objective: Osteoporosis is recognized as the main osteoarticular complication of rheumatoid arthritis (RA) and results an increased risk of fractures. The anti-TNF α therapy has been administrated in patients with RA. The influence on BMD is unknown. The aim of this study was to assess the effects of anti-TNF therapy on BMD of the lumbar and femoral on postmenopausal women with rheumatoid arthritis.

Methods: In study were included 75 females with RA treated with anti-TNF therapy, and 35 women not treated with anti-TNF therapy. BMD (femoral neck and lumbar spine) was measured using DXA before initializing biologic therapy and after one year. The following parameters were analyzed: age, duration of disease, disease activity.

Results: 110 patients were studied. 75 patients received anti-TNF therapy and 35 patients received conventional therapy (DMARDs). In the anti-TNF group the DAS score was 6.6 $\pm$ 1.2 at baseline and 2.8 $\pm$ 0.8 after 1 year with therapy. There were 5 non responders. Patients receiving anti-TNF- α were significantly younger and had significantly higher activity scores than controls. Baseline BMD measurements were higher in the anti-TNF therapy group, but the only significant difference was at the lumbar spine. BMD was reduced from 0.98 $\pm$ 11 to 0.80 $\pm$ 0.105 g/cm² (-17.4%, p=0.001) at the femoral neck, and from 1.05 $\pm$ 0.11 to 0.88 $\pm$ 0.16 g/cm² (-15.6%, p=0.001) at the lumbar spine in the anti-TNF therapy group after 12 months of therapy. BMD was reduced from 0.91 $\pm$ 0.18 to 0.79 $\pm$ 0.12 g/cm² (-13.2%, p=0.001) at the femoral neck, and 0.92 $\pm$ 0.12 to 0.85 $\pm$ 0.128 g/cm² (-6.1%, p=0.09) at the lumbar spine in controls after 12 months of treatment.

Variables associated with a low BMD included age and steroid dose. BMD loss was higher in postmenopausal anti-TNF patients than in postmenopausal controls.

Conclusions: After 1 year of follow-up, patients had lower BMD on both the femoral neck and lumbar spine, but the loss was greater in patients receiving anti-TNF α than in patients receiving conventional treatment. The postmenopausal RA patients treated with anti-TNF α should be evaluated to prevent further BMD loss and to receive anti osteoporosis treatment.

P1000

EVALUATION OF SARCOPENIA DEFINITIONS IN A RURAL POPULATION FROM THE GAMBIA, WEST AFRICA

A. Zengin¹, A. Prentice², L. Jarjou³, C. Cooper⁴, P. Ebeling¹, K. Ward⁴

¹Monash University, Melbourne, Australia, ²MRC Elsie Widdowson Laboratory, Cambridge, UK, ³MRC The Gambia Unit, Banjul, The Gambia, UK, ⁴MRC Lifecourse Epidemiology, University of Southampton, Southampton, UK

Objectives: By 2050 over 60% of the world's ageing population will live in low and middle-income countries. This study aimed to evaluate the suitability of the Federation for the National Institute of Health appendicular lean mass (FNIH_{ALM}) and European Working Group on Sarcopenia (EWGSOP) definitions of sarcopenia to predict poor muscle performance in The Gambia.

Methods: 249 women and 239 men (mean[SD] age 61.1[12.5] and 60.8[12.3] years[y]) were recruited. Outcomes were lean mass by DXA, muscle force and power by jumping mechanography, and grip strength. FNIH_{aLM} and EWGSOP were used to define sarcopenia. Receiver operating characteristic (ROC) curve analysis was used to determine the sensitivity and specificity of the two definitions for prediction of poor muscle force and power. Differences between AUC's were tested to assess which definition best predicted poor performance.

Results: EWGSOP defined 19% of men and 10% of women as sarcopenic; in contrast, FNIH_{aLM} defined 20% of men (81% >60 yr) and 45% of women (68% >60 yr) as sarcopenic. FNIH_{aLM} had better sensitivity and specificity than EWGSOP for all functional measures for both men and women. The FNIH_{aLM} classification had higher sensitivity in women (62–76%) than in men (37–50%), with similar specificity (60–70%, 87–94% respectively). FNIH_{aLM} had moderate-good ability to discriminate those with low vs. normal s2LJ force in men (AUC=0.71) and women (AUC=0.72), as well as low vs. normal s2LJ power in men (AUC=0.69) and women (AUC=0.69). In women, the FNIH_{aLM} better predicted low s2LJ force (p=0.004), m1LH force (p=0.002) low grip strength (p=0.02) with a trend in s2LJ power (p=0.06) than EWGSOP; FNIH_{aLM} and EWGSOP performed similarly in men.

Conclusions: The variation in the prevalence of sarcopenia depends on the definition used and highlights the importance of assessing the definitions across diverse populations and in both sexes. A one size fits all threshold for sarcopenia may not be appropriate.

P1001

STUDY OF THE DIAGNOSTIC VALIDITY OF THE SARC-F QUESTIONNAIRE IN INSTITUTIONALIZED ELDERLY

L. H. Caamaño Barrios¹, A. Ladislao López²

¹Gimbernat University School, Physical Therapy Department, ²Gimbernat University School, Cantabria, Spain

Objective: Sarcopenia is one of the main problems observed in elderly people. This term has been included (M62.84) in the *International Classification of Disease*, Tenth Revision, Clinical Modification (ICD-10-CM). European Working Group in Older People (EWGSOP) established an algorithm in order to diagnosis it. Other diagnosis tools have been developed such as SARC-F questionnaire. The correlation of both has been revised in community-dwelling elderly, and hospitalized but still not in elderly institutionalized. The aim of this study was to determine whether the questionnaire SARC-F is a tool capable of detecting sarcopenia at the institutional level, according to the criteria established by the EWGSOP.

Methods: Twenty-one institutionalized elderly people were enrolled, aged 65 years and older (mean age 81.33±10.06) with MEC> 24. It was used the EWGSOP definition for the detection of sarcopenia, using hand-grip strength, muscle mass index (MMI) and gait speed of 4 m. Involving two groups of 11 non-sarcopenic subjects and 10 sarcopenic subjects. Finally, SARC-F questionnaire was applied.

Results: Differences between sensitivity and specificity were obtained. The SARC-F sensitivity was 70% and specificity 81.81%. The negative predictive value was 75% and the positive predictive value was 77.77%. The positive likelihood ratio was 3.84 and the negative ratio was 0.366. The area under the ROC curve of SARC-F was 0.759.

Conclusion: The results obtained coincide with previous studies done in the community, being the specificity greater than the sensitivity. Therefore, SARC-F is a more appropriate tool to rule out sarcopenia than to detect it. Unlike other areas, the sensitivity of this tool when applied in geriatric centres, increases considerably. That is the reason why it becomes a tool for studies, so as to detect sarcopenia in the institutionalized population. This could be due to the factors related to a sedentary institutional lifestyle, which could predispose to sarcopenia or a faster development of it, being more easily identifiable by the SARC-F questionnaire.

P1002

INCREASED LUMBAR BMD RESULTING IN ECHINOCCAL CYST: LONG-TERM MONITORING

M. Cokolic¹, M. Krajnc¹

¹University Clinic for Internal Medicine, Department of Endocrinology and Diabetology, Maribor University Medical Centre, Maribor, Slovenia

A 82-year old female with known osteoporosis was reassessed for BMD measurement. Her baseline BMD and T-score of lumbar spine (L1-L4), measured 2004 were 0.699 g/cm², -3.5 SD, T-score of total left hip was 0.618 g/cm², -2.7. She was treated with alendronate 70 mg, cholecalciferol 7000 IE per week and calcium supplements for some years. On control 2013 DXA of lumbar spine and hip, BMD of lumbar spine L1-L4 was 0.910 g/cm², T-score was -1.2 SD. BMD and T-scores for singly lumbar vertebrae were: L1 1.384 g/cm², +4.2 SD; L2 0.667 g/cm², -3.3 SD; L3 0.654 g/cm², -3.9 SD; L4 0.785 g/cm², -3.0 SD. The BMD and T-score of the neck were 0.463 g/cm², -3.5 SD and of the total hip were 0.590 g/cm², -2.9 SD. On examining of the picture, we identified a calcified mass in the projection of L1 vertebra. We repeated the analysis of DXA scan and excluded the calcified formation and L1 vertebra. BMD of analyzed lumbar spine (L2-L4) was 0.701 g/cm², T-score was -3.4 SD. BMD and T-scores were: L2 0.614 g/cm², -3.8 SD; L3 0.642 g/cm², -4.0 SD; L4 0.785 g/cm², -3.0 SD. In 2018 BMD of analyzed lumbar spine (L3-L4) was 0.911 g/cm², T-score was -1.7 SD. BMD and T-scores were: L3 0.976 g/cm², -1.0 SD; L4 0.845 g/cm², -2.5 SD, superposition of calcified formation was on L1+L2. In CT of abdomen three centimeters large calcified Echinococcal cyst (EC) was found, which was in 2004 unnoticed. On 2013 DXA scan EC was projected to the L1, on 2018 on L1+L2+L3 because of the development of kyphosis and consequently reduction 9 cm of height in 14 years, BMD of hip was stable, 10 year fracture risk for major osteoporosis fracture was 16% and for hip fracture 7.5%. Discussion. The study showed that calcium carbonate pills and bra wires positioned lateral to the spine can change BMD. Several medical conditions, such as osteoarthritis, ankylosing spondylitis, vertebral fractures, osteophyte formation, and aortic calcifications can also increase BMD. In our case, the patient's hip BMD decreased by -1.8% and increased by 51.3% in L1-L4 without corrections on account of EC in the period of 14 years.

P1003

COMPARISON OF EFFECTIVENESS AND SAFETY OF TRAMADOL/ACETAMINOPHEN AND NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS) FOR TREATMENT OF KNEE OSTEOARTHRITIS IN ELDERLY PATIENTS

S. Y. Kim¹, J. W. Ryou¹, J. W. Hur¹

¹Eulji university hospital, Seoul, South Korea

Objective: To compare the analgesic effectiveness and safety of tramadol 37.5 mg/acetaminophen 325 mg combination tablets (tramadol/acetaminophen) with nonsteroidal anti-inflammatory drugs (NSAIDs) for the treatment of osteoarthritis in elderly patients.

Methods: This randomized controlled study enrolled 48 patients with chronic knee osteoarthritis where the diagnostic period was over 3 months. Patients with at least moderate pain [visual analog scale (VAS) with scores ≥40/100 mm] after the washout period were randomized to tramadol/acetaminophen or NSAID. All patients received tramadol/acetaminophen 1 tablet TID or NSAID (naproxen 500 mg) BID. The primary outcome measures were the final pain VAS scores. Secondary measures included pain relief (5 point Likert scale), adverse events, and overall medication assessments.

Results: In total, 43 intent-to-treat (ITT) patients received tramadol/acetaminophen (n=21) or NSAID (n=22). Mean baseline pain VAS scores showed no difference between two groups. ITT analysis showed significantly better mean final VAS scores (38.45 vs. 31.24, p=0.004) and mean final pain relief scores (2.18 vs. 2.95; p=0.007) for tramadol/

acetaminophen rather than for NSAID. The most common treatment related adverse events with tramadol/acetaminophen were nausea/vomiting (47.6%) and constipation (33.3%). Epigastric soreness and heartburn was more frequent in NSAID treatment.

Conclusion: Tramadol/acetaminophen combination showed better effectiveness in pain reduction compared with NSAIDs when used for the treatment of osteoarthritis in elderly patients.

P1004

POTENTIAL OF MESENCHYMAL STEM CELLS: ANALYSIS OF DIFFERENT GRADES OF OSTEOARTHRITIS

M. Mazon¹, A. Mazon², A. Cesaro¹, E. Lespessailles¹, H. Toumi¹
¹ISMTO, EA 4708, University of Orleans, ²Service Chirurgie Orthopédique et Traumatologique Centre Hospitalier Régional d'Orléans, Orleans, France

Objective: Recent data suggested that osteoarthritic (OA) cartilage contain multidifferentiation potential of mesenchymal progenitor cells (MPC). Yet, whether the prevalence of these cells are related to OA progression remains unknown. Herein, we explore the prevalence and differentiation potentials of MPC isolated from different OA grades.

Methods: Human osteoarthritic tibial plateaus were obtained from 25 patients undergoing total knee replacement. Each sample was classified as mild, moderate or severe OA according to OARSI scoring. The mRNA expression levels of CD105, CD166, Notch 1, Sox9, Acan, Col II A1 and Col I A1 were measured at day 0, day 14 (2 weeks *in vitro*) and day 35 (after chondrogenesis). At D35, the pellets matrix composition was tested on formation of proteoglycan, collagen II and I by HES and Immunofluorescence.

Results: Cells from all OA grades significantly increased MPC markers mRNA with *in vitro* expression. Proliferated cells expressed MPC specific antigens: CD105, CD166, CD73, CD90, Notch-1 and Nucleostemin. The chondrogenesis induced decrease in CD105, Notch 1 and Sox9 mRNA only in mild and moderate OA. Yet, only moderate OA-derived pellets revealed significantly high levels of proteoglycans and hyaline cartilage marker collagen II and low expression of fibrocartilage marker collagen I at both mRNA and protein level.

Conclusion: Our data confirm differences in MPC potential between OA grades. Only moderate OA-derived cells were able to form hyaline-like matrix with insignificant levels of fibrocartilaginous calcified tissue. Yet, to validate clinical relevance of these cells for use in cartilage therapies, analysis of mechanical properties of MPC-derived tissue are required.

P1005

CLINICAL AND LABORATORY ASSOCIATIONS BETWEEN SERUM NESFATIN-1 AND OSTEOPOROSIS IN RHEUMATOID ARTHRITIS PATIENTS

T. Z. Kvividze¹, B. V. Zavadovsky², Y. R. Akhverdyan², L. E. Sivordova², J. V. Polyakova², D. P. Lavrova¹, E. A. Zagorodneva¹
¹Volgograd State Medical University, Volgograd, Russia, ²Treatment and Prevention of Joint Disease Laboratory, Federal State Budgetary Institution "Research Institute of Clinical and Experimental Rheumatology named after A.B. Zborovskiy", Volgograd, Russia

Objective: Recent studies suggested, that adipokines, secretory proteins of adipose tissue, are involved in bone homeostasis including development and remodeling [1]. Nesfatin-1 is new regulatory peptide, which participates in the regulation of hunger and fat storage [2]. Nesfatin-1 could promote the release of proinflammatory mediators, such as IL-8, IL-6, and macrophage inflammatory protein-1 α (MIP-1 α) in chondrocytes [3]. We hypothesized that nesfatin-1 concentration may be correlated with OP development and progression. Our aim was to study the diagnostic value of serum nesfatin-1 for evaluating osteoporosis (OP) in rheumatoid arthritis (RA) patients.

Methods: We observed 170 people: 110 RA patients (mean age 54.07 $\pm$ 11.32; hereinafter M $\pm$ Std.dev) and 60 healthy controls (52.09 $\pm$ 14.12). The diagnosis of RA was set according to the ACR/EULAR Classification Criteria for RA (2010). All RA patients were examined using DXA using LUNAR DPX-Pro densitometer. All patients underwent the complex clinical and laboratory examination using standard methods, including N-terminal propeptide of procollagen type I, C-telopeptide of type I collagen, 25(OH)-vitamin D. Serum nesfatin-1 levels were measured by indirect solid-phase enzyme immunoassay using the commercial test system Nesfatin-1 ELISA (RaiBiotech, catNo EIA-NESF) according to the instructions attached to the kit.

Results: We revealed that mean concentration of nesfatin-1 in RA patients was 50.49 $\pm$ 34.05 ng/ml, which was significantly higher than of healthy controls - 31.61 $\pm$ 3.17 ng/ml ($p < 0.001$). We divided the RA patients into 2 subgroups - 1st (n=44) with normal nesfatin-1 concentration in sera (< 37.95 ng/ml) and 2nd (n=66) - with increased nesfatin-1 level (> 37.95 ng/ml). Elevated serum nesfatin-1 levels in RA patients were linked with higher activity degree (DAS-28), presence of extra-articular manifestations, disease duration > 5 years and III class of functional joints disability. We did not find any difference of serum C-terminal telopeptide of type I collagen between first and the second groups. The results showed statistically significant correlation between nesfatin-1 and N-terminal propeptide of type I procollagen (P1NP) ($r = 0.218$, $p = 0.022$). We did not note any significant relationships between serum nesfatin-1 level and BMD at any site and between nesfatin-1 with either lean or fat mass.

Conclusions: Thus, we did not reveal relationship between increased serum nesfatin-1 level and BMD at any site and body composition in RA patients. Nevertheless we noted relationship between nesfatin-1 and bone turnover marker (P1NP). We suppose that nesfatin-1 may influence on osteoblasts formation and functions.

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P1006

THE COMPARATION OF EFFICACY OF TREATMENT WITH TERIPARATIDE IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS AND GLUCOCORTICOID INDUCED OSTEOPOROSIS IN COMMON POPULATION

O. R. Ruzickova¹, J. T. Tomasova¹, M. S. Sokalska¹

¹Institute of research in Rheumatology, Prague, Czech Republic

Objective: Teriparatide is drug of the choice in the treatment of the postmenopausal osteoporosis, glucocorticoid induced osteoporosis and male osteoporosis for the patients in the highest risk of fracture. Usually we have data from multicentric, randomized, double blind, placebo or active comparator controlled trials. The efficacy of the teriparatide was performed on the study population, which fulfilled inclusion and exclusion criteria. Based on results of several clinical trials it seems that patients with glucocorticoid induced osteoporosis have higher gain in BMD compare to patients with postmenopausal osteoporosis after teriparatide treatment. Our aim was to compare effect of treatment with teriparatide on the gain of BMD in patients with glucocorticoid induced osteoporosis and with postmenopausal osteoporosis in common population.

Methods: Patients with postmenopausal osteoporosis and glucocorticoid induced osteoporosis who fulfil ACR criteria for these subgroups of osteoporosis and were treated with teriparatide for two years, underwent DXA examination and laboratory examination (serum level of Ca, 25-OH-vitamin D, P1NP, β CTX, osteocalcin, u-Ca). DXA examination was performed in the most important regions of interest: lumbar spine, total femur (hip), femur neck (neck). Our osteocentre is equipped with iDXA Lunar machine.

Results:**Patients with finished 2 years therapy N=91**

GIOP (N=62); 68,1%

Postmenopausal osteoporosis (N=26); 28,6%

Male osteoporosis (N=3); 3,3%

Demography**Men** (N=11); 12,1%**Women** (N=80); 87,9%**Age (years)**

Median 68,9

BMD and T-score total femur

		N	Median (5.; 95.percentil)	P*
start	GIOP	58	0,70 (0,46; 0,87)	0,389
	PM	26	0,66 (0,54; 0,86)	
1.year	GIOP	43	0,75 (0,51; 0,92)	0,138
	PM	15	0,65 (0,45; 0,84)	
2.year	GIOP	39	0,75 (0,49; 0,98)	0,026
	PM	14	0,65 (0,49; 0,82)	

* Mann-Whitney
T-score

		N	Median (5.; 95.percentil)	P*
start	GIOP	59	-2,60 (-4,40; -1,10)	0,560
	PM	26	-2,90 (-3,80; -1,20)	
1.year	GIOP	43	-2,10 (-4,00; -0,80)	0,168
	PM	15	-2,80 (-4,60; -1,40)	
2.year	GIOP	39	-2,10 (-4,20; -0,40)	0,034
	PM	14	-2,80 (-4,30; -1,50)	

* Mann-Whitney
Change of BMD and T-score – total femur
BMD

		N	Median (5.; 95.percentil)	P**
Start -> 1.year	GIOP	42	0,01 (-0,06; 0,08)	0,027
	PM	15	-0,02 (-0,07; 0,02)*	
Start -> 2.year	GIOP	38	0,02 (-0,05; 0,14)*	0,035
	PM	14	0,00 (-0,08; 0,06)	

* Statistically significant change (Wilcoxon test).

** Mann-Whitney
T-score

		N	Median (5.; 95.percentil)	P**
Start -> 1.year	GIOP	43	0,10 (-0,70; 0,70)	0,032
	PM	15	-0,10 (-0,60; 0,20)	
Start -> 2.year	GIOP	39	0,20 (-0,40; 0,90)*	0,054
	PM	14	-0,10 (-0,70; 0,60)	

* Statistically significant change (Wilcoxon test).

** Mann-Whitney
BMD and T-score – femoral neck
BMD

		N	Median (5.; 95.percentil)	P*
Start	GIOP	58	0,70 (0,52; 0,85)	0,261
	PM	26	0,67 (0,58; 0,88)	
1.year	GIOP	43	0,73 (0,53; 0,88)	0,014
	PM	15	0,67 (0,51; 0,78)	
2.year	GIOP	39	0,75 (0,51; 1,04)	0,004
	PM	14	0,67 (0,54; 0,84)	

* Mann-Whitney
T-score

		N	Median (5.; 95.percentil)	P*
Start	GIOP	58	-2,55 (-4,10; -1,10)	0,135
	PM	26	-2,90 (-3,80; -1,30)	
1.year	GIOP	43	-2,20 (-3,90; -1,10)	0,046
	PM	15	-2,60 (-3,90; -1,80)	
2.year	GIOP	39	-2,10 (-4,00; -0,80)	0,009
	PM	14	-2,70 (-3,60; -1,20)	

* Mann-Whitney
Change of BMD and T-score – femoral neck
BMD

		N	Median (5.; 95.percentil)	P**
Start -> 1.year	GIOP	42	0,02 (-0,09; 0,13)	0,092
	PM	15	-0,01 (-0,10; 0,04)	
Start -> 2.year	GIOP	38	0,03 (-0,10; 0,25)*	0,135
	PM	14	0,01 (-0,08; 0,08)	

* Statistically significant change (Wilcoxon test).

** Mann-Whitney
T-score

		N	Median (5.; 95.percentil)	P**
Start -> 1.year	GIOP	42	0,25 (-0,70; 1,10)*	0,985
	PM	15	0,20 (-0,60; 0,70)*	
Start -> 2.year	GIOP	38	0,30 (-0,60; 1,10)*	0,812
	PM	14	0,25 (-0,40; 0,90)*	

* Statistically significant change (Wilcoxon test).

** Mann-Whitney
BMD and T-score– L spine
BMD

		N	Median (5.; 95.percentil)	P*
Start	GIOP	56	0,80 (0,68; 1,07)	0,032
	PM	23	0,76 (0,57; 0,94)	
1.year	GIOP	41	0,89 (0,72; 1,12)	0,059
	PM	16	0,83 (0,68; 1,21)	
2.year	GIOP	40	0,91 (0,72; 1,18)	0,238
	PM	15	0,87 (0,67; 1,23)	

* Mann-Whitney
T-score

		N	Median (5.; 95.percentil)	P*
Start	GIOP	57	-3,10 (-4,30; -0,80)	0,041
	PM	23	-3,50 (-5,00; -1,90)	
1.year	GIOP	41	-2,30 (-4,00; 0,50)	0,075
	PM	16	-2,80 (-4,10; 0,10)	
2.year	GIOP	40	-2,20 (-3,80; -0,15)	0,316
	PM	15	-2,60 (-4,10; 0,20)	

* Mann-Whitney

Change of BMD and T-score– L spine
BMD

		N	Median (5.; 95.percentil)	P**
Start -> 1.year	GIOP	39	0,11 (-0,04; 0,25)*	0,163
	PM	13	0,08 (-0,06; 0,23)*	
Start -> 2.year	GIOP	38	0,11 (-0,07; 0,33)*	0,574
	PM	13	0,11 (0,01; 0,30)*	

* Statistically significant change (Wilcoxon test).

** Mann-Whitney

T-score

		N	Median (5.; 95.percentil)	P**
Start -> 1.year	GIOP	40	0,80 (-0,20; 3,40)*	0,230
	PM	13	0,70 (-0,50; 1,90)*	
Start -> 2.year	GIOP	38	0,90 (-0,50; 2,40)*	0,502
	PM	13	1,00 (0,20; 2,20)*	

* Statistically significant change (Wilcoxon test).

** Mann-Whitney

Conclusion: These results of common population of patients suffering from the postmenopausal osteoporosis and glucocorticoid induced osteoporosis confirm higher gain in BMD in patients with glucocorticoid induced osteoporosis compare to postmenopausal osteoporosis.

P1007

IMPACT OF TRAPEZIOMETACARPAL OSTEOARTHRITIS SEVERITY ON FOREARM BMD IN A COHORT OF POSTMENOPAUSAL WOMEN

M. Paoletta¹, A. De Sire¹, A. Moretti¹, A. Camerlingo¹, C. Improta¹, F. Gimigliano², G. Iolascon³

¹Department of Medical and Surgical Specialties and Dentistry, University of Campania “Luigi Vanvitelli”, ²Department of Mental and Physical Health and Preventive Medicine, University of Campania “Luigi Vanvitelli”, ³Department of Medical and Surgical Specialties and Dentistry, University of Campania “Luigi Vanvitelli”, Naples, Italy

Objective: Osteoarthritis (OA) and osteoporosis are common diseases in older people but it is still not clear whether there is a correlation between them [1]. Trapeziometacarpal (TMC) OA is a common age-related degenerative disorder that might negatively influence the upper limb functioning. Aim of our study was to evaluate the influence of TMC OA severity on forearm BMD in a cohort postmenopausal women.

Methods: We included postmenopausal women, aged ≥ 50 years, with a diagnosis of TMC OA (according to EULAR recommendations), with an Eaton-Glickel staging ≥ 2 [2]. We divided our cohort in 2 groups: mild TMC OA group (Eaton-Glickel staging 2) and moderate-severe TMC OA

group (Eaton-Glickel staging 3-4). Outcome measures were: ultradistal radius (UDR) BMD, 33% radius BMD, lumbar spine (LS) BMD, and femoral neck (FN) BMD.

Results: We included 20 postmenopausal women, mean aged 68.65 ± 6.63 years, 11 with mild TMC OA and 9 with moderate-severe TMC OA. The moderate-severe TMC OA group had a significantly lower UDR BMD (0.313 ± 0.052 g/cm² vs. 0.436 ± 0.095 g/cm²; $p=0.0088$) and a significantly lower 33% radius BMD (0.584 ± 0.130 g/cm² vs. 0.778 ± 0.166 g/cm²; $p=0.0062$). No statistically significant differences were found in LS BMD and FN BMD between the two groups.

Conclusion: Our data reported that TMC OA might have a negative impact on forearm bone health, as showed by the significantly lower UDR and 33% radius BMD in patients affected by moderate-severe TMC OA. On the other hand, no differences were found in the other skeletal sites.

References:

1. Dillon CF et al. Am J Phys Med Rehabil 2007;86:12
2. Eaton RG, Littler JW. J Bone Joint Surg Am 1973;55:1655

P1008

ASSOCIATION OF COGNITIVE IMPAIRMENT AND SACOPENIA IN OLDER ADULTS: BUSHEHR ELDERLY HEALTH PROJECT

F. Sharihi¹, G. Shafiee², R. Heshmat², I. Nabipour³, B. Larijani⁴, S. M. Arzaghi¹, A. Ostovar⁵

¹Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ²Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, ³The Persian Gulf Biomedical Research Institute, Bushehr University of Medical Sciences, Bushehr, Iran, ⁴Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, ⁵Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Objective: Cognitive impairment is one of the common geriatric syndromes. Osteoporosis in elderly could result to disability and mortality because of femoral and vertebral fractures. Relationship between these two disorders has not clearly be revealed. This study was designed to clarify the relationship between cognitive impairment and osteoporosis in a community representative sample of older adults in Iran.

Methods: The sample of this study was representative of aged >60 years that were selected using a cluster random sample method based on the neighborhoods of Bushehr, Iran. Demographic data were gathered used an approved questionnaire. Cognitive status was assessed using, Mini-Mental State Examination (MMSE), Animal Naming Score (ANS), Functional Assessment Test, and history of dementia (and Alzheimer's disease). Who had the problem in one of this test or had the history of dementia was considered as the subject with cognitive impairment and those had the normal condition in all tests was assumed as subjects with normal cognition. Bone densities of the neck of femur and lumbar vertebra were evaluated using DXA. Osteoporosis was defined as T-score ≤ -2.5 in each of mentioned sites. Multivariate logistic regression model used for assessed association between osteoporosis and cognitive impairment. The results of association were adjusted for age, sex, and BMI.

Results: Data of 2263 subjects from 2426 participants that had cognitive and bone densitometry assessment results were considered for analyses. Of the total, 51.8% were women. Mean age of the participants was 69.28 (6.33) years. In multivariable regression model, odds ratio (OR)=1.276 (CI 95%; 1.036 – 1.572 for spinal osteoporosis and OR=1.350 (CI 95%; 0.966 – 1.887) for femoral osteoporosis were calculated.

Conclusion: It seems that the cognitive impairment is independently associated with osteoporosis. This association was more significant in spinal osteoporosis. It may be a similar pathway such as inflammation could be explained this relationship.

P1009

COMPARATIVE PROTEOMIC ANALYSIS OF DIFFERENT INVASIVE OSTEOSARCOMA CELL LINESD. Hong¹, L. W. Zhang¹¹Orthopaedic Department, Taizhou Hospital of Wenzhou Medical University, Linhai, China**Objectives:** To identify the differential proteins expression in MG63 and HOS osteosarcoma cell lines.**Methods:** Proteomics based on stable isotope labeling with amino acids in cell culture (SILAC) was used to quantitatively analyze the difference of expression of proteins between MG-63 and HOS, whose are inconsistent in tumor invasion and metastasis.**Results:** 16 proteins showed significantly different expression (ratio>2.0) were found out by MADIL-TOF-MS/MS and bioinformatic analysis, including myotrophin, ANP32B, ARHGDI, Rab-7a, CDC42, CLIC1, THIOREDOXIN, TIMM9, AnnexinA2, AnnexinA5, galectin1, PEBP1, stathmin1, Vimentin, GSTM-1, COTL-1. Furthermore, the expression of three proteins were validated using western blot and real-time PCR.**Conclusions:** With the combined proteomic and molecular biology approach, we found three potential biomarkers for osteosarcoma and might provide new insights into the mechanism of osteosarcoma, potentially leading to the design of novel diagnostic and therapeutic strategies.

P1010

DIFFERENTIAL PROTEOMIC ANALYSIS OF SYNOVIAL FLUID FROM ANKYLOSING SPONDYLITIS AND OSTEOARTHRITIS PATIENTSL. Sang-Heon¹, H. Seung-Jae², K. Sung-Soo³, K. Sang-Hyon⁴, S. Chang-Nam⁴, K. Jong-Seo⁵¹Department of Rheumatology, School of Medicine, Konkuk University, Seoul, ²Department of Rheumatology, School of Medicine, Keyung Hee University, Seoul, ³Division of Rheumatology, Department of Internal Medicine, Ulsan University School of Medicine and GangNeungAsan Hospital, Gangneung, ⁴Division of Rheumatology, Department of Internal Medicine, Keimyung University Dongsan Medical Center, Daegu, ⁵Center for RNA Research, Institute of Basic Science (IBS), Seoul, South Korea**Objective:** When peripheral arthritis in ankylosing spondylitis (AS) develops early in the disease course it is a predictor of more aggressive disease. The purpose of this study was to identify those proteins relatively more abundant in the synovial fluid (SF) of patients suffering from AS and osteoarthritis (OA) using mass spectrometry.**Methods:** Approximately 2 ml of the synovial fluid samples were aspirated from the affected knees of 5 AS and 5 OA patients. We identified differentially expressed protein (DEP) in SF of AS and OA, and analyzed cellular component and biological process using DAVID software and protein-protein interaction network model.**Results:** The analysis led to the identification of 1105 DEPs in 10 samples. Out of the 1105 DEPs, 36 were found to be upregulated and 36 were downregulated in AS synovial fluid ≥ 2 -fold when compared to OA. Upregulated DEPs were MMP3, QSOX1, HEL-S-37, SERPIND1, PFN1, MMP3, PGAM1, and CPN1. Downregulated DEPs were SERPINA1, A2M, APOA1, HP, IGL, HEL-S-153w, IGHM, and DKK3. Upregulated biological process was mainly complement activation, classical pathway, lymphocyte mediated immunity, and acute inflammatory response. Downregulated biological process was defense response, acute inflammatory response. Cellular components presented extracellular region.**Conclusion:** Mass spectroscopy based proteomics could identify many proteins in synovial fluid of AS and OA patients. Further investigations are needed to replicate these DEPs in western blot analysis or enzyme-linked immunosorbent assay.**References:**

1. Balakrishnan L et al. Clinical Proteomics 2014;11:1.

2. Bhattacharjee M et al. Clinical Proteomics 2013;10:11.

Acknowledgments: The biospecimens for this study were provided by the Keimyung University Dongsan Hospital Korea Regional Biobank, a member of the National Biobank of Korea, which is supported by the Ministry of Health and Welfare. This research was supported by the Keimyung University Research Grant of 2015.

P1011

EAGLE'S SYNDROME IN SPORTSC. Matzaroglou¹, E. Tsepis¹, P. Gkrilias¹, K. Fousekis¹, K. Kafchitsas², J. Gliatis¹, E. Heristanidu³, V. Billis¹¹Technological University of Western Greece, Human Assessment and Rehabilitation Laboratory, Aigio, ²Asklepios Orthopaedic Clinic, Lindelohe, Germany, Schwandorf, Germany, ³ENT Department, Patras City Hospital, St Andrew, Patras, Greece**Objective:** Eagle's syndrome face due to an elongated styloid process or calcified stylohyoid ligament and consists of specific symptoms of dysphagia, foreign body sensation, cervical pain, face pain and throat pain with radiation to the ipsilateral ear. We present four cases with Eagle's syndrome, which was discovered after low impact spine injuries in sports (indoor soccer)**Methods:** Four male athletes presented with Eagle's syndrome after low impact cervical whiplash type spine injury in Indoor soccer immediately after the initial trauma.**Results:** The ossification of the styloid process was observed in all cases, accompanied by the ossification of stylohyoid ligaments. Fracture and medialization of the ossified stylohyoid ligament, with incomplete repair due to continuous hyoid bone movements reported in radiology examination. Two months after the initial trauma clinical improvement achieved with special physiotherapy protocols.**Conclusions:** The Eagle syndrome was characterized by symptoms typically occurring after tonsillectomy. It manifests as a nagging dull, long-term ache in the throat, sometimes radiating to the ipsilateral ear and the sensation of a foreign body in the throat. The topic Eagle syndrome is still being debated. Eagle (1937-1948) considered surgical trauma (tonsillectomy) or local chronic irritation could cause osteitis, periosteitis, or tendonitis of the stylohyoid complex with consequent reactive, ossifying hyperplasia. Eagle considered tonsillectomy responsible for the formation of scar tissue around the styloid apex, with consequent compression or stretching of the vascular and nervous structures contained in the retrostyloid compartment. This is the first time that Eagle syndrome presented after spine injury in sports. In the last years, the term "styloid syndrome" was created to describe a cervico-pharyngeal pain related to the styloid process if no previous history of trauma was found.**References:**

1. Eagle WW. Arch Otolaryngol 1948;47:630
2. Eagle WW. Arch Otolaryngol 1949;49:490
3. Fusco DJ et al. Acta Neurochir (Wien) 2012;154:1119

P1012

BONE MINERAL DENSITY AND ANTICONVULSANT MEDICATION IN A COHORT OF PATIENTS WITH EPILEPSYA. L. Barbulescu¹, P. L. Ciurea¹, B. A. Chisalau¹, C. D. Parvanescu¹, S. C. Firulescu¹, C. Criveanu¹, R. E. Sandu¹, F. A. Vreju¹¹Univeristy of Medicine and Pharmacy Craiova, Craiova, Romania**Objective:** It is well known and shown by previous studies, that chronic use of antiepileptic drugs is associated with a low mineral density and an increased risk of fractures. We aimed to establish the presence of low BMD in a cohort of patients treated with anticonvulsant drugs and the possible associations with disease variables.**Methods:** We enrolled 83 consecutive patients, treated with antiepileptic drugs, for at least 1 year, and a control group, of 95 subjects, similar as age

and sex, without associated medication or comorbidities that can increase the risk of osteoporosis. BMD was determined using by DXA, assessing T-score both for total hip and lumbar spine.

Results: Of the 83 patients, over 50% had T-scores compatible with osteopenia/osteoporosis, either for lumbar spine or total hip; we established a percentage of 38.55 (32) for osteopenia and 14.45 (12) for osteoporosis. Regarding control group, osteoporosis was found for 10 (10.52%) subjects and osteopenia for 30 (31.57%), either for lumbar spine or total hip; the results were statistically significant different between the two groups: $p=0.009$ for lumbar spine and 0.012 for total hip. Regarding disease variables, only disease duration and total use of anti-convulsants significantly correlated with the presence of a low BMD.

Conclusion: The presence of a low BMD is significant in patients that use antiepileptic drugs and may potentially lead to fractures. Therefore, periodic evaluation of these patients should also include a screening for osteoporosis, in order to establish an early diagnosis, apply the proper therapeutic measures, and prevent the major consequences, vertebral and nonvertebral fractures.

References:

1. Lee R et al. *Endocr Pract* 2012;14:1
2. Pack AM et al. *Neurology* 2008;70:1586
3. Ferguson FT et al. *Arch Osteoporos* 2015;10:41

P1013

NEWS ABOUT THE ROLE OF THYROID HORMONES IN OSTEOPOROSIS INDUCTION

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Covei⁵, A. Camen¹, A. S. Enescu⁶, A. Enescu⁷, D. M. Albulescu⁸, N. Ionovici⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital /Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁷University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁸University of Medicine and Pharmacy, Department of Radiology, Craiova, ⁹University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Objectives: Thyroid hormones have deep effects on a large number of metabolic processes in almost all tissues and the bone is sensible to their actions. Thyrotoxicosis represents a complex of clinical manifestations induced by the presence of thyroid hormones excess at intracellular tissue and also at receptor level. As thyroid hormone excess comes from thyroid hyperfunction or not, thyrotoxicosis is classified as: with hyperthyroidism and without hyperthyroidism. The cases included in our study showed thyrotoxicosis with hyperthyroidism. We highlight the cases of thyrotoxicosis with hyperthyroidism, evaluation of thyroid hormone status and bone markers and the study of mineral bone density.

Method: The study was performed on 42 cases with hyperthyroidism from which: Graves-Basedow disease (19), multi-hetero-nodular toxic goiter (18), Plummer toxic adenoma (5), with ages between 24-55. At all cases were studied FSH, TSH, ATPO, osteocalcin and CrossLaps. Thyroid ultrasound was made to highlight the size of the gland, the homogeneous/non-homogeneous aspect of the structure, the nodules presence and the vasculature type. At all cases the BMD was evaluated through DXA.

Results: Osteodensitometry revealed the presence of osteoporosis at all cases with Graves-Basedow disease, Plummer toxic adenoma and at the 12 cases with multi-hetero-nodular goiter (82.2%).

Conclusions: 1. For all thyrotoxicosis cases with hyperthyroidism requires hormonal, immunological, echographic and osteodensitometric

evaluation. 2. The use of anti-thyroid therapy, β -blockers, immunosuppressants in combination with antiresorptive / proformative medication contributes to increase the bone mass and reduce the risk of fragility fractures. 3. Thyrotoxicosis with hyperthyroidism affects the trabecular bone and also the cortical bone, and the mechanism seems to be related to the resorption increased through the local turnover speed up.

P1014

THE STUDY ON STRONTIUM-DOPED NANO HYDROXYAPATITES (SR-NHAS) COATING MATERIALS IN RATS

C. Wang¹, X. Ma², Q. Li³, J. Yang⁴, T. Fu⁵, Y. Jiang⁶

¹Department of Orthopaedics, The Affiliated Xi'an Ninth Hospital, School of Medicine, Xi'an Jiaotong University, Xi'an, ²Department of Orthopaedics, The First Affiliated Hospital, Xi'an Jiaotong University, Xi'an, ³Department of Orthopaedics, The No.1 Hospital of Shijiazhuang, Shijiazhuang, ⁴School of Aerospace, Xi'an Jiaotong University, Xi'an, ⁵Key Laboratory of Biomedical Information Engineering of Ministry of Education, School of Life Science and Technology, Xi'an Jiaotong University, Xi'an, ⁶Department of Dermatology, The Affiliated Xi'an Ninth Hospital, School of Medicine, Xi'an Jiaotong University, Xi'an, China

Objective: Hydroxyapatite (HA) has been widely used in bone implants. However, for patients with osteoporosis, pure HA has little effects on promoting bone formation and suppressing bone resorption. As a result, the loose rate of pure HA coated implants is high. On the other hand, strontium (Sr) can simultaneously promote bone formation and inhibit bone deterioration in osteoporosis. So we hope to improve implant coating by using Sr-doped nanohydroxyapatites (Sr-nHAs), a novel biomaterial.

Methods: Pure nHA, 5% Sr-nHA and 10% Sr-nHA were prepared by our one-step method. The preparation details can be found in the literatures we published. The properties of prepared nHA and Sr-nHAs were characterized by using FTIR (Fourier transform infrared spectroscopy), XRD (X-ray diffraction) and TEM (Transmission electron microscopy). The coatings on the titanium (Ti) rods surface were prepared by plasma spraying after the different nHA powders were made. The composition and surface morphology of the coatings were performed by XRD, EDS (energy dispersive spectrometry) and SEM (scanning electron microscopy). Four weeks after femoral marrow cavity implantation in Sprague Dawley rats, the osseointegration of different implants was examined histologically and biomechanically.

Results: With the increase of strontium doping, the wider labeling band of fluorescent tetracycline indicates the more new bone formation in unit time. Meanwhile, mineral apposition rate (MAR) as another parameter for the new bone formation increased gradually (Figure 1 and Table 1). The biomechanical results showed that the pull-out resistance increased with increasing strontium content (Figure 2). Compared with nHA (123.2842 ± 17.13492 , $n=5$) and 5% Sr-nHA (164.6758 ± 15.02538 , $n=5$), the pull-out resistance in 10% Sr-nHA (189.7341 ± 10.88298 , $n=5$) was significantly greater ($*P<0.05$).

Conclusion: In this study, both the pure nHA and Sr-nHAs (5% and 10%) were successfully synthesized and used for Ti implant coatings. Preliminary implantation in vivo showed an implicit osseointegration by using the Sr-nHAs coating materials. The long-term impacts of Sr-nHAs synthesized in this study are expected to be further explored and optimized for biomedical applications in osteoporosis.

Reference:

1. Wang C et al. *Mater Sci (Medziagotyra)* 2017;23:243
2. Ma X et al. *Mater Technol* 2016;31(S1):23
3. Feng Y et al. *Chin J Orthodont* 2011;1:27

Table 1. Two line interval width (D) and mineral apposition rate (MAR) under the fluorescence microscope (n=6, $\bar{X} \pm S$)

	D/ μm	MAR/ $\mu\text{m} \cdot \text{d}^{-1}$
nHA	166.282 $\pm$ 7.212	23.7546 $\pm$ 1.0303
5% Sr-nHA	184.706 $\pm$ 6.853	26.3865 $\pm$ 0.9789
10% Sr-nHA	186.605 $\pm$ 6.574	26.6579 $\pm$ 0.9392

MAR=D/ Δ T (D is the width of labeling band of fluorescent tetracycline/ Δ T is the Interval time between the twice injection).

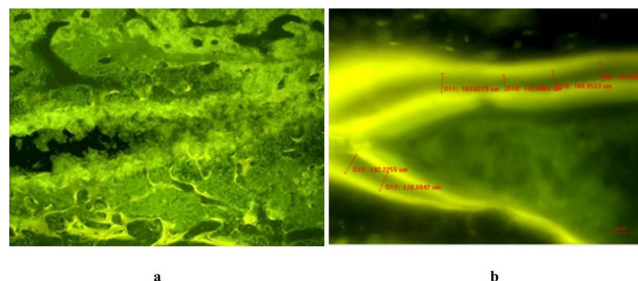


Figure 1. Schematic diagram of two line interval width (D) four weeks after surgery (a, 50 $\times$ and b, 400 $\times$)

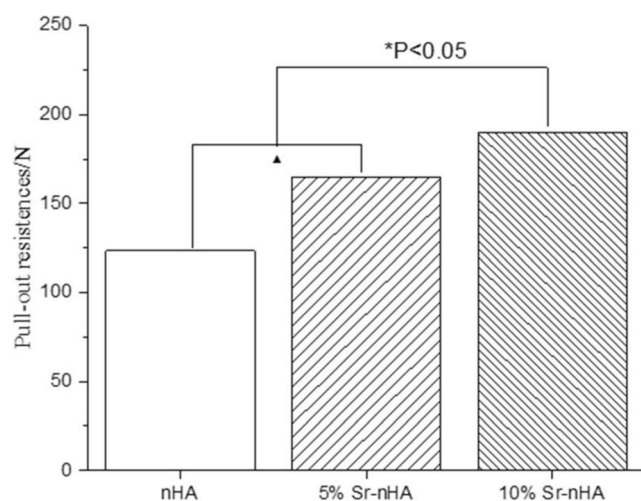


Figure 2. Pull-out resistances in three groups. *Compared with nHA and 5% Sr-nHA, the pull-out resistance in 10% Sr-nHA was significantly greater ($P < 0.05$). ▲ There was no significant difference between nHA and 5% Sr-nHA.

P1015

THE STUDY OF LIPID METABOLISM MODIFICATIONS IN HYPOGONADAL OSTEOPOROSIS

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, I. S. Vasile², A. Covei⁴, A. S. Enescu⁵, A. Enescu⁶, A. Camen¹, E. Stefan⁷, N. Ionovici⁸, D. M. Albulescu⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy /Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Philanthropy Hospital, Department of Endocrinology, Craiova, ⁵University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁶University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁷Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁸University of

Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, ⁹University of Medicine and Pharmacy, Department of Radiology, Craiova, Romania

Objectives: Hypogonadal osteoporosis refers to the absence or the low level of estrogen, progesterone and androgen, singularly or in combination. The more and more often screening of cases with hypogonadism (feminine or masculine), motivates the approach of the study of metabolic and hormonal modifications in hypogonadal osteoporosis, which is established early. We highlight lipid metabolism modifications at patients with hypogonadal osteoporosis.

Method: The total number of patients enrolled in the study was 57 from which: 1. late puberty 26 cases with age between 12-25 years from which: gonadal dysgenesis 13 cases (Turner syndrome with female phenotype 9 cases, Klinefelter syndrome 4 cases); 2. hypogonadotropic hypogonadism 13 cases from which: pituitary dwarfism with sexual infantilism 3 cases, adiposogenital syndrome 8 cases (female 3 cases, male 5 cases), pituitary tumor insufficiency 2 cases; 3. premature ovarian failure 31 cases with age between 20-33 years. At all cases, BMD was evaluated through DXA.

Results: After the lipid metabolism study, were obtained the following values: normal values - premature ovarian failure (31 cases), Klinefelter syndrome (4 cases); low values - pituitary dwarfism with sexual infantilism 3 cases and pituitary tumor insufficiency 2 cases; elevated values - Turner syndrome with female phenotype 9 cases and adiposogenital syndrome 8 cases

Conclusions: At cases with Turner syndrome and adiposogenital syndrome where all components of lipid metabolism had elevated values, the explanation lies in the association of hypothyroidism whose effect is increasing the deposits and the concentration of plasma lipids. It is necessary to combine hypolipidemic therapy with antiresorptive/proformative medication.

P1016

THYROXIN OSTEOPOROSIS PARTICULARITY

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Covei⁵, A. Camen¹, A. Enescu⁶, A. S. Enescu⁷, D. M. Albulescu⁸, N. Ionovici⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital/, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁷University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁸University of Medicine and Pharmacy, Department of Radiology, Craiova, ⁹University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Objectives: Thyrotoxicosis, as a term, defines the manifestations as clinical, physiopathological and biochemical that happen when tissues are exposed and respond to the excessive actions of thyroid hormones. Thyrotoxicosis is a cause of osteoporosis, bone resorption is increased at most of the patients with hyperthyroidism. Considering that the association between thyrotoxicosis and osteoporotic risk, in case of treated or under treatment hyperthyroidism is controversial, the aim of our study is to compare the bone density between a batch of active hyperthyroid and a batch of ex-hyperthyroid, currently euthyroid, in the absence of anti-osteoporotic treatment, and the observation of a possible correlation between the etiology of hyperthyroidism and the severity of osteoporosis.

Method: Our study was conducted in 2016 at Endocrinology Clinic, using two lots of 20 patients: the first group was represented by patients with active hyperthyroidism under treatment and the second group included patients with ex-hyperthyroidism having an average period of 6 months of chemically euthyroidism. All patients had aged between 30-50 years and bone density was determined by osteodensitometry at 3 months.

Results: Patients with active hyperthyroidism exhibited a reduction in BMD, and the ex-hyperthyroidism patients had a partial recovery of bone density, but insufficiently to normalize bone density. In the same study, there were no differences between BMD at Graves disease patients and those with a polynodular toxic goiter or toxic thyroid nodule.

Conclusions: At euthyroid patients, ex-hyperthyroidism, was observed a slight increase of bone density, and the etiology of hyperthyroidism does not appear to play a major role in the severity of thyroid osteoporosis.

P1017

THE STUDY OF OSTEOPOROSIS INCIDENCE IN PRIMARY OVARIAN INSUFFICIENCY

S. A. Bugala¹, O. R. Pavel², L.-P. Pavel³, E. Stefan⁴, I. S. Vasile², A. Camen¹, A. Covei⁵, A. Enescu⁶, A. S. Enescu⁷, D. M. Albulescu⁸, N. Ionovici⁹

¹University of Medicine and Pharmacy, Faculty of Dentistry, Craiova, ²University of Medicine and Pharmacy, Department of Endocrinology, Craiova, ³Queen Mary Hospital, Department of Obstetrics and Gynecology, Craiova, ⁴Hospital CF2, Department of Orthopaedic and Traumatology, Bucuresti, ⁵Philanthropy Hospital, Department of Endocrinology, Craiova, ⁶University of Medicine and Pharmacy, Department of Emergency Medicine, Craiova, ⁷University of Medicine and Pharmacy, Department of Human Anatomy, Craiova, ⁸University of Medicine and Pharmacy, Department of Radiology, Craiova, ⁹University of Medicine and Pharmacy, Department of Occupational Medicine and Occupational Diseases, Craiova, Romania

Objective: At female patients with premature ovarian failure, follicular dilation is very low and therefore ovarian hormonogenesis is reduced. With the number of follicles lower, the shorter lifetime of the ovary is, a clinical spectrum is constituted from the lack of total or partial puberty sexualization to the early installation of the climacterium. By disturbing the secretion of ovarian hormones that control bone homeostasis, the bone formation-bone loss ratio is deregulated, with bone loss and osteoporosis occurring.

Method: The study was performed on 31 patients with age between 20-33 years. Hormonal investigations were focused on the study of FSH, LH, PRL, estradiol, progesterone. Utero-ovarian pelvic echocardiography was also performed. At all patients, the BMD was evaluated by DXA. As biochemical markers of bone turnover, serum osteocalcin and CrossLaps were studied through the ELISA method.

Results: Hormonal dosages revealed low levels of estradiol and progesterone, whereas gonadotrophic hormones (LH, FSH) were between 210-385 milli/ml (above the upper limit of normal: 0.110-190 milli/ml). BMD measurement revealed the presence of osteoporosis at 22 cases representing 45.8% of all cases investigated. The BMD values correlate with those of the biochemical markers of bone turnover.

Conclusions: 1. The DMO study and the biochemical markers of bone turnover in premature ovarian failure must be performed periodically to identify patients who are rapidly losing bone mass and have an increased risk of osteoporosis. 2. Estro-progestative substitution is the primary therapeutic attitude for premature ovarian failure to prevent osteoporosis, metabolic and visceral complications. 3. Female patients with osteoporosis will be associated with anti-resorptive agents or proformers to prevent fractures of fragility.

P1018

STRATEGIES TO PROMOTE BONE AND CARDIOVASCULAR HEALTH FROM CHILDHOOD THROUGH DIET AND PHYSICAL ACTIVITY: A CROSS-SECTIONAL AND LONGITUDINAL STUDY

T. Hirota¹, A. Yokota¹, R. Takahara¹, M. Takagi¹, K. Hirota²

¹Dept. of Health & Nutrition, Kyoto Koka Women's University, Kyoto,

²Dept. of Obstetrics & Gynecology, Nanko Hospital, Osaka, Japan

Objectives: Osteoporosis and atherosclerosis are two major public health problems associated with lifestyle and aging. Preventive strategies have been investigated independently and separately, but strategies to reduce osteoporosis may also benefit cardiovascular health. This study examines cost-effective methods to simultaneously prevent osteoporosis and atherosclerosis by improving diet and other lifestyle factors from an early age.

Methods: 128 healthy female students aged 18-22 years were recruited. Their BMD of each subject's os calcis was measured by quantitative ultrasound (QUS). The cardio-ankle vascular index (CAVI) was also measured to assess arterial stiffness as an atherosclerosis related index, which lineally increases with age. Two years later, CAVI were measured again in 88 subjects aged 20-21 years as a longitudinal study. The associations between diet, physical activities and other lifestyle factors from childhood, and BMD or CAVI were studied by regression analysis.

Results: The BMD of the subjects was consistent with Japanese peak bone mass ('Stiffness' index was $96 \pm 16\%$ vs. 100% in the American) and their CAVI value was 5.44 ± 0.66 (9.0 is the indicator values for atherosclerosis). Both of their BMD and CAVI were typical for the age group and these associated with age from 18-22. Their BMD was associated with dairy intake from childhood, and with a history of sporting activity from high school to the present. Their CAVI values were associated with dairy intake from childhood to the present, intakes of fruit, soybean, and present physical activities such as daily walking. Intake of oily sweetened snacks was associated with lower BMD and higher CAVI values. The yearly increase of CAVI values after two years were suppressed by high dairy intake and long duration of exposure to sun.

Conclusion: Higher dairy intake from childhood, a lower intake of oily sweets, and more frequent outdoor physical activity can be assumed to be effective for the prevention of both osteoporosis and cardiovascular disease in later life. Early education for children on appropriate diet and physical activity is necessary for a future healthier life and to save on medical expenses in later life.

P1019

BACILLUS CLAUSII (BC) INHIBITS OVARIECTOMY INDUCED OSTEOPOROSIS VIA MODULATION OF TREG-TH17 CELLS

H. Y. Dar¹, R. K. Srivastava²

¹Department of Zoology, Dr H S Gour Central University, Sagar,

²Department of Biotechnology, All India Institute of Medical Sciences (AIIMS), New Delhi, India

Objective: Probiotic bacteria are live microorganisms which upon administration in adequate amounts confer a health benefit on the host by altering the composition of the GM. Previously different studies have shown that various strains of bacteria have immense potential of regulating bone health. Taking cue from these studies we administered *Bacillus clausii* (BC) strain for studying its effect on bone mass in ovariectomy (ovx) induced osteoporotic mice model.

Methods: Mice were divided into three groups viz. Sham, Ovx and Ovx + BC with each group having not less than 10 mice. BC was administered orally and after 6 weeks mice were sacrificed and analyzed for various parameters for accessing the role of BC on bone health by the use of different cutting-edge technologies such as AFM, SEM, FTIR, μ CT, FACS, and ELISA.

Results: Interestingly, it was observed that administration of BC protected mice from ovx-induced bone loss which was confirmed by SEM, AFM, FTIR and μ CT analysis of bone samples. Mechanistic studies revealed that administration of BC significantly increased the percentage of Tregs in both primary and secondary lymphoid tissues along with simultaneously decreasing Th17 cells. Serum cytokine analysis further confirmed that BC administration significantly decreased proinflammatory cytokines (IL-6, IL-17, TNF- α) and increased anti-inflammatory cytokines (IL-10, IFN- γ) in ovx group.

Conclusion: Thus, we propose that the inhibitory effect of BC on bone loss is mainly mediated via its effects on the Th17 & Treg which in turn regulates osteoclastogenesis.

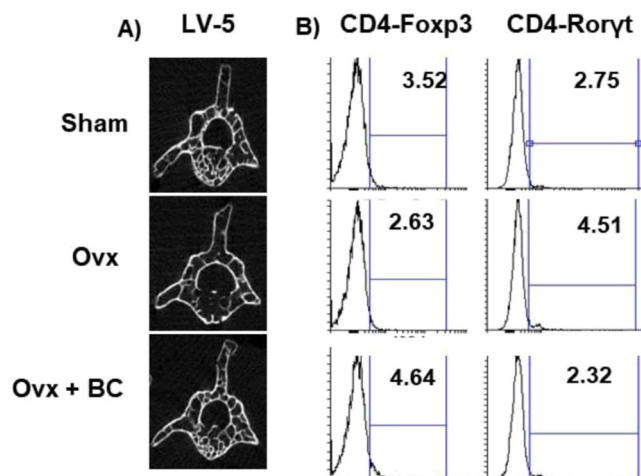


Figure 1. A). MicroCt images of LV-5. B). Treg and Th17% in bone marrow

P1020

CERVICAL WHIPLASH INJURIES IN SPORTS ACTIVITIES HAVE MINOR SEVERITY

C. Matzaroglou¹, V. Billis¹, K. Kafchitsas², J. Gliatis³, P. Megas³, E. Tsepis¹, M. Tyllianakis³

¹Technological University of Western Greece, Human Assessment and Rehabilitation Laboratory, Aigio, Greece, ²Asklepios Orthopaedic Clinic, Lindelohe, Germany, Schwandorf, Germany, ³Department of Orthopaedics, University of Patras, Patras, Greece

Objectives: We assess qualitatively and quantitatively the potential risk in athletic activities to sustain cervical whiplash type spine injury and chronic whiplash syndrome (WAD, Whiplash Associated Disorders).

Methods: We gathered data from sports accidents type “whiplash”, that occurred between 2008-2013. 325 with WSI injuries were recorded in sports in Orthopaedic Departments and classified according to Quebec Task Force (QTF) classification. The most of them classified in grade 0 according QTF (256/325). All the other patients (69/325) with chronic musculoskeletal signs returned for the 6-months, 1-year and 2-year follow-up appointment. All these patients (average age, 22.3 years old) underwent clinical, laboratorial and health related quality of life scales (SF-36) and psychometric examinations (HADS). The mean posttraumatic interval was 22 months. Statistical analysis was performed using the GraphPad Prism 2.01.

Results: The 69 patients classified in the minor grades I and II according QTF classification. No patient complained for neurological signs after six months from the injury. Only 4 patients 4/325 remain with neck pain, vertigo, tinnitus, and tenderness, but with no physical signs [grade I] one year post-traumatic.

Conclusions: Our study shows that there is a significant risk of whiplash type injuries in sports, especially indoor soccer 5x5. But serious injuries with neurologic sequelae and WAD remain very infrequent, and most of these injuries have minor severity.

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P1021

BMD IN MEN WITH CORONARY ATHEROSCLEROSIS

T. Raskina¹, A. Voronkina², M. Letaeva¹, A. Kokov³, O. Barbarash³, I. Shibanova³

¹Federal State Educational Institution of Higher Education “Kemerovo State Medical University”, ²State Autonomous Healthcare Institution Kemerovo region “Regional Clinical Hospital of Emergency Medical Care named M. Podgornbunsky”, ³Federal State Budgetary Scientific Institution “Scientific-Research Institute of Complex Issues of Cardiovascular Disease”, Kemerovo, Russia

Purpose: To examine relationship between BMD and atherosclerotic lesions of coronary arteries (CA) in men with coronary heart disease (CHD).

Methods: We observed 102 men with verified CHD aged 51-75 (60.8 ± 6.9) years. All patients underwent DXA of lumbar vertebral bodies LI-LIV and femoral neck (Excel XR-46, Norland, USA) and polyprojection coronary angiography (Innova, General Electric, USA). Based on results of densitometry value of T-criterion (recommendations ISCD, 2007) BMD was evaluated as: normal BMD (T-criterion ≥ 1), osteopenia (T-criterion between -1 and -2.5) and osteoporosis (T-criterion of < -2.5). On the basis of coronary angiography options for destruction CA were evaluated: one and two vascular lesions, three vascular and defeat of left CA trunk in combination (or not) with hemodynamically significant stenosis of any other CA. We considered hemodynamically significant narrowing of >50% of artery diameter.

Results: The results of densitometry patients were distributed as follows: 21 patients (20.6%) with normal BMD, 48 (47.0%) with osteopenia and 33 (32.4%) with osteoporosis. Osteopenic syndrome (OPS) was detected in 79.4% of men. Depending on variant of CA lesion patients were divided into three groups: 39 men with one and two vascular lesions, 47 patients with three vascular defeat and 16 patients with lesions of left CA trunk in combination (or not) with any other lesions of CA. It is shown that T-criterion in these groups of patients was -1.69 ± 0.99, -1.81 ± 1.17 и -2.53 ± 1.02 SD, respectively. It is established that with increasing severity of CA densitometric indices in neck of femur are reduced. So, average value of T-criterion in men with a lesion of left CA trunk was significantly lower than in patients of first two groups (p < 0.05). According to correlation analysis an inverse relationship between T-criterion of femoral neck and severity of lesions of CA was revealed (r = -0.19, p = 0.05).

Conclusions: The decline in BMD in men is associated with a significant lesion and correlates with severity of atherosclerosis CA. The obtained results confirm high probability of existence of common pathogenetic links OPS and atherosclerotic lesions of CA.

P1022

EFFICIENCY OF ANTIOSTEOPOROTIC THERAPY IN PATIENTS WITH PSORIATIC ARTHRITIS AND SECONDARY OSTEOPOROSIS

V. Y. Samakhavets¹, E. V. Rudenka², A. V. Rudenka³, A. E. Buhlova³

¹Minsk City Clinical Hospital, ²Belarusian State Medical University, ³Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus

Objective: to assess the state of BMD in patients with psoriasis (P) and psoriatic arthritis (PsA) and its dynamics after complex antiresorptive therapy.

Methods: study included 39 patients with P and PsA with low BMD. BMD was measured using DXA in the lumbar spine (LS) and proximal femurs (PF) before administration of anti-osteoporotic treatment and after 12 months. Statistical processing of the results was carried out in the programs MS Office Excel 2010 and STATISTICA 8.0 (StatSoft, USA). Critical level of significance in testing statistical hypotheses was p < 0.05.

Results: In patients with P and PsA and osteopenia, use of combined therapy with calcium carbonate 1000 mg/d and cholecalciferol 800 IU/

day leads to statistically significant increase in BMD in the LS: from 1.049 (0.097) g/cm² to 1.107 (0.087) g/cm²; $p=0.002$. In patients with P and PsA and osteoporosis oral bisphosphonates (alendronate/ibandronate), calcium carbonate (1000 mg/d) and cholecalciferol 800 IU daily leads to increase in BMD in the LS: from 0.954 (0.104) g/cm² to 0.983 (0.102) g/cm²; $p=0.040$ during control measurement after 12 months.

Conclusions: Complex antiresorptive therapy with calcium, cholecalciferol and/or bisphosphonate has positive effect on the dynamics of BMD in patients with P and PsA.

P1023

THE RELATIONSHIPS BETWEEN SATISFACTION AND EMOTIONAL STATE IN ELDERLY WOMEN

A. Cernovas¹, M. Fabijonavicius¹, G. Sadauskaite¹, M. Tamulaitiene², V. Alekna¹, R. Stukas¹

¹Vilnius University, Faculty of Medicine, ²Vilnius University, Faculty of Medicine, National Osteoporosis Center, Vilnius, Lithuania

Objective: The purpose of this study was to investigate relationships between satisfaction and emotional state in women aged 65–74 years.

Methods: This cross-sectional study was performed on community dwelling women aged 65–74 years who in 2017 were patients of the National Osteoporosis Center in Vilnius, Lithuania. Exclusion criteria: severe neuropsychiatric conditions; Montreal Cognitive assessment (MoCA) score lower than 18 (mild cognitive impairment). Data were collected by face to face interviewing. Satisfaction was evaluated using Satisfaction With Life Scale (SWLS); emotional state was measured with the Positive and Negative Affect Schedule (PANAS), using both positive (PA) and negative affect (NA) subscales. Data was analyzed with SPSS 18.0 for Windows program.

Results: The study was performed on 72 elderly women. Mean age was 68.9±2.9 (65–74) years. The mean values in questionnaires scores were: PANAS-PA – 35.2±6.9, PANAS-NA – 20.0±6.4, SWLS – 25.2±5.1. Correlation analysis showed moderate correlation between SWLS and PANAS-PA scores ($r=0.67$, $p<0.001$) and negative weak correlation between SWLS and PANAS-NA scores ($r=-0.39$, $p<0.001$). In further analysis participants were divided into two age groups (Group A: 65–69 y, $n=41$, Group B: 70–74 y, $n=31$). Statistically significant differences between explored values were not found between those age groups. Correlation analysis showed positive moderate SWLS score correlation with PANAS-PA ($r=0.61$, $p<0.001$) and negative – with PANAS-NA ($r=-0.52$, $p=0.001$) scores in Group A. In Group B, SWLS score positively strongly correlated only with PANAS-PA score ($r=0.74$, $p<0.001$).

Conclusion: Satisfaction with life was associated with positive emotional state in women aged 65–74 years.

P1024

HEALTH LITERACY AND UPTAKE OF ANTI-FRACTURE MEDICATIONS IN A POPULATION-BASED SAMPLE OF AUSTRALIAN WOMEN

S. M. Hosking¹, S. L. Brennan-Olsen², A. Beauchamp³, R. Buchbinder⁴, L. J. Williams¹, J. A. Pasco¹

¹Deakin University, Geelong, ²University of Melbourne, St Albans, ³Deakin University, Burwood, ⁴Monash University, Melbourne, Australia

Objective: To investigate associations between health literacy and anti-fracture medication uptake in women with osteoporosis.

Methods: Data were collected for women participating in the 15 yr follow-up of the Geelong Osteoporosis Study (GOS), a population-based cohort in southeastern Australia. Health literacy was ascertained using the Health Literacy Questionnaire (HLQ), a multidimensional tool that generates scores across nine scales. BMD was measured by DXA (Lunar

DPX-L) and osteoporosis was defined as a BMD T-score ≤ -2.5 at the hip and/or spine, or BMD in the osteopenic range (T-score -1 to -2.5) combined with any adult (aged ≥ 20 yr) fracture. Medications use was self-reported. Analysis of variance (ANOVA) and Cohen's d effect sizes (ES [95%CI]) (categorised; Small >0.2 – 0.5 , Moderate >0.5 – 0.8 , Large >0.8) were calculated for differences in mean HLQ scale scores between participants with osteoporosis who did vs. did not self-report medication use.

Results: In our women, 134 (21.6%) had osteoporosis and 14 (10.5%) of those women were taking medication. Small and moderate ES observed indicated that women taking medication had lower HLQ scores in three scales; 'Navigating the healthcare system', 'Ability to find good health information' and 'Understand health information' (ES 0.36 [0.25, 0.79], 0.41 [0.29, 0.87] and 0.64 [0.54, 1.03], respectively). No significant differences for any scales were observed using ANOVA; however, a trend was observed for the scale 'Understanding health information' ($p=0.09$).

Conclusion: These results suggest that women who score poorly in health literacy scales relating to ability to find, understand and use health information and services are more likely to report using anti-fracture medications. Further research is required to understand how health literacy interacts with other factors such as prescription bias and osteoporosis awareness to influence anti-fracture medication uptake.

P1025

CONTRIBUTORS TO LOW BONE MASS: EXPERIENCE OF A METABOLIC BONE DISEASES CLINIC FROM PAKISTAN

S. Ahmed¹, L. Jafri¹, H. Majid¹, A. Aziz¹, A. H. Khan¹

¹The Aga Khan University Karachi, Karachi, Pakistan

Objective: Guidelines on osteoporosis advocate the evaluation of patients presenting with low bone mass to identify the cause of osteoporosis and contributory factors. We evaluated the frequency of risk factor of low bone mass in patients with suspected osteoporosis referred to a subspecialty clinic at Aga Khan University Hospital Karachi.

Methods: A retrospective review of risk assessment was conducted. Review of data collected through a detailed clinical history form aimed at evaluation of risk factors for low bone mass and secondary causes of osteoporosis was performed for each patient presenting with suspected osteoporosis. Clinical risk factors and details of baseline blood tests performed, DXA findings and treatment initiated were analyzed through Statistical Package for Social Sciences (SPSS) version 21.

Results: Mean age of the patients ($n=42$) was 51.1±15.3 years, 75% ($n=31$) being females. Following risk factors were identified; previous fracture ($n=12$), smoking ($n=4$), alcohol consumption ($n=1$), early menopause ($n=23$) and family history ($n=20$). Secondary osteoporosis was found in 12 (28%) cases (8=steroid intake, 3=hypothyroidism, 1=celiac disease). The most common presenting complaint was backache in 45% ($n=19$) cases followed by generalized body ache ($n=12$) and knee pain ($n=3$). Only positive family history was significantly associated with development of osteoporosis (p -value <0.05). Median (IQR) recorded for each biochemical parameter namely iPTH 47(24) pg/ml, 25-Hydroxy vitamin D level of 27.3(16) ng/ml, calcium 9.4 (0.9) mg/dl and NTx 12(4.9) nMBCE/L. Increase bone turnover was found in 2 patients. 25-hydroxyvitamin was <30 ng/ml in 50% ($n=21$) cases. DXA Scanning was indicated in 31 patients; showed osteopenia and osteoporosis in 29 (93.5%) patients. BMD was normal in 1 patient and 1 patient did not follow up. Among the 11 patients, where DXA was not advised, 4 had fracture at the time of presentation and it was not indicated for 7 patients. Treatment of osteoporosis with Bisphosphonates was initiated in 51% ($n=15$) cases while the rest of the group was managed conservatively.

Conclusion: At presentation, 28% of patients have secondary osteoporosis while positive family history was significantly associated with development of osteoporosis.

P1026

CLINICAL DEMOGRAPHIC CHARACTERISTICS OF PRIMARY KNEE OSTEOARTHRITIS PATIENTS REFRACTORY TO STANDARD CARE IN A RHEUMATOLOGY CLINIC

N. Islam¹, N. Ferdous², F. Bin Nazrul³, A. Razzaque¹, J. Rasker⁴¹Department of Rheumatology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, ²Department of Medicine, MH Samorita Medical College & Modern One Stop Arthritis Care and Research Center, Dhaka, ³Modern One Stop Arthritis Care and Research Center, Dhaka, Bangladesh, ⁴Department of Psychology, Health and Technology, University of Twente, Enschede, The Netherlands**Objective:** To evaluate the profile of primary knee Osteoarthritis (OA) patients refractory to standard care.**Methods:** After informed written consent consecutive patients of primary knee OA (fulfilled ACR criteria) was enrolled in a rheumatology center of Dhaka, Bangladesh from July 2013 to April 2015. Ethical clearance was obtained from IRB of BSMMU. Clinical demographics, laboratory tests and knee X-rays in standardized position were recorded. The Bengali version of WOMAC Index (WOMAC 3.1) for function and European Quality of Life- 5 Dimension- 3 Level (EQ-5D-3L) for QoL were used as evaluation tools. Pain (VAS) 100 mm visual analogue scale was used by both patients and investigator. Joint space and Kellgren-Lawrence (K-L) grading were evaluated for OA severity. Values were expressed in number, percentage, mean and standard deviation.**Results:** A total 65 patients were approached, 8 failed to fulfill ACR criteria and 57 (male 17 and female 40) enrolled. Mean age 56.04 ±11.02 years (range 31-90). Maximum patients (31) were in age group of 50-71 years. By education, illiterate, primary, secondary and above patients were 8 (14%), 20 (35.1%) and 29 (50.8%), respectively. Among occupations most common was housewife 33 (57.9%) and then service 14 (24.6%). Mean duration of suffering was 66.42±37.61 months. Pain in both and single knee was in 48 and 9 (right knee) patients respectively. Obese patients were 36 (63.15%) and mean BMI 26.74±4.45. Mean WOMAC score (Ka, Kha, Ga and total) was 24.63±8.87, 9.95 ±4.51, 89.7±32.34 and 124.28±43.99, respectively. Patients pain VAS score was 68.98±11.64 and physician VAS 68.67±10.53. EQ-VAS and EQ-5D-3L score were 36.70±13.39 and 10.44±1.67, respectively. Joint space (mm) in right knee was 0.85±1.01 and left knee 0.91±0.97. K-L grade (right knee); 2 was in (30.9%), 3 in (56.4%) and 4 in (12.7%) and for left knee, 36.2%, 53.2% and 10.6%, respectively.**Conclusion:** Longer duration of sufferings, obesity, moderate to severe pain, marked reduction of joint space and K-L grading 3 were remarkable characteristics of primary knee OA patients refractory to standard care visited rheumatologist for management in a developing country.

P1027

QUALITY OF LIFE AND WELLBEING IN PATIENTS WITH HAND OSTEOARTHRITIS

C. Suteu¹, D. M. Farcas¹¹Faculty of Medicine and Pharmacy, Oradea, Romania**Objective:** To assess quality of life and wellbeing in a group of patients with hand osteoarthritis.**Method:** Our study consisted in a group of 68 patients with hand osteoarthritis. We divided the patients in two groups. First group consisted in 34 patients who underwent a physical rehabilitation program for two weeks, repeated at six months and the second group of 34 sedentary patients. All the patients were assessed with AUSCAN Index for hand osteoarthritis, Short Form-36 for quality of life, Hamilton Anxiety Rating Scale for anxiety, at six months and at twelve months. Effects were analysed with sensitivity statistics (effect size, ES). Patients were recruited from ambulatory system Bihor county, Romania. The mean

age in the first group was 65.29±2.38, and in the control group of 65.93 ±4.15. Educational level was almost similar in both groups. The inclusion criteria were: age over 18, fulfilling the ACR criteria for hand OA, possibility of evaluation and reevaluation at 6, 12 month, complying with the principles of medical ethics. The exclusion criteria were: age under 18, severe diseases, noncompliance.

Results: The values of the Auscan Index proved a small improvement at 6 months and at 12 months in the treatment group, but in the control group we did not find any improvement. At SF 36 assessment both Physical Component Summary (PCS) and Mental Component Summary (MCS) showed an improvement after 6 and 12 months in the group who underwent rehabilitation program, than in the control group which showed no improvement in quality of life. Anxiety values diminished in the rehabilitation therapy group after 6 and 12 months, but in the control group we found a mild increase in values at 6 and 12 months. Our study showed also some correlations between quality of life and anxiety.**Conclusion:** Hand osteoarthritis is a chronic disease that need to be treated properly. Rehabilitation programs play an important role also in improving quality of life and wellbeing in such patients.

P1028

25(OH)D, MARKERS OF BONE TURNOVER, CALCIUM AND PHOSPHORUS, DENSITOMETRIC AND ANTHROPOMETRIC PARAMETERS IN BELARUSIAN POSTMENOPAUSAL WOMEN

A. V. Rudenka¹¹Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus**Objective:** To determine serum total vitamin D (25(OH)D), calcium (Ca), phosphorus (P), markers of bone turnover, results of densitometry and anthropometric parameters in Belarusian postmenopausal women.**Methods:** 452 women (mean age 63.7±8.1 years) were enrolled. Serum levels of 25(OH)D, C-terminal telopeptide of type I collagen (CTX) and osteocalcin (OC), total calcium (Ca) and inorganic phosphorus (P) were evaluated. Examination was carried from November 2016 to March 2017. Status of vitamin D was considered as normal for the values of 25 (OH) D >30 ng/ml, 20-30 ng/ml were defined as insufficiency, <20 ng/ml as deficiency, <10 ng/ml as severe deficiency. Anthropometric examination consisted in measuring height (m) and weight (kg). BMD was measured in the lumbar spine (LS, L1- L4) and proximal femurs (PF) by DXA (Lunar Prodigy, GE, USA).**Results:** Normal values of 25(OH)D were detected in 98 (21.7%) women, vitamin D insufficiency in 142 (31.4%), deficiency in 134 (29.6%), severe deficiency in 78 (17.3%). Osteoporosis (OP) was verified in 265 (58.6%) of the examined, 134 (29.7%) had normal BMD and 53 (11.7%) osteopenia. Women with normal (group I, n=98) and low (group II, n=354) values of 25(OH)D had differences (p<0.05) in weight (67.2 ±9.6; 76.8±10.1 kg), BMI (25.9±3.3; 29.±5.4) and serum P (1.2±0.2; 1.28±0.27 mmol/l). Women with severe vitamin D deficiency had lower levels of calcium (2.32±0.21 mmol/l) compared with women who had normal values of 25(OH)D (2.51±0.19 mmol/l). Women with low BMD who regularly take vitamin D supplements for >3 months at a dose of at least 400 IU/d (n 148) were statistically significantly different from women who did not take vitamin D (n 170) for BMI (26.9±4.9; 28.5±5.4), height (1.6±0.06; 1.58±0.06), serum Ca (2.5±0.3; 2.2±0.2 mmol/l), CTX (0.304±0.171; 0.387±0.181 ng/ml), OC (22.1±12.6; 27.2±14.8) and 25(OH)D (31.2±7.9 and 21.3±10.8 ng/ml). Further analysis revealed statistically significant difference between women with low BMD (n 318) and those with normal BMD (n 134) in the level of 25(OH) D, Ca and P: 24.5±10.4; 18.9±8.4 ng/ml; 2.67±0.26 and 2.51±0.18 mmol/l; 1.26 ±0.23 and 1.16±0.18 mmol/l, respectively. One of the most probable causes of these differences is higher incidence of vitamin D supplementation among individuals with low BMD: 73 persons with OP (27.5%)

regularly took vitamin D supplements while in the group with normal BMD only 12 (8.9%).

Conclusion: Vitamin D failure in Belarusian postmenopausal women is widespread and is associated with higher BMI, low values of Ca and P. One of the most important factors that determine optimal 25(OH)D status in the studied sample is regular intake of vitamin D supplements.

P1029

EFFECT OF THE TREATMENT OF OSTEOARTHRITIS OF THE KNEE

Z. Skaric Karanikic¹, M. Vukovic¹, V. Bokan Mirkovic¹, S. Nejkovic¹, I. Nikcevic Vukovic¹

¹Center of PRM, Clinical Center of Montenegro, Podgorica, Montenegro

Objective: Osteoarthritis of knees goes along with high disability, especially in older population. The treatment is complex and multidisciplinary: nonpharmacological-noninvasive, pharmacological and surgical. Nonpharmacological-noninvasive treatment includes education, therapeutic exercise, physical therapy modalities, managing obesity and use of orthosis. The goal of this work is to evaluate the effects of treatment with physical agents and therapeutic exercises on pain and life quality in patient who suffer from osteoarthritis of knees.

Methods: Research included 21 patients with osteoarthritis of knees. In all patients the diagnosis of OA was radiologically certified. On their first examination, all patients were questioned using the test: Index of Severity for osteoarthritis of the knee by Lequesne et al (ISK). Sections of questionnaire were: a) Pain or Discomfort (POD), b) Maximum Distance Walked (MDW), c) Activities Of Daily Living (AoDL). Index of severity=SUM (points for all parameters). Interpretation: *minimum points for each section: 0, *maximum points for each section: 8, *minimum index score: 0, maximum index score: 10, maximum index score 24. Index score- handicap: (0)-none, (1-4) mild, (5-7) moderate, (8-10) severe, (11-13) very severe, (> 14) extremely severe. All patients were treated with physical agents and therapeutic exercise, followed by education and advice. Therapy lasted 20 days. On the last day, after concluding therapy, every patient went through control testing.

Results: Research included 21 patients, 18 women and 3 men. Mean ages 64.24.±10.42. POD: there is a significant difference in median as before (5;2-8) and after (3;0-7) therapy. $V=206.5$, $p<0.001$, Wilcoxon's signed rank test. MDW: there is a significant difference in median as before (1;0-7) and after (0; 0-6) therapy. $V=36$, $p<0.01$, Wilcoxon's signed rank test. AoDL: there is a significant difference in median as before (10,2-19) and after (6,0.5-18.5) therapy. $V=210$, $p<0.001$, Wilcoxon's signed rank test.

Conclusion: Research pointed out to decrease in values of median as after therapy in all sections for index, significantly more in POD and AoDL, which led to significant decrease in total score after therapy and decrease in handicap level from severe to moderate.

P1030

FRACTURE RISK AFTER GASTRIC BYPASS SURGERY: A RETROSPECTIVE COHORT STUDY

K. F. Axelsson¹, M. Werling², B. Eliasson³, E. Szabo⁴, I. Näslund⁴, H. Wedel⁵, D. Lundh⁶, M. Lorentzon¹

¹Geriatric Medicine, Sahlgrenska Academy, University of Gothenburg, Mölndal, ²Department of Gastrointestinal Research & Education, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, ³Department of Molecular and Clinical Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, ⁴Department of Surgery, Faculty of Medicine and Health, Örebro University, Örebro, ⁵Health Metrics, Sahlgrenska Academy, University of Gothenburg, Gothenburg, ⁶School of Bioscience, University of Skövde, Skövde, Sweden

Objectives: Gastric bypass surgery constitutes the most common and effective bariatric surgery to treat obesity. Gastric bypass leads to bone

loss but fracture risk following surgery has been insufficiently studied. Our objective was to investigate if gastric bypass surgery in obese patients, with and without diabetes, was associated with fracture risk, and if the fracture risk was associated with post-surgery weight loss or insufficient calcium and vitamin D supplementation.

Methods: Using large databases, 38 971 obese patients undergoing gastric bypass were identified, 7758 with diabetes and 31 213 without. Through multivariable 1:1 propensity score matching, well-balanced controls were identified. The risk of fracture and fall injury was investigated using Cox proportional hazards and flexible parameter models. Fracture risk according to weight loss and degree of calcium and vitamin D supplementation one year post-surgery was investigated.

Results: 77 942 patients had a median and total follow-up time of 3.1 (IQR 1.7-4.6) and 251 310 person-years, respectively. Gastric bypass was associated with increased risk of any fracture, in patients with diabetes and without diabetes using a multivariable Cox model (HR 1.26, 95%CI 1.05-1.53 and HR 1.32, 95%CI 1.18-1.47, respectively). The risk of fall injury without fracture was also increased after gastric bypass, both in patients with (HR 1.26 95%CI 1.04-1.52) and without diabetes (HR 1.24 95%CI 1.12-1.38). Weight loss or degree of calcium and vitamin D supplementation after gastric bypass were not associated with fracture risk.

Conclusions: Gastric bypass was associated with an increased risk of fracture and fall injury. Weight loss or calcium and vitamin D supplementation following surgery were not associated with fracture risk. These findings indicate that gastric bypass increases fracture risk, which could at least partly be due to increased susceptibility to falls.

P1031

CALCIUM INTAKE AND BMD, BONE FRACTURES AND CARDIOVASCULAR HOSPITALIZATIONS IN WOMEN WITH TYPE 2 DIABETES: 5 YEARS PROSPECTIVE STUDY

L. Napiórkowska¹, H. Wichrowska¹, M. Walicka¹, E. Franek¹

¹Department of Internal Diseases, Endocrinology and Diabetology, Central Clinical Hospital of the Ministry of the Interior and Administration in Warsaw, Warsaw, Poland

Objective: To estimate the effect of calcium intake on calcium-phosphate metabolism parameters, BMD, bone fractures and cardiovascular hospitalizations in women with type 2 diabetes

Methods: It was the observational study that included 221 women with type 2 diabetes. Intake of calcium and vitamin D was estimated using an appropriate questionnaires. The patients were divided into two groups depending on calcium intake: group I (n=126) - intake <400 mg/d and group II (n=95) - intake >400 mg/d. In both groups BMD of lumbar spine, femoral neck and distal radius at baseline and after 5 years of follow-up were measured using DXA. The concentration of 25(OH)D, calcium, phosphorus, PTH and HbA1C was evaluated. The number of osteoporotic fractures and the frequency of hospitalization for cardiovascular reasons were assessed.

Results: The mean age of study participants was 65 years (±7.7), mean BMI - 32.5 kg/m² (±5.0), mean HbA1C concentration - 7.2% (±1.2) and average duration of diabetes - 11.8 years (±7.0). Groups did not differ in terms of the above mentioned parameters as well as mean 25(OH)D, calcium, phosphorus and PTH concentration. In group II significantly higher BMD in distal radius was found (33% radius T-score -0.71±1.07 vs. -1.12±1.05, $p<0.005$). BMD in femoral neck and lumbar spine was comparable in both groups. There was no correlation between the calcium intake and the occurrence of bone fractures. A positive correlation between the duration of diabetes and the occurrence of osteoporotic fractures was found. The number of hospitalizations for cardiovascular reasons was comparable in both groups. At 5 years of follow-up the intake of calcium and vitamin D and concentration of HbA1C in both groups was at similar level; BMD of femoral neck and distal radius decreased significantly while BMD of lumbar spine has not changed.

Conclusions: The intake of calcium above 400 mg/day positively affects BMD of distal radius however, does not affect BMD of femoral neck and

lumbar spine and the frequency of osteoporotic fractures and the number of cardiovascular hospitalisations in type 2 diabetic women. The frequency of osteoporotic fractures positively correlates with the duration of diabetes.

P1032

BIOMECHANICAL CONSEQUENCES OF SKELETAL DEFORMITY OF HALLUX VALGUS: FOREFOOT BONY STRESS DISTRIBUTION AND JOINT CONTACT PRESSURE

Y. Zhang¹, Y. D. Gu², J. Awrejcewicz¹

¹Department of Automation, Biomechanics and Mechatronics, Lodz, Poland, ²Research Academy of Grand Health, Ningbo University, Ningbo, China

Objective: To investigate the influence of the skeletal deformity of severe hallux valgus on the metatarsal stress distribution and the metatarsophalangeal (MTP) joint contact pressure while balanced standing using finite element (FE) methodology.

Methods: Three-dimensional FE models of a normal foot and a severe HV foot were constructed and validated by plantar pressure measurements. Each FE model involves 28 bones, cartilages, ligaments, plantar fascia, and encapsulated soft tissue. All the materials except for the encapsulated soft tissue were considered isotropic and linearly elastic, while the encapsulated soft tissue was set as nonlinear hyperelastic. Hexahedral elements were assigned to the bones, cartilages and the encapsulated soft tissue. Link elements were assigned to ligaments and plantar fascia. A plate was created for simulating ground support. A vertical force of a half-body weight was applied on the plate bottom as loading condition. The superior surfaces of the encapsulated soft tissue, distal tibia and distal fibula were fixed. The interaction between the foot and the plate was simulated as contact surface with the coefficient of friction of 0.6. The contact between bone and cartilage contact surfaces was assumed as frictionless. The force of Achilles tendon was defined as 50% of the body load.

Results: As compared to the normal foot model, the HV foot model showed obvious increase in peak von-Mises stress in the fifth (55%), first (44%) and fourth (40%) metatarsal, while the stress concentration in the second metatarsal decreased (about 2.6%). Additionally, lower magnitude of MTP joint loading was found in the HV foot model.

Conclusion: Knowledge of this study indicates that patients with severe HV deformity are at higher risks of metatarsal injuries and functional disability of the MTP joints while weight bearing.

P1033

THE RELATIONSHIP BETWEEN MRI FINDINGS, PAIN AND DISABILITY IN THE PATIENTS WITH CERVICAL OSTEOARTHRITIS

L. Altan¹, B. Metin Ökmen², T. Tuncer³, U. Akarınmak⁴, F. Ayhan⁵, A. Bal⁶, G. Bozbaş⁷, L. Cerrahoğlu⁸, R. Çevik⁹, B. Durmaz¹⁰, T. Duruöz¹¹, D. Dülgeroğlu⁶, G. Güler⁷, S. Gürsoy¹², S. Hepgüler¹⁰, S. Hizmetli¹³, C. Kaçar³, E. Kaptanoğlu¹³, H. Kocabaş¹⁴, K. Nas¹⁵, H. Nur³, S. Özçakır¹⁶, S. Öz dolap¹⁷, D. Sindel¹⁸, O. Şahin¹³, F. Şendur⁷, C. Tıkız⁸, H. Uğurlu¹⁴

¹Uludağ University School of Medicine, Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Bursa,

²University of Health Sciences Yüksek İhtisas Training and Research Hospital, Department of Physical Medicine and Rehabilitation, Bursa,

³Akdeniz University School of Medicine, Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Antalya,

⁴Istanbul University Cerrahpaşa School of Medicine Department of Physical Medicine and Rehabilitation, Istanbul, ⁵University of Health Sciences Ankara Training and Research Hospital, Department of Physical Medicine and Rehabilitation, Ankara, ⁶University of Health Sciences Diskapi Yıldırım Beyazıt Training and Research Hospital,

Department of Physical Medicine and Rehabilitation, Ankara, ⁷Adnan

Menderes University School of Medicine, Department of Physical Medicine and Rehabilitation, Aydın, ⁸Celal Bayar University School of Medicine, Department of Physical Medicine and Rehabilitation, Manisa, ⁹Dicle University School of Medicine, Department of Physical Medicine and Rehabilitation, Diyarbakır, ¹⁰Ege University School of Medicine, Department of Physical Medicine and Rehabilitation, İzmir, ¹¹Marmara University School of Medicine, Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Istanbul, ¹²Gaziantep University School of Medicine, Department of Physical Medicine and Rehabilitation, Gaziantep, ¹³Cumhuriyet University School of Medicine, Department of Physical Medicine and Rehabilitation, Sivas, ¹⁴Necmettin Erbakan University Meram School of Medicine, Department of Physical Medicine and Rehabilitation, Konya, ¹⁵Sakarya University School of Medicine, Department of Physical Medicine and Rehabilitation, Division of Rheumatology and Immunology, Sakarya, ¹⁶Uludağ University School of Medicine, Department of Physical Medicine and Rehabilitation, Bursa, ¹⁷Bülent Ecevit University School of Medicine, Department of Physical Medicine and Rehabilitation, Zonguldak, ¹⁸Istanbul University, Istanbul Faculty of Medicine, Department of Physical Medicine and Rehabilitation, Istanbul, Turkey

Objective: Unnecessary employment of MRI may cause increased health expenses and may occasionally lead to overdiagnosis and overtreatment. In this study, we aimed to assess the correlation between MRI findings and clinical and functional status of the patients with the diagnosis of cervical osteoarthritis (OA).

Methods: A subgroup of a total of 266 patients (75.9% females and 24.1% males and average age was 60.42±11.47) with the diagnosis of cervical OA and an available MRI from the multicenter national cohort were included in our study. Pain was classified on the basis of its existence or absence and recorded separately as during motion, after repetitive activities, and following long-term inactivation. Disability was evaluated by Neck Disability Index. MRI findings of the patients were classified depending on the existence or absence of disc herniation, disc degeneration, root compression, and osteophytes. Statistical analysis of data was done using SPSS 22.0 program. Correlation of MRI findings with pain and disability was done by Pearson correlation analysis.

Results: Neck pain was observed during motion in 86.8%, after repetitive activities in 85.3%, and following long-term inactivity in 59.8% of the patients. Significant positive correlation was found between repetitive activities and long-term inactivity and the MRI finding of disc degeneration ($p < 0.05$), but with no other MRI finding ($p > 0.05$). Pain during motion did not show significant correlation with any of the MRI findings ($p > 0.05$). Neck Disability Index showed no significant correlation with MRI findings ($p > 0.05$).

Conclusion: Our results suggested that MRI findings were not correlated with disease severity in patients with cervical OA.

Disclosure: Altan L: Amgen, MSD; Roche, Abvie, UCB, Pfizer speaker invitation, Duruöz T: He received research Grant from AbbVie; speaking fee from Sanovel, Sindel D: Speaker invitations / advisory board activities for Lilly. Speaker invitations for Amgen, Novartis and Sandoz. The other authors declare none.

P1034

CRITICAL APPRAISAL OF PSYCHOMETRIC METHODS USED IN VALIDATION OF PATIENT-REPORTED OUTCOMES MEASURES

V. Rabenda¹, V. Leclercq¹, J. Y. Reginster¹, O. Bruyère¹

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objective: To perform a literature review of the psychometric methods used in validation studies of newly developed patient-reported outcomes measures (PROMs).

Methods: All validation studies of PROMs, published in 2014 and 2015, were retrieved from the following online databases, according to a

pre-specified search strategy: MEDLINE, PsycINFO, and EBM Reviews–Cochrane Database of Systematic Reviews. Eligibility criteria were established and applied by two investigators to include suitable studies. Data on psychometric measurement were extracted and reported according to the 3 main quality domains (validity, reliability, and responsiveness).

Results: The search strategy identified a total of 5254 articles. Out of this pool, 158 articles reporting validation studies met the inclusion criteria. In total, most of the studies reported at least one analysis for validity (98%) or for reliability (94%). Validity (content validity, structural validity and at least one hypotheses testing analyses) was completely assessed in only 31% of the included studies. Construct validity (structural validity and hypotheses testing) was completely assessed in only 8% of the included studies. Particularly, concerning hypotheses testing, only 14% of the included studies had tested the 3 aspects of this propriety (i.e., convergent, discriminant and discriminative validity) and a great proportion did not formulate hypotheses regarding expected correlations in advance. Criterion validity was assessed in 23% of the studies. Concerning reliability analyses, 88% and 63% of the studies measured internal consistency and the test-retest reliability, respectively. Only 53% of the studies assessed these two properties. Inter-rater, intra-rater reliability or measurement error were tested in <2% of the studies. Finally, floor and ceiling effects were rarely mentioned (35%).

Conclusion: The results of this review highlight that the available evidence on the measurement properties is mostly limited. In fact, a lot of information regarding the measurement properties of the original version of PROMs is still lacking.

P1035

COMPARISON OF INTRA-ARTICULAR LUMBAR FACET JOINT STEROID INJECTIONS AND LUMBAR FACET JOINT RADIOFREQUENCY DENERVATION IN THE TREATMENT OF LOW BACK PAIN

C. Matzaroglou¹, V. Billis¹, P. Gkrilias¹, E. Tsepis¹, P. Megas², K. Kafchitsas³, M. Tyllianakis²

¹Technological University of Western Greece, Human Assessment and Rehabilitation Laboratory, Aigio, Greece, ²Department of Orthopaedics, University of Patras, Patras, Greece, ³Asklepios Orthopaedic Clinic, Lindeloh, Germany, Schwandorf, Germany

Objectives: Different therapeutic techniques in the treatment of facet-related pain have been described in the literature, including intraarticular lumbar facet joint steroid injections and radiofrequency denervation. In this study, we compared the effectiveness of intraarticular facet joint steroid injections and radiofrequency denervation.

Methods: Our controlled study included patients who received intraarticular steroid infiltrations in the lumbar facet joints (L3/L4-L5/S1) and patients who underwent radiofrequency denervation of L3/L4-L5/S1 segments (Fig. 1&2.) The inclusion criteria were based on MRI findings showing hypertrophy of the facet joints L3/L4-L5/S1. The initial control was the EuroQuol Questionnaire, one day postoperative. Secondary control were the VAS (visual analog scale) and the ODI (Oswestry Disability Index) at 6 months and 1 year postoperatively.

Results: Thirty-eight patients were randomized; 19 of 38 patients in the steroid injection group and the other 19 patients of 38 patients in the denervation group completed the 6-month follow-up. Pain relief and functional improvement were observed in both groups in 84%. There were no significant differences between the 2 groups for the first follow up control and for both secondary follow up controls (VAS and ODI).

Conclusions: Intraarticular steroid infiltration or radiofrequency denervation appear to be a managing option for chronic function-limiting low back pain of facet origin with favorable short- and midterm results in terms of pain relief and function improvement, but improvements were similar in both groups.

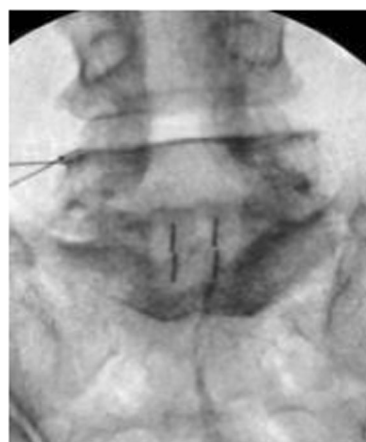


Fig. 1. Fluoroscopic images of the radio-frequency (RF) needle position.

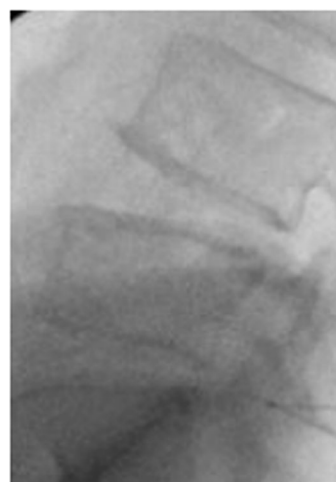


Fig. 2. Fluoroscopic images of the anteroposterior/lateral view of the L5/S1 level facet

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P1036

PREVALENCE OF OSTEOPOROSIS IN THE TURKISH WOMEN, RISK FACTORS AND THEIR AWARENESS ABOUT OSTEOPOROSIS ACCORDING TO THE CAMPAIGN OF "HEALTHY BONES & STRONG WOMEN"

Y. K. Kirazli¹, F. C. A. Atamaz Calis¹, S. T. Tuzun², O. E. El³, O. P. Peker³, B. D. Durmaz¹, S. O. Oncel³

¹Ege University Medical School, Izmir, ²Cerrahpasa Medical School, Istanbul, ³Dokuz Eylul Medical School, Izmir, Turkey

Objective: A campaign named "Healthy Bones & Strong Women" was conducted by the Turkish Osteoporosis Society to identify Turkish women at risk for osteoporosis, and to evaluate their awareness of osteoporosis.

Method: According to the campaign, 849 Turkish women aged 50 and older were scanned by calcaneal quantitative ultrasonography (QUS) in big shopping centers on the World Osteoporosis Day. Evaluation was carried out in a mobile ambulatory (motor home) with a staff composed by physicians and technicians. FRAXTM questionnaire was used for risk assessment. In addition,

demographic data (such as BMI and age of menopause) was obtained, and their awareness (history of measurement BMD by DXA) was evaluated.

Results: Regarding T-scores, 60 (9.9%) women were osteoporotic (age 61.2 ± 9.0), 275 (45.5%) women were osteopenic (age 60.6 ± 7.1), while 269 (44.5%) women were normal (age 57.9 ± 7.1). The awareness was significantly high in osteoporotic group ($p < 0.05$). In this group, 60% of subjects had at least 1 BMD measurement in the past. Correlation analyses revealed statistically significant moderate-high correlations between T-scores and age, BMI, weight and education level ($p < 0.05$).

Conclusion: This is a National epidemiological study based on “Healthy Bones & Strong Women” campaign. It can be concluded that QUS variables and FRAX major osteoporotic fracture probability without BMD are good candidates for the identification of both osteoporotic fractures.

P1037

BMD CHANGE IN CHILDREN WITH TURNER SYNDROME

N. Peskavaya¹, A. Solntava¹, N. Vasilieva²

¹Belarusian State Medical University, ²Republic Medical Rehabilitation and Balneotherapy Center, Minsk, Belarus

Objective: To evaluate BMD and its relationship with estrogen replacement and growth hormone (GH) treatment in children with Turner syndrome (TS).

Methods: We examined 25 children with TS from 8-17 years (average age 14.6 ± 2.03 years), who were regularly followed up in the University Hospital (Minsk). Depending on the karyotype, 4 groups of patients were identified: group1 - with karyotype 45,X ($n=18$, age 15.32 ± 1.65 yrs), group2 - with mosaic karyotype ($n=4$, age 13.37 ± 3.62 yrs), group3 - with structural anomalies of X chromosome ($n=3$, age 15.52 ± 2.67 yrs), group4 - control with normal karyotype ($n=40$, 14.32 ± 2.30 yrs ($p=0.3$)). Body composition with evaluating of mineral component were made by DXA with the calculation of lumbar spine (L1-4) BMD (g/cm^2) and Z-test. Results were processed using SPSS.22 and Excel 10.

Results: TS was diagnosed in patients with characteristic phenotypic signs according to the results of karyotyping at the age of 6.26 ± 5.16 years. GH treatment was initiated at the age of 10.6 ± 3.0 years. Girls with TS showed significantly lower than control group age-matched BMD of lumbar spine (L1-4) (-1.74 ± 1.14 vs. 1.80 ± 2.60 , $p=0.018$) and z-score of BMD (0.89 ± 0.12 vs. 1.23 ± 0.02 g/cm^2 , $p=0.036$). There were no significant differences in BMD depending on karyotype. We found that BMD levels increased as a result of growth hormone treatment and the BMD increase were correlated with treatment duration ($r=0.7$, $p=0.04$). 5 girls (2 with structural anomalies of X chromosome and 3 with mosaic karyotype) had spontaneous puberty, others started estrogen replacement from age 13.4 ± 1.3 . A direct correlation of spine BMD and estrogen therapy duration ($r=0.88$, $p=0.04$) were found in girls with TS.

Conclusions: A significant decrease in spine BMD were found in all groups of children with TS, long-term growth hormone treatment and estrogen replacement improve BMD.

P1038

REVIEW OF TERMINOLOGY OF MEASUREMENT PROPERTIES FOR PATIENT-REPORTED OUTCOME MEASURES

V. Rabenda¹, V. Leclercq¹, J. Y. Reginster¹, O. Bruyère¹

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objective: To report the terminology used for measurement properties of patient-reported outcome measures (PROMs), and to assess the frequency of appropriateness of terms used, according to the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) checklist.

Methods: A literature search was performed in MEDLINE, PsycINFO, and EBM Reviews—Cochrane Database of Systematic Reviews databases

to identify all validation studies of PROMs, published in 2014 and 2015. Studies were selected according to eligibility criteria. Data on terminology and definitions of psychometric measurement were extracted and reported according to the COSMIN checklist.

Results: A total of 178 articles reporting validation studies met the inclusion criteria and were included. Among studies testing structural validity, only 7% of the authors used the term “structural validity”; 20% used the term “construct validity”, which is a more global term since it encompasses the structural validity and hypotheses testing; 24% used other terms such as validity, internal structure, factor analysis/structure; 3% used inappropriate terminology (reliability, convergent or divergent validity). No study used inappropriate terminology for convergent and discriminant validity analyses. However, in these analyses, the authors used the more global term “construct validity” in 39% and 24% of studies, respectively. Among studies assessing discriminative validity, inappropriate terminologies were recorded in 23% of cases: the terms “convergent”, “discriminant”, and “criterion” were used in 3%, 17% and 4%, respectively. Finally, no misuse of terminology was recorded in studies reporting reliability analyses. However, the term “reliability” was used in 10% of the cases, without report the appropriate terminology (i.e., internal consistency, test-retest).

Conclusion: The results of this review highlight the fact that there is yet a lack of uniformity in terminology on measurement properties. This provides a lot of room for interpretation and lead to confusion about which measurement property is assessed.

P1039

CHARACTERISTICS OF CLINICALLY SUSPECTED OSTEOPOROSIS PATIENTS ATTENDING IN A RHEUMATOLOGY CLINIC-STUDY FROM A DEVELOPING COUNTRY

N. Islam¹, A. Khan¹, F. Bin Nazrul², N. Ferdous³, J. Rasker⁴

¹Department of Rheumatology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, ²Department of Medicine, MH Samorita Medical College & Modern One Stop Arthritis Care and Research Center, Dhaka, ³Department of Medicine MH Samorita Medical College & Modern One Stop Arthritis Care & Research Center, Dhaka, Bangladesh, ⁴Department of Psychology, Health and Technology, University of Twente, Enschede, The Netherlands

Objective: To evaluate the clinical demographic characteristics of clinically suspected osteoporosis patients.

Methods: Consecutive patients aged ≥ 50 years of both gender fulfilled clinical risk factors of osteoporosis were enrolled in a rheumatology clinic of Dhaka from January 2015 to January 2018. Subjects were evaluated clinically and by X-ray of lumbosacral spine, S. creatinine, S. Calcium, 25 (OH) D level, FRAX and DXA scan of lumbar spine and hips. Descriptive values were expressed in number, percentage and mean. Risk factors were evaluated by univariate and multivariate analysis.

Results: A total 267 (female 254, male 13) patients were enrolled. Mean age was 64.64 ± 8.12 (range 50-94) years. House wife was 88.4%. Height loss, unexplained low back pain and early menopause was in 132 (49.4%), 115 (43.56%), and 46 (18.5%) cases respectively. Patients were from rural 44.6% and from semi-urban and urban 55.4%. By education, illiterate, primary, secondary and above were 7, 151, 109 patients respectively. Tobacco consumers 42.3% (113, male 6, female 107) and use of steroid were in 10.5% (28). Out of 249 postmenopausal women, natural and surgical cases were 217 (87.1%) and 32 (12.9%) respectively. Age at menopause was 47.22 ± 5.33 years and duration of menopause at enrollment 17.44 ± 7.94 years. The normal menstrual cycle was in 98.4%. History of low trauma fracture in patients and parents were 10.5% and 4.5% respectively. Rheumatoid arthritis was in 17.2%. By BMI, 66% were obese and overweight and 6.4% were under-nutrition patients. Osteoporosis at L1-L4 were 102 (38.2%) and osteopenia 114 (42.7%) whereas, by L1-L2, osteoporosis was 120 (44.9%) and osteopenia 103 (38.6%). FRAX score for major osteoporotic fracture ($\geq 20\%$) without and

with BMD were 10 (3.7%) and 11 (4.1%) and hip fracture ($\geq 3\%$) without and with BMD were 89 (33.3%) and 68 (25.5%) respectively. Serum calcium was low in 6.3%, insufficient serum Vit D in 74.3%. Serum creatinine was high in 16.9% patients. Age, sex, BMI, smoking, rheumatoid arthritis and steroid uses were significant risk factors.

Conclusions: L1-L2 BMD identified more cases of osteoporosis. For MOF, FRAX was not a good case identifier.

P1040

OSTEOPROTECTIVE BEHAVIOR AMONG IRAQI GENERAL POPULATION: AN URGENT NEED FOR BONE HEALTH RESCUE CAMPAIGN

M. N. Sahib¹, S. A. Abdulameer¹

¹Faculty of Pharmacy, Al-Rafidain University College, Baghdad, Iraq

Objective: Strategies focused on gaining information regarding knowledge, health belief, and self-efficacy toward osteoporosis are important for promoting osteoporosis-preventing behavior for high-risk populations and preserving lifelong bone health. Therefore, the aim of this study was to assess osteoprotective behavior among Iraqi general population.

Methods: A cross-sectional design, with a random cluster sampling method from the community, was used. Arabic versions of osteoporosis Knowledge (OKT), Health belief (OHBS) and self-efficacy (OSES) toward osteoporosis were used to assess the osteoprotective behaviors.

Results: The results revealed low osteoporosis knowledge, health belief and self-efficacy scores (11.50 ± 3.958 , 149.95 ± 35.936 and 658.43 ± 222.014 , respectively). Different demographic data showed significant differences and associations with OKT, OHBS and OSES tools. Moreover, both exercise and calcium intake subscales of the OKT were positively correlated with all OHBS subscales. While, OSES exercise and calcium intake subscales were positively correlated with the perceived susceptibility and perceived barriers to exercise and calcium intake. Moreover, there were positive correlations between the OSES total score with total knowledge and health belief. Multivariate analysis revealed different predictors for osteoporosis knowledge, health belief and self-efficacy among Iraqi general population.

Conclusions: Beside cultural obstacles, an educational program for both gender and for all age is an urgent issue and must be tailored according to the culture needs.

P1041

THE PREVALENCE OF LOW BMD AND ITS ASSOCIATED FACTORS IN JUVENILE IDIOPATHIC ARTHRITIS

K. N. Kim¹, J. S. Shin¹, M. J. Kang¹

¹Department of Pediatrics, Hallym University Sacred Heart Hospital, AnYang city, South Korea

Objectives: The purpose of this study is to assess the prevalence of low BMD and its associated factors in juvenile idiopathic arthritis (JIA). There are no data to assess the osteoporosis in JIA in Korea. There are also no established guidelines for prevention and treatment of glucocorticoid-induced bone loss in JIA. To determine the low BMD in JIA, we analyze the BMD of JIA by using lumbar spine DXA scan.

Methods: A cross-sectional survey was conducted from January through June, 2017 in a single center in Korea. Total 39 JIA patients were include (male 16 and female 23). Systemic JIA 41% (n=16). RF + poly JIA 8% (n=3). RF – poly JIA 18% (n=7). Oligo JIA 23% (n=9). ERA 10% (n=4). Each BMD converted to a standard deviation score by comparing normal reference values. Analyzed BMD by chronological age (CA), bone age (BA) and height age (HA). Low BMD was defined that BMD SDS is lower than -2.0.

Results: Comparison of BMD with JIA patients and normal age-matched group, there were low BMD in JIA ($p < 0.05$). Comparison of BMD with systemic JIA and nonsystemic JIA, there were significantly low BMD in sJIA ($p < 0.05$). Comparison of BMD with corticosteroid user and

non-corticosteroid user, there were significantly low BMD in CS user ($p < 0.05$). BMD according to lever of 25(OH) vitamin D, there was no relationship between chronological age, bone age and height age.

Conclusions: JIA patients had lower BMD than normal group and sJIA patients had lower BMD than non-sJIA group. The reduced bone mass in JIA patients is related to use of corticosteroids. The serum level of 25(OH) vitamin D was not associated with BMD. As a result, we recommend those who requiring systemic glucocorticoids in JIA patient, need more prevention of osteoporosis especially in sJIA. This is the first report in Korean JIA patient.

P1042

BMD IMPAIRS WALKING SPEED ABILITY OF FALLER'S PRE-FRAIL OLDER WOMEN

A. S. Wojciechowski¹, S. Biesek², J. Melo Filho¹, A. M. V. Pereira³, V. Z. C. Borba⁴, V. L. Pintarelli⁵, A. C. R. Ferreira⁶, E. I. Rabito⁶, A. L. F. Rodacki⁷, A. R. S. Gomes⁸

¹Federal University of Parana, Physical Education, ²Federal University of Parana, Physical Education, Centro Universitário Autônomo do Brasil (UNIBRASIL), ³Hospital de Clínicas of the Federal University of Parana, ⁴Federal University of Paraná, Internal Medicine, ⁵Federal University of Parana, Department of Internal Medicine, ⁶Federal University of Parana, Department of Nutrition, ⁷Federal University of Parana, Physical Education Department ⁸Federal University of Parana, Prevention and Rehabilitation in Physiotherapy Department, Physical Education, Curitiba, Brazil

Objective: To verify the association between BMD, vitamin D status and walking speed (WS) of fallers (F) and non-fallers (NF) pre-frail older women.

Methods: Cross-sectional study included 37 pre-frail older women (71.3 ± 4.6 years-old), classified by the Fried's Phenotype (1 or 2 criteria). Participants were categorized as F or NF if they had at least one fall in the past 12 months. BMD was measured at total hip with DXA using a Lunar Prodigy Advance. BMD (T-scores) was classified as normal (≥ -1 SD), osteopenia (-1.0 and -2.49 SD), and osteoporosis (≤ -2.5 SD). To assess vitamin D status, serum 25(OH)D was measured after 12hr fasting. Habitual and fast walking speed (HWS and FWS) were assessed using 10-meter walk test. WS reserve was calculated as a difference (WSdif) using subtraction FWS-HWS, and as a ratio (WSrat) (FWS/HWS). Timed Up and Go (TUG) was performed to assess risk of falls and fractures. The independent t-test was used to compare groups (F and NF), and Pearson's correlation was used to verify the association between the outcomes ($p < 0.05$). Results: Twenty-one participants were classified as fallers (56.8%), and 16 as non-fallers (43.2%). The most part of the both groups was classified as osteopenia (F: 54.5%; NF: 56.3%); and vitamin D [20-30ng/mL; insufficient (F: 90.9%; NF: 75%)]. WSdif and WSrat were reduced in F compared to NF (0.18 ± 0.14 m/s vs. 0.30 ± 0.12 m/s; $p = 0.01$ and 1.15 ± 0.11 m/s vs. 1.24 ± 0.11 m/s; $p = 0.02$, respectively). It was found correlation between T-score and WSdif ($r = 0.49$; $p = 0.02$) and WSrat ($r = 0.48$; $p = 0.02$) in F participants. Also, T-score explains 24% the WSdif ($r^2 = 0.24$; $p = 0.02$), and 23% the WSrat ($r^2 = 0.23$; $p = 0.02$). Fallers showed risk of falls and fracture (TUG: 11.5 ± 5.7 s).

Conclusions: Fallers pre-frail older women with poor bone health had a lower ability to increase WS when needed. This might be indicative of risk of falls and fracture, and impaired neuromuscular control.

P1043

THE CASE OF A SHOULDER IMPINGEMENT SYNDROME AND PRIMARY BILIARY CIRRHOSIS IN A FEMALE PATIENT

N. Klyaus¹, A. Tsiberkin¹

¹Federal State Budgetary Institution "V.A. Almazov National Medical Research Center" of the Ministry of Health of the Russian Federation, Saint-Petersburg, Russia

Objective: To illustrate the importance of anamnesis and ultrasonography in patients with pain in the shoulders and syndrome of accelerated ESR.

Methods: Here we describe the case of a shoulder impingement syndrome and primary biliary cirrhosis (PBC) in a female patient.

Results: A 72-year-old female patient has presented with history of 10-year syndrome of accelerated ESR (max - 42 mm/h) and 6-month pain in the shoulders. Other specialists established a diagnosis of polymyalgia rheumatic (PR), glucocorticosteroids were prescribed. However, the patient did not take that treatment. When we asked the patient, we noticed that first there was pain in the right shoulder joint, and a month later in the left one. The ultrasonography did not detect the changes that are typical for PR, but the bilateral shoulder impingement syndrome was diagnosed. The local injection of glucocorticosteroids was carried out with significant improvement. Nevertheless, this diagnosis did not explain the accelerated ESR within 10 years. Therefore, the antinuclear factor (ANF) was investigated. The titer of ANF was 1:1000, autoantibodies AMA-M2 (+++) were found. According to ultrasonography, normal bile ducts were found. However, based on the results of the additional examination (increased alkaline phosphatase to 251 U/l (normal range: 40-150), hypercholesterolemia to 8.14 mmol/l (normal range: 0.00-5.17), the diagnosis of PBC was supposed. γ -glutamyltranspeptidase, immunoglobulin M, bilirubin were normal. A biopsy confirmed the diagnosis of PBC.

Conclusions: Our case underlines the importance of anamnesis and ultrasonography of joints in patients with pain in the shoulders and syndrome of accelerated ESR. Not only PR, but also two other unrelated diseases can cause these changes.

P1044

ANALYZING THE CORTICAL AND TRABECULAR BONE OF THE FEMUR OF PATIENTS WITH VERTEBRAL FRACTURES USING DXA-BASED 3D MODELING

A. M. Galich¹, L. Humbert², R. Winzenrieth², L. E. Maffei³, V. Premrou³, A. Frigeri⁴, E. Vega⁵

¹Hospital Italiano, Buenos Aires, Argentina, ²Galgo Medical, Barcelona, Spain, ³Consultorios Asociados de Endocrinología, Buenos Aires, ⁴Centro SERES, Buenos Aires, ⁵CESAN, Buenos Aires, Argentina

Objective: To analyze the cortical and trabecular bone of the femur of patients with prevalent vertebral fractures.

Methods: 162 postmenopausal women were included in this study. A questionnaire was used to assess prevalent vertebral fractures. DXA analysis were performed at Hospital Italiano (Buenos Aires, Argentina) using a Prodigy scanner (GE Lunar, USA) and the software enCORE (version 16, GE Lunar). 3D analysis of the femoral cortical and trabecular bone were performed using the 3D-Shaper software (version 2.4, Galgo Medical). The algorithm registers a 3D appearance model of the femoral shape and density onto the hip DXA scan to obtain a 3D subject-specific model of the femur of the patient and quantify the volumetric BMD (vBMD) and cortical thickness distribution.

Results: 29 subjects (Fx) had prevalent vertebral fractures, while 133 subjects (controls) had no history of major osteoporotic fracture. Mean age of participants was 64.7±8.9 years. No statistical difference in age was found between Fx subjects and controls (p=0.425, Student's t-test). The BMI of Fx group (23.7±2.9 kg/m²) was lower, compared to controls (25.5±4.2 kg/m², p=0.025). aBMD measured at the total hip and neck by DXA was lower for Fx participants, compared to controls, although the differences between the two groups were not statistically significant (-0.035 g/cm², -4.3%, p=0.080 for the total hip and (-0.034 g/cm², -4.3%, p=0.081 for the neck). Significant differences were found for the cortical vBMD at the total hip (-2.1%, p=0.027) and neck (-2.4%, p=0.026). The cortical thickness at the total hip was lower for Fx participants (-3.5%, p=0.089), although not statistically significant. A significant difference was found for the cortical thickness at the neck (-4.7%, p=0.042) (Figure 1). The trabecular vBMD at the total hip was lower for Fx participants (-7.9%, p=0.059), although not statistically

significant. A significant difference was found for the trabecular vBMD at the neck (-7.4%, p=0.043).

Conclusions: Differences in aBMD measured by DXA between Fx participants and controls at the neck and total hip were not statistically significant. 3D analysis did show statistical differences at the neck (cortical thickness, cortical vBMD and trabecular vBMD) and at the total hip (cortical vBMD). DXA-based 3D modeling could potentially be used as a tool to assess the risk of fragility fracture at the hip in patients with prevalent vertebral fractures.

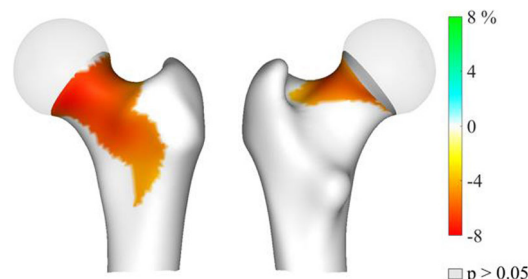


Figure 1. Differences in cortical thickness between participants with and without vertebral fracture. Nonsignificant differences (p>0.05, Student's t-test) are left in grey.

P1045

THE SOCIAL PATTERN OF SARCOPENIA IN PORTUGAL

P. Pita Barros¹, F. M. Pimentel-Santos², D. Neto³, C. L. Crespo², A. Sepriano², A. F. Mourão², C. S. Pereira⁴, C. Lodeiro⁵, C. Quaresma⁶, G. Ferreira dos Santos⁷, I. Nunes⁸, J. L. Capelo⁵, J. P. Santos⁶, L. Domingues², L. V. Lapão⁹, M. A. Botelho², M. I. Gomes¹⁰, M. P. Macedo², M. Fonseca¹¹, N. Gouveia², P. Videira¹², P. Simões Coelho¹³, P. Soares Branco², V. Vassilenko¹⁴, J. C. Branco²

¹NOVA School of Business and Economics - NOVA University of Lisbon, ²Chronic Diseases Research Centre, NOVA Medical School, Faculdade de Ciências Médicas - NOVA University of Lisbon, ³Instituto Superior de Psicologia Aplicada - Instituto Universitário de Ciências Psicológicas, Sociais e da Vida, ⁴Centro de Investigação em Saúde Pública, Public Health Research Center - Escola Nacional de Saúde Pública - NOVA University of Lisbon, ⁵Chemistry Department, Faculty of Sciences and Technology - NOVA University of Lisbon, ⁶Department of Physics, Faculty of Sciences and Technology - NOVA University of Lisbon, ⁷Department of Physical Medicine & Rehabilitation, Central Lisbon Hospital Center, ⁸Department of Mechanical and Industrial Engineering, Faculty of Sciences and Technology - NOVA University of Lisbon, ⁹Institute of Hygiene and Tropical Medicine - NOVA University of Lisbon, ¹⁰Centre of Mathematics and Applications, Faculty of Sciences and Technology - NOVA University of Lisbon, ¹¹Center of Mathematics and Applications, Faculty of Sciences and Technology - NOVA University of Lisbon, ¹²Department of Life Sciences, Faculty of Sciences and Technology - NOVA University of Lisbon, ¹³NOVA Information Management School - NOVA University of Lisbon, ¹⁴Department of Physics, Faculty of Sciences and Technology - NOVA University of Lisbon, Lisbon, Portugal

Objective: Sarcopenia is one of the least studied conditions associated with disability and lower quality of life in the elderly. The main objective of this study is to identify the social pattern (gender, age, education and income gradients) of Sarcopenia in Portugal.

Methods: Using the SHARE (Survey on Age, Health and Retirement in Europe), wave 3 (2011) and wave 6 (2015) databases, we conducted a logistic regression analysis of 2387 observations, including demographic controls, allowing to establish a socio-economic profile of Sarcopenia in the Portuguese population. The criteria for the likelihood of having Sarcopenia were based on muscle strength, assessed with handgrip dynamometers. An harmonised protocol across countries and waves was used. The thresholds of European Working Group on Sarcopenia in Older

People (EWGSOP, 2010) - 20 kg for females and 30 kg for males were considered.

Results: There are no significant overall differences between 2011 and 2015. Age, gender and education are the principal determinants of Sarcopenia. There are considerable age impacts and gender differences in the probability of Sarcopenia, with women being more likely to present it. On the other hand, there is a strong education gradient benefit: 10 years more of education lead to a Sarcopenia probability percentage points equivalent-in-age decrease of 7.5 years. We find no income gradient associated with the presence of Sarcopenia. Other individual characteristics included in the study, such as BMI, smoking status and living alone, are not associated with the presence of Sarcopenia.

Conclusions: The results contribute to the elaboration of a social profile of Sarcopenia in Portugal. Preventive interventions should focus on particular groups, based on low education levels, and particularly in women. Future research should focus on establishing early detection tools and innovative therapeutic approaches.

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P1046

LIPID PROFILE AND CARDIOVASCULAR RISK FACTORS IN RHEUMATIC INFLAMMATORY DISEASES IN A TUNISIAN POPULATION

M. Mrouki^{1,2}, S. Dghaies², Y. Cherif^{1,2}, H. Ajlani³, F. Ben Dahmen², M. Abdallah^{1,2}

¹Tunis El Manar University, Faculty of Medicine of Tunis, Tunis,

²Regional Hospital of Ben Arous, Internal Medicine Department, Ben Arous,

³Regional Hospital of Ben Arous, External Consultation Department, Ben Arous, Tunisia

Objective: Rheumatic inflammatory diseases are known to be at a high cardiovascular risk factor with early atherosclerosis secondary to inflammation. This study aimed to evaluate the lipid profile and the cardiovascular risk in a Tunisian population followed-up for inflammatory rheumatic diseases.

Methods: A retrospective study over three years was conducted in all patients followed for an inflammatory rheumatic disease in the internal medicine department.

Results: 86 files were included: 10 men and 76 women with a gender ratio of 7.6. The mean age was 50.3 years old (21-82). Patients were followed-up for Sjogren's syndrome (n=19), rheumatoid arthritis (n=18), systemic lupus erythematosus (n=9), systemic scleroderma (n=10), inflammatory myositis (n=3), vasculitis (n=15) and sarcoidosis (n=12). A family history of lipid disorders was found in 8.1% of patients, diabetes in 30.2%, hypertension in 31.3% and cardiovascular diseases in 12.8% of patients. The disease was active in 58.1% of patients. 62.8% of patients were treated with corticosteroids, 13.9% were smokers, 30% had diabetes and 29% had arterial hypertension. The mean BMI was 28.16 kg/m² and 29% of the patients were obese. Mean values of total cholesterol, triglyceride, HDL and LDL cholesterol were, respectively, 5.08 mmol/l, 1.62 mmol/l, 0.99 mmol/l and 1.26 g/l. 37.2% of patients had hypercholesterolemia with a mean value of 6.88 mmol/l and 29% of patients had hypertriglyceridemia with a mean value of 2.8 mmol/l. Associated hypothyroidism were present in 13% of patients. Six patients were cared for with dyslipidemia before the diagnosis of the systemic disease. 30% of the patients were treated with statin. Six patients had cardiovascular complications such as stroke (n=1), coronary artery disease (n=2) and peripheral arterial occlusive disease (n=3).

Conclusion: The study shows that inflammatory rheumatic diseases are associated with risk factors of cardiovascular morbidity. The long-term corticosteroid therapy and the inflammatory state combined to metabolic comorbidities lead to a greater and earlier cardiovascular mortality. A

better management of the disease and the co-morbidities would improve the prognosis of these patients.

P1047

THE INFLUENCE OF WALKING SPEED ON FOOT KINEMATICS AND KINETICS USING A MULTI-SEGMENT FOOT MODEL

D. Sun¹, G. Fekete², Z. Zheng³, Y. Gu⁴, Q. Mei⁵

¹Faculty of Engineering, University of Pannonia, Veszprem, Hungary,

²Savaria Institute of Technology, Faculty of Informatics, Eötvös Loránd

University, Szombathely, Hungary, ³ANTA Sports Products Co., Ltd,

Jinjiang, China, ⁴Research Academy of Grand Health, Ningbo

University, Ningbo, China, ⁵Auckland Bioengineering Institute,

Auckland University, Auckland, New Zealand

Objective: Almost all biomechanical features scale with walking speed. Previous studies always treat the foot as a rigid body and focus on lower extremity motion and kinetics. The purpose of this study was to analyze differences between slow walking (SW), normal walking (NW) and fast walking (FW) via comparison of biomechanical parameters, including foot kinematics (foot inter-segment motions and range of motions) and kinetics (ground reaction forces, knee and ankle joint moments) using the Oxford foot model.

Methods: 14 healthy male subjects participate in this study. The subjects were asked to walk at a self-selected walking speed and then walking at 75% and 125% of their self-selected speed, respectively. Ground reaction forces and three-dimensional kinematics of the shank, hindfoot, forefoot and hallux and were recorded as subjects walking at average speeds of 1.01 m/s, 1.34 m/s and 1.69 m/s.

Results: Hindfoot and forefoot dorsiflexion angles were found increased in FW, while decreased hallux dorsiflexion were found in FW. Increased peak eversion angle and peak external rotation angle in hindfoot was observed in FW accompanied with decreased peak supination angle in forefoot. Ground reaction forces were significantly increased with walking speed. The peak value of the knee and ankle moment in the sagittal and frontal planes increased with FW compared to SW and NW.

Conclusions: The foot kinematic and kinetic data of healthy individuals provided in the current study will set a reference as normal gait to distinguish abnormal and pathological gait patterns. On the other hand, measuring foot kinematic and kinetic patterns related to walking speed could provide guidance for intervention strategies aimed at improving gait performance.

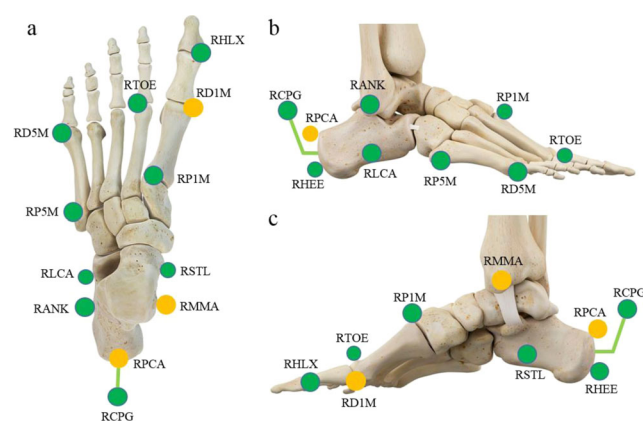


Figure 1. Oxford foot model marker placement

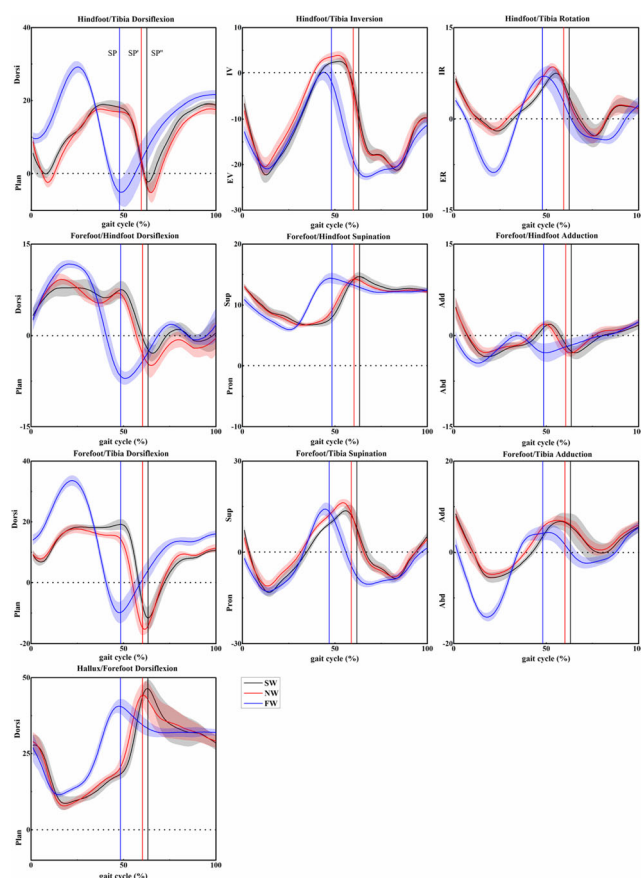


Figure 2. Average foot kinematics (°) in sagittal, frontal and transverse planes during the gait cycle

P1048

CORRELATIONS BETWEEN HAND GRIP STRENGTH AND ANTHROPOMETRIC STATUS IN YOUNG INDONESIAN ADULTS

D. Widjaja¹, K. Tjhai¹, K. Dermawan¹, J. Kalim¹, S. Tanzil¹, A. Pramusinta¹, H. K. Phenca¹, A. Kurniawan²

¹Faculty of Medicine, Pelita Harapan University, ²Department of Internal Medicine, Faculty of Medicine, Universitas Pelita Harapan, Tangerang, Banten, Indonesia,

Objectives: To know the correlations between hand grip strength and anthropometric status of young Indonesian adults.

Methods: A cross-sectional study in Tangerang was conducted on January 2018. The hand grip strength of the dominant arm was tested using digital hand dynamometer JAMAR and anthropometric status was measured using SECA balance and measuring tape. Baseline characteristics were presented using descriptive statistics and Pearson bivariate correlation analyses were used to determine correlations between measures. All statistical analysis was done using IBM SPSS 23.0.

Results: A total of 302 participants were enrolled to the study and most were female (65.2%). The median of age was 19 (16–48) years old and the median of BMI was 23.10 (14.82–41.73) kg/m². The median of hand grip strength of female population was 23.77 (11.70–37.70) kg and male population was 35.83 (15.03–63.30) kg. The hand grip strength was significantly correlated with BMI ($r=0.34$, $P<0.001$), mid upper arm circumference ($r=0.361$, $P<0.001$), hip circumference ($r=0.296$, $P<0.001$), waist circumference ($r=0.302$, $P<0.001$), calf circumference ($r=0.311$,

$P<0.001$), waist-hip ratio ($r=0.188$, $P<0.001$), and waist-stature ratio ($r=0.187$, $P<0.001$).

Conclusions: The hand grip strength in young Indonesian adults population was significantly correlated with all anthropometric measurements.

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P1049

IS THERE A RELATIONSHIP WITH DISULPHIDE/THIOL LEVELS AND ANKYLOSING SPONDYLITIS?

H. Uzkeser¹, C. K. Bicer², S. Neselioglu², B. Ekinci³, M. E. Budak⁴, O. Volkan⁵, S. Haliloglu⁶, A. Carlioglu⁴

¹Department of Physical Medicine and Rehabilitation, Ataturk University Medical Faculty, Erzurum, ²Departments of Biochemistry, Yildirim Beyazit University Medical Faculty, Ankara, ³Department of Physical Medicine and Rehabilitation, Erzurum Region Training and Research Hospital, Erzurum, ⁴Departments of Internal Medicine, Erzurum Region Training and Research Hospital, Erzurum, ⁵Departments of Rheumatology, Erzurum Region Training and Research Hospital, Erzurum, ⁶Department of Physical Medicine and Rehabilitation, Maltepe Occupational Diseases Hospital, Istanbul, Turkey

Objective: Ankylosing spondylitis (AS) is a chronic, inflammatory disorder that mainly affecting axial skeleton and peripheral joints. Although many studies investigate oxidative metabolism in inflammatory joint disease, only a few were applied in patients with AS. This study explore the disulphide/thiol homeostasis, which has an important role in many cellular activities such as antioxidant protection, detoxification, cell growth and apoptosis in patients with AS.

Methods: 31 patients that fulfilling the New York criteria for AS and 35 age- and sex-matched healthy controls were included in the study. Disease activity was assessed using a variety of variables including erythrocyte sedimentation rate and C-reactive protein, Bath AS disease activity index (BASDAI) and Bath AS functional index (BASFI).

Results: The mean ages of patients group (32.96 ± 9.0) and control group (29.76 ± 9.1) were similar ($p=0.160$). When we determine at the disulphide / thiol homeostasis parameters in both groups, we can see the mean native thiol levels are 462.5 ± 43.2 in the AS group and it is 492.7 ± 39.7 in the control group ($p=0.004$). The mean disulphide level was higher (16.65 ± 6.0) in the AS group than control (13.27 ± 4.5) group ($p=0.013$). The multiple regression analysis of disulphide/thiol balance and other risk factors was performed. We observed a positive correlation disulphide/thiol ratio with BASFI ($r=0.429$; $p<0.001$).

Conclusion: In this study we have shown that disulphide/thiol homeostasis may be used as a novel oxidative stress marker in patients with AS. Understanding the role of disulfide/thiol homeostasis in AS might provide new therapeutic intervention strategies for patients.

P1050

EXTENSIVE UNDERTREATMENT OF OSTEOPOROSIS IN OLDER SWEDISH WOMEN

D. Sundh¹, A. G. Nilsson¹, H. Johansson², J. A. Kanis², D. Mellström¹, M. Lorentzon¹

¹Institute of Medicine, Department of Internal Medicine and Clinical Nutrition, Geriatric Medicine, Sahlgrenska University Hospital, Mölndal, Sweden, ²Institute for Health and Ageing, Australian Catholic University, Melbourne, Australia

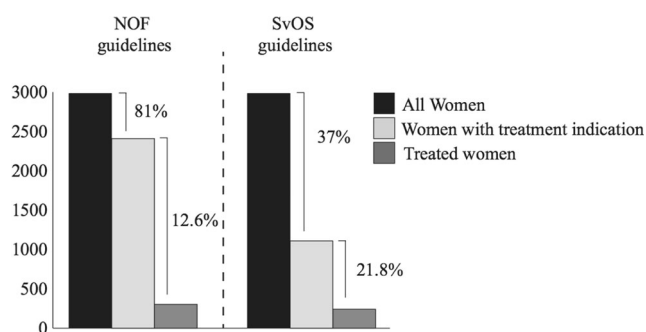
Objective: Fracture rates increase dramatically at old age and the incidence of hip fracture is among the greatest in the world in Swedish women.

Although effective pharmacological treatment is available, treatment rates remain low. However, only limited data is available regarding treatment rates in relation to a thoroughly evaluated fracture risk in a population-based setting in older women. The aim of this population-based study was to investigate the proportion of older women with treatment indication, according to National Osteoporosis Foundation (NOF) or Swedish Osteoporosis Society (SvOS) guidelines, to determine the proportion of these women receiving osteoporosis treatment, and to identify predictors for treatment.

Methods: The study was performed in Gothenburg and included 3028 older women (77.8±1.6 years [mean±SD]). BMD of the spine and hip was measured with DXA. Clinical risk factors for fracture and data regarding osteoporosis medication (current and previous use of p.o. bisphosphonates, zoledronic acid, denosumab, or teriparatide) was collected with questionnaires. Binary logistic regression was used to evaluate if the 10-year probability score of sustaining a major osteoporotic fracture (FRAX-score) predicts receiving osteoporosis treatment. In addition, a backward stepwise logistic regression was performed to evaluate which potential clinical risk factors predicted administration of osteoporosis medication.

Results: Of the 2983 women with complete data, 1107 (37%) and 2411 (81%) women had treatment indication using SvOS or NOF criteria, respectively. The proportion of these women receiving osteoporosis treatment was 21.8% and 12.6%, respectively (Figure 1). For women with treatment indication according to SvOS guidelines, the strongest predictors of the clinical risk factors, for receiving osteoporosis medication, were glucocorticoid treatment [odds ratio (95%CI) 2.93 (1.83-4.68)] and prior fracture [2.62 (1.87-3.67)]. The FRAX-score was also associated with receiving osteoporosis medication [1.02 (1.00-1.03) per percent FRAX score].

Conclusion: This large population-based study demonstrates that a major proportion of older Swedish women should be considered for osteoporosis medication, given their high fracture risk, but that only a minority receives treatment. This undertreatment would be even more pronounced using NOF criteria in Sweden.



P1051

ASSESSMENT OF CHRONIC KIDNEY DISEASE IMPACT AT THE PROXIMAL FEMUR USING A DXA-BASED 3D MODELING APPROACH

R. Winzenrieth¹, L. Humbert¹, E. Leib²

¹Galgo Medical SL, Barcelona, Spain, ²Dept. of Medicine, University of Vermont College of Medicine, Burlington, USA

Objective: Individuals with chronic kidney disease (CKD) have an increased risk for fracture. Areal BMD (aBMD) is commonly used to assess fracture risk in the general population, but the utility of measuring aBMD in patients with CKD remains unclear. The aim of this study is to assess the effect of CKD on cortical and trabecular femoral bone using a DXA-based 3D modeling approach.

Methods: In this case-control study, Caucasian women from a single American institution who had a history of stage II to V CKD and

underwent bone density testing were identified. Each CKD case was matched for age (±3 years) and BMI (±3 kg/m²) with two or three controls. Controls were excluded if they had a historical fracture or past or present treatment or illness that might influence bone metabolism. Cortical and trabecular bone evaluations were performed using 3D-Shaper software (v2.6, Galgo Medical, Spain) assessing: the volumetric trabecular (vBMDTrab) and cortical (vBMDCort) densities, the cortical thickness (Cth) and the cortical surface density (sBMDCort), computed as the multiplication of Cth and vBMDCort.

Results: 101 patients with CKD (mean age 55.9±13.3 years, BMI 26.4±4.7 kg/m²) and 291 controls (55.5±13.5 years and 26.3±4.6 kg/m²) were included. Among them, 17% had at least one low-energy fracture. 3D measurements were significantly lower in CKD patients (all p<0.001). OR per SD decrease was higher for sBMDCort (2.0 [1.5-2.6]) than for vBMDTrab (1.7 [1.3-2.2]) aBMD at femoral neck (1.7 [1.4-2.2]) and total femur (1.8 [1.4-2.4]). ROC analysis demonstrated a significantly higher AUC (p<0.05) for sBMDCort (0.68 [0.63-0.73]) than for vBMDTrab (0.63 [0.57-0.67]) and aBMD at total femur (0.65 [0.60-0.70]).

Conclusions: These results are in agreement with those expected from iliac crest biopsies and HR-pQCT literature. In this study, the cortical compartment (as assessed by sBMDCort) was more impacted than the trabecular one in individuals with CKD. Interestingly, this cortical alteration was global over the proximal femur with a more marked impairment in the inter-trochanteric region than in the femoral neck region (as presented in Figure 1).

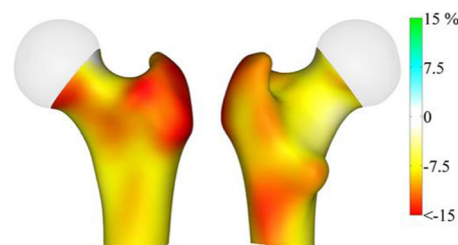


Figure 1. Anatomical distribution of differences in sBMDCort (in percent) observed between patients suffering from CKD and controls. An average difference of -7.7% was observed.

P1052

PARATHYROID DYSFUNCTION IN PATIENTS WITH TRANSFUSION DEPENDENT THALASSEMIA MAJOR IDENTIFIED USING PTH NOMOGRAM

H. Majid¹, A. Khan¹, L. Jafri¹, J. Talati¹, B. Moiz¹

¹Aga Khan University, Department of Pathology and Laboratory Medicine, Karachi, Pakistan

Objective: Harvey et al used mathematical modeling to develop a multidimensional nomogram to provide a biologically sensitive estimation of PTH taking serum calcium and 25OHD that physiologically regulate PTH release. Aim of this study was to determine the prevalence of parathyroid dysfunction by using nomogram developed by Harvey et al in patients with transfusion dependent β thalassemia major (TM).

Methods: We categorized 380 patients with transfusion dependent β TM into clinical groups based on biochemical parameters of corrected calcium, iPTH and 25OHD into primary (low calcium & iPTH), normocalcemic hypoparathyroidism (low iPTH, normal calcium and 25OHD), and functional hypoparathyroidism (low/normal calcium, normal iPTH with & without 25OHD deficiency). Patient specific upper limit of normal PTH (maxPTH) was derived using Harvey et al nomogram $\{120 - (6 \times \text{calcium}) - (0.5 \times 25\text{OHD}) + (0.25 \times \text{age})\}$. Difference between maxPTH and

measured iPTH was calculated to identify patients with parathyroid gland dysfunction. The statistical analysis was performed using the Statistical Package of Social Sciences (SPSS) version 20. Since the data was not normally distributed, median IQR were calculated.

Results: Total 378 patients were included in final analysis after exclusion of two patients with hypercalcemia. Median age of patients was 11 years (13-7) with males being 54.2% (n=205). Primary Hypoparathyroidism was observed in 3.4% (n=13) had {median iPTH 11.4pg/ml (13.1-7.8)}. Based on Harvey nomogram (Patient specific maxPTH less than iPTH) another 54.2% (n=191) and 1.3% (n=5) were identified as functional {iPTH 41pg/ml (53.3-29)} and normocalcemic hypoparathyroidism {iPTH 12.3pg/ml (12.7-6.8)} respectively.

Serum Ferritin was higher in subjects with primary hypoparathyroidism {Median ferritin 7756ng/ml (9797-5297)} followed by functional and normocalcemic hypoparathyroidism {ferritin 4845ng/ml (6506-3327) and 3271ng/ml (6528-2643); p value 0.014} respectively.

Conclusion: PTH Nomogram identified low secretion capacity of parathyroid gland that correlated with biochemical classification of patients. This study suggest that thalassemia patients with higher ferritin are at increased risk of developing hypoparathyroidism. Rising trend with increasing age indicates that early identification can improve bone health of these children. Panel testing including calcium, phosphorus, PTH and 25OHD is recommended for identifying PTH dysfunction. The nomogram requires clinical validation before using in clinical practice for assessing parathyroid dysfunction.

P1053

INFLUENCE OF THREE DIFFERENT TYPES OF PHYSICAL TRAINING PROGRAMS ON BMD IN A GROUP OF ELDERLY SUBJECTS

R. Nasr¹, E. Watelain², A. Khawaja¹, A. J. Berro¹, R. El Hage¹

¹Department of Physical Education, Faculty of Arts and Social Sciences, University of Balamand, El-Koura, Kelhat, Lebanon, ²Université Lille Nord de France, UVHC, LAMIH Dep SHV, UMR CNRS 8201, Valenciennes, France

Objective: To analyze the effects of three different training protocols on bone mineral content (BMC) and BMD in a group of elderly subjects.

Methods: This study included 52 healthy elderly subjects (35 women and 17 men) whose ages range between 65-75 years. Subjects were randomly assigned to resistance training group (RTG), endurance training group (ETG), combined resistance and endurance training group (CRETG) or a control group (CG). The experimental groups performed incremental training for 12 months, two sessions per week. They were selected from an autonomous and independent population, living in their ordinary environment in north Lebanon. For bone measurements, BMC (in gram) and BMD (in gram per square centimeter) were determined for each individual by DXA (GE Healthcare) at whole body (WB), lumbar spine (L1-L4), total hip (TH), and femoral neck (FN). All variables were measured before and after the training period.

Results: All experimental groups (RTG, ETG and CRETG) showed significant increases in lumbar spine BMD. RTG and CRETG showed significant increases in WB BMC and WB BMD values. TH BMD and FN BMD values were increased only in the resistance training group. CG showed significant decreases in WB BMC, WB BMD, L1-L4 BMD, TH BMD and FN BMD values. RTG showed the highest improvements in BMC and BMD values.

Conclusion: The present study shows that resistance training is an effective method to increase bone mineral content and BMD in elderly subjects.

P1054

ASSESSMENT OF AUTONOMIC DYSFUNCTION IN FIBROMYALGIA PATIENTS USING COMPASS 31

D. Cepoi-Bulgac¹

¹State University of Medicine and Pharmacy "Nicolae Testemitanu", Chisinau, Moldova

Objective: Today fibromyalgia (FM) is considered a multifactorial disorder involving central sensitization and inappropriate diffuse noxious inhibitory control system, and autonomic dysfunction is regarded as a possible mechanism contributing to psychosocial stress in patients of fibromyalgia [1,2]. Our aim was to assess presence and severity of autonomic dysfunction in Fibromyalgia vs. non-Fibromyalgia subjects based on COMPASS 31 (Composite Autonomic Symptom Score).

Methods: 12 fibromyalgia (based on 2010 ACR diagnostic criteria) patients and 12 sex and age matched non-FM controls were asked to fulfill COMPASS 31 questionnaire. Both groups were composed exclusively of female subjects. The average age in the FM group was 45.75 (±11.11) years and 46.4 (±11.54) years in the control group. COMPASS 31 is an abbreviated quantitative measure of autonomic symptoms, assessing the autonomic profile. The maximum possible weighted score is 100.

Results: The total COMPASS 31 scores differed between FM and non-FM subjects (39.75±10.76 vs. 22.51±16.62) significantly, as well as for each individual area of autonomic function. The comparative weighted scores for FM and non-FM groups were as follows: orthostatic intolerance - 20.33±9 vs. 11.3±11.29, vasomotor - 2.22±1.25 vs. 0.625±1.13, secretomotor - 6.79±2.87 vs. 3.75±3.18, gastrointestinal - 5.43±2.98 vs. 4.08±3.08, bladder - 1.94±1.58 vs. 1.2±1.45, pupilmotor - 3.03±1.03 vs. 1.58±1.41, correspondingly.

Conclusion: Subjects in the FM group displayed significantly higher scores of autonomic dysfunction according to COMPASS 31 compared to non-FM controls, both for total as well as for each individual area of autonomic dysfunction.

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2. Kulshreshtha P, Deepak KK. Clin Physiol Funct Imaging 2013;33:83

P1055

ARTHROPATHIES IN ALKAPTONURIA: CASE SERIES AND SYSTEMATIC REVIEW FROM A DEVELOPING COUNTRY

A. H. Khan¹, H. Majid¹, Y. Ysura¹, B. Afroz², L. Jafri¹

¹Aga Khan University, Department of Pathology and Laboratory Medicine, ²Aga Khan University, Karachi, Pakistan

Objective: To identify the spectrum of musculoskeletal involvement in alkaptonuria (AKU) from cases reported from Biochemical Genetics laboratory (BGL) of Aga Khan University between 2013-2017 and its comparison with local data from Pakistan.

Methods: Diagnosed cases of AKU were contacted on telephone to gather the information on clinical features. AKU was diagnosed on the basis of homogentisic acid peak in urine by GC-MS. Simultaneous data bases was independently searched by two reviewers for studies published in English from 1996 to 2017 on AKU and Pakistan. Nine studies were identified; Cochrane n=0, Medline n=0, PubMed n=2 and HEC Digital Library n=1, Google Scholar n=7. Common studies extracted by data bases were excluded. Data for study design, year of study, demographic details, symptomatology and treatment prescribed was extracted.

Results: Ten cases of AKU were diagnosed in 5 years at BGL, male to female ratio was (2:1). Median age of patients was 31.2 years (32 days-55.5); 3 cases presented in infancy. Systematic review showed 8 case reports and 1 literature review from Pakistan, with male to female ratio of 3:1 in published literature. Presenting age in systemic review was after fourth decade of life except two cases presenting in second decade and infancy and almost all patients were harboring symptoms for 10-15 years.

Musculoskeletal involvement was all cases from literature; all cases had joint pain, 5/9 also reported restriction movements, while 1 patient each had a height loss of 15cm and flexion contractures. Arthritis was common in wrists, elbows, shoulders, knees, and ankle joints. Joint pain was also identified in patients reported from BGL, 7/10. Three patients in whom joint problems were not identified were of ages <1 year.

Conclusion: High prevalence of musculoskeletal involvement is seen in patients. AKU being a rare autosomal recessive disorder of metabolism is likely to be missed by physicians as a cause of arthropathy unless specifically looked for. The cases in Pakistan were being diagnosed late due to non-availability of diagnostic testing earlier. Ten cases in 5 years indicates that the burden of disease may be high in Pakistan.

P1056

CHRONIC LOW BACK PAIN AND LIFE STYLE FACTORS

C. Matzaroglou¹, K. Assimakopoulos², V. Billis¹, E. Tsepis¹, K. Fousekis¹, K. Kafchitsas³, J. Gliatis¹, M. Tyllianakis⁴

¹Technological University of Western Greece, Human Assessment and Rehabilitation Laboratory, Aigio, ²Department of Psychiatry, University of Patras, Patras, Greece, ³Asklepios Orthopaedic Clinic, Lindelohe, Germany, Schwandorf, Germany, ⁴Department of Orthopaedics, University of Patras, Patras, Greece

Objectives: Low Back Pain (LBP), is one of the leading disorders, including disability pensions. The aim of this study was to compare life style factors with Life Style Index (LSI), in patients associated with long-term pain, compared with a normal population-based sample.

Methods: 296 patients with LBP, 2009-2014, were included in a randomized controlled trial with the objective of comparing. For these patients, a cross-sectional study was carried out with baseline data. LSI compared between the patients and 128 "normal" population by logistic regression analysis. Hierarchical linear regression analysis was used to assess their predictive value. Short-term changes in physical activity, measured with the ODI (Oswestry Disability Index), was the outcome measure.

Results: In the univariate analyses, revealed that depression and anxiety, obesity, low education have strong relation with chronic pain disability and in contrast, young age, and high self-esteem related to return to work.

Conclusions: The strong predictors of return-to-work were 4 socioeconomic variables, young age, obesity, low education, and high self-esteem. Other objective variables from LSI and treatment variables were non-predictors. All the predictors have been insufficiently statistically studied because of small sample, and so our study need further research and data.

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P1057

THE INFLUENCE OF LOAD CARRIAGE WEIGHT AND POSITION ON PLANTAR KINETICS DURING WALKING

Y. Shu¹, A. Jan¹, Y. Changxiao²

¹Department of Automation, Biomechanics and Mechatronics, The Lodz University of Technology, Lodzkie, Poland, ²Research Academy of Grand Health, Ningbo University, Ningbo, China

Objective: Load carriage affects gait features has been investigated in numerous studies. The purpose of this study was to investigate vertical

ground reaction force and plantar pressure distribution during walking with load carriage in anterior and posterior positions.

Methods: Twenty healthy young males volunteered to participate and performed treadmill walking with load carriage of 5%, 10%, 15% and 20% body weight in anterior and posterior positions. A Novel Pedar System (Germany) was used to capture kinetics data. The repeated measures analysis of variance (ANOVA) followed by Bonferroni post hoc testing was performed to investigate the variation tendency among different weight of loads. Significance level $P < 0.05$ is defined as a statistical difference.

Results: Ground reaction forces (GRFs) of anterior position were higher than posterior position, and GRFs of posterior carriage showed an increasing trend in first impact peak. The anterior position had high plantar pressure from 5% to 15% BW of loads while posterior position exceeded it at 20% BW of loads.

Conclusion: During the load carriage in different position, the anterior position has higher impact peaks GRFs than the posterior position. The posterior position shows increase in the first impact peak of GRFs with the increasing BW loads. In addition, with the increase of loads, the anterior position shows large plantar loading below 20% while the posterior position shows increase at 20%, indicating that 20% BW load was the weight of load independent of position. Backpack is not advisable with a load corresponding to 20% of BW, however a backpack in front position has deleterious effects even with lighter loads. The findings of this study suggest that both anterior and posterior load carriage lead to high plantar pressure and GRFs, and posterior position is predisposed to higher risk of foot injury than anterior position.

P1058

EFFECTS OF STRENGTH TRAINING AT DIFFERENT MODALITIES AND INTENSITIES ON SENESENCE-PRONE T-CELLS IN PERIPHERAL BLOOD IN COMMUNITY-DWELLING ELDERLY FEMALE

R. Njemini¹, H. Cao Dinh¹, I. Beyer², O. O. Onyema¹, K. Lieberman¹, L. De Dobbeleer¹, W. Renmans², S. Vander Meeren², K. Jochmans², I. Bautmans¹

¹Vrije Universiteit Brussel, Department of Gerontology, ²Universitair Ziekenhuis Brussel, Brussels, Belgium

Objective: Immunosenescence (IS) refers to the inability of the immune system to respond adequately to challenges. It is characterized by an accumulation of highly differentiated memory and senescent cells - at the expense of naïve cells - with a consequent increased risk of morbidity and mortality. There is growing evidence of a causal link between the accumulation of senescent cells and the development of osteoarthritis. Therefore, targeting senescent cells is thought to be a promising way to prevent or alleviate age-related osteoarthritis. Although exercise is recognized as a safe countermeasure for IS, few studies have explored its long-term effect on IS. Moreover, the optimum training modality required to obtain beneficial results in older subjects is lacking. Therefore, we investigated the impact of different training modalities on makers of IS in elderly subjects.

Methods: 100 older women (>65 years) were randomized to 2-3 times/weekly training for 6 weeks at either intensive strength (3x10 repetitions at 70-80%1RM, IST, n=31), strength endurance (2x30 repetitions at 40%1RM, SET, n=33), or flexibility (control, FT, n=36) training. The surface markers of IS were determined using flow cytometry.

Results: There was a significant training-induced decrease in the number of the senescence-prone cells in the SET intervention group ($p < 0.05$). No significant change was observed following IST or FT. More so, a significant association was found between the reduction in the absolute number of senescence-prone cells and the number of exercise sessions performed ($r = -0.270$, $p = 0.014$).

Conclusion: The results indicate that SET can reduce senescence-prone cells following 6 week-training. Conceivably,

training protocols with many repetitions - at a sufficiently high external resistance to mobilize lymphocytes - might be necessary to obtain optimal results. Whether SET might represent a potential novel strategy to delay the onset and impede the progression of osteoarthritis requires additional investigation.

P1059

FRAILITY AS A RISK FACTOR FOR PREDICTING FALLS AND FRACTURES IN COMMUNITY DWELLING OLDER WOMEN

P. Bartosch¹, L. Malmgren¹, D. Buchebner¹, F. Mcguigan¹, K. Akesson¹

¹Lund University, Dept. of Clinical Sciences Malmö, Malmö, Sweden

Objective: An important aspect of frailty is the functional decline of the musculoskeletal system, affecting balance and mobility. This is particularly important regarding osteoporotic fracture, since by age 80 almost every second woman will fracture. In this study we describe frailty in community-dwelling older women and its relationship with falls and fractures.

Methods: The OPRA cohort of community-dwelling women consists of n=1044 women, all aged 75 at baseline. Follow-up visits took place at age 80-85. At all visits women were asked if they had fallen within the previous year. Prospective fractures were monitored continuously. Using variables available at all time-points a frailty index of deficits in health was created based on the principles of Searle et al and scored 0 (lowest) to 1 (highest frailty).

Results: Over 10 years, the annual progression of frailty in these identically aged women was estimated at 6-7%. More than three times as many of the frailest women (quartile 4) had falls compared to the reference category (quartile 1) at baseline (45.2% vs. 14.2%, $p<0.001$). With age falls continued to be higher among the frailest (80 y: 41% vs. 26.8%, $p=0.012$); 85y: 63.6% vs. 38.2%, $p=0.017$). The proportion with hip fractures at 10 years increased stepwise from lowest to highest frailty quartiles (Q1 8.4% vs. Q4 16.1%, $p=0.007$) while osteoporotic fractures did not differ significantly. The frailest women were more likely to sustain a hip fracture earlier than similarly aged, but less frail women; estimated as on average 2 years earlier ($p=0.004$).

Conclusions: In community-dwelling older individuals, frailer women fall more and are at risk of fracture. Evaluating and preventing frailty may be an important component in fracture management.

Reference: Searle SD et al. BMC Geriatr. 2008;8:24

P1060

OSTEOPOROSIS AMONG CHILDREN WITH CHRONIC DISEASES: EARLY DETECTION AND CAUSES

A. Fahmy¹

¹Alazhar University in Cairo, Cairo, Egypt

Introduction: Osteoporosis is a world wide well established clinical problem for adults. On the other hand, osteoporosis in children is rather new and increasingly recognized with certain unique diagnostic and clinical challenges. (Bogunovic et al, 2009).

Aim of the work: The aim of this study is to detect osteoporosis in children suffering from chronic diseases early if present.

Patients and methods:

Patients: This study carried out on 93 children suffering from one of chronic diseases who are attended to the rheumatology outpatient clinic in Bab El-Shearya University Hospital (group A). 11 healthy children were included as control group (group B). Both patient and controls were matched regarding age and sex.

Group [A]: (93) patients

Inclusion criteria

93 Children aged between 5 and 16 years old referred from pediatric department having one of the following chronic diseases according to national osteoporosis society (Eastell et al, 2004)

Methods:

All children (patient and controls) will submitted to:

- Complete history taking
- Complete clinical examination
- Laboratory Studies
- Radiographic plain x ray
- DEXA

Results

-most of our candidate (patient and control)have laboratory osteomalacia and many of them have osteoporosis in DEXA scan

-anemia was significantly founded in patient with osteoporosis and osteopenia than normal control which may explained by either state of mal nutrition and reduction in most of important element or it may be anemia of

chronic diseases and the link between bone health and anemia should be further investigated

-there's a significant difference (p value <0.05) between juvenile idiopathic arthritis group and controls group as regard lumbar spine BMD (fifteen patient out of twenty JIA patient suffer from osteoporosis or osteopenia)

*In the concern of inflammatory bowel disease normal BMD in lumbar spinal DEXA was noticed , but all are osteopenic by total body minus head DEXA with Z score between (-1and -2)

*100% of Asthmatic patients whom have had lumbar osteoporosis diagnosed by DEXA , only (25%) of them had osteopenia by total body DEXA, That is to say in asthmatic patients the lumbar spine is the first sit for bone changes and so lumbar DEXA is very helpful in early detection of bone changes than total body DEXA.

*there is a significant deficiency in serum vitamin D level in most of our patient and even in control children denoting poor nutritional status augmented by dark skin and lack of sun exposure which lead to significant hypovitaminosis D which in turn reflect more on bone health

P1061

MONITORING OF SECONDARY OSTEOPOROSIS AT THE OSTEOPOROSIS AND BONE METABOLISM SERVICE OF THE DEPARTMENT OF GERIATRY OF BOLZANO IN THE YEARS 2015 AND 2016

P. Di Gregorio¹, A. March¹

¹Department of Geriatrics, Azienda Sanitaria dell'Alto Adige, Bolzano, Italy

Objective: Osteoporosis is a systemic and progressive disease characterized by a reduction in bone mass, alteration of its architecture and increased risk of fracture. Among the various types of osteoporosis special attention must be paid to secondary ones determined by other pathological states or therapies capable of inducing bone fragility, with mechanisms not necessarily related to age. Our aim was to evaluate the characteristics of secondary osteoporosis in patients treated at the Osteoporosis and Bone Metabolism service in Bolzano, with particular attention to the prevalence of comorbidities and associated risk factors (including therapies at risk of iatrogenic osteopenia).

Methods: From patients evaluated over two years (2015/2016) 86 were identified secondary osteoporosis. In each patient were investigated anthropometric values, risk factors, comorbidities, active therapy, radiological, vitamin D, PTH and calcium levels. The data were collected through Excel 2007 and processed with SPSS vers. 11.5 for Windows.

Results: The sample was composed of 15 men and 71 women, with an average age of 79 ± 9 years. Common were a reduced intake of calcium with diet (20.9% of cases) and a low level of physical activity (13.6%). The most frequent comorbidities were neoplastic pathologies (51.2% of the total) the endocrine pathologies (30.2% of which diabetes 65.4%), the COPD (23.2%) and the autoimmune pathologies (16.3%). 29.0% of patients took corticosteroids, 20.9% diuretics, 15.1% SSRI and 13.9% warfarin; levothyroxine was used by 11.6% of patients, and in a similar proportion hormonal blockers were used. An immunosuppressive drug was taken by 10.5% of patients. Among the osteotropic drugs, vitamin D was the most represented (69.8% of cases); also bisphosphonates were used orally (33.7%) and intravenous (4.6%, $N=4$), calcium (13.9%) and denosumab (1.1%). The highest percentages of therapeutic association with a bisphosphonate were recorded in immunosuppressive therapy (44.4%), in steroid and with hormonal blockers (44% and 40%) and with the use of levothyroxine (40%). In the course of SSRI therapy, bisphosphonate was used by 38.5% of patients ($N=5$), and in 33.3% of patients taking warfarin.

With the use of antiepileptics, bisphosphonate was present in 28.6% of cases, and in 22.2% in association with loop diuretics. About the comorbidities, a bisphosphonate was used by half of patients with autoimmune disease or with glucocorticoid osteoporosis, 41.2% of diabetic patients and 35.0% of patients with COPD. 36.4% of patients with breast cancer also took anti-fracture therapy, as well as 50% of patients with prostatic carcinoma; in chronic inflammatory bowel disease (IBD) a bisphosphonate was used in 25.0% of cases. Mild to moderate CKD was present in the sample (mean eGFR (CKD-EPI Equation) 54.1 mL/min for women and 65.3 mL/min for men) and three patients had renal transplant outcomes. The median of the T-score suggested a widespread presence of osteopenia in the sample; 17.2% of the total had bone mass within normal limits, 41.4% were osteopenic, 24.2% had osteoporosis; finally 17.2% showed complete osteoporosis (T-score < -2.5 SD and presence of at least one osteoporotic fracture). The median of the serum vitamin D was 29.0 ng/mL and the PTH level was 60.4 pg/mL; at the upper limits, the values ESR (21.0 mm/h) and CRP (0.7 mg/dL) are standard.

Conclusion: Patients at higher risk of fracture in this study appeared undertreated. Given the average age and comorbidities of patients arriving at the Osteoporosis and Bone Metabolism service of Geriatrics, our group (in collaboration with other Departments) has set itself the goal of initiating effective preventative measures by consensus of pathology related to secondary osteoporosis.

P1062

MUSCULOSKELETAL FUNCTION AND RISK OF FALLS IN PRE-FRAIL OLDER WOMEN WITH DIFFERENT CATEGORIES OF BONE HEALTH

A. R. S. Gomes¹, A. S. Wojciechowski², S. Biesek³, J. Melo Filho², A. P. Miro⁴, V. Z. C. Borba⁵, A. L. F. Rodacki⁶, A. B. Ferreira⁷, G. A. Tormes⁷, E. I. Rabito⁸

¹Federal University of Parana, Prevention and Rehabilitation in Physiotherapy Department, Physical Education, ²Federal University of Parana, Physical Education, ³Federal University of Parana, Physical Education, Nutrition at Centro Universitário Autônomo do Brasil (UNIBRASIL), ⁴Federal University of Parana, Geriatric Physician in Hospital de Clínicas at Federal University of Parana, ⁵Federal University of Parana, Internal Medicine Department, ⁶Federal University of Parana, Physical Education Department, ⁷Federal University of Parana, Physiotherapy, ⁸Federal University of Parana, Nutrition Department, Curitiba, Brazil

Objective: To compare musculoskeletal function and risk of falls (RoF) in pre-frail older women with different bone health categories.

Methods: Cross-sectional study included 38 pre-frail older women (71.2 ± 4.6 years; BMI: 28.8 ± 4.7 kg/m²), classified as pre-frail by the Fried's Phenotype (1 or 2 criteria). BMD was measured at total hip with DXA

using Lunar Prodigy Advance. BMD (T-score) was categorized as normal (≥ -1); osteopenia (-1 and -2.49); and osteoporosis (≤ -2.5). Knee extensors and flexors peak torque (PTe and PTf, respectively) was assessed using an isokinetic dynamometer (Biodex, System4Pro), concentric mode at 60°/s. MiniBESTest (MB) was used to assess balance and Timed Up and Go (TUG) functional mobility and both for RoF. One way ANOVA was used to compare variables in different BMO categories ($p \leq 0.05$). Spearman correlation was used to verify association between the outcomes.

Results: Regarding BMD 37% (14) was classified as normal; 55% (21) osteopenia and 8% (3) osteoporosis. Older women showed lower PTe 82.8 ± 23.8 Nm independent of BMD category, while the PTf was inferior 23.8 ± 16.5 Nm only for osteoporosis ones. TUG performance was 10.5 ± 4.5 s and MB score was 17.8 ± 4.5 . Comparing BMD categories no difference was observed in PTe $F(2,35)=2$, $p=0.151$; PTf $F(2,35)=1.62$, $p=0.21$; MB $F(2,35)=0.27$, $p=0.97$ and TUG $F(2,35)=0.419$, $p=0.66$. It was found association between TUG and: MB ($r=0.62$; $p=0.000$); PTe ($r=-0.33$; $p=0.04$) and PTf ($r=-0.40$; $p=0.01$). Also, correlation between MB and PTe ($r=0.55$; $p=0.001$) and PTf ($r=0.58$; $p=0.0001$). Multiple Linear Regression showed that MB, PTe and PTf explain 34% of TUG ($r^2=0.34$; $p=0.001$). PTe and PTf influence 37% ($r^2=0.37$; $p=0.001$) of postural balance (MB).

Conclusions: Pre-frail women showed high prevalence of osteopenia, reduced strength, poor functional mobility and RoF. Knee strength, balance and functional mobility explain RoF independent of bone health category.

P1063

TRAINING-INDUCED DECREASE IN SENESENCE-PRONE T-LYMPHOCYTES IN PERIPHERAL BLOOD: DOES CYTOMEGALOVIRUS PLAY A ROLE?

R. Njemini¹, H. Cao Dinh¹, I. Beyer², O. O. Onyema¹, K. Lieberman¹, L. De Dobbeleer¹, W. Renmans², S. Vander Meeren², K. Jochmans², I. Bautmans¹

¹Vrije Universiteit Brussel, Department of Gerontology, ²Universitair Ziekenhuis Brussel, Brussels, Belgium

Objective: Ageing is associated with a decline in immune function termed immunosenescence (IS). This process is characterized amongst others by more senescent cells, which have been implicated in the pathogenesis of many age-related diseases including osteoarthritis and osteoporosis. Although cross-sectional studies indicate that regular exercise may combat the adverse effects of IS, reports regarding the long-term benefits of exercise have been largely equivocal. These inconsistencies may be due to potential contributors to IS. As cytomegalovirus (CMV) infection is associated with an expansion of senescence-prone T-cells, we investigated if CMV serostatus influences T-cell response to exercise.

Methods: IgG anti-CMV antibodies were measured using Architect iSystem in 97 out of 100 older women (aged over 65 years) who were randomly allocated to 2-3 times/weekly training for 6 weeks at either intensive strength (3×10 repetitions at 70-80%1RM, $n=31$), strength endurance (2×30 repetitions at 40%1RM, SET, $n=33$), or flexibility (control, $n=36$) training. The surface markers of senescence were determined before and after 6 weeks (24h-48h after the last training) using flow cytometry.

Results: As expected, CMV-seropositivity was significantly associated with less naive cells, more memory and senescence-prone phenotypes ($p < 0.05$). Intriguingly, 6 weeks of SET decreased significantly terminally differentiated T-lymphocytes in CMV-seropositive but not CMV-seronegative.

Conclusion: Our results portray that SET can reduce senescence-prone T-cells following 6 week-training, which was influenced by subjects' CMV-serostatus. Therefore, participants' CMV-serostatus should be addressed to make valid conclusions on the effectiveness of training in immune restoration.

P1064

VITAMIN D RECEPTOR GENE FOKI POLYMORPHISM AND THE EFFICACY OF POSTMENOPAUSAL OSTEOPOROSIS TREATMENT WITH DENOSUMAB

A. Wawrzyniak¹, I. Krela-Kazmierczak², M. Marcinkowska¹, M. Kaczmarek-Rys³, M. Michalak⁴, R. Słomski⁵¹Department of Family Medicine, University of Medical Sciences,²Department of Gastroenterology, Human Nutrition and Internal Medicine, Poznań University of Medical Sciences, ³Institute of HumanGenetics Polish Academy of Sciences, ⁴Department of Computer Sciences and Statistics, Poznań University of Medical Sciences,⁵Department of Biochemistry and Biotechnology, Poznań University of Life Sciences, Poznań, Poland, Institute of Human Genetics Polish Academy of Sciences, Poznań, Poland

Objective: Polymorphism *FokI* of the vitamin D receptor (VDR) gene have been investigated in studies evaluating the relationship with the risk of postmenopausal osteoporosis. Aim was evaluation of the association between *FokI* polymorphism of the VDR gene and the effectiveness of annual denosumab therapy in Polish women with postmenopausal osteoporosis.

Methods: 62 women with postmenopausal osteoporosis (mean age 74.97 ± 7.31 years) underwent one-year therapy with denosumab 60 mg s.c. every six months and 1,250 mg of calcium carbonate and 2,000 IU of vitamin D3. The efficacy of one year treatment was assessed as a changes in L1-L4 BMD of various variants of the *FokI* VDR gene polymorphism. DNA was isolated from peripheral blood leukocytes by the guanidine isothiocyanate method, polymorphism was examined by PCR-RFLP.

Results: Differences in the change in Δ (after one-year of denosumab therapy) of densitometric parameters L1-L4 (BMD- g/cm²) for carriers of polymorphisms (FF, Ff and ff) of the VDR gene is presented in the Table. Table. Changes (delta) DXA parameters for carriers of various variants of the *FokI* polymorphism

Results of DXA (L1-L4)	FF N=12	Ff N=33	ff N=17	P
BMD I	0.834±0.100	0.837±0.146	0.876±0.157	ns
BMD II	0.889±0.108	0.877±0.157	0.877±0.174	ns
BMD Δ	0.073±0.051	0.036±0.063	0.040±0.072	ns
T-score I	-2.773±0.955	-2.874±1.216	-2.516±1.305	ns
T-score II	-2.440±0.885	-2.312±1.632	-2.500±1.455	ns
T-score SD Δ	-0.420±0.774	0.487±1.212	0.352±0.616	ns
T-score I	-0.772±1.038	-0.732±1.206	-0.672±1.392	ns
T-score II	-0.420±1.036	-0.449±1.274	-0.682±1.403	ns
Z-score SD Δ	0.477±0.727	0.215±0.534	0.375±0.633	ns

Conclusions: The VDR *FokI* polymorphism in our study not associated with effectiveness of annual denosumab therapy in Polish women with postmenopausal osteoporosis. Further large, pharmacogenetic studies are necessary.

P1065

INTERVENTION THRESHOLD BASED ON FRAX AND BMD

H. Johansson¹, F. Azizieh², N. Al Ali³, A. Thamer⁴, N. Harvey⁵, E. McCloskey⁶, J. Kanis¹¹Institute for Health and Aging, Catholic University of Australia,Melbourne, Australia, ²Department of Mathematics and NaturalSciences, Gulf University for Science and Technology, Kuwait, ³Unit of

Endocrinology & Metabolism, Al-Amiri Hospital, Kuwait, Kuwait,

⁴Endocrinology, Diabetes & Metabolism, Mubarak Al-Kabeer Hospital,Kuwait, ⁵MRC Lifecourse Epidemiology Unit, University ofSouthampton, Southampton, UK, ⁶Centre for Metabolic Bone Diseases,

University of Sheffield, Sheffield, UK

Objectives: A FRAX[®] model has recently been calibrated for Kuwait, but guidance is needed on how to use fracture probabilities in the assessment of patients to inform treatment.

Methods: We investigated age-specific intervention thresholds based on fracture probabilities by FRAX, equivalent to women with no clinical risk factors apart from a prior fragility fracture (without BMD: BMD), compared with age-specific fracture probabilities associated with femoral neck T-scores of -2.5 SD and -1.5 SD, in line with current guidelines in Kuwait.

Results: When a BMD T-score of -2.5 SD was used as an intervention threshold, FRAX probabilities of a major osteoporotic fracture (MOF) in women aged 50 years were approximately two-fold higher than in women of the same age without clinical risk factors. The increase in risk associated with the BMD threshold decreased progressively with age such that, at the age of 83 years or more, a T-score of -2.5 SD was associated with a lower probability of fracture than that of the age-matched general population with no clinical risk factors. The same phenomenon was observed from the age of 66 years at a T-score of -1.5 SD. A FRAX-based intervention threshold, defined as the 10-year probability of a MOF in a woman of average BMI with a prior fracture, rose with age from 4.3% at the age of 50 years to 23% at the age of 90 years, and identified women at increased risk at all ages compared to age-matched women with no clinical risk factors. Similar findings were observed in the case of hip fracture probability and in men.

Conclusion: Compared to BMD-based intervention thresholds, those based on FRAX fracture probabilities equivalent to a 'fracture threshold' consistently target women at higher fracture risk, irrespective of age.

P1066

THE IMPACT ASSESSMENT PHYSIOKINETOTHERAPEUTIC TREATMENT OF PATIENTS WITH FEMORAL-PATELLAR AND FEMORAL-TIBIAL CHONDROPATHY

C. D. Nistor-Cseppento¹, N. Pascalau¹, F. Marcu¹, I. Mircea¹, D. C. Iovanovici²¹Faculty of Medicine Oradea, Oradea, ²University of Medicine Timisoara, Timisoara, Romania

Introduction: The role of articular cartilage is to alleviate the friction force at the articular level. Its lesions are frequent, and their etiology is multifactorial. The Outerbridge classification includes four lesion stages: type I: licking; type II: superficial cracks; type III: deep cracks with depths below 75% of cartilage thickness, no exposed bone; type IV: subcutaneous bone exposure.

Material and method: An observational, prospective study was conducted on a group of 20 patients aged 41-52, admitted to the Recovery Department of the "Avram Iancu" Hospital Hospital in Oradea between September and October 2017. Patients were divided into two lots: the first lot I having Condromatosis stage I and the second group with stage II condromatosis. The classification in the studio group was based on the MRI evaluation. We conducted 3 evaluations, admission, discharge, and 3 months. We used the VAS pain scale, the WOMAC index for functional evaluation, the HAQ score for quality of life.

Results and discussions: The average age is 50.2 years. As far as the environment of origin is concerned, there is a slight predominance of rural patients. The results of the study show that 86.6% of patients have a body mass index above the normal limit, it results that obesity is one of the exogenous factors involved in the degradation of articular cartilage. Another important result is the evidence of overloading of the joint, the increased physical effect in 72% of patients in the second group and 28% in those in group I.

The mean value of the WOMAC index decreases by 14.52% after treatment in group I versus baseline and at 3 months after treatment the index increases by 3.57% from baseline. In group II, the WOMAC index decreases by 5% from baseline and returns to baseline at 3 months after initiation of the sudoku.

The quality of life of the patients, increases from an average of 2.25 to 2.38, therefore it is slightly improved after 10 days of treatment but the quality of life decreases again after a 6-month period without treatment, the average life-quality index reaching the initial value, both batches.

P1067

OSTEOPOROSIS IS A COMPANION OF AUTOIMMUNE INFLAMMATORY DISEASES

A. Scarlat¹, A. Sulea¹, R. Gutiu², F. Mocian¹, M. Copotoiu¹

¹Emergency County Hospital Targu Mures, Targu Mures, ²Iuliu Hațieganu University of Medicine and Pharmacy, Cluj Napoca, Romania

Objective: The aim of our study is to outline the presence of rheumatoid arthritis (RA), systemic lupus erythematosus (SLE) and diabetes are prone conditions for the presence of osteoporosis.

Methods: A prospective study that included 90 patients – 30 diagnosed with RA, 30 with SLE and 30 with primary osteoporosis. We monitored the subclinical activity of the diseases using the ultrasound evaluation of the small joints - the wrist, the metacarpophalangeal (MCP's) and the proximal interphalangeal (PIP's) in order to see the presence of synovitis and tenosynovitis. The lumbar and hip osteodensitometry was performed as well.

Results: The SLE patients (pts.) mean age was 48.43 years old vs. the RA pts. and diabetes pts. with a mean of 56.11 and 56.23 years old. The mean onset of the diseases in the 3 groups was: 6.53 years for SLE pts. vs. 11.7 years for RA pts. and 13.4 years for diabetes pts. Tenosynovitis of the second MCP was present in SLE's pts. with a positive correlation with osteopenia (p: 0.0001) in patients already on preemptive osteoporotic treatment. The presence of stage three synovitis of the third MCP was correlated with the lack of preemptive osteoporosis treatment. The presence of synovitis at the second MCP's and wrist was associated with osteopenia in patients with diabetes (p: 0.0014).

Conclusions: In the future the presence of tenosynovitis in patients with lupus and synovitis in RA and diabetes of the third and second MCP is to be evaluated as a presumed factor for the presence of osteopenia.

P1068

DAIRY AND BONE HEALTH: HOW STRONG IS THE SCIENTIFIC EVIDENCE?

E. G. H. van den Heuvel¹, M. J. M. Steijns¹

¹FrieslandCampina, Wageningen, The Netherlands

The relevance of dairy produce for the diminishment of osteoporotic risk is still a matter of scientific debate due to the outcome of a few single observational studies. This presentation will address the most robust point estimate on the role of dairy, as reported in systematic reviews and meta-analyses on randomized controlled trials in case of bone mineralization or prospective studies in case of fracture risk. Plain dairy or fortified with calcium and/or vitamin D improves total body BMC with 45-50 g over one year when the daily baseline calcium intake is lower than 750 mg in Caucasians and Chinese girls. In Caucasian and Chinese women, calcium from (fortified) dairy increased BMD with 0.7-1.8% over 2 years dependent on the site of measurement. Despite the results on BMC, there are currently no studies that have investigated the potential of dairy to reduce fracture risk in children. In adult Caucasian women, daily intake of 200-250 ml of milk is associated with a reduction in fracture risk of 5% or higher. In conclusion, the role of dairy for BMC or BMD has been sufficiently established in Chinese and Caucasian girls and women. In Caucasian women, drinking milk also reduces fracture risk. More research on the role of dairy products within the context of bone health promoting diets is needed in specific ethnicities, other than Chinese and Caucasians, and in men.

P1069

THE TEMPORAL PATTERN OF SARCOPENIA IN 22 EUROPEAN COUNTRIES

P. Pita Barros¹, F. M. Pimentel-Santos², D. Neto³, C. L. Crespo², A. Sepriano², A. F. Mourão², C. S. Pereira⁴, C. Lodeiro⁵, C. Quaresma⁶, G. Ferreira dos Santos⁷, I. Nunes⁸, J. L. Capelo⁵, J. P. Santos⁶, L. Domingues², L. V. Lapão⁹, M. A. Botelho², M. I. Gomes¹⁰, M. P. Macedo², M. Fonseca¹¹, N. Gouveia², P. Videira¹², P. Simões Coelho¹³, P. Soares Branco², V. Vassilenko¹⁴, J. C. Branco²

¹NOVA School of Business and Economics - NOVA University of Lisbon,

²Chronic Diseases Research Centre, NOVA Medical School, Faculdade de

Ciências Médicas - NOVA University of Lisbon, ³Instituto Superior de

Psicologia Aplicada - Instituto Universitário de Ciências Psicológicas,

Sociais e da Vida, ⁴Centro de Investigação em Saúde Pública, Public

Health Research Center - Escola Nacional de Saúde Pública - NOVA

University of Lisbon, ⁵Chemistry Department, Faculty of Sciences and

Technology - NOVA University of Lisbon, ⁶Department of Physics,

Faculty of Sciences and Technology - NOVA University of Lisbon,

⁷Department of Physical Medicine & Rehabilitation, Central Lisbon

Hospital Center, ⁸Department of Mechanical and Industrial Engineering,

Faculty of Sciences and Technology - NOVA University of Lisbon,

⁹Institute of Hygiene and Tropical Medicine - NOVA University of

Lisbon, ¹⁰Centre of Mathematics and Applications, Faculty of Sciences

and Technology - NOVA University of Lisbon, ¹¹Center of Mathematics

and Applications, Faculty of Sciences and Technology - NOVA University

of Lisbon, ¹²Department of Life Sciences, Faculty of Sciences and

Technology - NOVA University of Lisbon, ¹³NOVA Information

Management School - NOVA University of Lisbon, ¹⁴Department of

Physics, Faculty of Sciences and Technology - NOVA University of

Lisbon, Lisbon, Portugal

Objective: Sarcopenia is an important but under-recognized health challenge in the world today. The main objective of this study is to describe the evolution of Sarcopenia in Europe (2004-2015).

Methods: Data from the SHARE (Survey on Age, Health and Retirement in Europe) was used. The criteria for the presence of Sarcopenia were based on muscle strength, assessed by handgrip dynamometers. An harmonised protocol across countries and waves was established and the thresholds of European Working Group on Sarcopenia in Older People (EWGSOP, 2010) - 20 kg for females and 30 kg for males - were considered. We used the 6 waves of SHARE, from 2004-2015, for an unbalanced panel of 22 European countries. A probit regression analysis was computed with 190903 observations, including demographic controls and country fixed effects.

Results: The results show a decreasing trend in Sarcopenia, mainly due to evolution in women's scores. The main determinants of Sarcopenia are age and gender (female), followed by living alone, while years of education and income have a protective effect. Country differences are large, with Southern Europe countries, particularly Mediterranean countries, having significantly higher levels of sarcopenia.

Conclusions: There is a trend for Sarcopenia reduction, with social factors playing an important role in this process. Southern European countries seem to be the most affected. Genetic and environmental determinants should be assessed in future studies to allow a comprehensive understanding and an effective intervention.

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P1070

CONSUMPTION OF DAIRY PRODUCTS IN RELATION TO PRESENCE OF CLINICAL KNEE OSTEOARTHRITIS: THE MAASTRICHT STUDY

K. F. M. Denissen¹, A. Boonen², J. T. H. Nielen³, A. L. Feitsma⁴, E. G. H. van den Heuvel⁴, P. J. Emans⁵, C. D. A. Stehouwer⁶, S. J. S. Sep⁷, M. C. J. van Dongen¹, P. C. Dagnelie⁸, S. J. P. Eussen⁹

¹Maastricht University, Department of Epidemiology & CAPHRI Care and Public Health Research Institute, Maastricht, ²Maastricht University Medical Centre, CAPHRI Care and Public Health Research Institute & Department of Internal Medicine, Maastricht, ³Maastricht University Medical Centre, Department of Epidemiology & CAPHRI Care and Public Health Research Institute & Department of Clinical Pharmacy and Toxicology, Maastricht, ⁴FrieslandCampina, Wageningen, ⁵Maastricht University Medical Center, Department of Orthopaedics, Maastricht, ⁶Maastricht University Medical Centre, CARIM School for Cardiovascular Diseases & Department of Internal Medicine, Maastricht, ⁷Maastricht University Medical Centre, CAPHRI Care and Public Health Research Institute & CARIM School for Cardiovascular Diseases & Department of Internal Medicine & Department of Rehabilitation Medicine, Maastricht, ⁸Maastricht University, Department of Epidemiology & CAPHRI Care and Public Health Research Institute, Maastricht, ⁹Maastricht University, Department of Epidemiology & CARIM School for Cardiovascular Diseases, Maastricht, The Netherlands

Objective: Observational studies showed inverse associations between milk consumption and knee osteoarthritis (knee OA) (1, 2). There is lack of information on the role of specific other dairy product categories. Our aim was to explore the association between dairy consumption and presence of clinical knee OA in individuals aged 40–75 year participating in the Maastricht Study.

Methods: Presence of clinical knee OA was defined according to a slightly modified version of the ACR clinical classification criteria (3). Data on dairy consumption was appraised by a 253-item food frequency questionnaire covering 47 dairy products with categorization on fat content, fermentation or dairy type. Multivariable logistic regression analyses were performed to estimate odd ratios (ORs) and 95%CI, while correcting for relevant factors.

Results: Of the 3010 participants included in this study, 427 individuals (14%) were classified as having clinical knee OA. Significant inverse associations were observed between presence of clinical knee OA and intake of full-fat dairy and Dutch, primarily semihard, cheese, with OR for the highest compared to the lowest tertile of intake of 0.68 (95%CI 0.50 - 0.92) for full-fat dairy, and 0.75 (95%CI 0.56 - 0.99) for Dutch cheese. No significant associations were found for other dairy product categories.

Conclusion: In this Dutch population, higher intake of full-fat dairy and Dutch cheese, but not milk, was cross-sectionally associated with lower presence of clinical knee OA. Prospective studies need to assess the relationship between dairy consumption, and in particular semi-hard cheeses, with incident knee OA.

P1071

THE ACCURACY OF SELF-REPORTED FRACTURES AMONG A BELGIAN COHORT OF POSTMENOPAUSAL WOMEN: THE FRISBEE STUDY

F. Baleanu¹, P. Bergmann¹, V. Kinnard¹, L. Iconaru¹, S. I. Cappelle¹, M. Moreau², M. Paesmans², R. Karmali¹, J.-J. Body¹

¹CHU-Brugmann, ²Inst. J. Bordet, Data Centre, Brussels, Belgium

In large population-based epidemiological studies of osteoporotic fractures, self-report is an important way of obtaining information. However, this method is subject to errors of recall and may result in misclassification of fracture status. Surprisingly, the accuracy of self-reported fractures has only rarely been assessed.

The purpose of our study was to assess the accuracy of self-reported fractures in the FRISBEE cohort (Brussels, Belgium) of 3560 postmenopausal, aged 60–85 years. Baseline assessment parameters were collected during an interview by trained nurses. Participants were followed yearly by phone call for the occurrence of incident fragility fractures.

From 967 reported fractures, 79.3% (n=767) were radiologically confirmed. Among the 20.7% (n=200) unconfirmed fractures, 56.5% (n=113) had no fracture (true false positive; the radiology report indicated that the area was investigated but no fracture was found), for 21% (n=42) no radiology report was available (no x-ray was taken or not enough information was given to find the record), 16% (n=32) reported an existing fracture (the x-ray at the time the subject reported the fracture showed an old fracture), and 6.5% (n=13) of fractures were unconfirmed because of an equivocal radiology report or wrong declared area.

Based on the fracture site, among the 56.5% (n=113) of true false positive, we found a percentage of 2.7% (n=3) for hip, 9.7% (n=11) for wrist, 9.7% (n=11) for humerus, 23% (n=26) for spine, 10.6% (n=12) for ankle, 5.3% (n=6) for pelvis and 38.9% (n=44) for “minor” fractures (face/skull, ribs, knee, carpal/metacarpal bones, tarsal/metatarsal bones). Further, we investigated the characteristics of individuals who gave a ‘wrong information’ by using a multivariate analysis - covariates - age, BMI, fracture site, ethnicity, education, smoking, alcohol intake, history of fracture, falls, insomnia, physical activity, calcium and vitamin D intake. We found that subjects with a higher BMI (>25), with fractures on other site than hip, a lower education level, sedentarity and subjects taking calcium supplements were more likely to report unvalidated fractures.

In conclusion, the inaccuracy of self-reported fractures is far from being negligible for wrist, humerus, ankle and spine and is unacceptably high for fractures considered as minor.

P1072

THE EFFECTIVENESS OF DEEP CORE STABILITY BACK MUSCLES TRAINING IN REHABILITATION OF PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES

E. V. Makarova¹, L. A. Marchenkova¹, M. A. Eryomushkin¹

¹FSBI National Medical Scientific Center of Rehabilitation and Balneology, Moscow, Russia

Objective: To estimate the effectiveness of kinesiotherapy based on deep core stability muscles training in the program of rehabilitation in patients with osteoporotic vertebral fractures (VF).

Methods: 45 patients (M-4, F-41) aged 43–81 (average age 62.75±12.5) with primary osteoporosis and at least one non-traumatic VF were included in the study. The rehabilitation program focused on training of deep core stability back muscles and consisted of 4 kinesiotherapy methods (Dr. Wolff and CBS simulators, kinesiohydrotherapy in the pool and complex physical exercises by Gorinevskaya-Dreving) was prescribed for 21 days to all patients. Isometric core strength test (Back-Check, Dr. Wolff, Germany) was performed at baseline, at the end of the rehabilitation treatment and after 21 day past all training at follow-up visit.

Results: At baseline relative flexion strength (REL FS), relative extension strength (REL ES), left lateral flexion strength (LLAT FS), right lateral flexion strength (RLAT FS) were lower than recommended indexes: 113.01±34.03% of 150% (p=0.001), 75±12.78% of 100% (p=0.006), 85±12.78% (p=0.04) and 79.73±9.2% of 100% (p=0.003) accordingly. Ratio relative flexion/extension strength (FLE:EXT S) also was in imbalance in 38 of 45 patients. Lateral flexion ratio (LLAT:RLAT FS) showed imbalance only in 6 patients. The all isometric core strength test indexes improved significantly: REL FS up to 132.57±47.08% (p=0.0001), REL ES up to 86.45±9.4% (p=0.03), LLAT FS up to 90.7±9.55% (p=0.07), RLAT FS up to 89.4±2.5% (p=0.03) after the rehabilitation course. The muscle strengths stay better than the baseline indexes at the follow-up measurement: REL FS=121.5±39.9% (p=0.002), REL ES=79.78±10.5% (p=0.02), LLAT FS=87.1±11.07% (p=0.06), RLAT FS=80.14±8.62% (p=0.09).

Conclusions: The basic dysfunction of deep core muscles and misbalance flexion/extension strength in osteoporotic patients with VF were estimated. Rehabilitation program including kinesiotherapy in patients with VF showed the high prolong effect on improving back muscle strength.

P1073

AN INNOVATIVE NON-IONIZING TECHNIQUE FOR THE ASSESSMENT OF BONE HEALTH: RESULTS OF A MULTICENTER CLINICAL STUDY COMPARING REMS AND DXA DIAGNOSTIC ACCURACY AT LUMBAR SPINE

L. Cavalli¹, G. Arioli², G. Bianchi³, C. Caffarelli⁴, M. Matucci Cerinic⁵, L. Cianferotti¹, F. Conversano⁶, M. Di Paola⁶, D. Gatti⁷, G. Girasole³, A. Giusti³, S. Gonnelli⁸, M. Manfredini², M. Muratore⁹, R. Nuti⁸, P. Pisani⁶, E. Quarta⁹, M. Rossini⁷, O. Viapiana⁷, M. L. Brandi¹

¹Department of Surgery and Translational Medicine, University of Florence, Metabolic Bone Diseases Unit, University Hospital of Florence, Florence, ²Department of Neurosciences and Rehabilitation, "Carlo Poma" Hospital, ASST-Mantova, Mantova, ³SC Rheumatology, ASL 3 Genovese, Genova, Italy, ⁴Department of Medicine, Surgery and Neurosciences, University of Siena, Siena, ⁵Department of Experimental and Clinical Medicine, University of Florence & SOD Rheumatology AOUC, Florence, ⁶National Research Council, Institute of Clinical Physiology, Lecce, ⁷Rheumatology Unit, Department of Medicine, University of Verona, Verona, ⁸Department of Medicine, Surgery and Neurosciences, University of Siena, Siena, ⁹O.U. of Rheumatology, "Galateo" Hospital, San Cesario di Lecce, ASL-LE, Lecce, Italy

*Equal contributors listed in alphabetical order

Objective: To evaluate diagnostic accuracy of REMS (radiofrequency echographic multi spectrometry) technology in assessing the status of the bone at lumbar spine and compare it with DXA.

Methods: A total of 1575 postmenopausal women aged 51-70 years were enrolled in seven Italian referral centers for osteoporosis. REMS accuracy in osteoporosis discrimination was measured by performing in each clinical center two consecutive examinations on each patient: one by DXA device and the other one by REMS technology. The REMS exams reporting deviations from the correct focus or scan depth values were excluded from the data analysis; spinal DXA reports containing errors according to the last ISCD guidelines were also excluded.

Results: Analysing the diagnostic agreement between DXA and REMS in discriminating osteoporotic vs. non-osteoporotic patients, REMS approach reached a sensibility of 84% and a specificity of 85%. These parameters, when considering only DXA and REMS acquisitions perfectly adherent to guidelines, achieved values of 93% and 96% respectively. Moreover, densitometric values provided by the two techniques showed an high degree of Pearson's correlation, with $r=0.96$, $p<0.001$.

Conclusions: REMS has been shown to be an accurate non-ionizing approach to assess bone status at lumbar spine and to discriminate osteoporotic postmenopausal women from healthy ones as classified by lumbar DXA, with elevated correlation with DXA measurements.

P1074

THE CASE OF AN UNUSUAL FORM OF HYPERPARATHYROIDISM IN A YOUNG WOMAN WITH A LOW-ENERGY PELVIC FRACTURE

A. Tsiberkin¹, A. Dmitriev¹, L. Belousova¹, N. Klyaus¹, T. Karonova¹

¹Almazov National Medical Research Centre, St. Petersburg, Russia

Objective: To illustrate the importance of evaluation for underlying somatic pathology in young patients with low-energy fractures.

Methods: Here we describe the case of an unusual form of hyperparathyroidism in a female patient with a low-energy pelvic fracture.

Results: A 26-year-old female patient has presented with history of uro- and cholelithiasis, right ilium fracture following trivial trauma six month ago and revealed hypercalcemia. Patient's ionized calcium level was 1.56 mmol/l, blood phosphorus 1.42 mmol/l (0.81-1.45), PTH 1785.2 pg/ml (15.00-65.00), 24-h urinary calcium 23.5 mmol/l (2.5-7.5), 25(OH)D level was 10 ng/ml.

There are no lesions of parathyroid glands have found on neck ultrasonography and neck CT scan. Technetium-99m scanning has revealed

hotspot in the anterior mediastinum size of 25xx mm with native density up to +35HU, in arterial phase up to +170HU and in delayed phase up to +100HU. Severe osteoporosis has been found on DXA scan with a minimum Z-score down to -4.3 in distal forearm. Other components of MEN I and MEN IIA syndrome have been excluded.

Thus, adenomas of the mediastinal aberrant parathyroid gland have been revealed. Bisphosphonate and calcemimetic therapy as well as calcium and vitamin D supplementation have initiated. Patient has been referred for thoracic surgery.

Conclusions: Our case emphasizes the importance for evaluation of young patients with low-energy fractures for secondary causes. The using imaging modalities such as Tc-99m scanning is reasonable in patients with verified hyperparathyroidism and absence of lesions in the parathyroid glands.

P1075

ULTRASONOGRAPHIC EVALUATION OF THE EFFECTIVENESS OF ASU SUPPLEMENTS IN TREATMENT OF KNEE OSTEOARTHRITIS WITH SYNOVIAL INVOLVEMENT: A PRELIMINARY STUDY

S. Parisi¹, M. Scarati¹, M. C. Ditto¹, M. Priora¹, C. L. Peroni¹, R. Borrelli¹, E. Fusaro¹

¹Rheumatology Unit - AOU Città della Salute e della Scienza di Torino, Turin, Italy

Objective: The knee is one of the most affected joints in patients with osteoarthritis (OA) and many of them are undergo with Symptomatic slow-acting drugs for osteoarthritis (SYSADOA) and disease modifying osteoarthritis drugs (DMOAD) as their first treatment. A mismatch is frequently possible between pain and standard diagnostic imaging method (RX), due to the lack of sensibility of such method. In the last years, the interest for synovial involvement in OA has increased and the ultrasound (US) has taken on a very important role; in fact, it allows us to evaluate both synovial involvement and the uptake of PWD signal which are widely considered as signs of inflammation. The aim of the study was to evaluate the effectiveness of Avocado Soybean Unsaponifiables (ASU) supplements in patients whose knees are affected by OA.

Methods: We evaluated a cohort of 43 patients affected by knee OA according to ACR criteria, grade 2-3 of Kellgren-Lawrence scale and divided as follows: Group A: 22 patients treated with ASU; Group B: 21 patients treated with Chondroitin Sulfate and Glucosamine. All the patients have been monitored for 3 weeks while evaluating: the intensity of subjective pain on the visual analogue scale of pain (VAS), pain, stiffness and functionality by using WOMAC Index, US scan with a focus on the synovial Grey Scale and PWD signal uptake (according to OMERACT-score).

Results: 43 patients affected by knee OA were evaluated (Female 74.3%) with an average age of 69.3 years (± 4.1). All the subjects showed a reduction of the pain three months after the beginning of the treatment, but Group A showed a greater reduction than their control group (GrA:44.2% - GrB:32.8% $p=0.005$). WOMAC appeared to have a statistically significant improvement in Group A when compared to B [from 47.0% (95%CI: 44.6-50.8) to 61.6% (95%CI: 58.3-65.1, $p=0.015$)]. The improvement in WOMAC scores appeared to be higher in grade 2 Kellgren-Lawrence patients ($p=0.026$). PWD signal uptake improved as well in Group A (GrA Δ -0.95, GrB -0.35, p -value 0.023).

Conclusions: This preliminary study demonstrated the effectiveness of ASU supplements in treatment of knee OA with synovial involvement and its role as DMOAD. The metalloproteinase MMP13 and Nitric Oxide Synthase lowering effect showed by this group of supplements may partially explain their effectiveness among these patients. Furthermore, US allowed to evaluate some aspects related to synovial involvement which were not to be seen with standard imaging.

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P1076

25-HYDROXYVITAMIN D LEVELS, VITAMIN D DEFICIENCY AND INSUFFICIENCY IN PATIENTS WITH MUSCULOSKELETAL DISORDERS

V. Povorožnyuk¹, P. Pludowski², M. Holick³¹D.F. Chebotarev Institute of Gerontology of NAMS of Ukraine, Kyiv, Ukraine, ²The Children's Memorial Health Institute, Warsaw, Poland, ³Boston University Medical Centre, Boston, USA

Objective: To examine 25(OH)D level, Vitamin D deficiency and insufficiency prevalence in patients of various ages who have musculoskeletal disorders, and to reveal the influence of seasonal factors on these conditions.

Methods: 3460 patients of the Ukrainian Scientific-Medical Center of Osteoporosis Problems, aged 1-92 years (mean age 52.9±21.1 years). 25(OH)D and PTH analyses were performed by means of electrochemiluminescent method (Elecsys 2010 analyzer, Roche Diagnostics, Germany) and cobas test-systems. Statistica 6.0 software package (StatSoft, Inc. 1984-2001) was also applied.

Results: Among the patients with bone-muscular pathology, the highest 25(OH)D level was noted in the age group of 1-9 years (30.6±15.1 ng/ml) and the lowest – in the age group of 80 and over (20.4±11.4 ng/ml). Prevalence of vitamin D deficiency among the patients with bone-muscular pathology was 37.3%, vitamin D insufficiency 30.6%, normal vitamin D status in 32.1%. Normal 25(OH)D concentration was found in 38.0% of children, 33.2% of adults and in 29.6% of elderly patients. Month of blood-sampling had a significant influence on 25(OH)D concentration values ($F=7.49$; $p<0.0000001$). The highest significant differences in 25(OH)D concentrations during the summer vs. winter months were observed in the age groups of 10-19 years (18.2%), 40-49 years (17.3%), 30-39 years (16.2%) and 1-9 years (16.1%). There were no significant seasonal differences observed in the elderly patients (60 years and older) with musculoskeletal pathology.

Conclusion: Despite the combined calcium and vitamin D supplementation utilized by most patients with a bone-muscular pathology, only 37.9% of children, 33.2% of adults and 29.6% of the elderly people had normal 25(OH)D concentration values.

P1077

RHIZOARTHRITIS CAN BE IMPROVED BY A MULTIPROFESSIONAL EDUCATIONAL PROGRAM AND CARE

G. P. O. Ocampos¹, F. M. R. Reaes¹, M. Ivo¹, D. S. S. Scarcella¹, L. C. A. Almeida¹, R. M. S. Suzuki¹, M. U. R. Rezende¹¹Orthopaedics and Traumatology Department, University of Sao Paulo General Hospital, Sao Paulo, Brazil

Objective: To evaluate the effect of a clinical management program with education on the function of the hands of patients with rhizarthritis.

Methods: 108 patients with rhizarthritis and multiple arthritis (191 hands with clinical and radiographic rhizarthritis) followed for two years in an educational program on osteoarthritis performed the SF-36, DASH and HAQ questionnaires, palmar grip, pulp-pulp, key and tripod pinch at the time of inclusion and after 24 months. Age, race, level and frequency of physical activity, gender, age, BMI, percentage of body fat, degree of osteoarthritis were correlated to the tests performed.

Results: Women improved less than men in HAQ ($p=0.037$). Each 1% reduction in fat percentage increased the chance of improvement in HAQ by 9.2% ($p=0.038$). Physical activity did not influence the improvement of the parameters evaluated ($p>0.05$). Palmar grip improvement was affected by age and presence of rhizarthritis ($p<0.05$), patients with unilateral rhizarthritis improved 5.3 times more than patients without ($p=0.015$). Improvement of grip decreases 6.8% per year ($p=0.004$). Women improved more than men in the pulp-pulp pinch ($p=0.018$).

Conclusion: Patients with rhizarthritis and multiple arthritis improve quality of life and grip strength by clinical treatment, educational program and fat loss.

P1078

OSTEOPOROSIS IN COMUNITY BASED REHABILITATION (CBR) M. Muftić¹¹University in Sarajevo, Faculty of Health Sciences, Bolnička 25, 71 000 Sarajevo, BiH, Sarajevo, Bosnia-Herzegovina

* Muftić M1, Jaganjac A1, Avdić D1, Aganović M2, Turkić E3, Mulavdić M1.

1 University in Sarajevo, Faculty of Health Sciences, Bolnička 25, 71 000 Sarajevo, BiH

2 General Hospital "Abdulah Nakaš" 71 000 Sarajevo, BiH

3 Public Health Center Sarajevo Canton, 71 000 Sarajevo, BiH

Objective: Osteoporosis represents a global health problem. The reasons are numerous: first of all, the world population is older, medical science is becoming more and more advanced, allowing longer life, and technological innovations provide early diagnosis of osteoporosis. Osteoporosis is a disease that a population faces so called. "Third Age" or older people. It is long-lasting and clinically insensitive until the development of visible and very painful complications. These are first fractures, deformities, significantly reduced mobility and disability.

Methods: The study included 437 patients with diagnosed osteoporosis who were treated for a period of one year in CBR Sarajevo, regardless of sex and age. Involvement criteria were patients diagnosed with osteoporosis in CBR Sarajevo, and patients who stopped treatment were excluded from the study and showed no side effects or any other undesirable effect. The method of operation was a retrospective study.

Results: Of the total number of patients with osteoporosis, there were 19 males (4.35%) and 418 women (95.65%). The largest number of patients was 61 to 70 years of age, 36.85% of men and 47.36% of women. The largest number of patients with osteoporosis was in the status of pensioner. The most common clinical entities in patients with osteoporosis were lumbar and cervical syndrome and gonarthrosis. Of the total number of patients there were most female patients with clinical image of lumbosacral syndrome 59.09%, then with cervical syndrome 29.90%, and osteoarthritis 27.51%. Male patients were also the most numerous with clinical image of lumbosacral syndrome 57.90%, cervical syndrome 42.10%, and osteoarthritis 31.57% and thoracic syndrome 31.57%. By analyzing physical modalities, the largest number of patients with osteoporosis had kinesitherapy, manual massage and electrotherapy. Of all the physical therapy procedures most commonly used were kinesitherapy, interference current 89.70%, TENS 83.75%, cryotherapy 81.46%, manual massage 71.76% and ultrasound 51.25%. The average time spent in physical therapy with the largest number of patients with osteoporosis was 10-15 days.

Conclusion: Treatment of this disease is complex and it is always necessary to include physical therapy in addition to medical therapy. It is important to familiarize patients with prevention of osteoporosis and note that basic prevention is an active voluntary movement. This practically means that, with active kinesitherapy treatment that can be carried out individually or in small groups, other agents are being used as an additional agent in treating this disease.

P1079

OSTEOPOROSIS AND MUSCLE ATROPHY: HOW IS VITAMIN D RECEPTOR AN UNKNOWN DETERMINANT?

M. Celi¹, M. Scimeca¹, M. Feola¹, A. Botta¹, U. Tarantino¹¹University of Rome "Tor Vergata" Department of Orthopaedic Surgery, Rome, Italy

Introduction: Intracellular 1,25-dihydroxyvitamin D receptor (VDR) is expressed in human skeletal muscle tissues. However, it is unknown

whether VDR expression *in vivo* is related to age or vitamin D status. Therefore, in this study we investigated the influence of age, muscle atrophy, main VDR polymorphism and vitamin D levels on the expression of the VDR in human muscle tissue of osteoporotic and osteoarthritis patients.

Methods: We performed a *vastus lateralis* muscle biopsy in 50 patients with osteoporosis (OP) undergoing surgery for fragility hip fracture and in 50 age-matched patients (age range, 60–85 years) undergoing arthroplasty for hip osteoarthritis (OA). The patients signed an informed consent form before participating in the study. Serum concentrations of 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D were assessed at day of admission to surgery. To evaluate fibers atrophy 250 muscle fibers per biopsy have been evaluated comparing minimum transverse diameter and cross-sectional area of type I and type II fibers for relative prevalence. Nuclear Expression of VDR were studied by counting 500 nuclei per specimen and person. Nuclear VDR expression, Type I and Type II fibers were identified by immunohistochemistry.

Results: Morphometric analysis showed a significant difference in fiber type distribution between the two groups of patients. Mann-Whitney test displayed a significant difference in the nuclear expressions of VDR in OA group as compared to OP patients (OA 212.10 ± 11.85 , OP 84.73 ± 7.29 , $p < 0.0001$). In the univariate analyses, increased age was associated with decreased VDR expression ($p = 0.004$), whereas there were no significant correlations between VDR expression and vitD levels. In particular, the nuclear translocation of VDR appeared age independent in OA group and not influenced by age in OP patients. On note, we also found a strictly association between the polymorphism of Cdx2 and FoxI gene and muscle fiber atrophy. Specifically, patients with Cdx2 polymorphisms associated to minor expression of VDR, and FOKI polymorphisms associated to minor activity of VDR, showed $>50\%$ of atrophic fibers.

Conclusion: Older age was significantly associated with decreased VDR expression in osteoporotic patients, independent of serum vitD. Our results could lay the foundation for identification of patients potentially responsive to supplementation of vitamin D.

P1080

ASSESSMENT OF CALCIUM INTAKE IN THE ADULT POPULATION OF HUNGARY

B. Bakos¹, B. Szabó¹, B. Szili¹, I. Takács¹

¹Semmelweis University/1st Department of Internal Medicine, Budapest, Hungary

Objective: Optimal calcium intake is a prerequisite for ideal peak bone mass, maintaining overall skeletal health, avoiding early bone loss, and ensuring the efficacy of antiresorptive therapy. However, in the past decade, concerns were raised regarding the potential adverse cardiovascular and proinflammatory effects of increased calcium consumption. Our aim in the present study was to evaluate the sources and volume of calcium intake in different groups of the Hungarian adult population.

Methods: A questionnaire-based study was conducted among 744 adults between the ages of 20–59. The study sample was representative of the Hungarian general population for age- gender-, and geographical distribution. Calcium consumption from different alimentary sources and supplementation was assessed by a standardized questionnaire during routine physician visits.

Results: There were no significant differences in the mean value or the standard deviation of total calcium intake between different groups of age, sex, and place of residence. Average intake varied between 837–915 mg/d, while standard deviation between 384–482 mg/d. Daily calcium consumption was below 800 mg and 600 mg/d in 52% and 29% of all surveyed individuals respectively. Calcium supplementation was significantly more prevalent among women and participants over the age of 40. Calcium supplementation was warranted in almost $\frac{3}{4}$ of cases, while in the remainder, dietary intake would have been sufficient alone.

Conclusions: In this present study mean calcium intake was found to be roughly optimal in all study groups. An accompanying large standard deviation however means that calcium intake was still moderate to severely low in a significant portion ($\sim 50\%$) of the population. While these values represent an improvement compared to earlier Hungarian studies they clearly show a need for further patient and doctor education.

P1081

ARTHRITIS PREVALENCE AND DISABILITY: A CROSS-SECTIONAL ANALYSIS USING DATA FROM FIVE INTERNATIONAL SITES.

C. L. Curcio¹, S. L. Brennan-Olsen², S. Vogrin³, G. Duque⁴, F. Gomez¹

¹Research Group on Geriatrics and Gerontology, Faculty of Health Sciences, Universidad de Caldas, Manizales, Colombia, ²Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, Melbourne, ³Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, Melbourne, ⁴Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health., Melbourne, Australia

Methods: Cross-sectional survey data from random samples of adults aged 65–74 years at Canadian (Kingston, Ontario and Saint-Hyacinthe, Quebec in Canada), Mediterranean (Tirana, Albania), and Latin American sites (Natal, Brazil; Manizales, Colombia) (N=1995). Self-reported osteoarthritis was ascertained. Mobility disability was defined as reporting difficulty in walking 400m, or climbing stairs. Activities of daily living (ADL) disability were based on any self-reported difficulty in five mobility-related ADLs. The Short Physical Performance Battery (SPPB) was used to assess physical performance. Poisson regression models were fitted to estimate prevalence ratios.

Results: Total osteoarthritis prevalence was 14.9%, ranged between 19.2% (Saint-Hyacinthe) to 9.8% (Manizales). Mobility disability was reported in 50% of older people reported osteoarthritis with higher percentages in low to middle income countries (83.8% Albania, 53.8% Brazil, 41.7% Colombia vs. 36.4% Saint-Hyacinthe, 13.3% Kingston ($p < 0.001$)). Exercise practice was reported more frequently in Canada sites (ranged 16.1 to 27.8) in comparison con less developed regions (Tirana 0%, Brazil 8.1% and Colombia 10.5%) ($p < 0.001$). In the majority, age-adjusted prevalence of low SPPB, mobility disability, and ADL disability were higher in women than in men at all sites. 13% of people with osteoarthritis reported scored low on SPPB, more frequently in Canadian sites and Albania.

Conclusion: Differences of prevalence of osteoarthritis between higher and low to middle income countries are similar to previous reports. High prevalence of disability mobility is more frequent in women low to middle income countries from less developed areas. Greater attention should be given to older people with osteoarthritis to avoid early complications.

P1082

OSTEOPOROSIS THERAPY WITH DENOSUMAB IN SOLID ORGAN TRANSPLANT RECIPIENTS

J. Brunova¹, S. Kratochvilova¹, J. Stepankova¹

¹Institute for Clinical and Experimental Medicine, Prague, Czech Republic

Objective: Osteoporosis therapy recommendation in patients after solid organ transplantation includes the supplementation with calcium and D vitamin and bisphosphonates administration, which can be however limited with impaired renal function. The therapy option could be denosumab, monoclonal antibody against RANKL.

Methods: We investigated 63 patients (23 M, 40 F), 6.4 ± 6.3 years after the solid organ transplantation (15 diabetic patients after simultaneous

transplantation of kidney and pancreas, 34 patients after kidney transplantation, and 14 patients with liver graft). Patients were treated for osteoporosis of L spine and/or hips with denosumab 60 mg every 6 months in years 2012-2017. The mean duration of the therapy was 1.65 ± 0.7 years. Osteoporosis was diagnosed with the standard DXA examination with Lunar Prodigy apparatus using WHO criteria for the definition of osteoporosis ($T\text{-score} \leq -2.5$ SD).

Results: After the denosumab therapy L spine T-score improved in the whole group from -2.68 ± 1.2 to -1.85 ± 1.2 ($p < 0.001$). The values of hip T-score increased from -2.5 ± 0.83 to -2.21 ± 0.8 ($p < 0.01$). There was only mild, statistically insignificant improvement of distal forearm T-score. Mean increase in BMD of L-spine was $11.5 \pm 6.2\%$ in subject with osteoporosis in this site and $10.4 \pm 6.1\%$ in all patients respectively. The BMD of the total hip raised by $10.4 \pm 8.3\%$ in patients with hip osteoporosis, and by $7.5 \pm 7.3\%$ in all patients. The denosumab therapy decreased the prevalence of osteoporosis in L spine from 75% to 27% ($p < 0.001$), hip osteoporosis from 54% to 36% ($p < 0.05$), and non-significantly in distal forearm from 63% to 52%.

Conclusion: The denosumab therapy improved bone density in solid organ transplant recipients and was well tolerated. It seems that Denosumab may be considered treatment of choice in transplanted patients with osteoporosis especially in those with renal function impairment or bisphosphonate intolerance.

P1083

RISK OF FRACTURE THROUGH THE FRAX MODEL APPLIED TO PATIENTS IN THE EMERGENCY IN A COLOMBIA HOSPITAL

A. Pinzon¹

¹University Surcolombiana, Neiva, Colombia

Objective: To describe the risk of fracture with the FRAX scale for Colombia in patients admitted to the emergency room of Hernando Moncaleano Perdomo Hospital in a period of time.

Method: Prospective, cross-sectional quantitative study in patients aged 50-90 years admitted to the emergency service of the University Hospital Hernando Moncaleano Perdomo, October-December 2015. The FRAX tool was applied to assess risk of fracture.

Results: 193 patients included, the risk of suffering a major fracture was directly proportional with age and higher in women. In patients with BMI < 20, there was an increased risk of fractures; 10.32% for major osteoporotic fracture and 3.27% for hip fracture. Within the possible associations or risk factors identified in our population; it was observed that those smokers or those with a history of rheumatoid arthritis present a higher risk; 16.08% for major osteoporotic fracture and 14.7% for hip fracture; and of 18.4% and 8.30% respectively. The percentage of risk of major osteoporotic fracture and hip combined in those without a history of fracture was 4.76% vs. (9.2%) in those with a history of fracture.

Conclusions: Patients with a history of fracture presented a higher percentage of fracture risk, and those who presented at least one of these conditions upon admission to the emergency department, independently; rheumatoid arthritis, smoking, BMI < 20 had higher risk and prevalence of fracture.

Conclusion: Remembering these clinical characteristics or applying the FRAX tool in the emergency room helps us identify patients with a high risk of fracture.

P1084

HOW DOES THE MAGNITUDE AND PATTERN OF MUSCLE ECHOGENICITY AFFECT MUSCLE STRENGTH IN YOUNGER AND OLDER WOMEN?

A. R. S. Gomes¹, M. O. Harris-Love², C. Ismail³, J. Zabal⁴, P. Woletz⁵, L. Dipietro², L. H. Gallo⁶, M. R. Blackman⁷

¹Federal University of Parana, Prevention and Rehabilitation in Physiotherapy Department, Physical Education, Curitiba, Brazil, ²The

George Washington University, Department of Exercise and Nutritional Sciences, Milken Institute School of Public Health, Washington, ³The George Washington University, Department of Medicine, School of Medicine and Health Sciences, Washington, ⁴The George Washington University, Department of Exercise and Nutritional Sciences, Milken Institute School of Public Health, Washington, ⁵The George Washington University, Department of Exercise and Nutritional Sciences, Milken Institute School of Public Health, Washington, USA, ⁶Physical Education, Federal University of Parana, Curitiba, Brazil, ⁷The George Washington University, Department of Medicine, School of Medicine and Health Sciences, Washington, USA

Objective: Focal estimates of myosteatosis may reflect broad age-related changes in muscle, therefore, the objectives of this work were to: 1) examine the association of global muscle echogenicity with strength, and 2) determine if patterns of muscle echogenicity differ between younger and older women.

Methods: Twenty community-dwelling women participated in the study (younger: $n=10$, 23.7 ± 2.0 yrs; older: $n=10$, 63.2 ± 6.9 yrs). Muscle morphology was assessed via ultrasound (SonoSite M-Turbo) using a 13.6 MHz linear array transducer and B-mode scanning. The scanning sites were the trapezius, pectoralis major, deltoid, brachioradialis, and rectus femoris. Image capture was performed 3 times and averaged values were used for the analysis. Echogenicity was measured using ImageJ (Ver. 1.48) and expressed as absolute values in grayscale levels (GSL, 0-255), and as a relative index based on summed GSLs (values > 1.0 denote more hyperechoic muscle tissue). Strength was assessed using grip dynamometry scaled for body weight. Pearson correlation coefficients (r), linear regression (for standardized coefficients, β), and independent t-tests were used for the analysis ($\alpha=0.05$).

Results: Echogenicity from the summed and individual muscle groups, except pectoralis major, were significantly associated with strength ($r=-0.52$ to -0.74 , $p < 0.001$ – 0.018). Echogenicity at the rectus femoris retained an association with strength after adjusting for age ($\beta=-0.50$, $t=-2.8$, $p=0.02$). Relative GSL indices ranged from 0.66 (brachioradialis) to 1.43 (rectus femoris). While echogenicity was significantly higher in the older participants for all muscle groups ($t=-2.8$ to -5.0 , $p < 0.001$ – 0.008), the relative GSL indices for each muscle group revealed the same pattern of echogenicity for both young and old individuals ($t=-1.7$ to 0.0 , $p > 0.05$).

Conclusion: Although age-related changes in echogenicity affect multiple muscle groups, the pattern of involvement may be constrained by intrinsic muscle characteristics. Muscle morphology measures are associated with strength, but age is a covariate of echogenicity. Follow up studies involving larger samples of older adults, with age-decade group assignment, are recommended to better understand the independent association between myosteatosis and muscle performance.

P1085

RISK FACTORS OF SARCOPENIA IN UKRAINIAN POSTMENOPAUSAL WOMEN

V. Povoroznyuk¹, N. Dzerovych¹

¹D.F. Chebotarev Institute of Gerontology of NAMS of Ukraine, Kyiv, Ukraine

Objective: To study the risk factors (dietary protein intake, vitamin D, growth hormone (GH), total and free testosterone level (TT, FT)) of sarcopenia in Ukrainian postmenopausal women.

Methods: To evaluate the connection between appendicular lean mass (ALM) and dietary protein intake we have examined 63 women aged 52-89 yrs (mean age – 68.46 ± 9.26 yrs). For the purpose of studying the correlation between skeletal muscles and vitamin D level 87 healthy women aged 45-83 yrs were examined (mean age

– 66.29±8.35 yrs). To study the correlation between skeletal muscles and GH, TT, FT level, 42 healthy women aged 60–86 yrs (mean age – 70.62±6.97 yrs) were examined. To assess the dietary habits of women, we used a three-day sampling method. Lean mass was evaluated using DXA (Prodigy, USA). Strength of skeletal muscle was evaluated using springy carpal dynamometer, the functional capacity of skeletal muscle – by «four-meter» test. To determine the level of 25(OH)D, GH, TT and FT electrochemiluminescent method was used.

Results: Women of 80–89 yrs consuming <1.0 g of protein per 1 kg of body weight accounted for more than a half of their group (57.1%). Significant correlations among dietary protein, amino acids and ALM index values ($p<0.01$) were determined. We determined a significant correlation between parameters of lean mass ($p=0.05$) and vitamin D level; skeletal muscle functionality ($p=0.04$) and vitamin D level. Significant correlation between ALM and level of GH (60–74 yrs: $r=0.36$; 60–89 yrs: $r=0.31$), between strength of skeletal muscle and level of TT (75–89 yrs: $r=0.55$; 60–89 yrs: $r=0.32$), FT (75–89 yrs: $r=0.31$), GH (75–89 yrs: $r=0.35$; 60–89 yrs: $r=0.32$); between function of skeletal muscle and level of TT (75–89 yrs: $r=0.46$), FT (75–89 yrs: $r=0.48$) was found.

Conclusion: Significant correlation between parameters of lean mass, skeletal muscle strength, functionality and dietary protein intake, vitamin D, GH, TT and FT level was determined in the Ukrainian postmenopausal women.

P1086

ASSOCIATION BETWEEN OBESITY AND HAND GRIP STRENGTH IN YOUNG INDONESIAN ADULTS

S. Tanzil¹, D. Widjaja¹, K. Tjhai¹, K. Dermawan¹, A. Pramusinta¹, H. Keegan Phenca¹, J. Kalim¹, A. Kurniawan²

¹Faculty of Medicine, Pelita Harapan University, ²Department of Internal Medicine, Faculty of Medicine, Universitas Pelita Harapan, Tangerang, Banten, Indonesia

Objectives: To know the association between obesity and hand grip strength in Indonesian young adults.

Methods: We conducted across-sectional study in Tangerang on early January 2018. Digital JAMAR hand dynamometer was used to measure the hand grip strength of the dominant arm. BMI was measured using SECA balance. Obesity for Asian population was defined as BMI ≥ 25 kg/m² as recommended by WHO. Association between both variables was analyzed with Mann-Whitney U Test using SPSS version 23.0.

Results: This study enrolled 302 young adults and 99 (32.8%) participants were obese. The female gender ratio was 65.2%. The median age was 19 (16–48) years old and BMI was 23.10 (14.82–41.73) kg/m². The median hand grip value for non-obese female and male population were respectively 23.53 (11.70 – 37.70) kg and 35.65 (24.70 – 61.47) kg. While median value for obese female and male were 26.15 (14.60 – 35.60) kg and 36.37 (15.03 – 63.30) kg. Obesity was significantly associated with hand grip strength ($p<0.001$).

Conclusions: There was significant association between obesity and hand grip strength in young Indonesian adults.

P1087

AGE PECULIARITIES OF BMD IN YOUNG FEMALE WITH JUVENILE IDIOPATHIC ARTHRITIS

V. Povoroznyuk¹, M. Dzhus²

¹D.F. Chebotarev Institute of Gerontology of NAMS of Ukraine, ²O. Bohomolets National Medical University, Kyiv, Ukraine

Objective: to study the BMD in young adult females with juvenile idiopathic arthritis (JIA) depending on the age.

Methods: 99 females aged 19–39 (40 patients with JIA and 59 practically healthy persons) were examined and divided into 2 groups by age: I group – 20–29 years old and II group – 30–39 years old. The age of disease onset, delay in diagnosis, disease duration, ILAR-variant of JIA, BMD, T-score and Z-score were estimated.

Results: The onset of JIA was at the age of 11.16±4.34 years, delay in diagnosis was 23.52±21.37 months, the disease duration 11.9±9.4 years, persistent oligoarthritis was detected in 25% of patients, RF-negative polyarthritis in 22.5%, extended oligoarthritis in 10%, RF-positive polyarthritis in 10%, systemic-onset JIA in 12.5%, enthesitis-related JIA in 15%, undifferentiated arthritis in 2.5%, psoriatic arthritis in 2.5% of patients. BMD ($p<0.000001$), T- ($p<0.00001$) and Z-scores in the lumbar spine, femoral neck BMD ($p<0.000001$) and T-score ($p<0.0001$), total body BMD ($p<0.000001$), T- ($p<0.0001$) and Z-scores ($p<0.000001$) were lower in patients with JIA than in healthy people. However, ultradistal forearm BMD in the female patients differed from healthy only in T- and Z-scores ($p<0.01$, $p<0.01$). The BMD was significantly lower at the lumbar spine ($p<0.001$) and at the total body ($p<0.01$) in I and II groups, and at the femoral neck in I group vs. healthy group ($p<0.001$). T-score ($p<0.001$) and Z-score ($p<0.001$) in the lumbar spine were reduced in the I group, but in the II group only the Z-score ($p<0.01$) was reduced. Total body T-score and Z-score were reduced in female of both groups (group I: T-score $p<0.01$, Z-score $p<0.001$; group II: T-score $p<0.05$, Z-score $p<0.0001$). Patients of I and II groups had lower femoral neck T-score (respectively, $p<0.001$, $p<0.05$) but the Z-score was lower ($p<0.001$) only in group I. The ultradistal forearm T-score and Z-score decrease were revealed only in group II ($p<0.01$, $p<0.01$, respectively). Z-score<-2 SD in young females was detected in 40% of patients in the lumbar spine, in 25% of patients in the femoral neck, in 35% of patients in the total body and 52.5% of patients in ultradistal forearm, and T-score<-2.5 in 2.5% in lumbar spine, 2.5% in the femoral neck, 37.5% – in the total body, 22.5% in the ultradistal forearm. Osteopenia by T-score at the lumbar spine was found in 42.5%, of the femoral neck 42.5%, total body 37.6%, ultradistal forearm 22.5% of patients.

Conclusions: The presence of JIA in childhood had negative effects on the peak bone mass formation and BMD at young female. Reduction of BMD in the total body and in the ultradistal forearm testified the negative influence of JIA on bone tissue, and the increase of the disease duration lead to loss of BMD, especially in the ultradistal part of forearm in such patients. It is advisable to use not only the Z-score, but also the T-score for the diagnosis of osteoporosis in young female with JIA.

P1088

ASSESSING THE PREVALENCE OF GLUCOCORTICOID PRESCRIPTION, FRACTURE RISK FACTORS AND BONE HEALTH MANAGEMENT IN A PROSPECTIVE, UNSELECTED, NEURO-ONCOLOGY PATIENT POPULATION

S. Puvaneswaralingam¹, A. Rashed¹, C. McBain², C. E. Higham¹

¹Department of Endocrinology, Christie Hospital NHS Foundation Trust,

²Department of Clinical Oncology, Christie Hospital NHS Foundation Trust, Manchester, UK

Objectives: To determine prevalence of treatment dose glucocorticoid (GC) prescription, calculate fracture risk (FR) and review bone health management in an unselected, prospectively evaluated, neuro-oncology outpatient population.

Methods: Prospective data from 100 (41 female, mean(range) age 50 (26–86) yrs) unselected, sequential, neuro-oncology outpatients at a tertiary oncology centre were collected in Nov 2017 using patient questionnaires (demographics, oncology diagnosis, past/present GC treatment and risk factors for FR). FRAX score and NOGG 2017 assessment thresholds (NOGG-AT) (lifestyle/measure BMD/treat)

were calculated where appropriate ($n=26 <40$ yrs). In addition, patients declining the questionnaire ($n=47$) were reviewed for diagnosis and prevalence of GCs. Project approval obtained from local QIP/audit committee.

Results: 74 patients had gliomas (32 grade 3, 24 grade 2). Other diagnoses: spinal cord tumours (6), schwannomas (4), others (16). Oncology treatments: 42 first-line, 46 follow-up and 13 relapsed disease. 34/100 patients were receiving current GCs (30 dexamethasone; mean ($\pm$ sd) dose 3 (1.6)mg od, 16 had been on GCs for >3 months). In addition, 11 had received >3 months GC treatment previously; 39 had received some GC (at time of surgery or <3 months in total).

12/74 evaluable patients had hip FR $>4\%$ or major osteoporotic FR $>20\%$. According to NOGG-AT, 8 were in "treat" category (2/8 were receiving bisphosphonate therapy), 29 were in "measure BMD" (5/29 had BMD measured) and 35 "lifestyle/reassurance". 12/100 patients had history of fragility fracture: 8/12 had undergone DXA; 3/12 were treated with bisphosphonates. In total 15/100 patients had undergone DXA and 6/100 were receiving bisphosphonate therapy.

12/47 patients declining the patient questionnaire were receiving GCs (10) or had previously received GCs (2).

Conclusions: There is a high prevalence of GC prescription in this patient group. They are a high-risk group for poor bone health and fracture. Current management does not align with UK NOGG guidelines.

P1089

CUTOFF SCORES FOR GRIP STRENGTH BASED ON A YOUNG AND HEALTHY REFERENCE GROUP

D. Beckwée¹, I. Beyer¹, S. De Breucker², I. Bautmans¹, B.-S. Guideline Development Group On Sarcopenia³

¹Vrije Universiteit Brussel, ²Hôpital Erasme - ULB, ³Belgian Society for Gerontology and Geriatrics, Brussels, Belgium

Objectives: Dynapenia or age-related loss of muscle strength is an important aspect of sarcopenia. The actual cutoff scores for muscle weakness that are suggested by the European Working Group on Sarcopenia in Older People (EWGSOP) are based on gait speed [1,2]. Consequently, these cutoff scores represent a proxy for physical performance rather than being an independent outcome measure for strength. Moreover, these scores do not take into account the heterogeneity regarding older adult's health status. Therefore, in line with the T-scores of BMD assessments in osteoporosis, this work aims to present new cutoff scores for grip strength, based on normative data of young and healthy people, acquired from a systematic review with meta-analyses.

Methods: Pubmed was searched systematically using keywords corresponding to muscle strength and reference values. Studies, reporting reference values for grip strength of young (18-39 years) men or women, were included. Data was extracted and pooled for both sexes (meta-analyses). Subsequently, the pooled standard deviation was calculated by using the Welch-Satterthwaite equation for pooled degrees of freedom. Finally, cutoff scores were calculated based on the pooled mean and standard deviation (T-values).

Results: After screening 910 studies, 15 were included in the meta-analysis. The pooled mean grip strength for men ($n=1755$) and women ($n=2194$) was 49.8kg (95%CI (48.1, 51.5)) and 30.6kg (95%CI (29.3, 31.9)) respectively. Hence, grip strength cutoff scores were calculated for men ($T_1=38$ kg; $T_2=25$ kg) and women ($T_1=21$ kg; $T_2=11$ kg).

Conclusions: The presented cutoff scores for grip strength enable the interpretation of muscle function regardless of physical performance and the health status of the older individual. Further research should be done to validate these cutoff scores.

References:

1. Cruz-Jentoft AJ et al. Age Ageing 2010;39:412
2. Lauretani, F et al. J Appl Physiol (1985) 2003;95:1851

Acknowledgements:

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P1090

A FULLY AUTOMATIC VERTEBRAL MORPHOMETRY FOR QUANTITATIVE FRACTURE ASSESSMENT

R. Franchini¹, F. Conversano¹, P. Pisani¹, E. Quarta², M. Muratore², S. Casciaro¹

¹National Research Council, Institute of Clinical Physiology, Lecce, ²O.U. of Rheumatology, Galateo Hospital, San Cesario di Lecce, ASL-LE, Lecce, San Cesario di Lecce, Italy

Objective: Osteoporosis is a systemic skeletal disease characterized by a decrease in bone mass that can lead to compromised bone resistance and fractures. In clinical practice, vertebral morphometry is the best mode to identify the presence of vertebral fractures. This method is based on measurements of front (Ha), middle (Hm), and rear (Hp) heights of vertebral bodies in X-ray images, but its actual accuracy is affected by errors made during the time-consuming manual measurements. In this work we propose a fully automatic algorithm to avoid inaccurate results.

Methods: 90 conventional lateral radiographs were collected.

The heights of the vertebral bodies are defined as follows:

- $Hp = |P1 - P2|_2$,
- $Ha = |A1 - A2|_2$,
- $Hm = |M1 - M2|_2$.

Where:

- Pi: rear vertebral corners;
- Mi: middle vertebral points;
- Ai: front vertebral corners.

The vertebral deformities are classified as:

- biconcave deformity: $Hm/Hp < 0.80$,
- crushing deformity: $Hp/Hp(\pm 1) < 0.80$,
- wedge deformity: $Ha/Hp < 0.80$.

Our approach first combined literature-reported methods for the identification of vertebrae in radiography images, subsequent accurate determination of vertebral contours, and final for each detected vertebra, superimposition of the 6 characteristic points (Pi, Mi, Ai) and morphometric measurements without requiring any action from the operator.

Results: The performance tests were based on the comparison between the results coming from our automatic approach and those obtained from the manual measurements by an expert radiologist. The results of our method showed a sensitivity of 88.3% and a specificity of 99.0%. The values of mean and standard deviation compared with the manual method were very similar to each other.

Conclusions: The proposed algorithm showed a very good performance in vertebra detection, and provided the same diagnosis of an experienced operator that performed manual morphometric measurements. This result implies that the adopted method has a strong potential for an employment in clinical routine.

P1091

FROM MUSCULAR CRAMPS TO ABDOMINAL WALL ENDOMETRIOSIS

M. Carsote¹, A. Coccolos¹, N. Dumitru¹, D. Terzea², A. Valea³, C. Dumitrache¹, D. Paun¹, A. Ghemigian¹

¹C.I. Parhon National Institute of Endocrinology, Departments of Gonads, Bone and Adrenals, Bucharest, ²C.I. Parhon National Institute of Endocrinology & Oncoteam, Bucharest, ³Clinical County Hospital, Department of Endocrinology, Cluj-Napoca, Romania

Objective: Muscular cramps underline various caused from muscle and skeletal disorders to electrolytes anomalies or extension of the pain because of abdominal and/or pelvic masses. We aim to introduce a case of long-term scar endometriosis with atypical presentation.

Methods: This is a case report. Data of medical history, imagery and histological findings are provided.

Results: This is a 44-year old smoking female known with type 2 diabetes mellitus. The family medical history is irrelevant. The personal medical history includes hyperglycemias (without specific anti-diabetic medication), a birth through caesarean 14 years ago and regular menses since then. She started to accuse muscle cramps on both legs since last 3 years in addition to walking difficulties and abdominal pain of unspecific pattern. Recently, the pain at lower limb, abdomen and pelvis became extremely intense so the patient was admitted as emergency. Pain medication partially controlled the symptoms while investigations revealed: normal blood count, high fasting glucose of 142 mg/dL (normal between 70–115 mg/dL), normal total calcium of 9.4 mg/dL (N: 8.6–10.3 mg/dL), and serum magnesium of 2 mg/dL (N: 1.9–1.5 mg/dL), positive inflammation tests (C reactive protein 4 times above the upper limit), normal alkaline phosphatase of 91 U/L (N: 35–105 U/L) as well as liver and kidney function. Abdominal and pelvic computed tomography detected a tumour of 3.9 cm related to psoas muscle with irregular shape and inhomogeneous uptake of contrast substance. Surgery of abdominal wall and adequate reconstruction was performed. Local pain and muscle cramps remitted after surgery. Histological report pointed spreading of multiple endometrial isles into fat and muscular layer containing glands and stroma (which was CD10 positive at immunohistochemistry). 80% of endometrial epithelium cells had positive estrogen receptors.

Conclusion: Caesarean scar endometriosis is a very rare condition; the level of statistical evidence is series of small number. Particularly, the onset of symptoms was more than a decade since first surgery and it started with lower limb accusers. Due to massive spreading of endometriosis, a high risk of relapse is expected.

P1092

VITAMIN D DEFICIENCY AND BASEDOW'S DISEASE

E. Petrova¹, A. Cocolos², N. Dumitru², M. Carsote¹, M. Olaru², A. Valea³, M. Ghemigian⁴, A. Ghemigian¹

¹C.I. Parhon National Institute of Endocrinology & C. Davila UMPh, ²C.I. Parhon National Institute of Endocrinology/Departments of Gonads, Bone and Adrenals, ³Clinical County Hospital & I. Hatieganu UMPh, ⁴C.I. Parhon National Institute of Endocrinology, Bucharest, Romania

Objective: Hypovitaminosis D and thyroid autoimmunity may be linked. Whether supplementation of vitamin D improves the outcome of thyroid condition is still controversial. We aim to introduce a study on adult patients confirmed with Basedow's disease (BD) and vitamin D deficiency (VD).

Methods: This is a case-control interventional prospective study on adult population evaluated and treated during hospitalisation on tertiary endocrinology centres. All the patients were confirmed with BD and VD. Studied group was treated with 2000 IU of vitamin D (oral cholecalciferol) for 6 months while control group received no VD supplementation, only standard care for BD. Exclusion criteria includes concomitant glucocorticoid exposure, active malignancies of any type, malabsorption, osteoporosis, previously vitamin D and calcium supplements, etc. Reassessment was done after 6 months, mainly TRAb (anti-TSH receptor antibodies) based on electrochemiluminescence assays (ECLIA Cobas e601) and 25OHD (25-hydroxyvitamin D) based on electrochemiluminescence technique (ECLIA, Cobas e601). Informed consent was signed by each patient. Statistical significance was considered at $p < 0.05$.

Results: 62 subjects were included in VD group (N=37), respective control group (N=25) which were similar as age and sex distribution. All the patients had positive TRAb and 25OHD<30 ng/mL. Initially, TRAb was inversely correlated with 25OHD ($p < 0.05$).

Lower TRAb levels were registered in 35.84% of VD group, respective 3.53% in control group ($p = 0.03$). After 6 months of vitamin D supplementation, the correlation between TRAb and 25OHD was statistical significant.

Conclusion: 25OHD is negatively correlated with BD-related TRAb values in vitamin D deficient population and it remains so even after VD supplementation for 6 months. A higher percent of population improves TRAb levels if VD is added to standard anti-thyroid therapy in persons priory diagnosed with hypovitaminosis D.

P1093

PERIPROSTHETIC BONE DESTRUCTION: WHAT CAUSES DETERMINE ITS INCIDENCE AND MAGNITUDE?

I. Pérez-Coto¹, M. A. Sandoval-García², S. Roncero-González², A. J. Suárez-Vázquez², D. Hernández-Vaquero²

¹Hospital Universitario de Cabueñes, Gijón, ²Hospital Universitario San Agustín, Avilés, Spain

Objectives: To study the incidence and magnitude of periprosthetic osteolysis and to determinate which factors (epidemiological, implant related, treatments) influence on these two variables.

Methods: We used a sample of 25 long-term evolution total hip replacements (THR), where osteolysis had been diagnosed with X-Ray and its incidence analyzed with MRI. In this case, we used CT as a method to assess its magnitude, according to the number and the volume of lesions. For this purpose, we use a software for management of medical images and 3D reconstruction. Finally, we compared these data with epidemiological and biomechanical factors, with the variables referring to the implant (orientation, wear, etc.) and with other patient characteristics (NSAIDs, antiresorptives, etc.), trying to determine which of them influenced on the mentioned disease.

Results: The average number of lesions was 1.08 per case, with an average volume of 12.68 cm³ and affecting 1.52 of pelvis areas. Compared with MRI, CT showed a high sensitivity and specificity (82–96%). The wear rate of PE was 0.153 mm/year. Among the numerous statistical correlations found, we can highlight that both the number of injuries and the average volume had a significant relationship with the PE wear rate ($>0.538/p < 0.05$). This rate, in turn, depended on several factors, including weight and height of patients ($>0.467/p < 0.05$) or physical activity ($>0.491/p < 0.05$). Unlike other studies of our group, the orientation of the prosthetic components did not influence the wear or the volume of the lesions. Finally, although the treatment with NSAIDs as well as with antiresorptives was associated with a lower rate of osteolysis, this association was not significant.

Conclusions: CT is an excellent tool to study osteolysis and to plan its surgical treatment. Its precision is next to MRI one and allow us to calculate the volume of the lesions. This volume depends, basically, on the wear of the PE, that seems to respond to a biomechanical problem based, overall, on movement cycles (activity, age, BMI, etc.). The antiresorptive drugs did not modify, in our case, the evolution of this hard-to-manage complication.

P1094

EVALUATION OF FEMORAL BMD AND CORTICAL PARAMETERS IN PATIENTS WITH PRIOR TOTAL KNEE ARTHROPLASTY

T. Blaty¹, D. Krueger¹, R. Illgen¹, M. Squire¹, B. Heiderscheit¹, N. Binkley¹, P. Anderson¹

¹University of Wisconsin, Madison, USA

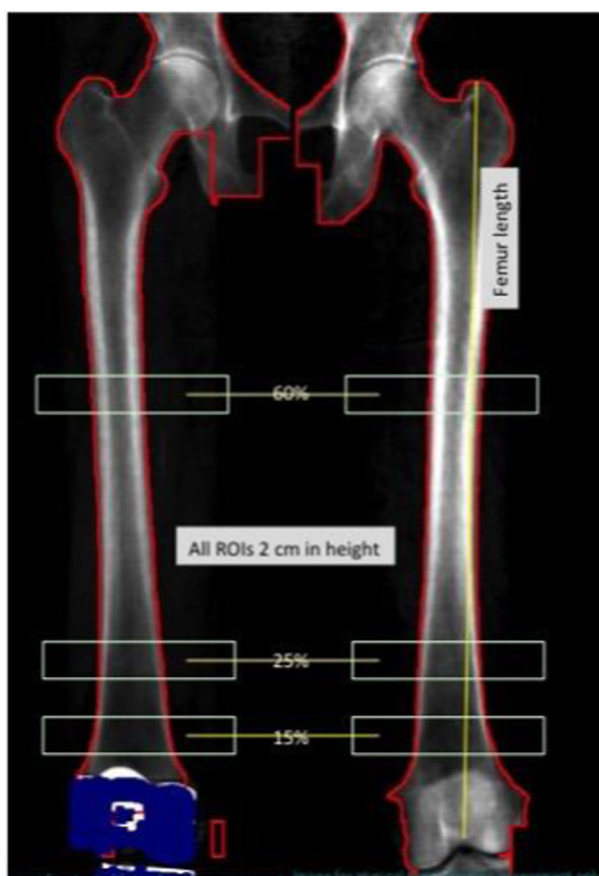
Objectives: Periprosthetic fractures following total knee arthroplasty (TKA) are not rare (reported incidence 0.3–2.5%). We hypothesize that TKA is associated with low bone mass, potentially increasing periprosthetic fracture risk. As there is no standard DXA

methodology, distal femur BMD is virtually never measured after TKA. Additionally, recent DXA advances allowing femoral cortical thickness and density measurement have not been evaluated after TKA. Thus, the purposes of this study are to: 1) Develop standard femur regions of interest (ROIs) 2) Evaluate the ability of DXA to assess distal femur cortical thickness and BMD after TKA and 3) Assess reproducibility of these measurements.

Methods: Twenty adults (9 M/11F) age range 59–80 years with prior unilateral, primary TKA within 2–5 years had femoral DXA scans performed in duplicate using a GE Healthcare iDXA densitometer with enCore v17 software. In prior work, femoral BMD was lowest in the distal metaphysis and highest in mid shaft. Thus, BMD and cortical widths were measured bilaterally at 3 ROIs placed 15%, 25% and 60% measured from the distal femoral notch (Figure). Measurements from the TKA leg were compared with the non-operated side by paired T-test.

Results: BMD was significantly lower in the operated femur at all measured ROIs (Table). Substantial between individual differences were observed with some subjects having BMD values up to 25% lower in their operated leg (data not shown). Cortical width was numerically, but generally not statistically, lower on the operated side (Table). BMD reproducibility was good; CV ~0.7–1.0%.

Conclusions: Distal femur BMD can reproducibly be measured using DXA. In those with prior TKA, distal femur BMD is on average 10% lower than the non-operated side. This lower BMD likely increases periprosthetic fracture risk. Further work to define approaches to optimize and monitor bone status prior to, and following, TKA is needed.



BMD and Cortical Width: TKA vs. Control Leg

*BMD	TKA leg	Control leg	P value	TKA leg %CV
Total Femur	0.946 (0.09)	0.978 (0.08)	0.015	0.70
15% ROI	0.819 (0.13)	0.900 (0.12)	<0.0001	0.68
25% ROI	1.142 (0.15)	1.242 (0.17)	0.0001	1.04
60% ROI BMD	2.101 (0.26)	2.169 (0.28)	0.0017	0.76
**Cortical Width				
Medial @ 15%	2.44 (0.31)	2.44 (0.30)	0.93	2.6
Lateral @ 15%	2.58 (0.84)	2.77 (1.44)	0.51	7.8
Medial @ 25%	3.29 (0.46)	3.41 (0.39)	0.24	2.9
Lateral @ 25%	3.07 (0.43)	3.27 (0.40)	0.002	2.9
Medial @ 60%	6.59 (0.77)	6.75 (0.82)	0.31	3.1
Lateral @ 60%	6.76 (0.89)	6.87 (0.82)	0.51	2.9

Note: Data as mean (SD); *BMD in g/cm²; **cortical width in mm

P1095

UPDATED INCIDENCE AND COSTS OF HIP FRACTURES IN ELDERLY ITALIAN POPULATION

P. Piscitelli¹, M. Feola², C. Neglia¹, C. Rao², E. Rizzo³, U. Tarantino²
¹Euro Mediterranean Scientific Biomedical Institute - ISBEM Research Centre, Brindisi, ²Division of Orthopaedics and Traumatology, University of Tor Vergata, Rome, ³Euro Mediterranean Scientific Biomedical Institute - ISBEM, Brindisi, Italy

Objective: To update our previous researches about the burden of hip fractures in elderly Italian population.

Methods: We analyzed national hospitalizations records from 2007 to 2014 to compute age- and sex-specific standardized rates

Results: 741,633 hospitalizations were observed in people ≥65 (women: 568,203; men: 173,430), with an overall increase of 5.50% over the 8-year period (females: +3.36; males: +12.9%). About 43.75% of total hip fractures were suffered by patients aged ≥85 years old. Women aged ≥85 accounted for 34.49% (n=255,763) of total fractures. The incidence rate per 10,000 inhabitants in people aged 65–74 decreased from 28.65 to 25.31 in women (−13.02%) and from 13.41 to 11.65 in men (−13.12%). Incidence per 10,000 in people 75–84 decreased from 121.6 to 105.2 in women (−13.49%) and from 55.8 to 47.5 in men (−14.87%). Paradoxically, also in people aged ≥85, the incidence per 10,000 declined from 300.99 to 268.72 in women (−10.72%) and from 174.59 to 171.17 in men (−1.96%) because the number of subjects aged ≥85 is growing faster than the number of fractures occurring in this latter age group. Direct hospitalization costs and rehabilitation costs increased from 433 to 457 million Euros and from 478 to 504 million Euros over the 8-year period, respectively. Overall costs of hip fractures in people aged ≥65 years old raised from 911 to 961 million Euros from 2007 to 2014.

Conclusion: The number of hip fractures and related hospitalizations costs in Italian elderly population is still increasing due to the fractures occurring in people ≥85 years old, although incidence rates are decreasing in all the age groups.

Year	2007	2008	2009	2010	2011	2012	2013	2014
Hospitalization due to hip fractures (femoral neck) (n)	89,601	92,532	93,169	92,549	91,733	93,408	94,116	94,525
Overall hospitalizations direct costs (€)	433,230,977	447,402,694	450,482,661	447,484,891	443,539,438	451,638,253	455,061,513	457,039,074
Overall rehabilitation costs (€)	478,324,581	493,971,385	497,371,936	494,062,138	489,706,016	498,647,810	502,427,386	504,610,785
Overall direct costs estimation (€)	911,555,558	941,374,079	947,854,597	941,547,028	933,245,454	950,286,063	957,488,899	961,649,860

P1096

THE LEVEL OF MALNUTRITION RISK CORRELATES WITH SARCOPENIA, DISEASE ACTIVITY AND SEVERITY AND ORAL AND GLOBAL HEALTH-RELATED QUALITY OF LIFE IN SYSTEMIC SCLEROSIS PATIENTS

M. Radic¹, K. Boric¹, I. Bozic¹, D. Martinovic Kaliterna¹

¹University Hospital Center Split, University of Split, School of Medicine, Department of Medicine, Division of Rheumatology and Clinical Immunology, Split, Croatia

Objective: Systemic sclerosis (SSc) is a rare connective tissue disease, clinically characterized by disorders in vascular, immunological and fibrotic pathways. Nutritional status is used as a marker for disease activity and severity, predicting mortality in SSc patients. SSc is an autoimmune disease which may lead to malnutrition. The aim of this study was to compare SSc patients with medium and high risk of malnutrition and to determine the possible association of malnutrition risk with oral health-related quality of life (HRQoL), global HRQoL, gastrointestinal symptoms, sarcopenia and disease activity and severity.

Methods: Subjects were recruited from Croatian SSc Center of excellence cohort. Malnutrition was defined according to recently published ESPEN criteria and malnutrition risk was measured using the Malnutrition Universal Screening Tool (MUST). The OHIP 49 was used to measure the dental outcomes in terms of its influence on the oral HRQoL. Global HRQoL was measured using the Medical Outcomes Trust SF-36 Health Survey. To explore gastrointestinal symptoms, UCLA questionnaire was administered. Sarcopenia was evaluated using skeletal muscle mass index.

Results: Fifty-one consecutive SSc patients with malnutrition risk and active disease were enrolled in this study-26 with high malnutrition risk and 25 with medium risk. The prevalence of sarcopenia was higher in SSc patients with high MUST ($p<0.05$, chi square for linear trend). Severity of oral and global HRQoL was different between SSc patients with high and medium MUST ($p=0.002$ and $p=0.03$, respectively; chi-square for linear trend). Unexpectedly, SSc patients with high MUST did not have worse gastrointestinal symptoms according to UCLA SCTC GIT 2.0 questionnaire ($p=0.09$). Severity score according to Medsger and activity score according to Valentini were higher in SSc patients with high MUST than in SSc patients with medium ($p<0.05$, $p<0.05$, respectively; chi-square for linear trend).

Conclusion: Our data suggest that level of malnutrition risk measured by MUST correlates with prevalence of sarcopenia in SSc. Oral and global HRQoL are associated with level of malnutrition risk in SSc patients. Gastrointestinal involvement (symptoms), however, is not related with level of malnutrition risk. Nutritional status can provide some prognostic information in SSc.

P1097

INCIDENCE AND COSTS OF HIP FRACTURES IN ELDERLY ITALIAN POPULATION: REGIONAL DATA

P. Piscitelli¹, M. Feola², C. Neglia¹, C. Rao², E. Rizzo¹, U. Tarantino²

¹Euro Mediterranean Scientific Biomedical Institute - ISBEM Research Centre, Mesagne, ²Division of Orthopaedics and Traumatology - University of Tor Vergata, Rome, Italy

Objective: Evaluating the burden of hip fractures in elderly Italian population at regional level.

Methods: We analyzed national hospitalizations records from 2007-2014 in order to estimate the number of hospitalizations due to hip fractures (femoral neck) at regional level. Besides, we have calculated hospitalization, rehabilitation and overall direct costs.

Results: Decreasing trends in the incidence of hip fractures were documented in all Italian regions between 65-79 years old, with further reduction up to 84 years old in 16 regions out of twenty. Region Lazio showed a decreasing trend also in people aged >85 years old. Direct hospitalization and rehabilitation costs increased in all the Regions over the 8-year period (although at different rates), with the exception of Friuli Venezia Giulia (from 21 to 19 million Euros) and Lazio (from 107 to 87 million Euros) as a consequence of a reduced number of fractures hospitalized in these latter regions.

Conclusion: Hip fractures in the elderly population remain a major public health issue in all Italian regions.

Figure 1. Northern Italy; 2- Central Italy; 3- Southern Italy)

Year	2007	2008	2009	2010	2011	2012	2013	2014
PIEMONTE	Hospitalizations due to hip fractures (femoral neck) (n)	8,775	8,946	8,823	9,020	9,391	9,439	9,479
	Overall hospitalizations direct costs (€)	42,438,118	43,254,922	42,660,203	43,612,721	45,408,548	46,805,656	45,832,038
	Overall rehabilitation costs (€)	47,002,408	47,701,287	47,330,766	46,532,227	46,102,788	46,961,687	46,768,006
	Overall direct costs estimation (€)	89,272,441	91,012,109	89,760,769	91,764,948	91,539,136	93,767,343	92,600,044
VALLE D'AOSTA	Hospitalizations due to hip fractures (femoral neck) (n)	135	174	186	196	199	220	225
	Overall hospitalizations direct costs (€)	769,442	842,310	897,803	947,683	962,394	1,025,039	1,047,244
	Overall rehabilitation costs (€)	827,450	928,879	992,939	1,046,323	1,062,138	1,121,061	1,101,136
	Overall direct costs estimation (€)	1,576,892	1,770,189	1,892,742	1,994,006	2,024,532	2,146,100	2,148,380
LOMBARDIA	Hospitalizations due to hip fractures (femoral neck) (n)	12,902	13,360	13,599	14,445	15,988	16,420	16,581
	Overall hospitalizations direct costs (€)	65,752,705	68,113,601	65,752,705	68,392,476	74,821,404	76,921,404	77,024,178
	Overall rehabilitation costs (€)	68,875,836	70,786,977	72,596,689	75,511,447	74,192,866	76,828,119	77,838,983
	Overall direct costs estimation (€)	134,628,541	138,900,578	138,349,394	143,903,923	149,014,270	153,749,523	154,863,161
TRENTINO-SOUTH TYROL	Hospitalizations due to hip fractures (femoral neck) (n)	1,615	1,617	1,678	1,758	1,750	1,750	1,682
	Overall hospitalizations direct costs (€)	1,808,708	1,818,378	1,813,520	1,850,129	1,831,768	1,842,448	1,812,660
	Overall rehabilitation costs (€)	1,807,889	1,807,889	1,807,889	1,807,889	1,807,889	1,807,889	1,807,889
	Overall direct costs estimation (€)	3,616,597	3,626,267	3,621,409	3,658,018	3,639,657	3,650,337	3,620,549
VENETO	Hospitalizations due to hip fractures (femoral neck) (n)	5,748	6,149	6,051	6,242	5,995	6,148	6,156
	Overall hospitalizations direct costs (€)	27,792,230	29,731,111	29,257,270	30,187,777	28,388,504	29,738,276	29,794,462
	Overall rehabilitation costs (€)	24,620,034	26,202,964	26,202,964	26,202,964	26,202,964	26,202,964	26,202,964
	Overall direct costs estimation (€)	52,412,264	55,934,075	55,460,234	56,390,741	54,591,468	55,941,240	55,997,426
FRIULI-VENEZIA GIULIA	Hospitalizations due to hip fractures (femoral neck) (n)	2,136	2,096	2,134	2,006	1,884	1,777	1,884
	Overall hospitalizations direct costs (€)	10,243,367	9,515,109	9,515,109	9,515,109	9,515,109	9,515,109	9,515,109
	Overall rehabilitation costs (€)	11,296,021	11,296,021	11,296,021	11,296,021	11,296,021	11,296,021	11,296,021
	Overall direct costs estimation (€)	21,539,388	20,811,130	20,811,130	20,811,130	20,811,130	20,811,130	20,811,130
LAZIO	Hospitalizations due to hip fractures (femoral neck) (n)	3,222	3,402	3,402	3,222	3,222	3,222	3,222
	Overall hospitalizations direct costs (€)	15,647,086	16,442,220	15,647,086	15,647,086	15,647,086	15,647,086	15,647,086
	Overall rehabilitation costs (€)	17,258,450	18,258,450	17,258,450	17,258,450	17,258,450	17,258,450	17,258,450
	Overall direct costs estimation (€)	32,905,536	34,700,670	32,905,536	32,905,536	32,905,536	32,905,536	32,905,536

Figure 2. Central Italy

Year	2007	2008	2009	2010	2011	2012	2013	2014
EMILIA-ROMAGNA	Hospitalizations due to hip fractures (femoral neck) (n)	7,641	7,249	7,219	7,478	7,100	7,385	7,328
	Overall hospitalizations direct costs (€)	38,044,032	36,044,738	36,044,738	36,156,178	34,208,324	35,405,609	34,372,018
	Overall rehabilitation costs (€)	37,887,585	38,897,489	38,897,489	39,302,529	39,302,529	39,302,529	39,302,529
	Overall direct costs estimation (€)	75,931,617	74,942,227	74,942,227	75,458,707	73,510,853	74,708,138	73,674,547
TOSCANA	Hospitalizations due to hip fractures (femoral neck) (n)	6,545	6,729	6,805	7,038	6,808	6,813	7,005
	Overall hospitalizations direct costs (€)	32,445,478	33,902,478	33,902,478	35,149,138	32,944,138	34,343,022	35,405,609
	Overall rehabilitation costs (€)	34,939,728	35,321,889	35,321,889	36,327,706	36,327,706	36,327,706	36,327,706
	Overall direct costs estimation (€)	67,385,206	69,224,367	69,224,367	71,476,844	69,271,844	70,670,728	71,733,315
UMBRIA	Hospitalizations due to hip fractures (femoral neck) (n)	1,647	1,680	1,732	1,833	1,847	1,885	1,773
	Overall hospitalizations direct costs (€)	7,963,432	8,122,960	8,122,960	8,662,762	8,930,454	9,124,388	8,727,655
	Overall rehabilitation costs (€)	7,963,432	8,122,960	8,122,960	8,662,762	8,930,454	9,124,388	8,727,655
	Overall direct costs estimation (€)	15,926,864	16,245,920	16,245,920	17,325,524	17,860,908	18,248,776	17,455,310
MARCHE	Hospitalizations due to hip fractures (femoral neck) (n)	2,605	2,693	2,689	2,759	2,829	2,803	2,714
	Overall hospitalizations direct costs (€)	12,959,470	13,022,960	13,016,619	13,243,377	13,728,887	13,523,823	13,122,497
	Overall rehabilitation costs (€)	13,906,451	14,739,289	14,739,289	14,621,835	15,125,473	14,961,491	14,688,719
	Overall direct costs estimation (€)	26,865,921	27,762,249	27,755,908	27,865,212	28,854,360	28,485,314	27,811,216
LAZIO	Hospitalizations due to hip fractures (femoral neck) (n)	10,602	11,106	11,403	11,800	10,807	11,206	11,403
	Overall hospitalizations direct costs (€)	52,327,025	54,980,767	56,124,796	58,552,338	54,004,808	56,222,152	56,802,603
	Overall rehabilitation costs (€)	56,932,213	59,288,097	60,873,397	61,667,844	61,667,844	61,667,844	61,667,844
	Overall direct costs estimation (€)	109,259,238	114,268,864	117,000,193	120,220,182	115,672,652	117,890,000	118,470,447

Figure 3. Southern Italy

Year	2007	2008	2009	2010	2011	2012	2013	2014
ABRUZZO	Hospitalizations due to hip fractures (femoral neck) (n)	2,068	2,223	2,439	2,429	2,341	2,388	2,425
	Overall hospitalizations direct costs (€)	10,076,178	11,191,287	11,996,139	11,744,490	11,310,000	11,473,379	11,725,150
	Overall rehabilitation costs (€)	11,129,139	12,216,132	12,613,552	12,666,938	12,497,158	12,643,562	12,688,021
	Overall direct costs estimation (€)	21,205,317	23,407,419	24,609,691	24,411,428	23,807,158	24,116,941	24,413,171
MOLISE	Hospitalizations due to hip fractures (femoral neck) (n)	371	369	366	368	398	407	347
	Overall hospitalizations direct costs (€)	1,760,850	1,721,179	1,766,674	1,766,674	1,895,554	1,944,807	1,633,377
	Overall rehabilitation costs (€)	1,802,126	1,802,126	1,802,126	1,802,126	1,802,126	1,802,126	1,802,126
	Overall direct costs estimation (€)	3,562,976	3,523,305	3,568,800	3,568,800	3,697,680	3,746,933	3,435,503
CAMPANIA	Hospitalizations due to hip fractures (femoral neck) (n)	6,805	6,293	6,456	6,465	6,324	6,789	7,231
	Overall hospitalizations direct costs (€)	34,479,325	31,500,400	32,105,400	32,105,400	31,500,400	33,945,400	36,000,000
	Overall rehabilitation costs (€)	32,518,099	33,594,453	34,464,610	34,464,610	34,464,610	34,464,610	34,464,610
	Overall direct costs estimation (€)	67,000,000	65,094,853	66,570,010	66,570,010	65,965,010	68,410,010	70,464,610
PUGLIA	Hospitalizations due to hip fractures (femoral neck) (n)	5,387	5,372	5,293	5,427	5,401	5,502	5,729
	Overall hospitalizations direct costs (€)	26,979,724	26,979,724	26,979,724	27,979,724	27,979,724	28,979,724	30,979,724
	Overall rehabilitation costs (€)	27,496,200	28,496,200	28,496,200	28,496,200	28,496,200	28,496,200	28,496,200
	Overall direct costs estimation (€)	54,475,924	55,475,924	55,475,924	56,475,924	56,475,924	57,475,924	59,475,924
BASILICATA	Hospitalizations due to hip fractures (femoral neck) (n)	1,001	968	963	1,048	1,023	1,096	1,093
	Overall hospitalizations direct costs (€)	4,899,348	4,680,390	4,732,816	5,047,658	4,946,121	5,205,879	5,126,737
	Overall rehabilitation costs (€)	5,341,612	5,341,612	5,341,612	5,341,612	5,341,612	5,341,612	5,341,612
	Overall direct costs estimation (€)	10,240,960	10,021,992	10,074,428	10,389,270	10,287,733	10,547,491	10,468,349
CALABRIA	Hospitalizations due to hip fractures (femoral neck) (n)	2,504	2,464	2,499	2,728	2,877	2,837	3,054
	Overall hospitalizations direct costs (€)	12,107,123	11,886,742	12,107,123	13,107,123	13,807,123	13,707,123	14,607,123
	Overall rehabilitation costs (€)	13,807,123	14,216,450	14,216,450	14,216,450	14,216,450	14,216,450	14,216,450
	Overall direct costs estimation (€)	25,914,246	26,103,192	26,323,573	27,323,573	28,023,573	27,923,573	28,823,573
SICILIA	Hospitalizations due to hip fractures (femoral neck) (n)	7,121	7,063	7,171	7,891	7,648	7,818	7,842
	Overall hospitalizations direct costs (€)	35,000,000	34,000,000	35,000,000	38,000,000	36,000,000	37,000,000	37,000,000
	Overall rehabilitation costs (€)	35,000,000	35,000,000	35,000,000	35,000,000	35,000,000	35,000,000	35,000,000
	Overall direct costs estimation (€)	70,000,000	69,000,000	70,000,000	73,000,000	71,000,000	72,000,000	72,000,000
SARDEGNA	Hospitalizations due to hip fractures (femoral neck) (n)	2,050	2,288	2,077	2,033	2,130	2,109	2,141
	Overall hospitalizations direct costs (€)	9,912,962	10,579,228	10,042,300	9,824,900	10,298,791	10,197,253	10,579,228
	Overall rehabilitation costs (€)	11,097,624	11,097,624	11,097,624	11,097,624	11,097,624	11,097,624	11,097,624
	Overall direct costs estimation (€)	21,010,586	21,676,852	21,139,924	20,922,524	21,396,415	21,294,877	21,676,852

P1098

THE ROLE OF ARACHIDONIC ACID MEDIATORS IN RHEUMATOID ARTHRITIS

M. Hoxha¹¹Catholic University Our Lady of Good Counsel, Department of Chemical, Toxicological and Pharmacological Evaluation of Drugs, Tirana, Albania

Objective: Rheumatoid arthritis (RA) is a chronic inflammatory joint disorder characterized by synovial joint inflammation and a complex pathogenesis. Several studies retain that arachidonic acid (AA) mediators as prostaglandins (PG) and leukotrienes (LT) are produced in inflamed synovium in RA. Phospholipase A2 (PLA2), 5-lipoxygenase, 15-lipoxygenase, the second isoform of cyclooxygenase (COX-2), PGE2, PGF2 α , PGI2, PGD2, LTB4 are over expressed in the synovial tissue of patients with RA. The objective of this study was to identify and synthesise all the available evidence on the role of AA metabolites in RA; contributing to a better understanding for novel RA drugs by targeting the AA mediators involved in RA.

Methods: A systematic literature review, on the role of AA metabolites in RA, published up to December 2017, was performed on electronic database (Pubmed, Cochrane). Studies were considered eligible if they reported the role of different of AA mediators in RA conducted in both humans, and animals.

Results: Of the 826 articles identified, 200 studies were considered eligible and analyzed for their quality and data content. Most studies showed that either, AA anti-inflammatory mediators (PGD2, 15dPGJ2) or AA pro-inflammatory mediators (PGE2, LTB4, PGI2) are produced in RA. LTB4 contributes to the amplification of the inflammatory response; in contrast to 15d-PGJ2 which is responsible of the reduction of pro-inflammatory mediators such as IL-6 or TNF α .

Conclusions: As no systematic review has been identified or published recently on this topic, this study is important to give a clear image on the implication of AA metabolites in RA, probably leading to new approaches for novel RA drugs. Despite the current RA treatment (including mainly the use of disease-modifying antirheumatic drugs, the nonsteroidal anti-inflammatory drugs; the corticosteroids and biological agents), actually there is an unmet clinical need for a novel rheumatoid arthritis treatment probably by targeting the eicosanoid pathway, such as the mPGES-1 which is over expressed in synovial fluid or the PGD2 pathway, or moreover by developing a dual compound displaying the COXIB/TP antagonist activity within a single molecule.

P1099

VERTEBRAL STRENGTH AND DENSITY AFTER LONG-DURATION SPACEFLIGHT AND RECOVERY ON EARTH

K. Burkhardt¹, D. Lee², B. Allaire³, T. Keaveny², M. Bouxsein⁴¹Harvard-MIT Health Sciences and Technology, Cambridge, ²O.N. Diagnostics LLC, Berkeley, ³Center for Advanced Orthopaedic Studies, Beth Israel Deaconess Medical Center, Boston, ⁴Department of Orthopedic Surgery, Harvard Medical School, Boston, USA

Objective: Determine the effects of long duration spaceflight and post-flight recovery on lumbar spine bone density and strength.

Methods: We examined previously collected 3D QCT scans of the lumbar spine from 17 long-duration crewmembers (16 M, 1 F, aged 44.6 $\pm$ 4.0 years). QCT scans of L1/L2 were collected pre-flight and post-flight in all subjects, 1-year post-flight (n=15), and 2-4 years post-flight (n=8). Whole vertebral strength, trabecular and peripheral bone strength were assessed by finite element analysis (FEA) of QCT scans (O.N. Diagnostics, Berkeley, CA), as previously published [1]. The peripheral compartment includes the outer 2mm layer of bone around the vertebral body (including cortical shell) and the trabecular compartment is the inner bone remaining after removing the peripheral layer. DXA aBMD of the lumbar spine was acquired pre- and post-flight in the 8 astronauts.

Results: Vertebral strength was significantly lower than pre-flight at all post-flight & recovery time points (Figure 1). Vertebral strength declined

>5% upon return in 11 of 17 subjects. Strength of the trabecular and peripheral compartments were also significantly lower than pre-flight values at all time points (Figure 1). Volumetric density of the entire vertebral body was significantly lower than pre-flight at all post-flight time points (-4.5% to -6.4%, p<0.01), and trabecular and peripheral density were also significantly decreased at all post-flight time points. The average post-flight spine aBMD was -3.6 $\pm$ 3.0% lower than pre-flight, and was not associated with the declines in vertebral strength.

Conclusions: In summary, lumbar vertebral strength and volumetric density decline significantly during spaceflight and remain significantly lower than pre-flight levels throughout recovery on Earth. Post-flight declines in DXA-based lumbar spine aBMD and vertebral strength are not associated with each other, limiting the ability of DXA to assess vertebral fragility following spaceflight.

References:

1. Crawford RP. et al. Bone 2003;33:744

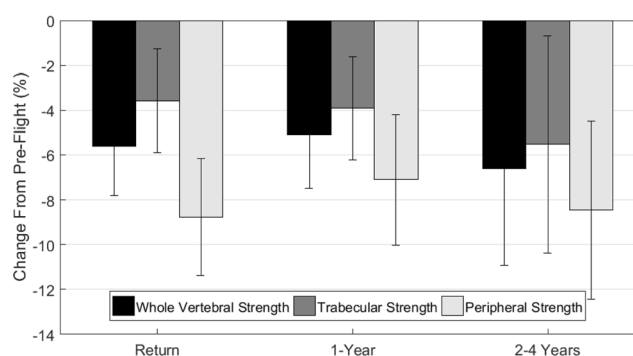


Figure 1. Percent change in whole vertebral, trabecular, and peripheral strength from pre-flight values at each measured time point. Error bars represent the 95%CI of the mean. All variables are significantly different from pre-flight at each time point.

P1100

EXTENDED ASSESSMENT IN POST-STREPTOCOCCAL REACTIVE ARTHRITIS: A CLINICAL, BIOLOGICAL AND ULTRASOUND STUDY

A. E. Musetescu¹, A. Cioroianu¹, C. Criveanu¹, S. C. Dinescu¹, P. L. Ciurea¹, A.-M. Bumbea¹, R. Traistaru¹, F. A. Vreju¹, O. Rogoveanu¹¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objective: Following group A streptococcal tonsillitis a particular musculoskeletal involvement is recognized such as post-streptococcal reactive arthritis (PSRA), rather than acute rheumatic fever according to 1992 Jones revised criteria [1]. The current study intended to evaluate the clinical, biological and ultrasound framing in patients with PSRA [2].

Methods: The study group consisted of 17 patients, mean age 27 $\pm$ 5.26 years. All patients had a history of group A streptococcal proven tonsillitis, and reported an arthritis episode within one month interval after the last tonsillitis flare. Any other joint specific inflammatory disease was excluded. Laboratory tests included inflammatory profile, rheumatoid factor, antinuclear antibodies and complement C3 detection. Plain x-rays of the hand, knees and ankles were performed. Musculoskeletal ultrasound (MUS) of knee, ankle joints and also other sites with clinically significant arthritis, probing for joint effusion, synovial proliferation and power Doppler signal was done, using a MyLab25Gold machine with a multifrequency array probe.

Results: Polyarticular involvement was detected in 47% of the cases followed by oligoarticular and monoarticular in 35% and 18% of cases, respectively. Large joint involvement was more prevalent. Arthritis of the lower limb, knees and ankles was dominant (94%), 17% reported symptoms in both lower limbs and upper limbs (elbows or wrists). One patient had only upper limb articular involvement. MUS evaluation showed signs

of synovitis and/or joint effusion in at least one of the examined sites the majority of patients (82%). Enthesitis was detected in 4 patients.

Conclusion: PSRA should be considered in lower-limb arthritis following streptococcal tonsillitis mainly in young adults. MUS is a useful tool in order to assess the joint and tendon involvement.

References:

1. Ayoub EM, Majeed HA. *Curr Opin Rheumatol* 2000;12:306
2. Musetescu AE et al. *Rom J Morphol Embryol* 2017;58:801

P1101

PRELIMINARY STUDY OF THE BONE MASS IN LUNG TRANSPLANTED PATIENTS IN TREATMENT WITH DENOSUMAB

M. Barceló-Brú¹, B. Rodríguez-Diez¹

¹Hospital Universitari Vall d'Hebron, Barcelona, Spain

Objective: Osteoporosis (OP) is a known complication before and after a lung transplant. In addition to altering bone mass, treatment with glucocorticoids alters the bone microarchitecture, conditioning an increased risk of fracture in these patients. Denosumab is a monoclonal antibody approved for the treatment of postmenopausal osteoporosis and its use for corticoid osteoporosis is pending approval. Its use in immunosuppressed patients is controversial due to a probable risk of increasing the rate of infections. Our aim was to describe the subcohort of lung transplant patients who have been treated with denosumab. To study the evolution of bone mass in patients with lung transplantation, with osteoporosis induced by glucocorticoids, treated with denosumab.

Methods: We included 19 lung transplant patients between 1995-2017, over 18 years of age, controlled in rheumatology for osteoporosis and in treatment with denosumab. Of these 19 patients, the evolution of bone mass of the 9 patients who have completed a minimum of 12 months of treatment is shown. Bone densitometry (DXA) was performed on a General Electric Healthcare Lunar Prodigy Advance 15 version densitometer, before and after treatment with denosumab. Demographic data of the patients were collected, the diagnosis of the disease that motivated the transplant, the glucocorticoid doses before and after the transplant, as well as the immunosuppressive treatment. In the 9 patients with DXA follow-up, the 3D-SHAPER software was applied in the DXA before and after the transplant.

Results: We included 19 patients, 9 men and 10 women, with a mean age of 58.6 years±11.4. The diagnosis of the disease that led to the transplant was in 4 COPD patients, 6 patients with pulmonary fibrosis or diffuse interstitial disease, 2 with bronchiectasis, 2 patients with cystic fibrosis, 1 with histiocytosis X, 2 with lymphangioleiomyomatosis, 1 with bronchiolitis obliterans and 1 patient with pulmonary hypertension. Before transplantation, 8 patients (42.1%) had required high doses of glucocorticoids. They presented fracture prior to transplantation 6 patients (31.6%), in all cases of vertebral location. The prevalence of osteoporosis prior to the start of treatment with denosumab in the 19 lung transplant patients was

with denosumab with respect to the transplant date was 4.31±5.83 years. The mean time in which the DXA was performed after the start of

	Tx (9)	
OP pre-Dmab	8 (88.9%)	
OP post-Dmab	8 (88.9%)	
DMO post-Dmab (media)	g/ cm ²	T-score
- L1-L4	0.949±0.13	-2.05±1.07
- CF	0.722±0.12	-1.86±2.22
- FT	0.696±0.06	-2.76±0.49
% cambio DMO		
- L1-L4	8.42±6.64*	
- CF	2.21±6.55*	
- FT	2.80±3.56*	
Dosis Alta GC pre-Tx	2 (22.2%)	
3D-SHAPER (media):		
- Cortical Density (g/ cm ²)	113.7±10	
- Trabecular vBMD (g/ cm ³)	88.5±23.7	
- Integral vBMD (g/ cm ³)	203.7±24.4	
% cambio 3D-SHAPER:		
- Cortical Density	4.13±4.5	
- Trabecular vBMD	3.4±10.9	
- Integral vBMD	2.6±7.7	

*p<0.001

denosumab was 19±4.17 months. The results of the evolutionary BMD, the 3D-SHAPER study and its percentage of change are shown in Table 2.

Of these 9 patients, 8 (88.9%) had received osteoactive treatment before denosumab, 5 with oral bisphosphonates and 3 with endovenous bisphosphonates. The mean time of treatment with bisphosphonates until the onset of denosumab was 5.4 years (range 1.3-12.9). After transplantation, 5 (26.3%) patients presented fractures, all of them of vertebral location. There were no significant differences in BMD evolution between patients treated for OP prior to Dmab and those not treated, nor for 3D-SHAPER.

Conclusions: All patients who started treatment with denosumab had a diagnosis of osteoporosis except one patient with osteopenia. The mean increase in BMD in patients treated with denosumab was significant in all the regions assessed, being higher in the lumbar spine. There was an increase in cortical density, trabecular volumetric BMD and integral volumetric BMD after denosumab treatment, although this increase was not significant for any of the three parameters.

P1102

IMPACT IN ECONOMICAL TERMS BY HIP FRACTURES IN THE MIGUEL SERVET UNIVERSITY HOSPITAL DURING 2017

M. Campoamor¹, A. Martín¹, C. Martínez¹, J. Camacho², C. Martín¹

¹Miguel Servet University Hospital, Zaragoza, ²San Jorge General Hospital, Huesca, Spain

Objectives: To measure the incidence of hip fracture in a middle-size city in western Europe and its economic impact during 2017.

Methods: During the period between January 1 to December 31, data were collected from the medical records about new low-energy trauma hip fracture. Exclusion criteria were high-energy trauma, primary bone diseases and bone metastatic disease. Moreover, ambulance transportation and continuous hospitalisation immediately after the hip fracture were included in the estimated costs.

	DMO g/cm ²	T-score
Lumbar spine	0.909±0.13	-2.40±1.08
Femoral Neck	0.708±0.94	-2.50±0.77
Total Hip	0.702±0.86	-2.73±0.59
Cortical Density (g/cm ²)	109.3±7.7	-2.9±0.3‡
Trabecular vBMD (g/cm ³)	85.7±21.4	-2.9±0.8‡
Integral vBMD (g/cm ³)	198.7±19	-3.3±0.5‡

‡ Only measured in women (5 patients)

94.7%. The means of BMD in g/cm² and T-score before treatment with denosumab and the results of the 3D-SHAPER are shown in Table 1. The mean time in which the DXA was performed prior to the treatment

Results: 637 patients supporting osteoporotic hip fracture (477 female 160, male), incidence was 125 new cases per 100,000 population - year. 71% occurred in subjects older than 80 years, and the peak number of fractures occurred in individuals above this age. 75% patients suffering hip fractures were women. The global economic burden was 3,026,765€, as a result of the sum of implants Cost (570,565€), hospitalisations (2,424,864€), and ambulance transportations (31,336€).

Conclusions: Hip fracture incidence in our health area is similar than the national rate, this data will help to assess the importance of interventions in order to reduce the number of fractures and associated costs.

P1103

PERIPROSTHETIC BONE METASTASIS FROM RENAL CELL CARCINOMA

Z. Panti¹, M. Nica¹, M. Pleniceanu¹, M. Popa¹, R. Ene¹, C. Cirstoiu¹

¹University Emergency Hospital of Bucharest, Orthopaedics and Trauma Department, Bucharest, Romania

Bone metastasis from renal cell carcinoma (RCC) represents a major surgical and oncological challenge, especially when it affects bone with implants. The metastatic lesions are usually lytic, with an increased risk of pathological fracture. In these situation the risk of implant loosening and periprosthetic fracture is even higher. The symptoms usually consist of pain in early stages, but any minor trauma can lead to a full loss of motion. We present a case of a male patient with total hip joint replacement, who underwent nephrectomy for a RCC in the near past. He presented to our institution with hip pain. X-ray and CT scan revealed an important osteolytic lesion at the level of the greater trochanter, without affecting the cortex. He undergoes biopsy and PET scan in search for any other bone or soft tissue lesions. It is hard to estimate the risk of implant loosening in such cases. The purpose of a revision surgery with or without implant removal is to obtain a good stability of the implant and painless status of patient for a good quality of life. Only just a few research papers discuss the management of such cases, in which we know that any kind of surgery is challenge. The prognosis of RCC with bone metastasis is bad, the overall 5-year survival rate is only 10% which makes this case even discussable in order to choose the right management.

P1104

COMMUNITY OSTEOPOROSIS SCREENING: AN ERA FOR ENHANCED OUTCOMES!

H. Dgour¹

¹HiKAYA Care, Amman, Jordan

Objective: Pharmacists play a key role in many healthcare systems by helping patients manage their illnesses, in osteoporosis management; gaps in health management arise from not identifying patients at high risk for fracture & from the issue of adherence to osteoporosis pharmacotherapy options. Pharmacists can extend the care provided for patients to improve health and wellness, and positively impact quality metrics in patient-centered approaches. Our aim was to o examine the impact of pharmacists interventions in improving osteoporosis management.

Methods: Assessing osteoporosis management interventions within pharmacy practice.

Results: Pharmacist interventions includes osteoporosis educational and counseling programs, screening by pharmacists based on risk factor assessment or BMD testing, and recommendations for patients to follow-up with a physician.

Conclusion: The potential role for pharmacists to help reduce gaps in osteoporosis management through improved identification of high-risk patients suggests a future opportunities for service providing, as community osteoporosis screening services provide a cost-effective approach towards preventing osteoporotic fractures for population health, particularly in identifying osteoporosis or high risk of the disease in populations.

P1105

EVALUATION OF THE PAIN INTENSITY AND QUALITY OF LIFE OF PATIENTS WITH OSTEOPOROSIS DIAGNOSIS AND TERIPARATIDE TREATMENT

A. Pinzon¹

¹Surcolombiana University, Endocrinology, Hospital Universitario Neiva, Neiva, Colombia

Objectives: A descriptive and retrospective study to determine whether treatment with recombinant parathyroid hormone (teriparatide) reduces pain in patients with osteoporosis, in the endocrinology unit at the Military Hospital in Colombia in 2008.

Aims: 1) Describe demographic aspects of osteoporosis patients managed with teriparatide. 2) Determine frequency of patients requiring analgesic adjuvant therapy for the management of pain associated with osteoporosis. 3) Determine whether the use of teriparatide reduced pain in patients with osteoporosis.

Methods: From twenty patients with osteoporosis who received teriparatide, 12 were included in the study in a period from January to December 2008. To evaluate the quality of life and pain intensity, the SF36 questionnaire and visual analog pain scale was used, respectively. All data from the surveys and the SF36 form, were stored in data bases using the program Excel 2011. A descriptive statistical analysis was performed using the frequency representation as a percentage.

To determine differences in the frequency of occurrence of an event, Chi2 test was used. $P < 0.05$ was considered as significant.

Results: Teriparatide treatment significantly decreased frequency of patients requiring analgesic adjuvant therapy with NSAIDs and opiates at 6 months follow up ($P = 0.04$, Chi2).

Conclusions: results suggest a beneficial effect of pain relief and quality of life with treatment for osteoporosis with teriparatide.

Table 1. Patient Characteristics:

Variable	n (%)
Age	
Mean (SD)*	68,8 (10,6)
Less than 75 years	8 (66,6)
More than 75 years	4 (44,4)
Sex	
Female	11 (91,6)
Male	1 (8,4)
Smoking	
No Smoker	5 (41,6)
Former Smoker	7 (58,3)
Fracture	
Yes	10 (83,3)
No	2 (16,6)

*Standard Deviation

Table 2. Pain level during treatment:

	Before Treatment	180 days	360 days
Pain (AVSP) *	n (%)	n (%)	n (%)
None: (0)	0 (0)	2 (16,6)	3 (25)
Mild: (1 – 4)	2 (16,6)	2 (16,6)	6 (50)
Moderate: (5 – 8)	7 (58,3)	7 (58,3)	1 (8,3)
Severe: (9 – 10)	3 (25)	1 (8,3)	2 (16,6)

*Analogous Visual Scale of Pain

Table 3. Daily dose of analgesic during treatment:

	Before Treatment	180 days	360 days
Daily Analgesic Dose	n (%)	n (%)	n (%)
0	1 (8,3)	6 (50)	7 (58,3)
1	8 (66,6)	4 (33,3)	4 (33,3)
2	1 (8,3)	1 (8,3)	0 (0)
3	2 (16,6)	1 (8,3)	1 (8,3)

Table 4. Patients with previous treatment with biphosphonate:

	Previous Treatment	
	Yes: n (%)	Not: n (%)
Pain (AVSP) *		
None: (0)	0 (0)	0 (0)
Mild: (1 – 4)	1 (8,3)	1 (8,3)
Moderate: (5 – 8)	4 (33,3)	3 (25)
Severe: (9 – 10)	2 (16,6)	1 (8,3)
	360 Days with teriparatide	
None: (0)	1 (8,3)	2 (16,6)
Mild: (1 – 4)	4 (33,3)	2 (16,6)
Moderate: (5 – 8)	0 (0)	1 (8,3)
Severe: (9 – 10)	2 (16,6)	0 (0)

*Analogous Visual Scale of Pain

P1106**PAGET'S DISEASE OF BONE: DISCORDANT FINDINGS**N. Dumitru¹, E. Petrova², A. Cocolos¹, A. Goldstein³, A. Valea⁴, M. Carsote², A. Ghemigian²¹C.I. Parhon National Institute of Endocrinology, Departments of Gonads, Bone and Adrenals, Bucharest, ²C.I. Parhon National Institute of Endocrinology & C. Davila UMPH, Bucharest, ³C.I. Parhon National Institute of Endocrinology, Bucharest, ⁴Clinical County Hospital & I. Hatieganu UMPH, Cluj-Napoca, Romania

Objective: Paget's disease of bone (PDB) is a long-term anomaly of bone turnover, mainly seen on adult people. Still incompletely described as aetiology including genetic panel, the condition also involves difficulties of diagnosis especially in mildly symptomatic cases. Early detection is established when shape and size of bones are not yet dramatically changed, neither the reduction of bone strength is registered. The best players in these particular cases are bone turnover markers and bone scintigram. We introduce a case of skull PDB in an adult male starting from unspecific symptoms.

Methods: case report

Results: This is a 59-year old non-smoker Caucasian patient with unrevealing family and personal medical history who had a short episode of dizziness and transitory troubles of hearing. No specific anomaly of the ear was detected at clinical examination but a cerebral/cranium computed tomography was however recommended. The results suggested a homogenous pattern of bones at anterior part of the skull. Further on, he was referred for an endocrine assessment. On admission, normal serum calcium and phosphorus was associated with mild anomalies of blood markers for bone resorption like CrossLaps (0.746 ng/mL, normal: 0.104–0.504 ng/mL), respective P1NP (77.33 ng/mL, normal: 15–74 ng/mL) with normal bone formation assays as osteocalcin (21.12 ng/mL, normal: 14–46 ng/mL), respective alkaline phosphatase (54 U/L, normal: 40–105 U/L). Vitamin D deficiency was detected (18.2 ng/mL, optimal >30 ng/mL)

Table 5. Quality life with treatment:

SF - 36		Pain (AVSP) *			
Domains	Mean Scores	None: (0)	Mild: (1–4)	Moderate: (5–8)	Severe: (9 – 10)
General Health	<50 n(%)	0 (0)	1 (8,3)	1 (8,3)	2 (16,6)
	>50 n(%)	3 (25)	5 (41,6)	0 (0)	0 (0)
Physical Functioning	<50 n(%)	0 (0)	2 (16,6)	1 (8,3)	1 (8,3)
	>50 n(%)	3 (25)	4 (33,3)	0 (0)	1 (8,3)
Role Physical	<50 n(%)	0 (0)	5 (41,6)	1 (8,3)	2 (16,6)
	>50 n(%)	3 (25)	1 (8,3)	0 (0)	0 (0)
Role Emotional	<50 n(%)	0 (0)	1 (8,3)	0 (0)	2 (16,6)
	>50 n(%)	3 (25)	5 (41,6)	1 (8,3)	0 (0)
Bodily Pain	<50 n(%)	0 (0)	2 (16,6)	1 (8,3)	2 (16,6)
	>50 n(%)	3 (25)	4 (33,3)	0 (0)	0 (0)
Energy / Vitality	<50 n(%)	0 (0)	2 (16,6)	1 (8,3)	2 (16,6)
	>50 n(%)	3 (25)	4 (33,3)	0 (0)	0 (0)
Mental Health	<50 n(%)	0 (0)	2 (16,6)	0 (0)	1 (8,3)
	>50 n(%)	3 (25)	4 (33,3)	1 (8,3)	1 (8,3)
Social Functioning	<50 n(%)	0 (0)	0 (0)	0 (0)	1 (8,3)
	>50 n(%)	3 (25)	6 (50)	1 (8,3)	1 (8,3)

*Analogous Visual Scale of Pain

without PTH raise. Lumbar DXA did not detect bone loss (BMD=1.439 g/cm², Z-score=1.4SD). Bone scintigram (20 mCi, 99mTc) pointed up-take of tracer at right parietal and occipital area, apparently a type of PBD of skull involvement. Single zoledronic acid injection was offered to the patient for the moment with subsequent close follow-up. Moreover, clinical exam also detected a large thyroid gland confirming at ultrasound a left macronodule with cystic component of 4/4.5 cm on polynodular background and normal function with benign features at fine needle aspiration.

Conclusion: Small increase of P1NP and/or CrossLaps in addition to anomalies at imaging techniques are useful for establishing the diagnosis of PBD and initiating therapy. Comorbidities as hypovitaminosis D or large multi-nodular goiter seem incidental. Adequate correction of vitamin D is necessary to enhance the response to bisphosphonates. In this particular case, the hearing conduct was not involved for the moment so a direct relationship with initial symptoms is difficult to establish.

P1107

SINGLE SPONTANEOUS VERTEBRAL FRACTURE: PLAYER ON THE FIELD OF ADRENALECTOMY DECISION

M. Carsote¹, N. Dumitru², E. Petrova¹, A. Cocolos², A. Valea³, A. Dumitrascu¹, A. Ghemigian¹

¹C. Davila University of Medicine and Pharmacy & C.I. Parhon National Institute of Endocrinology, Bucharest, ²C.I. Parhon National Institute of Endocrinology, Departments of Gonads, Bone and Adrenals, Bucharest, ³Clinical County Hospital & I. Hatieganu UMPH, Cluj-Napoca, Romania

Objective: Controversies are still presented regarding adrenal tumours with possible autonomous secretion of cortisol which display as incidentalomas, and not as clear Cushing's syndrome. The presence of co-morbidities as high blood pressure, diabetes mellitus, obesity or osteoporosis may be related to mentioned hormonal anomaly but the decision of adrenal tumour removal is mainly individual. However, changing the pattern of any co-morbidities, for instance, an arterial hypertension requiring more medication or new fragility fractures, are essential in establishing the indication of surgery. We introduce an female case known with adrenal incidentaloma (AI) who was followed for several years and displayed serial complications that lead to adrenalectomy decision.

Methods: Case study; normal plasma morning cortisol(PMC) is 6-21 µg/dL, morning ACTH (adrenocorticotrophic hormone)=3-66 pg/mL, 2nd day plasma cortisol after screening test with dexamethasone (DXMC) <1.8 µg/dL.

Results: This is a 63-year old former smoker Caucasian patient who had 5 years ago a severe episode of high blood pressure which required 5 classes of drugs to control it in association to obesity, and impaired glucose tolerance. She was accidentally found with a left AI of 1.2/1.1cm. The adrenal profile was normal except for high PMC of 29 µg/dL and DXMC of 4.6 µg/dL, considered as subclinical Cushing's syndrome at that time. She had normal DXA. Surgery was postponed and 6 months later DXMC normalized to 1.8 µg/dL. After 2 years, the computed tomography (CT) showed a tumour of 1.5/1.5cm with normal DXMC of 1.5 µg/dL. Three years later, the patient was re-assessed. She had no complains but diabetes mellitus was confirmed at oral glucose tolerance test (HbA1c of 6.1%) while a vertebral fracture was identified at lumbar L1 level (normal central DXA). Adrenal CT was status quo with low-normal ACTH=8 pg/mL, and normal PMC=11 µg/dL. The change in fracture risk due to this aspect indicated left adrenalectomy.

Conclusion: The diagnosis of a new vertebral fracture in an AI patient may represent the indication of adrenalectomy; specific algorithms of combining bone, cardiovascular profile and endocrine assays are necessary to select the patients referred to surgery. The presence of type 2 diabetes mellitus may mimic a normal skeletal status due to high BMD unless low trauma fractures are detected.

P1108

VITAMIN D DEFICIENCY AND BASEDOW'S DISEASE RELATED MULTIFOCAL PAPILLARY THYROID CARCINOMA

A. Cocolos¹, N. Dumitru¹, M. Carsote¹, E. Petrova¹, A. Valea², A. Ghemigian¹

¹C.I. Parhon National Institute of Endocrinology & C. Davila UMPH, Bucharest, ²Clinical County Hospital & I. Hatieganu UMPH, Cluj-Napoca, Romania

Objective: A link between vitamin D deficiency and thyroid cancer or/and autoimmune disorders has been established without a direct cause-effect relationship. Our purpose is to introduce a female case with Basedow's disease (BD) who was found with low vitamin D levels and a papillary cancer (PC) after thyroidectomy.

Methods: This is a case study; normal 25-hydroxyvitamin D (25OHD) is above 30 ng/mL

Results: This is a 53-year old non-smoker Caucasian woman who first came to our attention 3 years ago for developing BD-related eye anomalies. She associated high anti-TSH receptor antibodies of 17 U/L (normal levels above 1 U/L). Thiamazole was offered to the patient to control the hyperthyroidism and pulse therapy with metiprednisolone was started (a total dose of 3 grams for 6 months) to achieve an improvement of ophthalmopathy. At the beginning of therapy, a value of 17 ng/mL was detected for 25OHD and vitamin D supplements were added. Even the patient affirmed compliance to medication; a recent evaluation proved a normalization of thyroid function but still decreased 25OHD. The patient was referred to total thyroidectomy where a PC was accidentally detected (multifocal, within both lobes, PT3 - of 1.5 cm at right lobe, another of 0.4 cm at the same lobe and another of 0.15 cm at left lobe). Further radioiodine therapy (100 mCi) was introduced.

Conclusion: Hyperthyroidism as well as BD or PC have been found correlated to low vitamin D but a high prevalence of hypovitaminosis D in Caucasian population for East Europe may actually not be directed connected. Moreover, the introduction of glucocorticoid therapy for orbitopathy represents one more reason for adequately correction of 25OHD levels.

P1109

A PATIENT WITH OSTEOPOROSIS IMPERFECTA TREATED WITH DENOSUMAB: A CASE REPORT

M. Marcinkowska¹, A. Wawrzyniak¹, J. Dytfeld¹

¹Department of Family Medicine Poznan University of Medical Sciences, Poznań, Poland

Objective: Osteogenesis imperfecta (OI) forms a group of genetically determined diseases, resulting from incorrect structure of collagen (the main component of connective tissue). OI manifested principally by excessive bone fragility. There is no causative treatment of OI. The aim of treatment is to prevent fractures and limit their consequences. Pharmacotherapy includes bisphosphonates and calcium vitamin D supplementation.

Methods: A 59-year old woman, patient of Endocrinology Outpatient Clinic diagnosed with osteogenesis imperfecta came up for follow-up visit. In history, numerous low-energy fractures - i.e., vertebral, of humerus and forearm. The first clinical fracture occurred in age of 35. Menarche at 16, menopause at 50. Two times pregnant, both children also diagnosed with OI. Coexisting arterial hypertension and oesophageal stricture. Numerous low-energy fractures in patient's father. In physical examination weight 54 cm, height 144 cm (height deficiency -10 cm). Previously treated with calcitonin, oral bisphosphonates, and later zoledronic acid i.v. Constant treatment with vitamin D and calcium carbonate. After 5 years of regular iv bisphosphonate, a decision was made to discontinue therapy. She could not take oral bisphosphonate because of oesophageal disease.

Results: In 2012, DXA L1-L4 T-score -2.9 SD, in 2016 -5.0 SD. In vertebral morphometry - a severe fracture of Th6 and Th7 (Genant 3), and moderate of Th9 and Th10 (Genant 1 and 2).

Due to the exhaustion of recommended therapeutic options, the decision was made to initiate off-label denosumab. Currently, the patient is after three subcutaneous injections of the drug. There were no adverse events noted. During the 24-month follow-up, there were no new low-energy fractures. In DXA, an increase in BMD was observed (femoral neck T-score -1.9 SD in comparison to -2.2 at the beginning of therapy), L1-L4 - T-score -4.9 SD (increase by 0.1 SD).

Conclusions: Denosumab therapy may be well tolerated and effective for patients with OI.

It is worth considering to broaden the indications for denosumab for patients with OI.

P1110

SECONDARY KNEE OSTEOARTHRITIS IN PATIENTS WITH RHEUMATOID ARTHRITIS: A STUDY GROUP

A. E. Musetescu¹, A. Cioroianu¹, C. Criveanu¹, S. C. Dinescu¹, F. A. Vreju¹, P. L. Ciurea¹, A.-M. Bumbea¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objective: Secondary osteoarthritis (OA), osteoporosis, sicca symptoms or atherosclerosis are commonly considered complications of the disease in patients with rheumatoid arthritis (RA) [1]. In case of sicca symptoms, the glandular function is altered, thus most patients are diagnosed with secondary Sjögren's syndrome (sSS) [2]. Our aim was to determine the prevalence of secondary knee osteoarthritis in patients with RA.

Methods: Our study included 30 patients with RA and mean disease activity of 6.75 years (± 1.42 years) and mean age of 56.5 years (± 2.75 years). We measured the serum levels of erythrocyte sedimentation rate (ESR), C reactive protein (CRP), rheumatoid factor (RF), anti-citrullinated protein antibodies (ACPA), performed ultrasonographic (US) examinations and calculated the disease activity score (DAS) in the study group.

Results: ESR levels were higher than 30 mm/h in 18 patients (60%), while CRP had a mean value of 12.65 mg/dL (± 3.05). DAS was low in 6 patients (20%), moderate in 10 patients (33.3%) and high in 14 patients (46.6%). ACPA were positive in 21 patients (70%), while RF was positive in 25 patients (83.3%). sSS was found in 15 patients (50%), all of them being ACPA positive as well. US findings such as lateral and medial osteophytes, meniscus extrusions, synovial proliferation, cartilage damage and effusions were consistent with knee OA in 20 patients (66.6%), correlated with higher DAS and positive ACPA or RF.

Conclusions: Secondary OA is more frequently encountered in patients with RA who have high disease activity and positive serology for ACPA and RF.

References:

1. Maxime Dougados; et al. *Ann Rheum Dis* 2014;73:62
2. Dinescu ŞC; et al. *Rom J Morphol Embryol* 2017;58:409

P1111

DYNAMICS OF FEMUR NECK BMD DURING THERAPY WITH RITUXIMAB AMONG RHEUMATOID ARTHRITIS MEN BY RESULTS OF FOUR-YEAR OBSERVATION

M. Koroleva¹, T. Raskina¹, O. Malyshenko¹

¹Kemerovo State Medical University, Kemerovo, Russia

Objective: To evaluate the dynamics of BMD against rituximab in men with rheumatoid arthritis (RA) by results a prospective four-year follow-up.

Methods: We observed 36 men with a documented diagnosis of RA who received combination therapy with methotrexate (mean dose 13.22 [12.5-15.0] mg/week) and rituximab (1000 mg intravenously drip twice at 14 days intervals, the average number of courses - 3.65 [3.0-4.0]). By activity (index DAS-28) patients were distributed as follows: group 1 (n=16) - low and medium activity (DAS-28-3.2 [3.11, 4.48]), group 2 (n=20) - a high degree of activity (DAS-28 - 6.11 [5.61, 6.88]). BMD was measured by DXA (Norland EX- 46). The observation lasted four years.

Results: Initially, the BMD of Group 1 patients was 0.8094 ± 0.024 g/cm², which is statistically significantly higher than the BMD of Group 2 patients - 0.7599 ± 0.023 g/cm² ($p=0.036$). After four years of follow-up, the DAS-28 index decreased in both groups of patients (Δ DAS-28 group 1 - 1.09 ± 0.11 , Δ DAS-28 group 2 - 1.55 ± 0.06), but in group 1 the changes did not reach statistical significance ($p=0.08$), in contrast to group 2 ($p=0.042$). Positive statistically significant dynamics of the level of BMD was recorded in both groups (Δ BMD of group 1 - 0.048 ± 0.012 g/cm², Δ BMD of group 2 - 0.068 ± 0.017 g/cm², $p=0.002$ and $p=0.0092$, respectively).

Conclusions: The best anti-inflammatory effect of rituximab was observed in a group of patients with a high degree of activity. Positive effect of rituximab on the BMD in patients with RA, regardless of the initial activity of the disease, was noted.

P1112

A NEW DECISION TREE FOR DIAGNOSIS AND MANAGEMENT OF OSTEOARTHRITIS IN PRIMARY CARE: INTERNATIONAL CONSENSUS OF EXPERTS

F. Rannou¹, J. Martel-Pelletier², J. Pelletier², O. Mkinsi³, J. Branco⁴, L. Alekseeva⁵, P. Monod⁶, F. Planta⁷, E. Maheu⁸, J.-Y. Reginster⁹

¹Cochin Hospital, Paris, France, ²Osteoarthritis Research Unit, Research Centre of Montreal University Hospital, Montreal, Canada, ³Casablanca University Hospital, Casablanca, Morocco, ⁴Lisbon University Hospital, Lisbon, Portugal, ⁵Rheumatology Centre of Pr Nasonov, Moscow, Russia, ⁶Cabinet de Rheumatologie, Castelnau, France, ⁷Pierre Fabre Consumer HealthCare, Castres, France, ⁸Hôpitaux de Paris, Paris, France, ⁹Department of Public Health Sciences, University of Liège, Liège, Belgium and WHO Collaborating Centre for Public Health Aspects of Musculoskeletal Health and Aging, Liege, Belgium

Objective: Although osteoarthritis is managed mainly in primary care, general practitioners (GPs) are not particularly well trained in the area, which can lead to diagnostic delays, unnecessary resource utilization, and suboptimal patient outcomes.

Methods: To address this situation, an International Rheumatologic Board (IRB) comprising 8 experts from 3 continents developed guidelines for the management of osteoarthritis in primary care, focusing on the three major topologies of hip, knee, and hand/finger osteoarthritis. The IRB used ACR diagnostic criteria to characterise patients.

Results: Care pathways based on clinical and radiological findings were developed, incorporating red flags to indicate GP/specialist intervention thresholds. To optimize usability in the primary care setting, the guidelines were formatted as simple but comprehensive 1-page decision trees. In a two-phase validation stage, the draft guidelines were evaluated by rheumatologists and GPs for project execution, content and perceived benefit. This article describes the guidelines initiative through development and validation, highlighting key aspects of the evaluation process that informed the final version. The strength of the guidelines lies in their simplicity and potential for broad application. The IRB was of the opinion that guidelines, which allow GPs to make a simple but certain diagnosis of osteoarthritis and offer clear guidance about situations requiring expert opinion, would have potential to improve patient outcomes and reduce the number of unnecessary examinations.

Conclusions: This project has demonstrated the feasibility of developing simple and effective visual decision trees to facilitate the diagnosis and management of osteoarthritis of the hip, knee and hand/fingers in primary care. The next step will be to conduct an impact study of these recommendations on the management of osteoarthritis in general practice.

Acknowledgement:

Laboratoires Pierre Fabre set up an independent scientific board composed of international specialists: the IRB. While Pierre Fabre supports

the work carried out by the board financially and logistically, the laboratory has no involvement in the scientific content, work proposals or decisions taken during the board's working sessions.

P1113

DOES VITAMIN D DEFICIENCY INFLUENCE THE DEVELOPMENT OF SJÖGREN'S SYNDROME?

A. E. Musetescu¹, A. Cioroianu¹, C. Criveanu¹, S. C. Dinescu¹, F. A. Vreju¹, A.-M. Bumbea¹

¹University of Medicine and Pharmacy of Craiova, Craiova, Romania

Objective: Primary Sjogren's syndrome (pSS) is an autoimmune exocrinopathy characterized by hypofunction of the salivary and lacrimal glands, but also displays extraglandular manifestations affecting the joints, nerves, lungs, kidneys or vessels [1]. Our aim was to evaluate a potential link between vitamin D deficiency and the features of pSS.

Methods: The study group consisted of 20 patients (16 females, 4 males) with pSS and 20 age and sex-matched controls without any known risk factors for developing osteoporosis such as menopause, endocrine pathologies, consumption of steroidal anti-inflammatory drugs or other inflammatory diseases. The patients' mean age was 44.83 years (± 2.46 years) and the mean history of disease prior to study inclusion was 6 years (± 1.18 years). None of the subjects were taking vitamin D supplements. The serum levels of 25(OH)-D were measured and expressed in ng/mL, with normal levels being set at 30 ng/mL, while deficiency and insufficiency were defined between 20-30 ng/mL and lower than 20 ng/mL, respectively. Other laboratory tests included the levels of leukocytes, gammaglobulins, anti-Sjögren's syndrome antigen A (SSA), anti-Sjögren's syndrome antigen B (SSB), C3 and C4 components of the complement.

Results: 15 patients (75%) had either insufficient or deficient vitamin D serum levels with a mean value of 2.25 ng/mL (± 1.64) and no significant difference compared to the controls. Leukocytopenia was detected in 9 patients (45%) with vitamin D deficiency and only in 3 patients (15%) with vitamin D insufficiency. Regarding other laboratory tests and clinical features of pSS, there was no correlation between hypovitaminosis D and disease activity.

Conclusions: Although there have been studies discussing the link between low levels of vitamin D and pSS, the pathogenic mechanism has not been demonstrated yet. It is possible that hypovitaminosis D is only associated with certain subtypes of pSS (for example patients with leukocytopenia).

Reference:

1. Dinescu ȘC et al. Rom J Morphol Embryol 2017;58:409

P1114

ESTABLISHMENT OF A FRAGILITY FRACTURE LIAISON SERVICE IN A TERTIARY CARE HOSPITAL OF INDIA: ANY IMPACT IN 2 YEARS OF ITS IMPLEMENTATION

V. Sharma¹, K. Farooque¹, R. Malhotra¹

¹All India Institute of Medical Sciences, Delhi, India

Objective: Osteoporosis is a major health problem and it leads to almost 9 million fractures worldwide. Patients with one fragility fracture have an 86% increase in their risk for another fracture hence prevention of a secondary fracture has become a primary focus from a patient care and societal standpoint. India lacks data regarding the burden of fragility fractures. There is no comprehensive study wherein strategies for prevention/early detection and treatment modalities have been studied. The FFLS is a coordinated care model to guide the patient through osteoporosis management after a fragility fracture to help prevent future fractures.

Method: Before the establishment of FFLS in our institute, there was no organized system of active follow-up of post-fracture patients. A retrospective analysis of patients with fragility fractures revealed a shockingly high drop-out rate of >80%. Through the FFLS model of care, the patient

was automatically recruited for the medically necessary evaluation of his or her risk for a secondary fracture. The core of the FFLS program was constituted by an orthopedician, and a nurse coordinator. The nurse coordinator was specially trained to assist with osteoporosis education, medication administration and providing relevant instructions. A standardized order set for laboratory tests were done in all the patients, Imaging facilities included appropriate radiographs and bone densitometry scans.

Results: The FFLS became operative on January 1, 2016 in our institute. Till date, 568 patients have been enrolled in the FFLS and are under regular follow-up. The dropout rate is <5% - a drastic improvement from our previous experience. The patients included 56 number of spine fractures, 156 number of hip fractures, 254 number of distal radius fractures and 102 number of patients having fractures other than these three major fragility fractures. A total of 490 patients underwent DXA scans to assess their BMD - based on which treatment recommendations were made.

Conclusions: This FFLS model yields higher rates of diagnosis and treatment and less attrition in the post-fracture phase of care. In addition, the FFLS model is based on improved care coordination and communication about these patients, leading to success at achieving the ultimate goal of secondary fracture prevention. Our experience has led us to believe that the establishment of a FFLS is the need of the hour in tertiary healthcare set-ups.

P1115

PREVALENCE OF VERTEBRAL FRACTURE AMONG PATIENTS WITH HIP FRAGILITY FRACTURE

S. Ganhão¹, M. Guerra², F. Aguiar¹, G. Terroso³, R. Vieira², D. Gonçalves⁴, T. Meirinhos⁵, M. T. Rocha¹, A. Águeda⁶, R. Ferreira¹, C. Vaz¹, L. Costa³

¹Centro Hospitalar de São João, FMUP, Porto, Portugal, ²Centro Hospitalar de Vila Nova de Gaia/Espinho, Vila Nova de Gaia, ³Centro Hospitalar de São João, Porto, ⁴Centro Hospitalar de Trás-os-Montes e Alto Douro, Vila Real, ⁵Centro Hospitalar Baixo Vouga, Aveiro, ⁶Centro Hospitalar de Baixo Vouga, FMUP, Aveiro, Portugal

Objectives: To evaluate the prevalence of radiographic vertebral fracture (VF) in patients older than 65 years admitted by hip fragility fracture and to describe potential risk factors.

Methods: We included 236 patients over 65 years who were admitted by hip fracture at the Orthopaedics Service of Hospital de São João in the period March 2015-2017, after referral to specialized osteoporosis consultation, according to a fracture liaison service. We requested profile radiograph (Rx) of the dorso-lumbar spine, DXA and blood samples to all the patients in the first visit. We used the Genant classification of VF.

Results: 136 out of 236 (prevalence of 57.6%) had VF (80 had 2 or more). Only 4 out of 136 (2.9%) with documented VF had knowledge of it (95.5% subdiagnosed VF). Patients with at least 1 vertebral fracture were older [median age (min-max) of 84 (67-69) vs. 82 (66-93)] ($p=0.015$). These patients had also lower BMD values with mean total femur (TF) BMD of 0.81 g/cm³ (SD 0.2) vs. 0.52 g/cm³ (SD 0.1) and median (min-max) total femur T-score of -4.0 [-4.1-(-3.9)] vs. -2.2 [-3.2 (-0.5)]. Binary logistic regression showed that for each add year in age, the risk of VF increases 1037 times. By testing the same variables in a group with 2 or more VF, there were also statistically significant differences in age, BMD, gender and previous degree of dependence [8.1% of patients with 2 or more VF were totally dependent (vs 2%)]. However, after binary logistic regression, only gender (OR 0.2) and TF BMD (OR 2.3) remained statistically significant. No significant differences were demonstrated in previous steroid therapy, alcohol and tobacco consumption, phosphocalcic metabolism, among other variables tested.

Conclusion: Our sample suggests that VF is underdiagnosed which may compromise secondary prevention and the main risk factors related to this fracture type appear to be advanced age and lower BMD.

P1116

EVALUATION OF THE EFFECT OF WEIGHT LOSS ON LEVEL OF LEPTIN AND ITS RELATIONSHIP WITH CLINICAL MANIFESTATIONS OF KNEE OSTEOARTHRITIS IN PATIENTS WITH OBESITY

E. Strebkova¹, L. Alekseeva¹¹Nasonova Research Institute of Rheumatology, Moscow, Russia

Objectives: Osteoarthritis (OA) is one of the important diseases characterized by chronic pain and functional joint failure. It is known that obesity is a risk factor and progression of OA not only of the knee joints, but also of the joints of the hands. That speaks about the involvement of systemic biomarkers of inflammation and adipokines (leptin). The objective of our research was to study the effect of weight loss on level of leptin and to determine its relationship with clinical manifestations of OA in obese pts.

Methods: The study included 50 female pts aged 45-65 years with knee OA, Kellgren-Lawrence stage II-III, and obesity (BMI >30 kg/m²). Pts from Group 1 (n=25) were receiving orlistat 120 mg x 3 times/day for 6 months combined with low-caloric diet and therapeutic physical exercise. Pts from Group 2 (n=25) were administered only low-caloric diet and therapeutic physical exercise for 6 month. Anthropometry data, WOMAC and quality of life EQ-5D scores, as well as serum levels of leptin using ELISA were assessed at baseline and at 6 months in all pts.

Results: Following pharmacological and non-pharmacological therapy of obesity in pts with knee OA subjects from Group 1 reduced their body weight by 10.07% ($p<0.05$), were observed a significant decrease in anthropometric parameters (waist circumference by 7.5% ($p<0.001$) and hip circumference by 7.9% ($p<0.001$)), improvement in WOMAC ($p<0.05$) (WOMAC pain reduction by 52%, total WOMAC reduction by 51%), an improvement in the EQ-5D score by 52% ($p<0.05$), a 45% increase in the level of health by VAS ($p=0.05$). In pts from Group 2 the body weight decreased by 0.88% ($p>0.05$), with insignificant changes in the circumference of the waist and hips ($p>0.05$), significantly decreased WOMAC (pain by 20.9%, total WOMAC by 19.63%) and EQ-5D score ($p<0.05$). At baseline pts from both groups did not differ ($p>0.05$) by leptin levels. Decreased leptin levels were documented in pts from Group 1 after 6 months of orlistat therapy ($p=0.05$), which directly correlated with body weight loss ($r=0.5$, $p=0.02$), total WOMAC score reduction $r=0.5$, $p=0.01$, and score reduction in WOMAC subscales measuring pain $r=0.5$, $p=0.01$; stiffness $r=0.4$, $p=0.04$; and functional insufficiency $r=0.4$, $p=0.03$, thus reflecting improvement of OA symptoms; and inversely correlated with increased EQ-5D score ($r=-0.4$, $p=0.03$) reflecting improvement in quality of life. In pts from Group 2 of correlations between the level of leptin and body weight, clinical manifestations of OA have not been obtained.

Conclusion: There was a direct correlation between body weight loss and decreased leptin levels, as well as reduction in WOMAC scores reflecting improvement of knee OA clinical manifestations, and inverse correlation with EQ-5D score resulting in quality of life improvement. Accordingly, body weight loss following pharmacotherapy of obesity is associated not only with improvement of OA clinical symptoms, but also with down-regulation in production of pro-inflammatory leptin, most probably resulting in reduction of meta-inflammation in obese pts with OA.

P1117

THE RELATIONSHIPS OF VITAMIN D LEVEL AND SARCOPENIA IN ELDERLY PEOPLE

V. Alekna¹, J. Kilaitė¹, M. Tamulaitienė¹, A. Mastavičiūtė¹¹Faculty of Medicine, Vilnius University, Vilnius, Lithuania

Objective: To investigate the relations of vitamin D level and sarcopenia in community-dwelling older people.

Methods: A retrospective cross-sectional study was performed in National Osteoporosis Center based in Vilnius, Lithuania. Inclusion

criteria were: age 60 or more years, unrestricted mobility, no vitamin D supplementation. European Working Group on Sarcopenia in Older People criteria made in 2010, were used to diagnose sarcopenia. Muscle mass was measured by DXA (iDXA, GE Lunar, USA), muscle strength was evaluated by handgrip strength (JAMAR, Patterson Medical, UK), and physical performance was measured using the Short Physical Performance Battery (SPPB) test. Vitamin D (25(OH)D) concentration in serum was measured by automated immunoassay. Vitamin D deficiency (<20 ng/ml), insufficiency (20-29 ng/ml) or sufficiency (30-100 ng/ml) was determined by 2011 Endocrine Society guidelines. Multinomial logistic regression was used to determine the association between sarcopenia and vitamin D level.

Results: The study was performed on 74 subjects: 32 (43.2%) men and 42 (56.8%) women. Mean age was 78.95±6.71 years, ranging from 62.8 years to 94.7 years. Average height of participants was 166.24±8.28 cm and weight 68.03±6.55 kg. Of all subjects, 59 (79.7%) had vitamin D deficiency, 10 (13.5%) insufficiency and 5 (6.8%) were vitamin D sufficient. Thirty-six (48.6%) subjects were identified as having sarcopenia. Mean vitamin D concentration in sarcopenic subjects was 12.72±6.18 ng/ml which was statistically significantly ($p=0.007$) lower when compared to mean level of 17.92±6.95 ng/ml in non-sarcopenic subjects. Unadjusted regression analysis revealed that subjects with lower vitamin D concentration were more likely to be sarcopenic (OR: 0.92, 95%CI: 0.86; 0.98, $p=0.01$). After adjusting for confounders (age, gender, height, weight) the association between sarcopenia and low vitamin D concentration was still statistically significant (OR: 0.93, 95%CI: 0.87; 0.99, $p=0.03$).

Conclusion: Our study showed that low level of vitamin D is associated with sarcopenia in older adults.

P1118

WHOLE BODY VIBRATION INCREASE FUNCTIONALITY IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS

E. Moreira-Marconi¹, C. F. Dionelo¹, D. C. Sá-Caputo¹, L. L. Paineiras-Domingos¹, C. R. Souza-Gonçalves¹, M. Bernardo-Filho¹¹Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brazil

Objective: Knee osteoarthritis (KOA) cause a disability in older adults. Exercise is one of the main non-pharmacological treatment for improvement functionality. However, some subjects are unwilling to practice physical activities worried for a symptoms worsening. Whole body vibration exercise (WBVE) improve strength muscle through reflex muscle contractions and synchronizing motor unit activation, without adding loads to the knee joint. Studies previous with KOA subjects and WBVE used frequency high (25-40 Hz) and the squat position. We aimed to verify the WBVE effectiveness over the functionality of KOA subjects using a different protocol. **Methods:** Work approved by the local Ethics Committee (19826413.8.0000.5259). Subjects (<50 years old) with KOA (n=24) participated of the vibration intervention for 5 weeks (2 days/week). They sat in a chair in front of a side-alternating oscillating/vibration platform, with the feet barefoot on the base with a comfortable knee flexion and the hands in contact with their knees to facilitate the transmission of the mechanical vibration. They were instructed to perform 1 bout of 3 min at a peak to peak displacement - $D=2.5$ mm, 5.0 mm and 7.5 mm and 1 min rest between the bouts. The frequency has daily increased 1 unit, from 5-14 Hz (acceleration peak - $a_{peak}=0.12$ to 2.95 g). The subjects were evaluated (5-chair stand test, handgrip strength and 3-m walk test) at baseline and after 5 weeks of the intervention. The statistical test used was Wilcoxon signed-rank test ($P<0.05$).

Results: Current study showed that there was a statistically significant decrease in the time to perform the 5CST ($P=0.01$) and 3mWT ($P=0.03$) and an increase of the HS ($P=0.03$) indicating an improve of lower limb functionality.

Conclusion: WBVE may be used to increase functionality of KOA subjects, probably by physiological responses to the mechanical vibration. Moreover, the comfortable posture of the subjects may

be an incentive to perform a physical activity in this population in a safe way for knee joint.

P1119

EFFICACY OF GENERIC INTRAVENOUS ZOLEDRONIC ACID IN THE TREATMENT OF OSTEOPOROSIS: BELARUSIAN DATA

H. N. Ramanau¹, E. V. Rudenka², A. V. Rudenka³, N. F. Charnova⁴, V. Y. Samakhavets⁵, G. A. Babak⁶

¹Gomel State Medical University, Gomel, ²Belarusian State Medical University, Minsk, ³Belarusian Medical Academy of Postgraduate Education, Minsk, ⁴Republican Scientific Center for Radiation Medicine and Human Ecology, Gomel, ⁵Minsk City Clinical Hospital, Minsk, Belarus, ⁶Minsk City Clinical Hospital, Minsk, Belarus

Objective: The aim of this retrospective, single-center, non-interventional study was to evaluate the effectiveness and safety of once-yearly intravenous infusion of 5 mg/100 mL of generic zoledronic acid (ZA) (Belarus, Belmedpreparaty) in patients with osteoporosis for 3 years period.

Methods: We have analyzed data of patients, who were treated with IV ZA in the Minsk city hospital No. 1 for the period from January 2013 to December 2017. Inclusion criteria: age from 18 up to 90 years; established diagnosis of osteoporosis with or without the history of low-energy fractures; availability of the results of DXA of lumbar spine (LS) and proximal femurs (PF), performed not earlier than 3 months prior to administration of the drug (BMD₁) and after 36 (±2) months after first administration (BMD₂). All subjects received 5 mg of ZA every 12 months and supplements of calcium (1000 to 1200 mg/d) with vitamin D₃ (from 400-1000 IU/d). The primary efficacy endpoint was the change in BMD from baseline after 36 months of yearly ZA treatment.

Results: The study cohort comprised 64 patients (61 women and 3 men) with mean age 64.1 (SD 12.1) years and mean body weight of 60.9 (SD 12.6) kg. Repeated BMD measurements were performed in 52 patients who received 3 IV of ZA. Statistically significant positive trend of BMD was observed in all patients at lumbar spine (LS) (+0.044 (95%CI 0.032-0.056) g/cm²) and at proximal femurs (PF) (+0.024 (95%CI 0.019-0.032) g/cm²). The percentage of increase in BMD at PF was 5.14%, at left FN.

Conclusion: Effectiveness of 3-year administration of generic zoledronic acid was confirmed by positive dynamics of BMD in the LS and PF.

P1120

THE RIGHT CHOICE OF TREATMENT IN CHONDROSARCOMA: CASE REPORT

M. Pleniceanu¹, M. Popa¹, M. Nica¹, Z. Panti¹, C. Cirstoiu¹, R. Ene¹

¹Emergency University Hospital of Bucharest, Bucharest, Romania

Objective: To showcase the importance of the right choice of treatment in patients with chondrosarcoma tumors.

Methods: We present the case of a 59 years old male, that came to our clinic with a long history regarding the treatments he underwent for his distal femur chondrosarcoma. The patient was first diagnosed 7 years ago in a different clinic, where he had the tumor removed and the remaining void was filled with cement. At that stage the histopathologic result was chondrosarcoma G1. After a period of 3 years, the patient suffered a fracture of the distal femur, for which a dynamic condylar screw was used to fixate. After 3 more years the patient came to our clinic with a massive recurrence at the initial site. From the investigations resulted that the tumor was spread in the soft tissues surrounding the distal femur, as well as the knee. A biopsy was made initially and the result was chondrosarcoma G2. A wide resection of the distal femur was performed, with the implantation of an intramedullary long nail with cement on it between the remaining proximal femur and the tibia (Campanacci method). During the days after the surgery the patient developed an ischemic syndrome and the amputation of the proximal femur was performed.

Results: From the first choice of treatment, the chain of events brought this patient to the end result of proximal femur amputation. After the regular CT scan follow-ups the patient showed a promising prognosis, with no detectable recurrences.

Conclusions: The choice of treatment from the previous clinic played a major role in the end outcome. This case shows the importance of choosing the correct treatment, with various implications for both the patients and surgeons alike.

P1121

CLINICAL PRESENTATION AND MANAGEMENT OF PATIENTS WITH PRIMARY HYPERPARATHYROIDISM IN ITALY

F. Saponaro¹, F. Cetani², A. Repaci³, U. Pagotto³, C. Cipriani⁴, J. Pepe⁴, S. Minisola⁴, C. Cipri⁵, F. Vescini⁵, A. Scillitani⁶, A. Salcuni⁶, S. Palmieri⁷, C. Eller-Vainicher⁷, I. Chiodini⁷, B. Madeo⁸, E. Kara⁸, E. Castellano⁹, L. Gianotti⁹, G. Borretta⁹, F. Romanelli¹⁰, V. Camozzi¹¹, A. Faggiano¹², S. Corbetta¹³, L. Cianferotti¹⁴, M. L. De Feo¹⁵, A. Palermo¹⁶, G. Vezzoli¹⁷, F. Maino¹⁸, M. Scalese¹⁹, C. Marcocci²⁰

¹Department of Surgica, Medical, Molecular Pathology and of Critical Area, University of Pisa, Pisa, ²Department of Clinical and Experimental Medicine, University of Pisa, Pisa, ³Division of Endocrinology Department of Medical and Surgical Sciences, University of Bologna, Bologna, ⁴Department of Internal Medicine and Medical Disciplines 'Sapienza' University, Rome, ⁵Endocrinology and Metabolism Unit University-Hospital of Udine, Udine, ⁶Endocrinology Unit, "Casa Sollievo della Sofferenza," IRCCS, San Giovanni Rotondo, ⁷Unit of Endocrinology Fondazione IRCCS Cà Granda-Ospedale Maggiore Policlinico, Department of Clinical Sciences and Community Health, University of Milan, Milan, ⁸Unit of Endocrinology, Azienda Ospedaliero-Universitaria di Modena, Ospedale Civile di Baggiovara, Modena, ⁹Division of Endocrinology, Diabetes and Metabolism, Santa Croce and Carle Hospital, Cuneo, ¹⁰Department of Experimental Medicine, Sapienza University of Rome, Rome, ¹¹Endocrine Unit, University of Padova, Padova, ¹²Endocrinology, Federico II University of Naples, Naples, ¹³Endocrinology Service, Department of Biomedical Sciences for Health, IRCCS Istituto Ortopedico Galeazzi, Milan, Milan, ¹⁴Department of Internal Medicine, University of Florence, Florence, ¹⁵Endocrinology Unit, Careggi Hospital and University of Florence, Florence, ¹⁶Department of Endocrinology and Diabetes, University Campus Bio-Medico, Rome, ¹⁷Nephrology and Dialysis Unit IRCCS Ospedale San Raffaele, Milan, ¹⁸Department of Medical, Surgical and Neurological Sciences, University of Siena, Siena, ¹⁹Institute of Clinical Physiology, National Council of Research, Pisa, ²⁰Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy

Objective: Evaluation of the phenotype of primary hyperparathyroidism (PHPT), adherence to International Guidelines for parathyroidectomy (PTx), and rate of surgical cure.

Method: From January 2014-January 2016, we performed a prospective, multicenter study in patients with newly diagnosed PHPT. Biochemical and instrumental data were collected at baseline and during one-year follow-up.

Results: Over the first year we enrolled 604 patients (age 61±14 yrs), mostly women (83%), referred for further evaluation and treatment advice. 566 patients had sporadic PHPT (93.7%, age 63±13 yrs), the remaining 38 (6.3%, age 41±17 yrs) had familial PHPT. The majority of patients (59%) were asymptomatic. Surgery was advised in 281 (46.5%). Follow up data were available in 345 patients. Eighty-seven of 158 (55.1%) symptomatic patients underwent PTx. Sixty-five (53.7%) of 121 asymptomatic patients with at least one criterion for surgery underwent PTx and 56 (46.3%) were followed without surgery. Negative parathyroid imaging studies predicted a conservative approach [symptomatic PHPT: OR 18.0 (95%CI 4.2-81.0) p<0.001; asymptomatic PHPT: OR 10.8, (95%CI 3.1-37.15) p<0.001]. PTx was also performed in

16 of 66 (25.7%) asymptomatic patients without surgical criteria. Young age, serum calcium concentration, 24-h urinary calcium, positive parathyroid imaging (either ultrasound or MIBI scan positive in 75% vs. 16.7%, $p=0.001$) were predictors of parathyroid surgery. Almost all (94%) of patients were cured by PTx.

Conclusions: Italian endocrinologists do not follow guidelines for the management of PHPT. Negative parathyroid imaging studies are strong predictors of a non-surgical approach. PTx is successful in almost all patients.

P1122

ROLE OF KLOTHO RS9536282 GENE POLYMORPHISM ON BMD IN MEXICAN CHILDREN AND ADOLESCENT WITH TURNER SYNDROME

N. A. B. Altamirano-Bustamante¹, L. T. M. Torres-Maldonado¹, R. B. R. Barrientos-Ríos¹, M. A. B. Altamirano-Bustamante², R. P. Ríos¹, V. J. Velazquez¹, M. C. H. Murata¹, M. B. Molina¹, M. Mora-Tiscareño¹, P. J. Paredes¹, V. A. Valderrama¹, M. H. Montesinos¹, R. C. Robles¹, A. V. L. Arguinzoniz-Valenzuela¹, R. Ruiz-Reyes¹, V. C. Villaroel¹, D. C. V. Del Castillo¹, C. L. R. Calzada-León¹, C. A. Carnevale¹, F. S. Frías³

¹Instituto Nacional de Pediatría, ²Instituto Mexicano del Seguro Social,

³Instituto Nacional de Pediatría, UNAM, Mexico City, Mexico

Objective: To date, the cause of the great phenotype-genotype variability has not been identified and candidate genes are being searched. We aimed to describe the distribution of the rs9536282 polymorphism of the Klotho gene and its association with BMD in girls with TS.

Methods: Patients with TS, who were determined the BMD of three regions by DXA. DNA was extracted by Qiagen, with analysis of 74 samples of controls 46XX. SNP rs9536282 of the Klotho gene was detected, through the KASP method, the effects of polymorphism and karyotype were analyzed by general linear model, and the project was authorized by the Research and Ethics Committees of the INP.

Results: We present 45 patients, 27 45X and 18 with other cytogenetic findings. 45X patients tend to have lower bone mineral content ($p=0.072$). The genomic distribution of the polymorphism was different from that of the controls. Heterozygous TC predominated in patients with TS (20% vs. 10.7%) and was associated with lower total body BMD ($p=0.008$).

Conclusions: This study shows the possible association of the polymorphism rs9536282 of the Klotho gene to explain the variability of bone health in TS. CT heterozygous patients have lower total body BMD.

P1123

PSEUDOARTHROSIS OF STRUCTURAL ALLOGRAFT AFTER SEGMENTAL RESECTION OF TUMOR IN THE FEMUR

A. C. Urgel¹, M. Oisca¹, M. Royo¹, A. Rillo¹, M. P. Muniesa¹, A. Castro¹

¹Obispo Polanco, Teruel, Spain

Objectives: The use of structural bone allograft is a good option for the treatment of broad segmental resections in long bones. The clinical results and the appearance of possible complications will depend on the integration of the allograft with the patient's bone. The aim of this study is to review the gold standard treatment of pseudoarthrosis after extensive segmental resections in long bones.

Methods: We present the review of a clinical case of a 58-year-old woman with a pathological fracture in left femur, with segmental resection of the tumor (hemangioma), structural allograft placement and stabilization with intramedullary femoral nail.

Results: At 5 years after surgery the patient came with sudden pain of femur, presenting rupture of the intramedullary osteosynthesis with absence of consolidation of the structural bone allograft at the distal level. A new surgical procedure was performed with extraction of the broken nail and a plate of large fragments was placed with spongy allograft. At 12 weeks of surgery the patient returned to the emergency department because of increased pain in the affected limb, with rupture of the plate

being observed. Another surgery was performed again for extraction of the plate and new osteosynthesis with a milled intramedullary nail. The presence of a pseudoarthrosis after a fracture is a challenge for the orthopedic surgeon. The use of autologous grafting remains the gold standard for the treatment of this process. However, donor site morbidity may influence the use of other alternatives.

Conclusions: Pseudoarthrosis of long bones is a complication that is difficult to solve on many occasions, since many factors influence the stability of osteosynthesis and the biological characteristics of the bone itself.

P1124

SEVERE BONE COMPLICATIONS IN BETA THALASSEMIA MAJOR: STILL POSSIBLE IN SPITE OF CURRENT THERAPEUTIC PROGRESSES

M. Iancu¹, A. Albu¹

¹Elias Hospital, Endocrinology Department, Bucharest, Romania

Osteoporosis is a prominent cause of morbidity in thalassaemia major patients. Because of the latest advances in transfusion and chelation therapy the incidence and severity of osteoporosis in these patients has decreased significantly. Nontransfused or poorly transfused patients develop bone distortion mainly due to ineffective haematopoiesis and progressive marrow expansion, ultimately leading to osteoporosis and bone fractures. We present the case of a 40 years old patient with BTM major, diagnosed at 1 year of age, nonsplenectomised (the patient refused surgical intervention), noncompliant to transfusion and chelation therapy. He presented multiple complications associated with thalassaemia: cardiac insufficiency, hepatosplenomegaly, portal hypertension, and osteoporosis with multiple fragility fractures. The patient was diagnosed with osteoporosis at the age of 24 and he received recommendation for treatment with bisphosphonates. Unfortunately, he did not tolerate the prescribed treatment, reporting allergic reactions for alendronate and risedronate. His past medical history revealed multiple fragility fractures: right tibial fracture, left radius fracture, L3 vertebral fractures. At the age of 39, he was admitted in a neurosurgical department, where the MRI investigation revealed multiple tumoral formations at the level of thoracic, lumbar and sacral spine and a neurologic Frankel D incomplete lesion. Laboratory investigations revealed anemia (Hb=8.1 g/dl) and severe iron overload (serum ferritin=1973 ng/ml). There were multiple paravertebral nodular tumoral processes on the spine X-ray suggestive for extramedullary haematopoiesis. After excluding a malignant etiology of the tumoral bone formations he received treatment with teriparatide. The patient tolerated well the anabolic therapy, with good compliance and increasing BMD (from 0.690 g/cm² to 0.748 g/cm²) at one year evaluation indicating good response to therapy. Also, bone formation markers increased suggesting adequate response to therapy (? , nu am valorile). No additional fractures where depicted at spine X-ray. Despite the reduction of morbidity caused by osteoporosis in BTM due to the therapeutic progresses, there still remain patients with severe bone affliction. In such cases, the correction of the anemia, improvement of the chelation therapy and anabolic medications remain the ultimate therapeutic resource.

P1125

CORRELATION BETWEEN ANTHROPOMETRIC PARAMETERS OF LOCAL PATIENT POPULATION AND HAMSTRING GRAFT DIAMETER IN ACL RECONSTRUCTION

M. Nica¹, Z. A. Panti¹, M. Popa¹, M. Pleniceanu¹, R. Ene¹, C. Cirstoiu¹

¹University of Medicine and Pharmacy Carol Davila Bucharest, Bucharest, Romania

Objective: To patients for an adequate quadrupled hamstring graft diameter used for the primary arthroscopic anterior cruciate ligament reconstruction.

Methods: A number of 66 cases which required primary ACL reconstructions were evaluated in terms of anthropometric variables. Using statistical analysis (bivariate correlation) the measured height, weight and BMI of the patients were correlated with the final semitendinosus and gracilis quadrupled graft diameter and with the short term results regarding the incidence of graft failure.

Results: A graft diameter of 7 mm or more was registered in 90.9% of the cases with the strongest positive correlation between measured height of the patient and the graft diameter ($r=0.51$) and moderate strength of association when relating the BMI and weight of the individuals to the anthropometric parameters registered for each case. The short term (1 year) incidence of graft failure was low with only one case recorded, which did not present with inadequate size graft or extreme anthropometric measurements.

Conclusion: One of the most important factors for the preoperative planning and success rate of arthroscopic reconstruction of ACL is the graft size (diameter and length). If the length is usually not the limiting factor a minimum of 7 mm (8 mm for patients under 20 years old) for the graft diameter is considered safe for a reliable and predictable result. Out of the characteristic anthropometric parameters of the local population it seems that height is one of the most reliable factors in predicting the graft size and especially the diameter before surgery. Nevertheless the characteristic variations of different anthropometric factors in populations must be considered and no mathematical equation for estimating graft parameters was generally accepted yet.

P1126

ASSESSMENT OF DISABILITY AND QUALITY OF LIFE IN HIP OSTEOARTHRITIS PATIENTS

D. Matei¹, S. Patru¹, R. Marcu¹, A. Bighea¹

¹University of Medicine and Pharmacy Craiova, Craiova, Romania

Objective: Osteoarthritis is a long-term disease that affects especially aged people. Impairments of hip osteoarthritis, as a direct result of OA and as a cause for the associated pain and immobility, impose a substantial health care payers. The aim of this study is to investigate the disabilities and to evaluate the quality of life in patients with hip osteoarthritis.

Method: The patients (N:81) included fulfilled the ACR criteria for hip OA. They rated both their disease status and pain on a visual analog scale (VASg; VASd) and we used MHAQ to assess how the OA influenced their daily life. The study found significant correlations between these parameters in various groups.

Result: The rural/urban ratio was 4/2, 57% of all patients having a BMI above average. The presence of pain had sleeping repercussions (R 0.612) for almost 60% of the patients taken into account. The MHAQ was significantly correlated with the level of pain (R 0.723), especially for females and patients living in the rural area. In the same groups, the disease status did not influence the patients daily life (R 0.217).

Conclusion: Complex evaluation showed the impact of the functional status on the life quality of patients with hip OA, thus supporting the importance of complex therapy orientation according to symptoms and disabilities induced by the degenerative process.

P1127

THE PROBLEM OF RISK OF FALL AND ABILITY OF RISE UP IN WOMEN WITH OSTEOPOROSIS

A. Szczygielska-Babiuch¹, K. Smakowska², M. Lipińska-Stańczak³, S. Podsiadło¹

¹Małopolskie Centrum Krioterapii, Zakład Rehabilitacji w Krakowie, Akademia Krakowska im. A. Frycza Modrzewskiego, Wydział Lekarski i Nauk o Zdrowiu, Kraków, ²Gabinet rehabilitacji Fizjoactive, Kutno, ³Uniwersytet Jana Kochanowskiego w Kielcach, Wydział Lekarski i Nauk o zdrowiu, Kielce, Poland

Objectives: Osteoporosis is a disease affecting the whole human skeleton characterized by a reduced mechanical strength of the skeleton, which increases the risk of its fracture. Decreased physical activity and the appearance of disorders in the stability of posture and balance system cause an increased risk of falls. Striving to improve coordination and balance capacity is primarily aimed at improving mobility and increasing independence in life.

Methods: The study involved 262 women between 60 and 65 years old, suffering from osteoporosis and healthy. The average age of women with osteoporosis was 63±1.8 years, and healthy 62±1.9 years. The Senior Fitness Test was used to assess the level of physical activity. The risk of fall was assessed by Tinetti POMA and TUG. The ability to rise after fall was assessed using the Sit & Rise Test and Get up from lying on the floor tests.

Results: In the assessment of lower body strength, the result below the norm was obtained by 37.03% of patients with osteoporosis. Oxygen resistance below standard was observed in 40% of women with osteoporosis. In the assessment of upper body flexibility, the result below the norm was noted in 48.15% of women with osteoporosis. The fall risk assessment in the Tinetti POMA test showed that women with osteoporosis (57.77%) and (63.41%) healthy did not show a tendency to fall. TUG results show that 74.07% of women with osteoporosis and 83.74% of healthy ones don't show any risk of falling. Women with osteoporosis in 89.63% had no problems with rising after the fall, 6.66% had difficulty completing the task, and 2.96% were unable to perform it.

Conclusions: In both groups a reduced level was observed in at least three examined aspects. In both groups, no significant differences in the risk of falling were observed. Women with osteoporosis do not have major problems with rising after falling.

P1128

BENEFITS OF PHYSICAL THERAPY IN PERIARTHRITIS SCAPULOHUMERALIS

D. Matei¹, S. Patru¹, R. Marcu¹, A. Bighea¹

¹University of Medicine and Pharmacy Craiova, Craiova, Romania

Objective: Most people with PSH have difficulty reaching overhead and reaching to the low back. The treatment of PSH usually requires an aggressive combination of anti-inflammatory medication, cortisone injection into the shoulder and physical therapy. The purpose of this study was to examine the efficiency of an individualized, properly followed kinetic program on patients with PSH.

Methods: the study took place in the Rehabilitation Clinic of the University County Hospital in Craiova and included 43 patients diagnosed with periartthritis scapulohumeralis with ages between 37-68. They were evaluated before and after physical therapy that they learnt in the hospital and continued at home. The VAS scale, the Lee index and the range of motion.

Results: Compared to the first evaluation, significant difference was found for all items taken into consideration. The best benefit was registered for the level of pain, stated by the decrease of VAS scale from an average of 6.2 to 3.5. The changes in the range of motion were: from an average of 135° to 165° for flexion, from 35° to 50° for extension, from 140° to 160° for abduction, from 50° to 74° for internal rotation and from 42° to 56° for external rotation. The LEE functional index dropped from an initial total of 6 for all 17 questions in the beginning to a total of 4.

Conclusion: Making patients aware from the beginning of the purposes and possible effects physical exercise may have was determinant for building proper motivation and thus leading to better outcomes. The most important role of a kinetic program, as part of a complex medical care in patients with PSH, is an increase in quality of life.

P1129

SEVERE OSTEOPOROSIS AS THE SOLE EXPRESSION OF SYSTEMIC MASTOCYTOSIS IN A YOUNG MAN: CASE REPORT

A. Sucaliuc¹, D. Coles², A. Teodorescu³, D. Grigorie¹¹National Institute of Endocrinology, Carol Davila University of Medicine, ²National Institute of Endocrinology, ³Anima Medical Clinics, Bucharest, Romania

Osteoporosis is the most prevalent bone involvement in systemic mastocytosis.

Case report: A 36 years old man was referred to our bone department with multiple vertebral fractures discovered by MRI (T12, L1, L3, L4). Family and personal history were negative for metabolic bone diseases. Clinical findings: back pain, muscle weakness; no symptoms or signs of systemic mastocytosis. Lumbar spine and femoral neck BMDs by DXA were 0.653 g/cm² (T-score -4.5 SD, Z-score -5.2 SD) and 0.645 g/cm² (T-score -2.8 SD, Z-score -3 SD), respectively. Blood chemistries showed mildly elevated total proteins, mild anemia, normal ESR, normal osteocalcin, high CTX 0.53ng/ml (N: 0.158-0.442), vitamin D insufficiency (19.73 ng/ml). Results of other standard tests for secondary osteoporosis including calcium, phosphorus, kidney and liver function, thyroid function, testosterone level, and urinary free cortisol were normal. Further testing revealed a high serum tryptase level of 43.4 ug/l. Bone marrow biopsy confirmed the diagnosis of mastocytosis: tryptase positive mast cell infiltration expressing CD25; *c-kit* codon 816 mutation was also confirmed. The treatment was started with oral disodium cromoglycate 800mg/day and bisphosphonates (risedronate for 6 weeks and iv 5 mg zoledronate thereafter). At the one year follow-up LS BMD showed a mild improvement of 4%, but more vertebral fractures were found on radiological assessment at T7, T11, L2, despite clinical improvement with back pain resolution. No other specific cutaneous or systemic symptoms occurred.

Conclusion: This case highlights the need to consider systemic mastocytosis as a cause of osteoporosis especially in young patients with or without skin involvement.

P1130

LOSS OF BONE MASS IN YOUNG ADULT WITH CAH - CHRONIC GLUCOCORTICOID TREATMENT OR TESTOSTERON IMPAIRMENT? A FAVOURABLE OUTCOME CASE REPORT

E.-T. Oprea¹, D. Calinescu¹, C. Barbu²¹Elias University Hospital, ²Carol Davila University of Medicine Bucharest, Bucharest, Romania

Objective: Steroid 21-hydroxylase deficiency (21OHD) is the most prevalent form of congenital adrenal hyperplasia (CAH). Patients with 21OHD assume a lifelong glucocorticoid (GC) therapy, aiming, among others, to prevent adrenal or testicular adrenal rest tumors. Excessive GC treatment increases the risk of osteoporosis and bone fractures as well as the androgen secretion impairment caused by testicular adrenal rest tumors. We report the case of a 23 year old man, diagnosed at birth with 21OHD, who addressed our clinic for assessment of the chronic substitution treatment (dexamethasone 0.75 mg/d and fludrocortisone 0.1 mg/d).

Results: Electrolytes in balance, normal calcaemia, mild vitD deficiency, unsuppressed ACTH (>2000 pg/ml), high 17-OH progesterone (112 mg/ml) and low DHEA-S (78 ug/dl); the rest of hormonal dosages were normal. Testicular ultrasound revealed 3 hypoechoic images measuring between 0.4-0.7 cm on each testicle. In order to assess the possible mineral loss we performed a total body DXA: BMD=0.876 g/cm² with a Z-score=-2.9 DS. Considering these findings, we recommended a new therapeutic approach: hydrocortisone (20 mg/d) and fludrocortisone (0.1 mg/d). Also, we added AlphaD3 0.5ugr/day to improve the bone mineral mass. After 6 months on the current therapeutic scheme the results were

bittersweet: no significant changes on biological markers, ACTH remains unsuppressed (which seems to suggest an autonomous secretion), the testosterone level was close to the lower limit, but, a great improvement on bone mass - total body BMD=1.045 g/cm², Z-score=-1.1 DS.

Conclusions: Adolescents and adults with 21OHD experience a number of complications, including impairment in bone mass acquisition; transition from pediatric to adult care and management of long-term complications are challenging for both patients and healthcare providers, therefore, the safe transition of adolescents to adult care requires tight follow-up, due to apparent reversibility of bone mineral loss caused either by glucocorticoid long-term therapy or testicular androgen synthesis disorder.

P1131

MAJOR PRINCIPAL STRESS (MPS) DERIVED THROUGH DXA-BASED 3D MODELLING AS A HIGH PREDICTIVE NEW VARIABLE FOR HIP FRACTURE

C. Ruiz¹, L. Del Rio², S. Tassani¹, M. A. González³, L. Humbert⁴, J. Noailly⁵, S. Di Gregorio²¹BCN MedTech, Universitat Pompeu Fabra, ²CETIR Medical Centre, ³Catalan Institution for Research and Advanced Studies, ⁴Galgo Medical, ⁵BCN MedTech, Universitat Pompeu Fabra, Barcelona, Spain

Objective: In this study, we hypothesize that hip fracture risk prediction can be improved by the use of subject-specific finite elements (FE) fall simulations derived through DXA-based 3D modelling.

Methods: DXA femur scans were performed in 77 patients who had recently suffered a fracture and 71 non-fracture controls. For fractured patients, immediate post-fracture X-rays were obtained to assess the characteristics of the fracture. Patient-specific FE femur models were created by combining a DXA-based 3D model (3D-SHAPER, Galgo Medical) and mesh morphing algorithm. Lateral fall was simulated with a maximum velocity depending on the patient's weight and height. Critical regions were identified and analysed through ROC-AUC and support vector machine (SVM) with a 5-fold training-test validation, to identify the best biomechanical parameter for fracture discrimination and prediction.

Results: Major principal stress (MPS) fields resulting from impact simulations match with fracture lines identified in the X-rays for 96% of the 77 cases with neck and intertrochanteric fractures. Posterior ROC-AUC analyses of these zones in the 148 models led to AUC values of 0.99 when trabecular bone MPS was considered. Further SVM analyses revealed that trabecular bone MPS alone could classify 100% fracture and control patients at the neck region. Simulations and ROC-AUC analyses in these critical regions robustly pointed out that trabecular bone MPS best discriminated proximal femur fracture and non-fracture cases.

Conclusion: Finite elements simulations derived through 3D-SHAPER allow capturing the biomechanical behavior of the proximal femur in a fall situation. MPS in trabecular bone was the best descriptor for robust classification of fracture and non-fracture cases. In future work we will investigate if those promising results can be replicated in other cohorts including a larger number of subjects.

P1132

POST-VERTEBRAL MUSCLES CHANGES THROUGH THE ADULT FEMALE LIFESPAN AND THE ASSOCIATION WITH BMD

L. Wang¹, X. Li¹, W. Cai¹, X. Cheng¹¹Department of Radiology, Beijing Jishuitan Hospital, Beijing, China

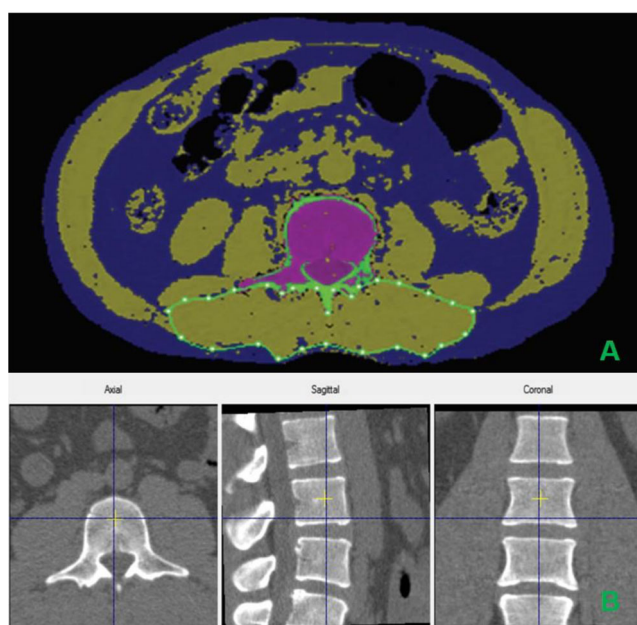
Objective: Sarcopenia is the loss of muscle mass and function that occurs with ageing. Body composition and muscle function have important implications for falls and fractures in older adults. We investigated the effects of aging on post-vertebral muscles changes and the association with BMD.

Methods: In this cross-sectional study, we used clinical quantitative computed tomography (QCT) of the lumbar spines to investigate aging effects

in 517 healthy female volunteers aged 21 to 81 years (42.3 ± 13.6 years). With respect to the acquirement of CT scans, our study enrolled a subset of the whole participants in a study of establishment of clinical and biospecimen information integration platform for orthopaedic degenerative diseases. QCT was used to measure the trabecular BMD of Lumber 2-4. The intramuscular fat area, skeletal muscular area and muscle fat ratio of the post-vertebral muscles of Lumber 3 level were analyzed by QCT Tissue Composition Module. We used a ANOVA to evaluate their associations with height, weight and age of age-groups and linear regression analysis was performed to explore the relationship between age and the intramuscular fat and the muscle.

Results: Age was the principal determinant of both post-vertebral muscles degeneration and BMD. Age had significantly different effects within muscle, fat and BMD. The muscle fat ratio was positively correlated with mean L2-4 BMD ($r=0.57$, $p<0.0001$). Compared with young women, elderly subjects had relative loss of post-vertebral muscles but strikingly increased intramuscular fat. At 21-30 years old age group, the muscle area was 38.6 cm^2 , whereas at 71-81 years it was 30.5 cm^2 . By contrast, at young women (aged 21-30 years) mean intramuscular fat area was 2.9 cm^2 , whereas at 71-81 years it was 11.0 cm^2 .

Conclusion: Elderly women had relative loss of post-vertebral muscles compared with young women but strikingly increased intramuscular fat.



P1133

A NOVEL METHOD FOR ESTIMATING NAIL-TRACT BONE DENSITY FOR INTERTROCHANTERIC FRACTURES

L. Wang¹, Y. Lin², X. Cheng¹, X. Gao²

¹Department of Radiology, Beijing Jishuitan Hospital, Beijing, ²Suzhou Institute of Biomedical Engineering and Technology, Chinese Academy of Sciences, Suzhou, China

Objective: Early surgical treatment is the preferred choice for unstable intertrochanteric fractures. However, poor-quality bone might be one of the most important causes of cut-out or pull-out complications. Thus, measurement of nail-tract BMD may clarify bone quality and improve preoperative planning for unstable intertrochanteric fractures. We conducted a study to test a new method for quantifying the spatial volumetric BMD (vBMD) of nail tracts.

Methods: Automatic calculation of average vBMD of nail tracts requires 3 main steps. First, we built a standard nail tract in a proximal femur

template. Then, we mapped the proximal femoral structure for each patient to the template by registering the patient's body with the template so that the nail tract corresponded to the standard nail tract. Finally, we calculated and visualized the average vBMD distribution of the nail tract. To verify the feasibility of the method, we enrolled 75 patients (52 women, 23 men) with hip fractures in our study to compare measurements. The root mean square of the standard deviation (RMSSD) and coefficient of variation (CV) of the RMSSD (CV-RMSSD) were used to calculate intraoperator and interscan precision. The Mann-Whitney U test was used to compare the average vBMD of nail tracts for the proximal femoral nail antirotation and the gamma nail.

Results: The feasibility and reproducibility of this method can be proved by findings regarding intraoperator and interscan precision. Intraoperator precision ranged from 1.4-7.9%, and interscan precision ranged from 4.1-7.7%. There was no significant difference in the average vBMD between patients with PFNAs and those with GNs ($p>0.05$).

Conclusions: The method we introduced is accurate for determining the average vBMD, which may provide a reference index for selection of appropriate intramedullary nails for individual patients.

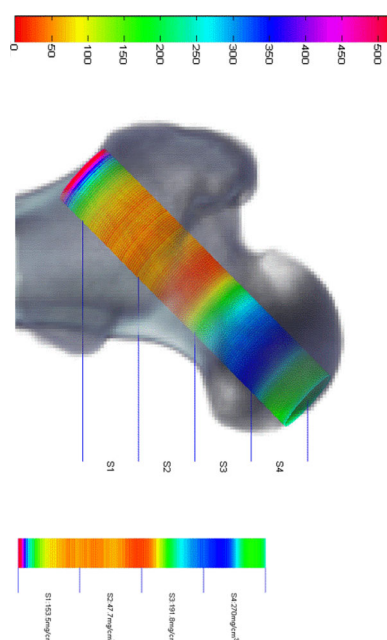


Table 1 Intraoperator and Interscan Reproducibility of Nail-Tract BMD Estimation

Site	Intraoperator Reproducibility		Inter	
	Operation 1 (n=29)	Operation 2 (n=29)	RMSSD	CV-RMSSD
S1	105.6±44.2	104.8±43.4		
S2	33.5±35.9	32.5±35.1		
S3	152.2±43.3	151.0±41.9		
S4	161.9±47.4	161.647.9±		

P1134

EXPERIMENTAL PREDICTION OF HIP AND PELVIC FRACTURES DUE TO FALLS TO THE SIDE

I. Fleps¹, A. Fung¹, P. Guy², S. J. Ferguson¹, B. Helgason³, P. A. Crompton⁴

¹Institute for Biomechanics, ETH Zürich, Zürich, Switzerland, ²Division of Orthopaedic Trauma, Department of Orthopaedics, University of

British Columbia, Vancouver, Canada, ³Institute for Biomechanics, ETH Zürich and School of Science and Engineering, Reykjavik University, Zürich, Switzerland, ⁴Orthopaedic and Injury Biomechanics Group, Departments of Mechanical Engineering and Orthopaedics and the School of Biomedical Engineering, University of British Columbia, Vancouver, Canada

Objective: There is ample evidence showing that majority (>90%) of hip fractures in the elderly is associated with a low trauma fall. The current clinical standard for establishing elevated risk of a hip fracture, areal BMD (aBMD), predicts less than half of population based hip fractures that are the result from a fall. [1] Injurious loads cannot be studied in vivo for ethical reasons. Biofidelic cadaveric impact experiments are an ethical alternative. We hypothesized, that, by subjecting specimens to boundary conditions and input energy representative of a fall to the side from standing height, we would be able to create clinically relevant fractures and observe non-fractures.

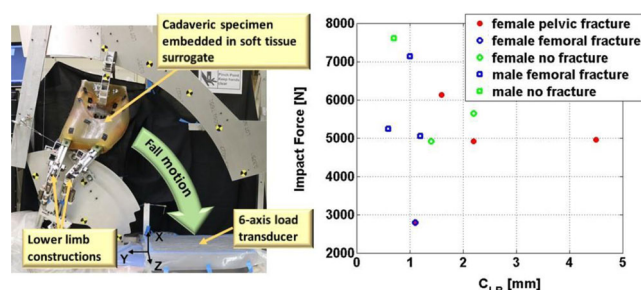
Methods: Eleven cadaveric pelvis-femur constructs (6 female, 5 male) were embedded in surrogate soft tissue and attached to individual lower limb structures. Subject specific inertia driven impacts were achieved by controlling the mass and inertia of the soft tissue and lower limbs. Subject specific impact force, pelvic deformation, BMD, and fracture outcome were recorded for each specimen.

Results: Figure 1 shows the maximum impact load over pelvic compression (C_{LR}), while highlighting the fracture outcomes and specimen gender. We observed 5 femoral fractures, 4 pelvic fractures, and 3 non-fracture outcomes. One specimen experienced both a femoral and a pelvic fracture. Femoral fractures were 1 femoral neck fracture and 4 intertrochanteric fractures. Pelvic fracture were shear fractures at the pubic ramus. Statistically significant differences were observed between the pelvic compliance between female and male specimen (Mann-Whitney U test, $p<0.05$)

Conclusion: The presented protocol is the first cadaveric impact protocol to create clinically relevant femoral fractures, pelvic fractures, as well as non-fractures, indicating that pelvic compliance might be an important factor for the prediction of subject specific fracture outcomes. We believe that this protocol may hold the key to answering the question: What predisposes a hip to fracture?

Reference:

1. Stone KL et al. JBMR 2003;19:47



P1135

IS ULTRASOUND A PRAGMATIC TOOL IN SARCOPENIA DIAGNOSIS OF RHEUMATIC PATIENTS?

O.-E. Branea¹, M. I. Ichim¹, O. D. Pop¹, M. Copotoiu¹

¹Clinical Emergency Hospital of Targu Mures, Targu Mures, Romania

Objective: To determine the power of ultrasound as an awareness instrument for sarcopenia early prevention and diagnosis, in rheumatic diseases as ankylosing spondylitis(AS), psoriatic arthritis(PA) and osteoarthritis(OA).

Methods: An intention to treat study was performed on 158 patients. Patients' muscle mass evaluation following the formula: MAC=mid-arm circumference - (3.14 x triceps skinfold thickness), with low muscle mass as MAC<21.1 cm in men and MAC <19.2 cm in women[1], ultrasound examination (US) (muscular inflammation assessment of long head of biceps and

supraspinatus) and handgrip dynamometer test, for low muscle strength <30 kg in men and <20 kg in women[2] were completed. Statistical analysis was performed using GraphPad Prism 7. Ink and a $p<0.05$ was used as a reference.

Results: Out of 158 patients, 67% were diagnosed with inflammatory diseases (73 AS, 33PA) and 33% with degenerative disease (52 OA). Concerning the BMI, all 3 groups were anthropometrical homogenous ($p=0.28$). Osteophytes ($p=0.0259$), calcifications ($p=0.0131$) and step-down lesions ($p=0.0144$), as seen in US for AS, PA, OA, were statistically significant. MAC revealed low muscle mass ten times higher in men (11.67% AS, 10.36% PA) and five times higher in female (5% AS, 6.90% PA) with inflammatory diseases. Moreover, dynamometer tests pointed out a great difference between men with inflammatory diseases (94.45% AS and PA) and OA (5.62%). There was a positive correlation in PA ($p=0.034$, $r=-0.401$), regarding the ultrasound and dynamometer tests. Also, scapulo-humeral enthesophytes and supraspinatus calcifications were predictors for sarcopenia when compared to dynamometer tests ($p=0.005$ and $p=0.049$). Furthermore, low MAC could be associated with supraspinatus osteophytes ($p=0.015$) and enthesophytes ($p=0.015$) in AS and with step-down lesions ($p=0.036$) in OA.

Conclusions: Finally, US has an important impact in determining sarcopenia and it should be considered when investigating sarcopenia in rheumatic patients.

References:

1. Landi F et al. Clin Nutr 2012;31:652
2. Cruz-Jentoft AJ et al. Age Ageing 2010;39:412

P1136

POSTPARTUM OSTEOPOROSIS: UNCLEAR CAUSES AND TREATMENT

I. M. Nistor¹, L. Mazalu¹, I. M. Lambrescu¹, S. Fica¹

¹"Elias" University Hospital, Endocrinology, Diabetes and Nutrition Diseases Department, Bucharest, Romania

Objective: Postpartum osteoporosis is a rare disorder with unknown etiology that leads to vertebral body fragility fractures. Some studies suggest that the pathogenesis involves hereditary factors. Other hypothesis is that pregnancy masks preexisting osteoporosis; also the changes in calcium metabolism during pregnancy and lactation might contribute to the onset of osteoporosis. The main complaint of this disease is severe pain in the lower back, often diagnosed not as an osteoporosis-related fracture, but rather as another pregnancy associated problem.

Case report: A 33-year-old female patient, Caucasian, with no family history of osteoporosis, was admitted to our department with postpartum osteoporosis, diagnosed 6 month after delivery. Our patient developed disabling lower back pain in the next 2-3 days postpartum, that improved gradually upon the next 4-5 months. She had no history of fractures, abnormal menstrual cycle, corticosteroid therapy, smoking or alcohol intake. Patients medical history included congenital cardiovascular disease (surgically corrected), thrombophilia and four spontaneous miscarriages, for which she was treated with enoxaparin during pregnancy. Clinical examination showed normal BMI, with no height reduction and no back pain. Further laboratory testing ruled out secondary causes of osteoporosis: normal levels of TSH, fT4, cortisol, PTH, 25-OH-vitamin D, osteocalcin, slightly elevated level of β -CrossLaps. Lumbar MRI scan showed multiple discrete vertebral compressions L1-L5. After treatment with denosumab for 1.5 years and one year with zoledronic acid the DXA results showed: L1-L4 BMD increased from 0.782-0.819g/cm², Z-score from -3.4DS to -3.2DS and T-score from -3.5DS to -3.3DS. Treatment was maintained with zoledronic acid, vitamin D and calcium until next evaluation.

Conclusion: Due to the lack of controlled trials, there are no guidelines for treatment of postpartum osteoporosis but bisphosphonates in conjunction with calcium and vitamin D supplements were used successfully. However, BMD appears to plateau relatively soon during this therapy. Recent studies consider adding teriparatide in young patients with multiple vertebral fractures, others recommend a combination therapy of vitamins D and K that may increase BMD.

P1137

SARCOPENIA AND DIABETES: THE LONGEVITY OF OUR MUSCLES IS AT RISKT. Harrabi¹, H. Zahra¹, M. Khiari¹, R. Mizouri¹, A. Temessek¹, N. Fendri¹, F. Ben Mami¹¹National Institute Of Nutrition and Food Technology of Tunis, Tunis, Tunisia

Muscles play various important roles in the human body, thus, loss of muscle mass and strength can cause a diverse range of functional disability and metabolic derangements in older adults. Sarcopenia has been closely related to many clinical consequences, including functional disability, metabolic impairment, increased cardiovascular risk, and mortality. Furthermore, rising prevalence of diabetes in elderly and its impact dictate a priority interest by the geriatric practice community. The aim of our study is to determine the prevalence of sarcopenia in a group of diabetic patients and explore some risk factors. We included 62 patients with type 2 diabetes aged 50 years and older. We excluded participants who had type 1 diabetes, acute disease, liver disease, renal failure, dysthyroid or under corticosteroid treatment. Body composition was analyzed using octapolar bioelectrical impedance analysis (BIA) and we calculated the appendicular skeletal muscle mass index (ASMI) as the sum of muscle mass in the four limbs divided by height squared. We also calculated skeletal muscle mass index (SMI) using BIA predicted skeletal muscle mass (SM) equation defined by Janssen et al. Considering the definition of the European Working group on sarcopenia in Older People, we assessed in addition the muscle function measured by hand-grip strength (HGS) using electronic hand dynamometer.

The mean age of the studied group were 61.5 (± 7) years with 62.9% were female. The medium duration of diabetes were 14 (± 8) years and the mean glycated haemoglobin (HbA1c) were 10% (± 1.4). These following anthropometric characteristics were determined as means of our group: the medium BMI was 30.8 kg/m² (± 7.12), the mean waist circumference was 103.4 cm (± 14.4), the mean ASMI was 8.17 kg/m² (± 1.23), the mean SMI was 8.22 kg/m² (± 1.3), the mean fat mass index was 10.94 kg/m² (± 5.65) and the medium HGS was 26 $\pm$ 6.7 kg. The prevalence of sarcopenia was 11.3% according to ASMI and was 9.7% according to SMI. As the European Consensus definition criteria, 30.6% were presarcopenic and 29% had a low HGS. A significant relation were found between sarcopenia and hypertension ($p=0.013$), dyslipidemia ($p=0.003$), alcohol consumption ($p=0.004$), tobacco use ($p<10^{-3}$), waist circumference ($p=0.001$) and fat mass ($p<10^{-3}$). Several reports have shown that type 2 diabetes mellitus is associated with accelerated muscle mass decrease. Additional research is clearly needed to better characterize the underlying causes of accelerated muscle loss in this population and develop subsequent therapeutic treatments specifically designed to combat sarcopenia and prevent functional decline.

P1138

HIP FRACTURES IN URBAN AND RURAL LITHUANIAN RESIDENTS IN 2005-2010M. Tamulaitiene¹, M. Jaramaviciene¹, J. Jaramavicius¹, A. Mastaviciute¹, E. Antropik¹, V. Alekna¹¹Vilnius University, Faculty of Medicine, Vilnius, Lithuania

Objective: To compare hip fracture data between Lithuania's urban and rural residents, in 2005-2010.

Methods: A retrospective study of Lithuanian residents aged 40 and over with primary hip fracture that occurred during 2005–2010 years. Data were collected from inpatient records in 47 orthopaedic-traumatology departments. Groups of subjects, who were officially living in the city and in the rural area, were compared by gender, age, energy of trauma, duration of hospitalisation, and outcomes.

Results: In 2005–2010, 15041 patients with primary hip fractures were treated in Lithuania's hospitals: 8847 (58.8%) in rural and 6194 in urban

residents. The average age was 79 years for females (95%CI 78.79–79.17) and 69 years for males (95%CI 68.92–69.66). Residents of rural areas experienced hip fractures earlier at 75.5 years (95%CI 75.20–75.70) comparing to the mean age of 76.5 years (95%CI 76.26–76.76) in urban residents ($p<0.001$). A greater difference was found between male age 68.7 years (95%CI 68.23–69.17) in rural areas and 70.2 (95%CI 69.58–70.76) years in cities ($p<0.001$). The incidence of hip fractures in total was 157.9/100 000 patient-years (95%CI 155.38–160.43): 153.3/100 000 (95%CI 150.11–156.49) in rural and 165/100.000 (95%CI 160.93–169.14) in urban areas, being higher in females - overall incidence was 181.8/100.000 patient-years in rural areas (95%CI 177.22–186.42) and 192.6/100 000 (95%CI 186.93–198.45) in urban residents ($p<0.001$). Of all hip fractures, 90.8% ($n=13541$) were caused by low energy trauma (95%CI 90.34–91.27%). The rural residents were hospitalised for 12.6 days (95%CI 12.48–12.86), while urban residents for 10.5 (95%CI 10.20–10.78) days ($p<0.001$). Long term care outcome was more frequent in urban residents 20.94% (95%CI=19.95–21.9) vs. 11.31% (95%CI 10.67–11.9) of rural residents ($p<0.001$). Death as an outcome was more frequent in urban than in rural residents (2.26% vs. 1.54%, $p<0.001$).

Conclusions: In 2005–2010, the incidence of hip fractures were higher in urban than in rural residents in Lithuania. Residents of rural area experienced fractures while being younger and were hospitalised for longer time than urban residents.

P1139

STUDY TO EVALUATE THE EFFECT OF RADIATION THERAPY ON PELVIC BONES IN PATIENTS OF CARCINOMA CERVIX UNDERGOING CONCURRENT CHEMORADIATION: AN ONGOING CLINICAL TRIAL INTERIM ANALYSISD. Kumar¹¹Postgraduate Institute of Medical Education and Research, Chandigarh, India

Objective: Carcinoma cervix is the leading cause of morbidity in developing countries. Radiation therapy with or without chemotherapy forms an integral part of management for these patients. We in this interim analysis have tried to evaluate BMD in lumbar spine and femur in patients of carcinoma cervix undergoing concurrent chemoradiation therapy (CCRT).

Method: DXA scan is performed in patients of carcinoma cervix who meet the eligibility criteria, both before start of radiation therapy and after completion of 1 year of radiation therapy. Results analysed statistically. Results: 20 patients have been analysed. T-scores of BMD at lumbar and pelvic bones 1 year after completion of CCRT is 89.2 $\pm$ 4.2% ($p<0.05$ in comparison to baseline).

Conclusion: Pelvic radiation therapy given in patients of carcinoma cervix might increase the risk of bone resorption further leading to osteoporosis.

P1140

EFFICACY OF OSTEOPOROSIS TREATMENT WITH DENOSUMAB IN BISPHOSPHONATE NON-RESPONDERSE. V. Rudenka¹, V. Y. Samakhavets², A. V. Rudenka³¹Belarusian State Medical University, ²Minsk City Clinical Hospital,³Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus

Objective: To evaluate efficacy of denosumab in the therapy of osteoporosis in patients with poor response to previous bisphosphonate (BP) therapy.

Methods: 54 women (mean age 58.6 $\pm$ 8.9 years) with OP (DXA) T-score <-2.5 and poor response to previous oral BP treatment during 3-year

period were enrolled in the study. BMD was evaluated by DXA at lumbar spine, L1 – L4 (LS) and proximal femurs (PF) prior to administration of denosumab (BMD1) and after 12 - 14 months of treatment (2 injections) (BMD2). All subjects also received calcium (1000-1200 mg/d) and vitamin D (from 400-1000 IU/d) supplementation. Visual analogue scale (VAS, mm) score was used to assess back pain prior to treatment and after 12-14 months of treatment. Effectiveness of therapy was assessed by changes in BMD and VAS score for back pain.

Results: Repeated BMD measurements revealed statistically significant positive trend of BMD in all treated patients at LS (+0.052 (95%CI 0.029-0.051) g/cm²) and proximal femurs (+0.029 (95%CI 0.019-0.029) g/cm²). BMD increased from baseline by 5.7% at the lumbar spine, 6.2% at total hip and 4.9% at femoral neck. Back pain significantly ($P<0.001$) improved from baseline during the study: the mean back pain VAS score at baseline was 38.2, mean (95%CI) change from baseline in back pain VAS scores at 12 months was -11.0 (-13.0 to -8.0).

Conclusion: Effectiveness of administration of denosumab in patients with OP and inadequate response to BP was confirmed by positive dynamics of BMD and VAS score for back pain.

P1141

OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN WITH ESTABLISHED RHEUMATOID ARTHRITIS

S. M. Rojas Herrera¹, M. C. Carrasco Cubero², J. Malave Calzada¹, P. Pérez David¹, I. Braña Abascal¹, E. Chamizo Carmona¹

¹Servicio de Reumatología. Hospital Ciudad de Mérida. SES., Mérida,

²Servicio de Reumatología. CHU de Badajoz. SES, Badajoz, Spain

Objective: The estimated prevalence of Osteoporosis (OP) in older than 50 year women is 22.8% in the lumbar spine (LS). The annual incidence of fractures is around 2%. Patients with Rheumatoid Arthritis (RA) have a higher rate of OP and osteoporotic fractures. Several factors related to the patient, disease and RA therapy have been associated with this increase. We aimed to determine the OP frequency in LS and femoral neck (FN) and fractures in older than 50 years women with established RA, as well as the factors associated with its appearance.

Methods: Observational study in postmenopausal women diagnosed with RA (ACR 1987 criteria), who underwent a protocolized study in the Bone Metabolism Unit between 2013 and 2017. The study variables were BMD, T-score and Z-score obtained through DXA densitometry (GE Lunar Prodigy[®]), estimated risk fracture through the FRAX tool, and predetermined clinical and demographic characteristics collected in a questionnaire. We reviewed the electronic medical records and image tests of the patients.

Results: Densitometry was performed on 238 women of 63.0±11.7 years of average age, with established RA of 9.9±8.1 years of evolution, of whom 187 (81.7%) were seropositive for RF (77.7%) and/or ACPA (69%). All were treated with DMARDs (83.8% MTX and 28.2% biological) and 162 (68.1%) with low doses of corticosteroids (≤ 10 mg/d). Of the 217 that had determinations of vitamin D, 65.1% had deficiency (<30 ng/ml), being moderate (<20 ng/ml) in 41% and severe (<10 ng/ml) in 7.8%. The densitometries revealed osteopenia (T-score <-1) in 116 (48.7%) (FN in 114 and LS in 90) and OP (T-score <-2.5) in 72 (30.3%) (FN in 43 and LS in 54). In the bivariate study, we did not find an association of FR, ACPA, vitamin D, corticosteroids or tobacco with osteopenia or OP. The OP was associated with older age ($p<0.01$) and lower BMI ($p<0.05$), whereas osteopenia was associated with older age and time of evolution of RA ($p<0.01$ for both). During the 10 years of follow-up, fractures occurred in 43 (18.1%) patients. The fracture was associated with densitometric osteopenia (OR=6.7) and OP (OR=4.5), FRAX >10 for major osteoporotic fracture (OR=7.1), corticosteroids treatment (OR=3.45) and older age ($p<0.01$), but was not associated with tobacco, vitamin D, FR and/or ACPA levels, BMI or RA evolution time. In the multivariate analysis, the main determinants of OP were older age

and lower BMI ($p<0.01$), while the fracture was associated with corticosteroid therapy ($p<0.01$), independently of other confounding factors ($p<0.01$).

Conclusions: Postmenopausal women with established RA have a higher rate of osteoporosis and bone fracture than in the general population. Risk factors for the appearance of OP in our sample were older age and lower BMI. Bone fracture was more frequent in patients with a corticosteroids treatment.

P1142

PREVALENCE AND CLINICAL SIGNIFICANCE OF SICCA SYMPTOMS IN ARTHRITIS PATIENTS

S. C. Dinescu¹, F. A. Vreju¹, S. C. Firulescu¹, A. Tudorancea¹, A. Stefanescu², A. E. Musetescu¹, P. Ciurea¹

¹Department of Rheumatology, Faculty of Medicine, University of Medicine and Pharmacy, ²Department of Pathology, Faculty of Medicine, University of Medicine and Pharmacy, Craiova, Romania

Objective: Sicca symptoms, defined mainly as dryness of mouth and/or eyes, can be related to various clinical settings. Occurrence of sicca symptoms in relation to inflammatory joint pain (IJP) is commonly seen in rheumatoid arthritis (RA), primary Sjogren's syndrome (pSS), or association of the two diseases, defined as secondary Sjogren's syndrome (sSS). In the latter, onset of SS can also precede the RA diagnosis, by up to 29 years in one study [1]. We aimed to identify the prevalence of xerophthalmia and/or xerostomia in patients admitted for IJP and determine the importance of sicca symptoms on diagnostic approach and clinical outcome.

Methods: 120 patients reporting IJP were evaluated for the underlying articular disease through serum inflammation markers, anticyclic citrullinated peptide antibodies (ACPA), conventional radiology and ultrasound exam of affected site. Work-up for sicca symptoms included subjective questionnaires, Schirmer test, anti-Ro and anti-La antibodies, serum complement levels. Salivary gland biopsy and further examination of SS-specific histopathology features [2] was limited to the set of patients with high sicca-related burden and positive SS-specific antibodies.

Results: Of the 120 patients admitted with IJP, 88 (73.3%) were diagnosed with RA and 32 (26.6%) with either a spondylarthropathy disease or gout. Sicca symptoms were present in 51 patients (42.5%), of which only 3 were further established as having pSS. The 88 RA patients were divided into three subgroups as follows: non-sicca RA (46 patients, 52.2%), sSS (15 patients, 17%) and RA associating sicca symptoms that did not meet sSS criteria (27 patients, 30.6%). Joint pain in pSS had a similar pattern as in RA group, but with a lack of lower limb involvement. 10 RA patients (11.3%) had positive anti-Ro antibodies, of which 8 were classified as sSS.

Conclusion: RA shows a rather higher prevalence of sicca symptoms. Although many patients may report ocular and/or mouth dryness on admission, only a small proportion of these are true sSS. Positive anti-Ro antibodies seem to influence the development of extraarticular manifestations in RA patients.

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2. Dinescu SC et al. Rom J Morphol Embryol 2017;409

P1143

NAIL PSORIASIS IS A PREDICTOR FOR PSORIATIC ARTHRITIS

V. Veronica¹, C. Constanta¹

¹University of Oradea, Oradea, Romania

Objectives: Nail psoriasis characterized by specific lesions of nail matrix and/or nail bed is an important clue for psoriatic arthritis in patients with skin involvement - indicative for severe form of disease as for patients with no skin involvement or no history of psoriasis.

Methods: We have a case report of a 43 years old woman who came to dermatology department for aesthetic reasons, discoloration of the nails,

limitations in daily activities due to pain and separation of nail plates from underlying nail bed. Dermatological examination revealed leukonychia-areas of white nail plate, yellow discoloration resembling drop of oil beneath the nail plate and onycholysis for fingernails. No skin involvement was detected as no history for skin disorders.

Results: Loss of transparency and onycholysis first must be differentiated for onychomycosis. Potassium Hydroxide mount and fungal culture negative excluded this possibility. Dermoscopy showed common signs of nail psoriasis confirming oil drops which is the most diagnostic sign of nail psoriasis caused by exocytosis of leukocytes beneath the nail plate as well as onycholysis and leukonychia correspondent to parakeratosis a significant histological feature for psoriasis.

Clinical examination revealed low mobility of fingers, stiffness, pain, but no joint deformity was observed. Joint x-rays identified only mild erosive disease at the cartilaginous edge with preserved cartilage and maintenance of a normal interphalangeal joint space in 3rd finger of right hand.

Conclusions: Psoriasis may involve the nails only without any other signs of skin findings. Nail psoriasis can be an isolated sign for psoriasis present from onset as in evolution of disease and may precede arthritis. Nail psoriasis is considered as a predictor of future psoriatic joint damage. Patients with nail psoriasis need several checkups to catch early changes in joints inflammatory process in order to limit the progression of the disease to arthritis mutilans, spondylitis or sacroiliitis. Doctors must be aware of early symptoms of psoriatic arthritis especially in patients with nails changes. A proper assessment of any patient suspected of having psoriasis should include careful examination of the nails.

P1144

IMMOBILIZATION OSTEOPOROSIS IN THE HEMIPLEGIC PATIENT

M. Borcan¹, A. M. Bumbea², B. Bumbea³

¹Neuropsychiatric Teaching Hospital, ²UMF Craiova, ³Emergency County Teaching Hospital, Craiova, Romania

Objectives: The occurrence of osteoporosis in a patient with post-stroke ischemic hemiplegia is a factor in the worsening of recovery prognosis and the occurrence of a possible fracture on a demineralised bone in a hemiplegic patient is a real challenge. Our goal is to evaluate the efficacy of apical early kinesitherapy in stroke patients.

Methods: We noticed a group of 40 recent stroke patients (one month) that we followed periodically for 2 years and were divided into two equal groups: study group 20 patients and control group 20 patients. All patients were male in the ages of 50-60 years. All of them followed specific drug treatment (neurotrophic, cerebral vasodilator, platelet antiaggregant, antihypertensive, hypolipidemic). Patients in the study group next to drug therapy followed a kinetotherapy program 30 min to 2 days. Patients in the control group followed only medical treatment. The assessment was made initially, one year and two years after the start of recovery therapy, following the fall in the height of the last 4 dorsal vertebrae (on the dorsal radiograph of the profile) and the decrease of the T-score to the DXA examination.

Results: We found significant changes in the control group without kinetotherapy, which consisted of a decrease of 0.3/year in the T-score and a decrease in height of the vertebral body on the dorsal spine radiograph with an average of 2.1 mm all over study period. The study group recorded unmarked variations in both the T-score and the dorsal vertebral evaluation.

Conclusions: Kinetotherapy that has been instituted early and continued for a long time, has obviously favorable effects on bone mineralization.

P1145

PATTERNS OF INVOLVEMENT IN PATIENTS WITH OVERLAP SYNDROME

S. C. Firulescu¹, C. D. Parvanescu², B. A. Chisalu¹, C. Criveanu¹, S. D. Dinescu¹, A. L. Barbulescu³, L. Streba⁴, R. Ionescu⁵, H. Popoviciu⁶, A. Rosu¹, P. Ciurea¹, A. F. Vreju¹

¹Rheumatology Department, University of Medicine and Pharmacy Craiova, Craiova, ²Rheumatology Department, Emergency County Hospital Craiova, Craiova, ³Pharmacology Department, University of Medicine and Pharmacy Craiova, Craiova, ⁴Internal Medicine Department, University of Medicine and Pharmacy Craiova, Craiova, ⁵Rheumatology Department University of Medicine and Pharmacy Carol Davila, Bucharest, ⁶Rheumatology Department, University of Medicine and Pharmacy of Targu Mures, Targu Mures, Romania

Objective: Overlap syndrome is a clinical condition that meets the criteria for diagnosing at least two connective tissue diseases that occur at the same time or at different times in the same patient. It may include systemic sclerosis (SSc), dermatomyositis or poly/dermatomyositis, (PM/DM), Sögren's syndrome (SS), rheumatoid arthritis (RA) and systemic lupus erythematosus (LES). Any association between diseases may be possible, with certain associations being encountered more frequently. The clinical picture is often complex, often making the diagnosis and treatment difficult. The combined pathology of these conditions has a major impact on clinical development, diagnosis and treatment. Clinical manifestations depend on affected organs, degree of inflammation and disease progression. The study proposed the evaluation of clinical and biological correlations, with the identification of frequent associations in overlap syndrome.

Methods: 37 patients with overlap syndrome, which were clinically and paraclinically evaluated, were included in the study (different overlapping between systemic sclerosis - SSc, rheumatoid arthritis - RA, systemic lupus erythematosus - SLE, mixed connective tissue disease - MCTD, or dermatomyositis - DM). The clinical information noted included type of systemic involvement, type of skin changes for SSc (diffuse/limited), or number of tender and swollen joint count (TJC, SJC). The inflammation markers (C reactive protein, erythrocyte sedimentation rate), and immunological changes (rheumatoid factor, antibodies profiles) were noted too. All the inflamed joints were evaluated by ultrasonography, magnetic resonance imaging or conventional radiography, by necessity.

Results: The most frequently found correlation in the overlapping of SSc with RA, was cutaneous ulcers in patients with absence of rheumatoid factor - 6 patients (27, 27%) compared with RA with positive rheumatoid factor, 1 patient (4.54%) ($p < 0.05$). In the group of 14 patients with RA and other connective tissue diseases (7 LES and RA patients, 3 DM and RA patients, 1 patient Sjogren and RA syndrome, 2 BMTC and RA patients, 1 SSc, DM, RA and antiphospholipid syndrome), seronegative RA is more commonly associated with Raynaud's phenomenon, compared to those with seropositive RA (50% vs. 14.28%, $p < 0.05$).

Conclusions: This study demonstrates the correlation of specific immunological changes in patients with overlapping syndromes, giving the possibility of identification of a pattern of involvement in these patients and suggesting that carefully assessment could lead to optimal treatment to prevent complications.

P1146

THE MAGIC CARPET: THE IMPORTANCE OF FALL PREVENTION IN OSTEOPOROSIS TREATMENT

G. C. Taujan¹, A. S. Dragomir², A. M. Dumitru², M. Olaru²

¹Lotus Med, Bucharest, Romania, ²National Institute of Endocrinology C. I. Parhon, Bucharest, Romania

Osteoporosis is a common disease associated with elevated fracture risk secondary to low bone mass and microarchitectural disruption. Besides pharmacological therapy, important aspects in osteoporosis treatment are lifestyle changes, aiming at reducing bone mass loss and fracture risk through calcium and vitamin D supplementation, diet, weight-bearing exercise, cessation of smoking and prevention of falling.

Case report: We present the case of a female patient, age 73, diagnosed with osteoporosis at 63 years old, for which she received bisphosphonates for seven years. The DXA evaluation conducted in December 2016 (age 71) was consistent with osteoporosis at the lumbar spine BMD 0.604 g/

cm^2 , $T=-3.4$ and at the left femur BMD 0.646 g/cm^2 , $T=-2.4$; according to this evaluation and assessment of fracture risk through FRAX score we decide to continue antiosteoporotic treatment and she was started on teriparatide. Two weeks before ending the first year of osteoanabolic treatment, the patient slipped and fell in the bathroom and presented to hospital with left pertrochanteric fracture. Subsequent radiologic evaluation of the thoraco-lumbar spine excluded other fractures. She underwent gamma nail osteosynthesis. After one year of osteoanabolic treatment, DXA evaluation revealed a significant increase of 21.5% in BMD; it was not possible to assess the evolution of BMD at the hip, because only the left hip was examined in previous years. At the right femoral neck, DXA showed osteoporosis – BMD 0.637 g/cm^2 , $T=-2.9$.

Conclusion: Despite previous treatment and a very good evolution in the first year of osteoanabolic therapy, this patient suffered a major osteoporotic fracture secondary to domestic accident. Use of non-skid mats as part of treatment plan for reducing fracture risk would have prevented this kind of accident. Prevention of falls remains an important part of treatment plan.

P1147

OUTCOME OF REHABILITATION THERAPY IN GERIATRIC PATIENT WITH SEVERE SCOLIOSIS AND OSTEOPOROSIS: CASE REPORT AND LITERATURE REVIEW

M. D. Clantau¹, L. Meiu², B. I. Mitoiu¹, G. L. Gheorghievici¹, S. A. Nica¹, G. Mologhianu¹

¹University of Medicine and Pharmacy “Carol Davila”, ²National Institute of Physical Medicine and Rehabilitation, Bucharest, Romania

Objectives: To describe the therapeutic management and outcomes in an older athlete patient with severe scoliosis, intense pain and osteoporosis. The patient accused progressive intense pain and disability installed in the last 3 months. The aim of our therapeutically protocol is also to increase the quality of life of the female patient.

Methods: We performed clinical and paraclinical assessment (radiographic and topographic measurement) before and after treatment, of an 88 years old female patient, who was an athlete. We correlated all this information with SRS 22 scale and VAS scale. Therapeutic management consisting of physiotherapy and medical treatment was established after this stage and was performed for 2 weeks of daily sessions (with 2 days pause). Cardiovascular and hemodynamic functions were assessed before prescribing rehab program.

Results: The patient had a positive response to rehabilitation methods. Pain has significant reduced from VAS 9 to 5, after 2 weeks of treatment and the quality of life was improved. Evidence of the efficacy of electrotherapy, kinetotherapy, massage and thermotherapy, noted also in literature, seems to be confirmed in this case as well.

Conclusion: Rehabilitation techniques show a promising effect on pain and functional level. Spinal deformities appear in general in the first years of life, but also has been noticed after intense physical exercises. One of the most frequent neuromuscular deformities appeared is represented by scoliosis. The addition of rehabilitation techniques to the medical treatment can be used with success for deconditioning and chronic pain. We must always take into account cardiovascular and hemodynamic parameters, especially in older patients and as such adapt the rehabilitation program.

P1148

TERIPARATIDE THERAPY AND BONE SCINTIGRAPHY RESULTS: A CASE REPORT

M. Krajnc¹, M. Čokolič¹

¹Dept. of Endocrinology and Diabetology, Maribor University Medical Centre, Maribor, Slovenia

Objective: Teriparatide has an important role in the management of osteoporosis with high fracture risk. Its daily application increases trabecular and cortical bone apposition due to increased

osteoblast activity. Bone mass, bone density and bone quality improve. Bone scintigraphy (mostly $^{99\text{m}}\text{Tc-MDP}$) is commonly used for the detection of bone metastases (sensitivity is sufficient for e. g. breast, lung and prostate metastases), and is also helpful in other skeletal and joint conditions. It has been known that teriparatide treatment influences bone scintigraphy results.

Case presentation: Our patient S.S., 1952, was treated for gastric cancer in 2004 (with operation, radio- and chemotherapy) and is being treated for ankylosing spondylitis. In 2007 he suffered osteoporotic vertebral fracture of L2, which was treated conservatively, he was then also prescribed ibandronic acid i.v. There were no other additional secondary causes of osteoporosis, laboratory tests were completely normal. In 2011 ibandronic acid was replaced with zoledronic acid. In 2016 he suffered second osteoporotic vertebral fracture of Th12 while on therapy, so teriparatide was introduced. During the treatment (approx. 2 months after the initiation) bone scintigraphy was ordered by urologist in diagnostics of suspected metastatic prostatic cancer. Increased radionuclide activity was seen in 7th and 8th left rib and multiple right ribs. Thoracic CT did not confirm bone metastases, prostatic cancer was also not diagnosed.

Conclusion: There is insufficient data about bone scintigraphy results and interpretation in teriparatide patients, mostly acquired from postmenopausal women. During the teriparatide treatment, the bone radionuclide uptake is usually increased, most extensively in calvarium and lower extremities, but the observed changes are not universal. Increased rib uptake (as seen in our patient) is not expected. In teriparatide treated patients, we have to consider the drug's effect on bone scintigraphy results since they can lead to inappropriate test interpretation.

Reference:

Moore AE et al. Eur J Nucl Med Mol Imaging 2012;326

P1149

VITAMIN D AS IMMUNOMODULATOR IN PATIENTS WITH PRIMARY HYPOTHYROIDISM DUE TO HASHIMOTO'S THYROIDITIS: A RANDOMIZED CONTROLLED TRIAL

D. R. Chaudhary¹

¹Endocrinology, Kolkata, India

Objective: Vitamin D deficiency has been linked to different autoimmune disorders. This study aimed to evaluate immunomodulatory role of vitamin D supplementation on thyroid autoimmunity (thyroid peroxidase antibody [TPO-Ab] titers) in patients with newly diagnosed primary hypothyroidism due to Hashimoto's thyroiditis in a randomized controlled trial (RCT).

Methods: 100 patients with newly diagnosed primary hypothyroidism due to Hashimoto's thyroiditis (TPO-Ab > 34 kIU/L), selected from 950 screened patients were randomized into GROUP-1 (intervention group) and GROUP-2 (control group). Group-1 received cholecalciferol 60,000 IU weekly and calcium 500 mg/d for 8 weeks; GROUP-2 received calcium 500 mg/d for 8 weeks. Responders were defined as $\geq 25\%$ fall in TPO-Ab titers. Individuals with at least 6 months follow-up were analyzed.

Results: Data from 100 patients (68 subclinical hypothyroidism, 32 overt primary hypothyroidism), with 93% having vitamin D insufficiency were analyzed. TPO-Ab titers were highest among patients in lowest quartile of 25-hydroxyvitamin D ($P=0.084$). At 6 months follow-up, there was significant fall in TPOAb in Group-1 (-50.73%) as compared to Group-2 (-20.6%) ($P=0.026$). 62% patients in Group-1 were responders compared to 42% in Group-2 ($P=0.015$). Subgroup analysis revealed significantly greater reduction in TPO-Ab titers in subclinical hypothyroidism, but not in overt primary hypothyroidism. Cox-regression revealed vitamin D supplementation (Group-1) followed by baseline TPO-Ab and fT4 levels to be good predictor of response to therapy ($P=0.042$, 0.069 and 0.074 respectively).

Conclusion: Vitamin D supplementation is associated with a significant reduction in TPO-Ab titers suggesting its immunomodulatory role.

P1150

BONE MINERAL CHANGES AND FRACTURE OUTCOMES IN 27 CHILDREN WITH OSTEOGENESIS IMPERFECTA TREATED BY PAMIDRONATEM. M. Kostik¹, R. V. Idrisova¹, I. A. Chikova¹, E. A. Isupova¹, O. V. Kalashnikova¹¹Saint-Petersburg State Pediatric Medical University, Saint-Petersburg, Russia**Objectives:** To evaluate the bone mineral accrual and fracture outcomes in children with osteogenesis imperfecta (OI) treated by pamidronate (PAM).**Methods:** In retrospective study 27 children with different types of OI were included: 10 boys (37.0%) and 17 girls (63.0%). According to clinical OI classification proposed by D. Silience, patients were divided in 3 types: OI I type -14 (51.9%), OI III type - 9 (33.3%) OI IV type - 4 (14.8%). The standard protocol with cyclic PAM infusions (3 consequent days 3-4 times in a year) was applied in annual cumulative dose ranged from 9-12 mg/kg. Observation period was 36 months. Bone mineralization parameters were detected by DXA of lumbar spine L₁-L₄ (densitometer Hologic QDR 4500C, with pediatric reference database). We evaluated BMD - Z-score, measured in standard deviations and deficiency in percentages and number of fractures per patient per year.**Results:** During PAM treatment we have observed BMD-Zscore accrual (p=0.003), decreasing the BMD deficiency (p=0.0004) and fracture rate reduction (p=0.003). BMD-Zscore increased from -2.9 (-3.8; -2.2) SD to -2.0 (-2.9; -1.3) SD in 1 year (p=0.02); -1.6 (-2.4; -0.7) SD in 2 years (p=0.03); -1.4 (-2.0; -0.5) in 3 years (p=0.03). The deficiency of BMD changed from -34.0% (-22.0; -46.0) to -26.0% (-15.0; -35.0) in 1 year (p=0.005); -18.0% (-8.0%; -25.0%) in 2 years (p=0.003); -17.0 (-7.0; -23.0) in 3 years (p=0.01). The fracture number decreased from 1.6 (0.8; 14.0) per patient per year to 0.0 (0.0; 2.0) in 1 year (p=0.0015); 0.5 (0.0; 2.0) in 2 years (p=0.005); 0.0 (0.0; 2.0) in 3 years (p=0.03). There were no differences in bone mineral accrual between types of OI. The maximum efficacy in BMD accrual and fracture rate was observed in first and second years and less BMD improvement in third year, accompanied with mild increase of fracture rate in third year.**Conclusion:** PAM treatment was effective in bone mineral accrual and fracture reduction. The maximum efficacy in bone mineral accrual was observed in first two years, the fracture rate is more stable.

P1151

A MISSED OPPORTUNITY: WHAT PROPORTION OF FRACTURE PATIENTS HAVE HAD A PRIOR FRACTURE?H. Johansson¹, E. Seeman², K. Siggeirsdottir³, N. Harvey⁴, A. Odén⁵, V. Gudnason⁵, M. Lorentzon⁶, E. McCloskey⁵, K. Sanders⁷, G. Sigurdsson³, J. Kanis⁷¹Institute for Health and Aging, Catholic University of Australia, Melbourne, Australia, ²Institute for Health and Aging, Australian Catholic University, Melbourne, Australia, ³Icelandic Heart Association Research Institute, Kopavogur, Iceland, ⁴MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, ⁵Centre for Metabolic Bone Diseases, University of Sheffield, Sheffield, UK, ⁶Centre for Bone and Arthritis Research, Geriatric Medicine, Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, ⁷Institute for Health and Aging, Catholic University of Australia, Melbourne, Australia**Objectives:** A history of fracture is a strong risk factor for further fractures. The aim of the present study was to determine the proportion of index fractures that were preceded by a previous fracture.**Methods:** Data were drawn from a population-based cohort of 18,872 men and women born between 1907 and 1935 from Iceland. Fractures were documented over 510,265 person-years. For all osteoporotic

fractures occurring in the cohort, the proportion of individuals who had experienced a previous osteoporotic fracture in the 10 years prior to the index event was ascertained.

Results: The population included 18,872 individuals with a mean age 52.8 years (range 33-81); 52% were women. 9,922 index osteoporotic fractures occurred for which there was at least 10 years of time at risk recorded before the index fracture. The proportion of index fractures preceded by an osteoporotic fracture increased with age. For example, in women the proportion increased from 26% (95%CI: 21-32) in those aged 60-69 years old to 59% (95%CI: 54-63) in those aged 90-99 years. The respective proportions were lower for men (14%, 95%CI: 7-21 vs. 39%, 95%CI: 30-49).**Conclusions:** Overall, the proportion of individuals having an incident fracture preceded by a prior fracture increases with age and is lower for men than for women. Importantly, around half of women over 70 years old and 40% of men over 80 years old presenting with an index fracture will have experienced a previous fracture event in the preceding 10 years. These data suggest that approaches that 'capture the first fracture' could reduce the risk of subsequent fracture events, given the very high recurrence rates.

P1152

TREATMENT GAP FOLLOWING HIP FRACTURE IN THE INTERNATIONAL COST AND UTILITY RELATED TO OSTEOPOROSIS FRACTURES STUDY (ICUROS)H. Johansson¹, A. Odén², N. Harvey³, K. Sanders¹, F. Borgström⁴, A. Svedbom⁵, M. Lorentzon⁶, E. McCloskey², J. Kanis¹¹Institute for Health and Aging, Catholic University of Australia, Melbourne, Australia, ²Centre for Metabolic Bone Diseases, University of Sheffield, Sheffield, UK, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, ⁴LIME/MMC, Karolinska Institutet, Stockholm, Sweden, ⁵Mapi, Stockholm, Sweden, ⁶Centre for Bone and Arthritis Research, Geriatric Medicine, Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden**Objectives:** Hip fracture is the most serious osteoporotic fracture in terms of morbidity, mortality and economic cost. The aim of the present study was to determine the uptake of bone-specific treatment in patients following a hip fracture.**Methods:** Adults aged ≥50 years with a low to moderate energy fracture were recruited from ten countries in three continents (Europe, S America, Australasia) to the international study on costs and utility for osteoporotic fracture (ICUROS). This prospective study included an 18 months follow-up of participants recruited approximately within 2 weeks of a hip fracture. Information about anti osteoporosis medication (excluding calcium/vitamin D) was collected at 4, 12 and 18 months after hip fracture.**Results:** 1913 hip fracture cases age ≥50 years had information on medication. Mean age was 76.9 years and 79% were women. The treatment gap (the proportion of individuals not having fracture preventing treatment) 18 months after the fracture was 80.3% (95%CI: 78.3-82.3). There was marked heterogeneity between countries, for example in Mexico the treatment gap was 99% (95%CI: 98-100, n=145) and in the UK was 44% (95%CI: 33-55, n=91). The gap was higher in men than in women and increased significantly with age. For women the treatment gap was 73% (95%CI: 67-80) for the age interval of 60-69 years and for the age interval of 80-89 it was 84% (95%CI: 81-88). For the age interval 60-69 for men the treatment gap was 84% (95%CI: 74-93).**Conclusions:** Even though individuals recruited to ICUROS might be expected to have higher than standard attention paid to health care, the treatment gap was large in this international study and similar to the findings in the US Medicare population (Keshishian A et al. Osteoporos Int. 2017; 28:2485-2494) where 72.2% were untreated within 12 months of fracture.

P1153

INFLUENCE OF BODY WEIGHT LOSS ON GAIT AND STABILITY FUNCTION IN PATIENTS WITH OBESITY

A. Vasileva¹, A. Marchenkova¹, A. Eryomushkin¹¹Federal State Budget Institution "National Medical Research Center for Rehabilitation and Balneology" of the Ministry of Health of the Russian Federation, Moscow, Russia**Objective:** In our research we studied changes of gait and balance parameters and falls frequency in obese patients during weight loss.**Methods:** We examined 37 patients aged 23-69 years (average age 53.6 ±11.1 years) with BMI ≥35 kg/m² (average BMI 40.9±9.3 kg/m²). All patients received recommendations to adhere hypocaloric diet and perform physical exercises in order to reduce body weight. We evaluated baseline body weight, BMI, the number of falls for 3 months, 10 m walk test along a flat surface, Romberg test and stabilometry (Stabilan - 01) were conducted.**Results:** After 3 months, the average body weight in the group decreased from 124.1±26.6 kg to 118.1±23.4 kg, $p=0.022$ (95%CI: 2.78, 9.22), the number of falls for 3 months reduced from 0.14±0.34 to 0, $p=0.023$ (95%CI: 0.02; 0.25), the results of 10 m walk test decreased from 113.0 ±8.82 m/s to 105.5±3.03 m/s, $p=0.005$ (95%CI: 2.86, 12.14). According to the stabilometry data the coefficient of stability improved from 113.5 ±9.11% to 104.0±2.16%, $p=0.012$ (95%CI: 3.035, 16.10), deviation of the pressure center in the sagittal and frontal plane decreased from 113.6 ±9.1 mm to 104.0±2.2 mm, $p=0.01$ (95%CI: 3.03, 16.1), the movement speed of the pressure center increased from 113.4±8.9 mm/s to 104.0±2.2 mm/s, $p=0.01$ (95%CI: 3.04; 15.81), speed index changed from 113.0±9.1 to 104.0±2.2, $p=0.01$ (95%CI: 3.0, 16.1) and overall rating movement reduced from 109.9±6.8 to 104.0±2.0, $p=0.0037$ (95%CI: 0.5; 11.2).**Conclusion:** Weight loss in obese patients is associated with the decline of falls frequency, improvement of gait speed, statics and balance functions.

P1154

MAJOR AND MULTIPLE MINOR ANOMALIES ASSOCIATED WITH KLIPPEL-FEIL SYNDROME

S. Pavlov-Dolijanovic¹, N. Vujasinovic Stupar¹, N. Hatab², B. Banko³, N. Nikolic Jakoba⁴, S. Seric⁵, R. Milenkovic⁵¹School of Medicine, University of Belgrade, Institute of Rheumatology,²Department of Maxillofacial Surgery, School of Dental Medicine, University of Belgrade, ³Center for Radiology and MRI, Clinical Center of Serbia, ⁴Department of Periodontology and Oral Medicine, School of Dental Medicine, University of Belgrade, ⁵Institute of Rheumatology Belgrade, Belgrade, Serbia

Klippel-Feil syndrome (KFS) is defined as congenital fusion of two or more cervical vertebrae, and is usually diagnosed after birth. Persons with KFS may be at increased risk for spinal cord injury after minor trauma. Also this patients often have hearing problems, cardiorespiratory, neurological, renal and urological symptoms. So far it is now that patients with a mild characteristic of the KFS may be overlooked for years. In later decades of life, these patients may develop neurological symptoms due to secondary degenerative changes of the spinal disks.

We describe an otherwise-healthy, active 55-year-old man with 1-year history of neck pain, headaches and one episode of syncope after a severe spill from a tractor. X-rays of spine revealed fused vertebral bodies of C2 through C5, a thoracic kyphoscoliosis and lumbar scoliosis but there were no other spinal anomalies. Cervical spine MRI revealed posterior a partial fusion of C2-C5, a hypertrophy of the posterior vertebral elements at levels C5-C7, degenerative disks changes, without signs of cord abnormalities or compressions. The major anomalies associated with KFS (scoliosis, obstructive sleep apnea, bilateral sensorineural hearing loss), as well as multiple minor anomalies (mild face asymmetry, high arched palate and nose anomalies) were detected.

This case is a good example of a rare characterisation of the KFS in elderly aged patients, associated with multiple extraosseous changes. The

early diagnosis of KFS is critical in determining the risk of other associated diseases and secondary neurological symptoms in the future, especially after trauma.

P1155

BMD IN PATIENTS WITH EPIDERMOLYSIS BULLOSA

N. Balatska¹, V. Povoroznyuk², I. Gedeon³, L. Derevyanko¹, T. Zamorska⁴, A. Musienko²¹Kyiv Medical University, ²State Institution "D. F. Chebotarev Institute of Gerontology" NAMS Ukraine, ³Okhmatdyt National Children's Specialized Hospital, ⁴Debra-Ukraine, Kyiv, Ukraine**Objective:** Epidermolysis bullosa (EB) is a group of inherited bullous disorders characterized by blister formation in response to mechanical trauma. We aimed to evaluate the peculiarities of BMD in patients with EB.**Methods:** There were examined 26 patients (14 males and 12 females) with EB generalized recessive dystrophic form aged 5-39 yrs. BMD of the lumbar spine and total body was measured by DXA with "Hologic". In children with physical developmental delay primary outcomes were areal BMD based on chronologic age and adjusted for height Z-score (Zemel et al 2013).**Results:** 57.7% of patients with EB had low bone density for chronologic age and one of them had osteoporosis which was accompanied with multiple vertebral fractures. 5 (19.2%) children had physical developmental delay but only 3 of them had low bone density for chronologic age. Furthermore, 84.6% patients were underweight and majority of them had protein-energy malnutrition (PEM) from moderate to severe degree. Among of patients with PEM mild and moderate degree normal BMD was registered in 40% and 50% respectively. However, all patients with severe PEM had low bone density for chronologic age. It was found correlation between weight deficiency (%) and Z-score at the level L1-L4 ($r=0.82$, $p<0.000$) and total body ($r=0.70$, $p<0.000$).**Conclusion:** Protein-energy malnutrition is one of the important factors which influence on BMD in patients with epidermolysis bullosa and increases the fracture risk. Protein and nutrient-enriched complementary drinks might have positive effect on weight of patient and BMD.

P1156

SECONDARY PREVENTION OF OSTEOPOROSIS AFTER DISTAL RADIUS FRAGILITY FRACTURES

L. Ben Zvi¹¹Carmel Medical Center, Department of Orthopedic Surgery, Haifa, Israel**Objective:** To evaluate the adequacy of existing treatment protocols for patients following surgery for a fragility fracture of the distal radius in the CLALIT HMO in northern Israel.**Methods:** Retrospective review of distal radius fragility fractures in an HMO hand service between 2012-2013 was performed. Fragility fracture was defined by radiographs and mechanism- of- injury. Demographic data, previous and subsequent fractures, quality of secondary prevention were documented. Chi- square was used for analysis.**Results:** Eighty-two patients were evaluated. Average Age was 64 years. Follow-up post- index fracture was 25.2 months. Twenty-eight percent of the patients had a second fracture. Seven had subsequent fracture within the follow- up period (8.5%), 16 had a fragility fracture prior to the index fracture. Mean time from primary to index fracture was 50 months. Patients who had additional fragility fractures were older, and with diagnosed osteopenia/osteoporosis. Hypercholesterolemia, hypertension and diabetes, did not seem to predispose to additional fractures. No patients were referred for prevention or an endocrinologist at discharge. 46% of patients were treated at any point, most by the family physician with vitamin D and calcium. Sixteen patients with previous or additional fracture (76%) did not see an endocrinologist. Nine patients with second

fracture received no preventive medication. Twenty two percent of the patient started treatment after their index fracture.

Conclusion: In our population, although treated and followed by a closed and organized medical system, patients were unlikely to receive appropriate evaluation and treatment for prevention of fragility fractures. Secondary prevention is most important for patients with known osteopenia or osteoporosis, and patients aged above 50. In order to improve care for our population, a systems based treatment plan for the prevention of osteoporosis should be implemented, such as a multidisciplinary osteoporosis clinic.

P1157

OBESITY AND VITAMIN D DEFICIENCY AND INSUFFICIENCY IN POSTMENOPAUSAL WOMEN

V. Povoroznyuk¹, A. Musiienko¹, N. Dzerovych¹, R. Povoroznyuk¹, O. Ivanyk¹

¹D.F. Chebotarev Institute of Gerontology of NAMS of Ukraine, Kyiv, Ukraine

Objective: Deficiency and insufficiency of Vitamin D is a pandemic of the 21st century. Obesity patients have a lower level of vitamin D, but the literature data are contradictory. The aim of this study is to examine vitamin D deficiency and insufficiency prevalence in postmenopausal women suffering from obesity.

Materials: We examined 1007 women aged 50-89 years. Mean age was 65.74±8.61 years; mean height – 1.61±0.07 m; mean weight – 70.65±13.50 kg; mean BMI – 27.27±4.86 kg/m² and mean 25(OH) D levels in serum – 26.00±12.00 nmol/l. The women were divided into the following 6 groups depending on BMI: I group – 338 women with normal body weight, II group – 16 women with insufficient body weight, III group – 382 women with excessive body weight, IV group – 199 women with obesity of class I, V group – 60 women with obesity of class II, and VI group – 12 women with obesity of class III. Level of 25(OH)D in serum was measured by means of an electrochemiluminescent method - Elecsys 2010 analyzer (Roche Diagnostics, Germany) and cobas test-systems.

Results: In Ukrainian women with obesity, BMI significantly influences vitamin D level, and this influence does not depend on the season. Vitamin D deficiency was found in 34.4% postmenopausal women, deficiency in 31.4% and normal levels in 34.4%. 25(OH) D levels were significantly lower in women with obesity of class I (23.60±10.24 ng/ml) and obesity of class II (22.38±10.34 ng/ml), compared with women who had normal body mass (28.24±12.99 ng/ml), p=0.00003. The study results reveal a weak correlation between 25(OH)D level and BMI (r=0.15).

Conclusion: In Ukrainian patients with obesity, significant influence of BMI was found on the level of vitamin D, which did not depend on the season. The presented results should be taken into account for prevention and treatment of vitamin D deficiency in obese women.

P1158

SUPPRESSION OF TUMORIGENICITY 2 (ST2) IS A NOVEL REGULATOR OF CHONDROCYTE DIFFERENTIATION

E. Bonyadi Rad¹, U. Schäfer²

¹Department of Orthopedics and Trauma Surgery, ²Department of Neurosurgery, Graz, Austria

Objective: Developing bone is one of the major sites of ST2 expression. The ST2 surface receptor (ST2L) abrogation has been shown to suppress the osteogenic potential of osteosarcoma cells and soluble isoform (sST2) was suggested as an early marker of osteoblastogenesis. Moreover, IL-33 inhibits osteoclast formation through its receptor ST2L (IL-33/ST2 signaling pathway) thus influencing bone volume. We have assessed for the 1st time the

expression pattern, regulation and function of the ST2 protein in different stages of chondrocytes differentiation since the IL-33/ST2 downstream pathways i.e., MAPK and NFκB are crucial regulators of chondrocytes proliferation, differentiation, and apoptosis.

Results: Immunohistochemical analysis revealed pronounced hypertrophic dependent expression of ST2 in femur and tibial growth plates in mice. Reduced ST2L/sST2 isoforms expression in proliferative zone and strong upregulation during hypertrophic differentiation was further verified by qPCR during sequential stages of ATDC5 chondrocytes differentiation. The ST2L/sST2 expressions were detected concomitantly with hypertrophic markers Col X, MMP-13, and Runx2. Furthermore, IL-33 was also progressively enhanced during ATDC5 hypertrophic differentiation. Key transcription factor Runx2 is a known inducer of chondrocyte hypertrophy. Gain and loss of Runx2 function by cDNA vector or siRNA transfections in ATDC5 and several primary human growth plate chondrocytes corroborated ST2 to be a novel Runx2 target in hypertrophic chondrocytes. Noticeable hypertrophic zone reduction along with a significant Col X and OSC downregulation observed in the growth plates of ST2 knockout mice indicated the functional relevance of ST2 expression in vivo. Likewise, ST2 knockdown in ATDC5 cells was accompanied by the reduced expression of Col X, OSC and VEGFA and significant enhancement of SOX9 and Col II, the proliferative stage markers suggesting that ST2 inhibits proliferative and promotes hypertrophic differentiation of chondrocytes. Furthermore, Runx2 mediated induction of hypertrophic markers Col X, OSC and VEGFA were decreased by ST2 silencing indicating a cooperative regulation of chondrocyte hypertrophy through Runx2 dependent activation of ST2 signaling.

Conclusions: This study provides the 1st evidence for the role of ST2 signaling in different stages of chondrocytes differentiation. Bone growth is controlled by complex physiological and biochemical mechanisms. Our investigation points to a novel mechanism controlling chondrocyte differentiation thus opening a new avenue towards the more profound comprehension of the highly orchestrated process of longitudinal bone growth.

P1159

CROSS-CULTURAL ADAPTATION OF THE SARQOL QUESTIONNAIRE INTO HUNGARIAN LANGUAGE

A. I. Gasparik¹, L. Hodinka²

¹University of Medicine and Pharmacy Tirgu Mures, Tirgu Mures, Romania, ²ORFI, Budapest, Hungary

Sarcopenia, the decline of skeletal muscle tissue with age, is one of the most important causes of functional decline and loss of independence in older adults. A reduced quality of life (QoL) due to impaired physical performance has been evidenced in affected individuals. SarQol (Sarcopenia Quality of Life), a multidimensional questionnaire, consisting in 55 items, translated into 22 questions, rated on a 4-point Likert scale is the first disease specific evaluation, addressing quality of life in patients with sarcopenia.

The purpose of our study was to translate and culturally adapt the English SarQol questionnaire into Hungarian language. We followed the recommended international protocol, translating the English version via the forward-backward/blind approach into Hungarian language. The pretest process involved 40 subjects (20 sarcopenic and 20 non sarcopenic). The comparison of the backward translations with the original questionnaire as well as the quality of cultural adaptation, accuracy, context sensitivity, clarity, possible cultural insensitivity, item discrepancies or functional differences were evaluated by an expert group, composed by a methodologist, two health professionals, a linguist and the two authorized translators. http://sarqol.org/en/sarqol_form

Using the recommended best practice protocol for translation, the pre-final version is comparable with the original instrument in terms of content and accuracy.

P1160

METABOLIC DISORDERS IN GOUT PATIENTS

C. Criveanu¹, C. F. Palici², A. L. Barbulescu¹, A. E. Musetescu¹, S. Firulescu¹, A. F. Vreju¹, S. C. Dinescu¹, B. A. Chisalau¹, A. Rosu¹, P. L. Ciurea¹

¹University of Medicine and Pharmacy of Craiova, ²Emergency County Hospital Craiova, Craiova, Romania

Objective: The prevalence of hyperuricemia has been increasing in recent years and it has been suggested that is associated with a various number of metabolic changes. Metabolic syndrome is a cluster of conditions – obesity, increased blood sugar, abnormal cholesterol and triglycerides and high blood pressure – that if occurring together may increase the risk of developing cardiovascular disease and diabetes. The aim of the study was to establish an association between elevated serum uric acid levels and high blood sugar, high blood pressure, dyslipidemia and inflammatory syndrome (ESR and CRP) in gout patients and the correlation with the disease duration.

Methods: This study was performed on 34 men patients with gout. The duration of their disease ranged from one to twelve years, the variables studied were: serum uric acid, blood sugar, cholesterol, triglycerides, ESR, CRP and blood pressure in patients with gout.

Results: We observed that between disease duration and the results of the cholesterol, triglycerides, blood sugar, blood pressure, there are some depending values, what means that one of them is influencing the others. Also, analyzing the uric acid levels, ESR and CRP we observed that in some cases there is also a depending value between one of them and the results of cholesterol, triglycerides, blood sugar levels and blood pressure. In these cases we want to determine these associations using the Spearman coefficient (r), that is a non-parametric method of correlation that shows us where we have a direct/inverse correlation and also the intensity of it. We observed, thus, a direct and intense correlation between disease duration and the blood sugar levels ($r=0.60$) and blood pressure ($r=0.65$), between serum uric acid levels and cholesterol ($r=0.51$) and triglycerides ($r=0.54$). We found, also, a direct correlation between ESR and cholesterol levels ($r=0.56$).

Conclusions: The gout duration had a very high association with the blood sugar levels and blood pressure and may increase the risk of cardiovascular events and diabetes. Regarding high prevalence of hyperuricemia and cholesterol and triglycerides levels, as well as the potential link between ESR/CRP and cholesterol/triglycerides levels, future studies should be done to determine the potential role of hyperuricemia and inflammation in the pathogenesis of metabolic syndrome.

P1161

ANALYSIS OF THE POSSIBILITY TO REDUCE THE FUTURE OSTEOPOROSIS RISK BY THE NUTRITION AND SPORT EDUCATIONAL PROGRAM FOR CHILDREN

D. Głabska¹, D. Guzek², B. Mellová³, K. Zadka¹, K. Żywczyk³, K. Gutkowska²

¹Department of Dietetics, Faculty of Human Nutrition and Consumer Sciences, Warsaw University of Life Sciences (WULS-SGGW), 159c Nowoursynowska Str., 02-776 Warsaw, Poland

²Department of Organization and Consumption Economics, Faculty of Human Nutrition and Consumer Sciences, Warsaw University of Life Sciences (WULS-SGGW), 159c Nowoursynowska Str., 02-776 Warsaw, Poland

³Nutrition, Health and Wellness Unit, Nestlé Polska S.A., 32 Domaniewska Str., 02-672 Warsaw, Poland

Objective: Due to the growing prevalence of osteoporosis, the aim of the presented study was to analyse the possibility to influence the risk factors, associated with diet (calcium and vitamin D intake) and body composition (skeletal muscle and fat mass), by the nutrition and sport educational program for children.

Methods: The study was conducted in the nationwide group of children aged 12-13, recruited in cooperation with Polish Athletic Association and Ministry of Sport and Tourism of the Republic of Poland. The analysis was conducted for the group of 1014 children recruited from all the regions of Poland, while the group of 507 children (297 girls and 210 boys) was educated for at least 1 year in the nationwide nutrition and sport educational program for children (3 h weekly) and the control group was pair-matched, taking into account gender, age and region. The diet was assessed using the previously validated 31-item food frequency questionnaire for children. The body composition was assessed using the bioelectrical impedance method while BIA 101/ASE was used and the standard procedure of measurement and standard predictive equations were applied. The statistical analysis was conducted using the Shapiro-Wilk test and U Mann-Whitney test.

Results: In case of girls, the educated individuals were characterized by significantly higher muscle mass (47.5 vs. 45.2%; $p=0.0000$), lower fat mass (25.5 vs. 28.5%; $p=0.0000$) and higher calcium intake (645 vs. 625 mg; $p=0.0336$), than noneducated ones, while the vitamin D intake did not differ between groups ($p=0.3205$). In case of boys, the educated individuals were characterized by significantly higher muscle mass (51.3 vs. 48.4%; $p=0.0000$) and lower fat mass (20.1 vs. 24.2%; $p=0.0000$), than noneducated ones, while the calcium ($p=0.1080$) and vitamin D ($p=0.3890$) intake did not differ between groups.

Conclusion: After 1 year of participation in the nutrition and sport educational program for children, the beneficial influence on the body composition was observed, but the influence on the nutritional osteoporosis risk factors was not observed in case of boys and for vitamin D intake.

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P1162

OSTEOPENIA AND ITS RELATIONSHIP WITH THE INTENSITY OF THE FORCE THAT CAUSES THE FRACTURE

D. Ruci¹, M. Jordhani¹, V. Duraj¹, A. Kollcaku¹, V. Ruci¹

¹UHC Mother Teresa, Tirana, Albania, Tirana, Albania

Objectives: To evaluate if there is a relationship between osteopenia and the intensity of the force that causes a fracture in patients presented at UHC Mother Teresa, Tirana, Albania.

Methods: This is a case-control study which included 670 patients. In the case group were included 48 patients with fractures from minor trauma and in the other group were included 622 patients with no fractures. Every patient was evaluated for osteopenia by undergoing a DXA and for fractures from minor trauma by their recent personal history. Inclusion criteria for the study were: Albanian nationality, age between 25-75 years. After gathering the data, it was realized the statistical analysis.

Results: It was found that in the group with fractures from minor trauma 47 patients (98%) were diagnosed with osteopenia and in the other group, the individuals with osteopenia were found to be 270 (43%), with other patients being with normal DXA. Analysing the data, was found that there is an important statistical relationship between minor trauma fractures and osteopenia in the studied patients. ($p<0.01$) (odds ratio 95%CI) (8.4-446)

Conclusions: There seems to be an important and significant relationship between osteopenia and the intensity of the force that causes a fracture in patients presented at our university center.

P1163

EFFECTS OF NANO CERIUM (IV) OXIDE ON RAW 264.7 CELLS ACTIVITY AND RANKL-STIMULATED OSTEOCLASTOGENESISD. Labudzynski¹, J. Tuukkanen², M. Veliky¹¹Palladin Institute of Biochemistry of the National Academy of Sciences of Ukraine, Department of Biochemistry of Vitamin and Coenzymes, Kyiv, Ukraine, ²University of Oulu, Medical Research Center Oulu, Department of Anatomy, Oulu, Finland

Osteoclastogenesis is a complex process that plays a critical role in bone remodeling. Based on detailed knowledge of the molecular mechanisms involved in osteoclastogenesis, new pharmacological agents (including nanoparticles) that selectively influence the differentiation or the activity of bone cells were developed during the last decade. The aim of our work was to study the molecular mechanisms of influence of 5 μ M citrate-stabilized CeO₂ nanoparticles (CNPs) on the RAW 264.7 cells, its proliferative activity and level of multinuclear cells formation during RANKL-stimulated osteoclastogenesis.

The murine macrophage cell line RAW 264.7 was cultured with CNPs (2–4 nm) in DMEM (4.5g/L glucose). Cell proliferative activity and apoptosis were assessed and visualized with IncuCyte ZOOM instrument. Bovine bone slices were stained with TRAP and Hoechst 33258 for TRAP-positive multinuclear cells detection. The levels of TNF- α , CCL2, COX2, IL-6, Rel A mRNA expression were examined by RT-PCR analysis.

Exposure of RAW 264.7 cells to CNPs (5 μ M) during 70 h decreased cell proliferation and apoptosis by 20% and 12% respectively compared with control ($p < 0.05$). MTT test shown a mild cytostatic effect of CNPs on RAW 264.7 cells. On the other hand, it was revealed a significant 26% increase in the number of multinuclear cells in bone slices under the effect of CNPs ($p < 0.05$). CNPs led to upregulation of TNF- α and Rel A (4.1- and 1.6-fold respectively) and downregulation of IL-6, CCL2, COX2 and GLUT 1 (1.9-, 1.8-, 1.3- and 1.6-fold respectively) mRNA expression after 24 hours of RANKL-stimulated osteoclastogenesis compared with control ($p < 0.05$). Our results demonstrate that CNPs caused a slight cytostatic effect on RAW 264.7 cells and enhanced the fusion of macrophages during RANKL-stimulated osteoclastogenesis. The findings suggest a significant CNPs-induced activation of TNF- α with the lowering effect on the levels of other inflammation factors, as well as GLUT 1 transporters.

P1164

THE EFFECTIVENESS OF PLATELET RICH PLASMA, HYALURONIC ACID AND PEPTIDE INJECTIONS IN KNEE OSTEOARTHRITIS TREATMENT: A PROSPECTIVE RANDOMISED CONTROLLED STUDYN. Kesiktas¹, B. Demek¹, H. Albayrak¹, M. Yildiz¹, T. Aydin¹¹SBU Istanbul Fizik Tedavi ve Rehabilitasyon SAUM, İstanbul, Turkey

Objective: Knee osteoarthritis (OA) is the most common cause of chronic arthritis in terms of severe pain, disability, loss of function and adversely affecting the quality of life. Recent studies have shown that the intra-articular administration of PRP with glucosamine, chondroitin sulfate and hyaluronic acid (HA) is effective not only in reducing pain but also in reducing disease progression. Particularly with the introduction of systems that increase bioavailability and durability, especially in the area of osteoarthritis, studies on peptides have gained speed. Our aim in this study is to compare the efficacy of three different injection methods, which are recently popular, in terms of functional status and quality of life.

Methods: A total of 54 patients who were scheduled for prospective randomization and who met the criteria for admission (symptomatic knee OA (Kellgren-Lawrence stage 2, or 4), 18–60 years of age and with no coagulation problem) were evaluated. Patients were randomized into three groups: in Group 1 (Peptide group, n=18), single dose peptide vial, in Group 2 (HA group, n=18), single dose vial and Group 3 (PRP group,

n=18), single dose PRP administration was performed. BMI, age, sex and knee OA grade and knee physical examination findings were recorded. Patients were assessed by WOMAC Index, Lequesne index, Health Assessment Questionnaire (HAQ) and VAS scores.

Results: The age of the patients in the peptide group was significantly higher ($p < 0.05$) than the PRP and HA groups. Gender distribution, weight, height, BMI, educational status and occupational distribution of patients were not significantly different ($p > 0.05$) in peptide, HA, PRP group. There was no significant difference in knee Kellgren-Lawrence grades, ROM values, knee circumference measurements, crepitation rates, temperature increase, ACL test positivity, varus stress test positivity, MC Murray test positivity and Apley test positivity in all three groups ($p > 0.05$). In all three groups, WOMAC pain scores, Lequesne Knee Pain Function Index scores, HAQ scores, VAS scores at rest, VAS doctor global score, VAS motion score, and VAS overall score were significantly ($p < 0.05$) lower than before treatment. Particularly in the peptide group, postoperative 3rd WOMAC pain score was significantly lower ($p < 0.05$) than HA and PRP group. Particularly in the peptide group, the WOMAC pain score in the 3rd month after treatment was significantly lower ($p < 0.05$) than HA and PRP groups.

Conclusion: In the treatment of knee osteoarthritis, all three of the injections of HA, PRP and peptides were found to be effective in terms of pain, functional status and quality of life in the first 3 months after treatment in early and advanced stages. In particular, the WOMAC pain score in the peptide group was significantly lower than the PRP and HA groups ($p < 0.05$).

P1165

CAN SELF-REPORTED FRAX BE USED TO CALCULATE 10-YEAR RISK OF OSTEOPOROTIC FRACTURE?S. Mészáros¹, V. Ferencz¹, E. Hosszú², E. Csupor³, K. Bors⁴, C. Horváth¹¹1st Department of Internal Medicine, Semmelweis University, Budapest,²2nd Department of Pediatric Semmelweis University, Budapest,³Budavar Local Authorities, Budapest, ⁴Rehabilitation Hospital, Visegrád, Hungary

Objectives: FRAX[®] is a computer-based algorithm developed by the former WHO Collaborating Centre for Metabolic Bone Diseases. This algorithm calculates fracture probability from clinical risk factors in women and men. The output of FRAX is the 10-year probability of a major osteoporotic fracture (hip, clinical spine, humerus or wrist fracture) and the 10-year probability of hip fracture. The FRAX is a cost-effective online calculator that is not only accessible to healthcare professionals, but also to patients. In our study 100 patients were selected to participate the program of Osteoporosis Division (ODM) of Semmelweis University, Department of Internal Medicine in 2013. Patients completed a questionnaire containing the questions of the FRAX calculator, which was pre-translated. As a result, the questionnaire was filled out again with the help of a healthcare professional - without knowing the previous answers. The FRAX value was calculated on the basis of the data recorded by both patients and the healthcare professional.

Results: 14 males and 86 females participated in the study (age 40–86 years). The FRAX value calculated on the basis of the questionnaire completed by the patients was higher than the risk calculated by the healthcare professional (HIP%: 4.3 ± 0.6 vs. 3.4 ± 0.4 , $p < 0.001$, MOP%: 10.8 ± 0.9 vs. 9.5 ± 0.7 , $p < 0.001$). Patients considered themselves to be taller and thinner than the measured values (body height [cm]: 162.4 ± 0.7 vs. 159.5 ± 0.7 , $p < 0.001$, body weight [kg]: 72.3 ± 1.4 vs. 71.9 ± 1.4 , $p < 0.001$). In the questionnaires completed by the patients, more steroids and rheumatoid arthritis (RA) cases were reported, than confirmed during the individual interviews (steroid treatment: 11 vs. 5, RA: 35 vs. 11).

Conclusions: Based on our results, we emphasize the importance of completing FRAX questionnaire by a healthcare professional, or if the questionnaire is filled out by patients, it is to be checked.

P1166

ASSOCIATIONS BETWEEN METABOLIC SYNDROME AND BMD, TRABECULAR BONE SCORE IN POSTMENOPAUSAL WOMEN WITH NONVERTEBRAL FRACTURESV. Povoroznyuk¹, L. A. R. Martynyuk², I. Syzonenko³, L. I. L. Martynyuk²¹D.F. Chebotarev Institute of Gerontology of NAMS of Ukraine, Kyiv,²Higher Educational Institution "I. Horbachevsky Ternopil State Medical University of Ministry of Health of Ukraine", Ternopil, ³Kyiv City Center for radiation protection of citizens affected by the Chernobyl disaster, Kyiv, Ukraine

Objective: Medical, social and economic relevance of osteoporosis is caused by reducing quality of life, increasing disability and mortality of the patients as a result of fractures due to the low-energy trauma. This study is aimed to examine the associations of metabolic syndrome components, BMD and trabecular bone score (TBS) in menopausal women with nonvertebral fractures.

Methods: 1161 menopausal women aged 50-79 year-old were examined and divided into three groups: A included 419 women with increased body weight (BMI - 25.0-29.9 kg/m²), B – 442 female with obesity (BMI >29.9 kg/m²) and C – 300 women with metabolic syndrome (diagnosis according to IDF criteria, 2005). It was used DXA (Prodigy, GE Medical systems, Lunar, Madison, WI, USA, 2005) for measuring of lumbar spine (L1-L4), femoral neck, total body and forearm BMD and bone quality indexes (last according to Med-Imaps installation). Data were analyzed using Statistical Package 6.0.

Results: A significant increase of lumbar spine (L1-L4), femoral neck, total body and ultradistal radius BMD was found in women with obesity and metabolic syndrome compared to the pre-obese ones ($p < 0.001$). TBS was significantly higher in women with increased body weight compared to obese and metabolic syndrome patients. Analysis showed significant positive correlation between waist circumference, triglycerides level and BMD of lumbar spine and femur. Significant negative association between serum HDL level and BMD of investigated sites was established. The TBS (L1-L4) indexes positively correlated with HDL level. Low-trauma non-vertebral fractures occurred in 14.6% female with increased body weight, 17.4% of women with obesity and 21.3% of patients with metabolic syndrome.

Conclusion: Menopausal women with obesity and metabolic syndrome have a significantly higher BMD at all measured sites compared to females with pre-obesity. TBS is significantly lower in women with nonvertebral fractures and increased body weight or obesity. Despite the fact that BMD indexes were better in women with metabolic syndrome, the frequency of nonvertebral fractures was significantly higher in this group of patients.

P1167

BMD AND MUSCLE STRENGTH IN POSTMENOPAUSAL WOMEN: ROLE OF PHARMACOLOGICAL THERAPYP. Kumar¹, N. Baquer¹¹School of Life Sciences, Jawaharlal Nehru University, New Delhi, India

Objective: Osteoporosis is a systemic disease of the skeleton characterized by a reduction in bone mass and alterations in microarchitecture accompanied by increase in fracture risk, with a relevant decline in quality of life and important social, economic, and health implications, representing one of the most common causes of disability and a major financial item of health cost in many countries. The best therapy for osteoporosis is prevention, consisting in measures to avoid or slow the onset of the disease. Treatment includes measures aimed at osteoporotic individuals, with or without previous fractures and a high risk of a first or additional fracture.

Method: We enrolled thirty postmenopausal osteoporotic women, allocated in the first group underwent a 6-month personalized drug therapy

and focused mechanoacoustic vibration (2 sessions per week, each lasting 15 min); women allocated in the second group underwent only 6-month personalized drug therapy. Patients were evaluated performing DXA and isokinetic machine evaluation, and administration of Tinetti scale and ECOS-16 questionnaire.

Result: Show improvement of BMD and T-score at the lumbar spine and femoral neck, handgrip strength and isokinetic strength of the knee extensors, balance and gait, and quality of life.

Conclusion: Hence, the combined treatment with focused mechanoacoustic vibration and pharmacological therapy has a beneficial effect on BMD and T-score as well as on the muscle strength and quality of life of osteoporotic subjects.

P1168

MID UPPER ARM CIRCUMFERENCE AS A NOVEL COMPLEMENTARY TOOL FOR SCREENING SARCOPENIA IN YOUNG INDONESIAN ADULTSD. Widjaja¹, K. Tjhai¹, S. Tanzil¹, K. Dermawan¹, A. Pramusinta¹, H. K. Phenca¹, J. Kalim¹, A. Kurniawan²¹Faculty of Medicine, Pelita Harapan University, ²Department of Internal Medicine, Faculty of Medicine, Universitas Pelita Harapan, Tangerang, Banten, Indonesia,

Objective: To know the usefulness of mid upper arm circumference measurement for screening sarcopenia in young Indonesian Adults.

Methods: Early on January 2018 we conducted a cross-sectional study of 302 young Indonesian adults in Tangerang. Sarcopenia was defined as hand grip strength <26 for male and <18 for female, based on the consensus report of the AWGS (Asian Working Group for Sarcopenia). The hand grip strength of the dominant arm was tested three times using digital hand dynamometer JAMAR and the average value was taken. MUAC (Mid Upper Arm Circumference) was measured using measuring tape. Baseline characteristics were presented using descriptive statistics. Cutoff value, specificity and sensitivity were analyzed with ROC curve using IBM SPSS 23.0.

Results: A total of 302 participants were enrolled to the study, 65.2% of them were female. The median of age was 19 (16-48) years old and the median of BMI was 23.10 (14.82-41.73) kg/m². The median of MUAC for female population was 26 (40-42) cm and male population was 31 (21-42) cm. Overall, 28 (9.3%) participants were diagnosed with sarcopenia. MUAC value of ≤ 28.25 had significant value for predicting sarcopenia with AUC value of 0.62 (95%CI 0.527 to 0.712, sensitivity 75%, specificity 42.3%, $p < 0.05$).

Conclusion: The MUAC can be used as a novel and simple complementary tool for screening sarcopenia in young Indonesian adults. Further study needed to be done.

Reference:

1. Chen L et al. J Am Med Dir Assoc 2014;15:95

P1169

LIMITATIONS OF A REHABILITATION PROGRAM FOR CHRONIC TOPHACEOUS GOUT AND ATAXIC POLYNEUROPATHYM. L. Nitu¹, G. Mologhianu², S. Botezatu¹, N. Ciuca¹, A. S. Nica²¹NIRPMB, Bucharest, Romania, ²Carol Davila University of Medicine, Bucharest, Romania

Gout is a chronic arthritis which is characterized by joint pain episodes that appear due to uric acid deposition in the tissue.

Methods: We present the case of a 62 years old man with chronic gout with tophi around the joints of hands fingers bilaterally (in treatment with Allopurinol 400mg/day) and olecranon bursitis. The patient associates: sensorimotor, ataxic polyneuropathy with tetraparetic flaccid motor weakness, predominantly crural and left central facial paresis, with

secondary trophic disturbances, predominantly lower limbs atrophies, multiple lacunar cerebral infarcts, heart failure by hypertrophic and ischemic cardiomyopathy, stage 3 hypertension, peripheral arterial disease, COPD, microcytic, hypochromic anemia, chronic kidney disease, mixed ischemic and toxic hepatopathy, secondary diabetes mellitus, post corticotherapy, iatrogenous Cushing syndrome, bilateral carpal tunnel syndrome, operated right bimalleolar fracture sequelae, fingers II and III bilaterally blocked in extension and fingers IV and V right hand and finger V left hand blocked in flexion. For the initial evaluation we used the following scales: Barthel, FIM (Functional Independence Measure), ADL (Activity of Daily Living) and muscle strength scales, scoring 40/100 points on Barthel scale, 5/8 points on ADL, 3/7 points on FIM scale, 4/5 muscle strength on superior limb and 3/5 on inferior limb. The patient followed a staged rehabilitation program and drug therapy.

Results: The evolution of the patient was favorable, scoring 45/100 points on Barthel, 5/8 on ADL and 3/7 on FIM scales. The value of uric acid in blood decreased from 9 mg/dL to 6 mg/dL.

Conclusion: The particularity of the case were the multiple associated pathologies that prevented us from a complete rehabilitation program, but the efficient control of the comorbidities and the progressive, individualized dosage of the kinetotherapy methods depending on the patient's tolerance brought satisfactory result. The value of uric acid in blood must be maintained at 5 mg/dL. The prolonged corticotherapy led to secondary diabetes mellitus insulin dependent and iatrogenous Cushing syndrome. The retraction of the palmar aponeurosis has prevented the improvement of the ADL score - surgical intervention is recommended.

P1170

EVALUATING SPINE MICRO-ARCHITECTURAL TEXTURE (VIA TBS) IN THE DIFFERENTLY-AGED FEMALE POPULATION OF UKRAINE

V. Povoroznyuk¹, D. Hans², N. Dzerovych¹, A. Musienko¹

¹D.F. Chebotarev Institute of Gerontology of NAMS of Ukraine, Kyiv, Ukraine, ²Center of Bone diseases, Lausanne University Hospital, Lausanne, Switzerland

Objective: To create a reference database for the trabecular bone score (TBS) including the Ukrainian women of different ages.

Methods: We examined 1066 women aged 40-89 years old (age – 62.47 ± 9.57 years, height – 1.61 ± 0.63 m, body weight – 73.48 ± 6.27 kg) who were divided into the groups depending on their age: 40-44 years (n=33), 44-49 years (n=62), 50-54 years (n=137), 55-59 years (n=169), 60-64 years (n=215), 65-69 years (n=180), 70-74 years (n=151), 75-79 years (n=76), 80-84 years (n=31), 85-89 years (n=12). TBS was assessed using TBS iNsight (Med-Imaps, Pessac, France). BMD of the lumbar spine (L₁-L₄) was measured by DXA (Prodigy, GE Lunar, Madison, USA).

Results: Age has a significant effect on the variability of the TBS (F=26.78; p<0.0001). However, the effect of age on BMD L₁-L₄ wasn't detected (F=1.02; p=0.42). We determined the following parameters of TBS and BMD L₁-L₄ for the Ukrainian women depending on their ages: 40-44 years – 1.374 ± 0.114 and 0.993 ± 0.201; 44-49 years old – 1.340 ± 0.116 and 1.068 ± 0.184; 50-54 years – 1.301 ± 0.120 and 1.072 ± 0.201; 55-59 years – 1.220 ± 0.151 and 1.025 ± 0.209; 60-64 years – 1.212 ± 0.124 and 1.031 ± 0.199; 65-69 years – 1.188 ± 0.143 and 1.027 ± 0.192; 70-74 years – 1.146 ± 0.134 and 1.030 ± 0.182; 75-79 years – 1.143 ± 0.143 and 1.027 ± 0.217; 80-84 years – 1.139 ± 0.132 and 1.024 ± 0.232; 85-89 years – 1.114 ± 0.158 and 0.993 ± 0.194.

Conclusions: TBS is a significant predictor of age-related bone changes in women.

P1171

ANALYSIS OF THE INFLUENCE OF FOOD NEOPHOBIA IN CHILDREN ON THE FUTURE OSTEOPOROSIS RISK

D. Guzek¹, D. Głabaska², B. Mellová³, K. Zadka², K. Żywczyk³, K. Gutkowska¹

¹Department of Organization and Consumption Economics, Faculty of Human Nutrition and Consumer Sciences, Warsaw University of Life Sciences (WULS-SGGW), 159c Nowoursynowska Str., 02-776 Warsaw, Poland

²Department of Dietetics, Faculty of Human Nutrition and Consumer Sciences, Warsaw University of Life Sciences (WULS-SGGW), 159c Nowoursynowska Str., 02-776 Warsaw, Poland

³Nutrition, Health and Wellness Unit, Nestlé Polska S.A., 32 Domaniewska Str., 02-672 Warsaw, Poland

Objective: Due to the serious problem with inadequate vitamin D and calcium intake in children, that may cause the future osteoporosis risk, the aim of the presented study was to analyse the influence of food neophobia in children (defined as reluctance/avoidance of unknown food products) on vitamin D and calcium intake, as well as their main dietary sources.

Methods: The study was conducted in the nationwide group of children aged 12-13, recruited in cooperation with Polish Athletic Association and Ministry of Sport and Tourism of the Republic of Poland. The analysis was conducted for the group of 1014 children recruited from all the regions of Poland, and was considered as representative for the general population. The diet was assessed using the previously validated 31-item food frequency questionnaire for children. The food neophobia was assessed using the Food Neophobia Scale (FNS) by Pliner and Hobden and the subgroups of highly neophilic individuals (10-20 points), neophilic tendency (20-30 points), lack of tendency (30-50 points), neophobic tendency (50-60 points) and highly neophobic individuals (60-70 points) were indicated. The Cronbach's α was at a respectable level (0.77) indicating good internal consistency. The statistical analysis was conducted using the Shapiro-Wilk test, chi² test and Spearman's rank correlation coefficient.

Results: The nonconsumers share in each neophobia level subgroup was compared and no difference for dairy beverages (p=0.9027) and cottage cheese (p=0.5621) was observed. The highest share of nonconsumers was observed in the subgroups of highly neophobic individuals for rennet cheese (21.4%; p=0.0297), fish (35.7%; p=0.0057) and fish products (92.9%; p=0.0000). The negative statistically significant correlation was observed between FNS level and calcium intake (p=0.0001; R=-0.1197), as well as vitamin D intake (p=0.0000; R=-0.2054).

Conclusion: The highly neophobic individuals may reject both dairy products and fish intake, that may result in low calcium and vitamin D intake and contribute to the higher osteoporosis risk in the future.

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P1172

THE ROLE OF PAMIDRONATE IN THE TREATMENT OF FIBROUS DYSPLASIA

M. Skoczynska¹, M. Frankowski², P. Wiland¹

¹Department and Clinic of Rheumatology and Internal Diseases, Wrocław Medical University, ²Department of Rheumatology and Internal Diseases, Wrocław University Hospital, Wrocław, Poland

Objective: Fibrous dysplasia (FD) is a rare bone metabolic disease, connected with altered bone formation. There have been few clinical studies of patients receiving pamidronate as an experimental therapy of FD but there are no current guidelines concerning such treatment. The aim of this work is to report two cases of FD in young patients, treated with pamidronate with a good outcome.

Methods: Two young patients (a male aged 21 and a female aged 35), with single fibrous dysplasia foci localized in the mandible, diagnosed via histopathologic test, have undergone treatment with pamidronate administered intravenously. They received the same dose of 60 mg/d but according to different regimens. The male patient received a single dose of pamidronate each 3 months, whereas the female patient received 60 mg

for three consecutive days every 6 months. Prior to each treatment cycle, patients were consulted with oral surgeon who ruled out contraindications such as dental caries.

Results: In both patients, aside from slightly increased ESR and CRP levels, laboratory tests' results were normal both before and after treatment. During the course of treatment, a clinical improvement (reduction in local pain and swelling), as well as radiologic regression was observed in both patients. No side effects were observed.

Conclusions: We conclude that according to current knowledge and our own clinical experience, intravenous treatment with pamidronate in accordance with aforementioned regimens is a suitable and safe therapeutic option for patients with FD. The use of pamidronate in FD is still off-label, and its long-term effectiveness and safety should be studied in a randomized controlled trial.

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P1173

STRATEGY FOR REDUCING OSTEOPOROTIC FRACTURES AND COST DECREASING WITH FRACTURED PATIENTS / FUSEX *

P. Portinho¹

¹Hospital Militar de Área De Brasília, Brasília, Brazil

Objective: Osteoporosis is a skeletal disease characterized by compromised bone resistance, predisposing to an increased risk of fractures. Bone resistance reflects the integration of two main aspects: Bone density, Bone quality (NIH Consensus Development Panel. JAMA 2001;285:785). Men, as well as women, peak bone mass around the age of 20. From the age of 30, spontaneous loss of bone mass, physiological, with the patient's age. The loss of bone mass is directly related to the occurrence of fragility fractures (Low energy). For example: Fall of the height itself. Women have a higher prevalence of fractures after menopause. It is estimated that 30% of women over 50 will have osteoporosis. As a result, the risk of fractures increases: - 50 to 60 years old wrist fractures prevail, - 60 to 70 years, spine fractures and -70 to 80 years, hip fractures. In men, it follows the same pattern, modifying the prevalence according to age. However, in hip fracture mortality is higher in men than in women (Looker A et al. Osteoporos Int 1998;8:468. Watts NB Am Fam Physician 1988;38:193). Currently, we are experiencing a pandemic of osteoporotic fractures. The prevalence is >200 million people worldwide with osteoporosis. The incidence of hip fractures will increase substantially in the year 2050: -240% in women, -320% in men. The hip fracture will increase from 1.7 million in 1990 to 6.3 million in 2050.

Method: Currently, FUSEX users who need to undergo surgical treatment (total hip prosthesis) due to osteoporosis fracture, have a minimum unit cost of 17-20 thousand reais (Data obtained in the OPME / FUSEX / HMAB sector, in Brasília / DF) with surgical and hospital treatment. This calculation does not consider the costs if there are complications inherent in the orthopedic surgical treatment and the pathology in question. In the military field, the movements during the career can compromise the patient's follow-up and treatment and, consequently, facilitate the occurrence of complications (new fractures in need of new surgical treatment) onerando the user and FUSEX. The uptake of these patients is essential for the elaboration of a database and follow up of the treatment instituted. The database together with a diagnostic protocol and treatment favor the patient in the extratification and directing the appropriate treatment with subsequent follow-up. These measures reduce the risk of prescription of high-cost drugs, dismissing the patient and FUSEX. There is a worldwide task force to recruit fractured patients to prevent refraction that will inevitably occur. At HMAB, we have been conducting this process for 6 years within the orthopedic outpatient clinic. We are able to perform a multidisciplinary treatment (related specialties) and medication (severe

osteoporosis) benefiting the FUSEX user. It is important to achieve patient adherence to the established treatment and follow-up of resolution of the patient's clinical condition. We have several ways to get patients: - Educational / institutional campaigns (HMAB Osteoporosis Prevention Week), -Ambulatories of related specialties (orthopedics, rheumatology, geriatrics, endocrinology and gynecology), -Patients from the orthopedic emergency room, -Patients from accredited health institutions that require surgical treatment (total hip prosthesis, osteosynthesis, spine surgeries).

Conclusion: As FUSEX works throughout the national territory, the proposal of a unified protocol seems to us a reasonable measure to maintain control of the database. Another possibility of control may be effected by a compulsory notification of the features of quadril by fragility. Such measures are reasonable because of the low cost of its implantation, easy reproducibility to the health professionals and administrative structure feasible in all the health institutions of the Brazilian Army.

P1174

OSTEOPOROSIS IN MEN WITH PITUITARY INSUFFICIENCY

D. Galusca¹, F. Marc¹, D. M. Farcas¹, A. Pallag¹

¹Faculty of Medicine and Pharmacy, Oradea, Romania

Introduction: Pituitary insufficiency has many causes - tumors, infiltrative diseases, empty sella, etc. and hormonal substitutive therapy is essential for the wellbeing of the patients. It is very important to investigate the presence of osteoporosis in these patients, especially if they have corticotrophin and gonadotropin insufficiency.

Method: We present 3 clinical cases of men diagnosed with pituitary insufficiency of different causes who were investigated with DXA scan for the presence of osteoporosis and the levels of serum 25(OH)vitamin D were measured.

Results: First case is a young male, 23 years old, on prednisone replacement therapy for 8 years and on testosterone undecanoate for 5 years; the DXA score was -1.8 (osteopenia) and the serum levels of vit D in the range of insufficiency (below 20 ng/ml). Second case, a 42 years old male, with corticotrophin and gonadotropin insufficiency was on Prednisone and long acting testosterone (undecanoate) for >5 years; the DXA score was -2.7 (osteoporosis) and vit. D below 20 ng/ml. The third case, a 75 years old male, was on Prednisone therapy for 13 years; after surgery, 13 years ago, he refused Testosterone therapy; the DXA score was -2.9 (osteoporosis) and vit D below 20 ng/ml.

Conclusions: Prolonged administration of corticotherapy in men with pituitary insufficiency, especially if they also have gonadic- testosterone insufficiency, may lead to the development of osteoporosis, so the follow up of these patients should include DXA measurements. Due to the geographic particularities of Romania, vitamin D deficiency or insufficiency may occur.

If patients are diagnosed with osteopenia, calcium and cholecalciferol are needed and if they have osteoporosis, Bisphosphonates must be introduced in their therapy.

P1175

RAPID BACTERIAL IDENTIFICATION USING MICROCALORIMETRY TO AVOID INFECTION GENERATED OSTEOARTHRITIS

M. I. G. Popa¹, R. Ene¹, J. Panti¹, M. Pleniceanu¹, M. Nica¹, A. Streinu-Cercel², C. Cirstoiu¹

¹Emergency University Hospital, Orthopaedics and Traumatology Department, ²The National Institute for Infectious Diseases "Prof. Dr. Matei Bals", Bucharest, Romania

Objective: Septic arthritis represents an infectious pathology that affects all ages. The most frequent pathogen agent isolated in adults is *S. aureus*. In the last few years the number of infectious arthritis rose and also the number of resistant bacteria as the Methicillin-resistant *Staphylococcus*

aureus (MRSA) is increasing. If septic arthritis is not swiftly identified and treated the outcome can be disastrous generating an important defect followed by osteoarthritis.

Methods: For our study we performed surgery and obtained samples from the infectious site of 44 patients. The probes were sent to the hospital laboratory which identified *S. Aureus* in 26 cases, *P. aeruginosa* in 11 case and 7 cases with *K. pneumoniae*, at the same time we use a microcalorimetry apparatus to evaluate the bacterial growth. Microcalorimetry, due to great improvement of the calorimetric mechanisms, could detect micro and nanothermic alterations. Using microcalorimetry we can study the behavior of bacterial populations in different culture media. This is possible due to their active metabolism that produces exothermal biochemical reactions.

Results: Using a microcalorimeter and the pathogen agent harvested from the patient we performed tests which came out very similar to each other. For the probes we inoculated 600 µl of Muller-Hinton liquid medium with the pathogen agent and then introduced it in a special microcalorimeter cell. The microcalorimeter thermograms were complete faster than the classical microbiological diagnosis.

Conclusions: The microcalorimetry method could be powerful if correctly used and can help the clinician in collaboration with laboratory colleagues to detect the bacteria faster and more precise as in the classical microbiological method. Using classical methods we need 72-96 h for final identification but using microcalorimetry we could obtain a complete thermogram in 24-48 h depending on different factors previously described.

P1176

CAN STUDENTS USE MUSCULOSKELETAL ULTRASOUND IN EVALUATING SYNOVITIS, TENOSYNOVITIS AND STEP-UP LESIONS IN REAL LIFE?

S. Paula Anca¹, G. Roxana², S. Adriana, M. Flavius, C. Monica

¹Emergency Counti Hospital Targu Mures, Targu Mures, ²County Emergency Hospital Cluj Napoca, Cluj Napoca, Romania

Objective: Musculoskeletal (MSK) ultrasound (US) is considered to be the “second” stethoscope in the clinical evaluation and monitoring of patients with systemic inflammatory autoimmune diseases. The study's two main objectives were to evaluate the capacity of students to achieve US skills and further to apply them in the evaluation of patients with autoimmune inflammatory systemic diseases and to see if there is a correlation between the musculoskeletal ultrasound changes, abdominal ultrasound changes and laboratory findings.

Methods: Two students were involved in the study and a qualified MSK US physician trained them during a week. 53 female patients diagnosed with systemic lupus erythematosus passed the inclusion criteria. The lesions studied were: synovitis of the second MCPs, second PIPs and step-up lesions, achilian bursitis, achilian enthesophytes, tenosynovitis of the peroneus brevis, longus and tibialis posteriorus. All images were interpreted at the initial evaluation and after one month. The inter/intrarater reliability was measured using ReCal 2 software. We also used the GraphPad Prism 6 and Microsoft Excel.

Results: Over 5000 images were stored and analysed. The percentage agreement for all lesions when looking at the interrater reliability was above 90%. The intrarater reliability was lower concerning grading the synovitis at the PIP's. The result were for grade 0 a percentage agreement of 60.46% with a Cohen's kappa of 0.27, grade 1 a percentage agreement of 83.72% with a Cohen's Kappa of 0.13 and a grade 3 with a 72.09% agreement and 0.01% Cohen's kappa. All the others lesions percentage agreement was above 90% with a Cohen's kappa of 0.80.

It seems that there is a correlation between the presence of the inflammation from the joints, abdominal ultrasound changes and laboratory findings.

Conclusion: MSK US can be used by students to monitor the presence of bursitis, tenosynovitis and step up lesions. Future training in grading synovitis is mandatory for a correct real-life evaluation.

P1177

HYPERECHOIC SPOTS INSIDE FLUID ARE MORE FREQUENTLY FOUND IN HYPERURICEMIC PATIENTS

A. F. Vreju¹, B. A. Chisalau¹, C. D. Parvanescu¹, S. C. Firulescu¹, C. Criveanu¹, S. C. Dinescu¹, A. L. Barbulescu¹, A. Rosu¹, R. A. Ionescu², H. V. Popoviciu³, L. Streba⁴, P. L. Ciurea¹

¹Department of Rheumatology, University of Medicine and Pharmacy Craiova, Craiova, ²Rheumatology Department University of Medicine and Pharmacy Carol Davila, Bucharest, ³Rheumatology Department, University of Medicine and Pharmacy of Targu Mures, Targu Mures, ⁴Dep. of Internal Medicine, University of Medicine and Pharmacy Craiova, Craiova, Romania

Objectives: Ultrasonography (US) has increasingly been used as a diagnostic and evaluation tool in rheumatology, both for articular and periarticular involvement. Findings as joint effusion, synovitis, or tendon involvement are frequently reported in patients with rheumatic diseases. The aim of this study is to find any correlations between the aspect of the fluid effusion and distinct diseases or paraclinical findings.

Methods: the study included 40 consecutive patients (30 females and 10 males) with knee joint fluid. All patients underwent, besides clinical and paraclinical evaluation, an US examination at least knee joints. Information including values of inflammation markers (erythrocyte sedimentation rate, C reactive protein) or serum uric acid level were noted.

Results: We found hyperechoic spots inside fluid in 21patients (87.5%), more frequently found in patients with serum uric acid over 5.4 mg/dl. Double contour sign was found in only 2 patients (7.2%), that proved hyperechoic spots in the fluid too. Seven patients were found to have fluid in other areas than knees, including elbow, glenohumeral joint or in flexor tendon sheet of the hands.

Conclusion: Hyperechoic spots inside joint effusion, an US finding that was intriguing for many years, might be related to crystal deposition disease. The present study shows that US could allow detecting early changes secondary to hyperuricemia.

P1178

A NEW MUTATION IN THE CRTAP GENE ASSOCIATED WITH JUVENILE OSTEOPOROSIS

S. H. J. Scharla¹, U. G. Lempert¹, W. Höppner²

¹Practice Endocrinology and Diabetes, Bad Reichenhall, ²Bioglobe GmbH, Hamburg, Germany

Objective: Osteoporosis is mostly prevalent in elderly people. However, also young adults and adolescents can suffer from osteoporotic fractures. Osteogenesis imperfecta (OI) is an important differential diagnosis, especially when several family members are affected. There is an increasing number of mutations associated with osteoporotic fractures.

Methods: The index patient was 17 years old and had suffered from fractures of the shoulder (traumatic) and the distal radius. Because of very low BMD (T-Score -3.3 at the lumbar spine) and a family history with several family members affected by osteoporosis, a genetic background was suspected. Genetic panel diagnostic analysis was done in the Bioglobe laboratory (Hamburg, Germany), searching for mutations in the following genes: COL1A1, COL1A2, CRTAP, LRP5, P3H1, WNT1, ALPL, CYP27B1, VDR, CASR, PHEX, WISP3.

Results: The index patient had no individual risk factors and normal clinical laboratory results, normal menstrual cycle, and normal vitamin D status. Physical examination was normal, and there were no apparent blue sclerae. We found following mutations: COL-1A1 Gen: c.104-441G>T:G/T het (known association with low BMD), LRP5-Gen: c.3989C>T:C/T het (known association with low BMD), and in the CRTAP-Gen: c.540G>A: G/A het (CRTAP=Cartilage -Associated Protein). This variant c.540G>A: G/A (p.Met180Ile) in the CRTAP gene has not been described before. In order to clarify the clinical relevance of this CRTAP mutation, we studied the family members. All three siblings of

the index patient (ages 6, 12 and 14 years) were heterozygous for all 3 mutations and had also bone disease (either fractures, low BMD, or both). The father (41 years old) was homozygous for the COL-1A1 mutation and heterozygous for the CRTAP and LRP5 mutation. He had already several osteoporotic vertebral fractures associated with very low BMD (T-Score -4). The mother was not available for examination. One aunt (56 years) had no mutations and no bone disease, and another aunt (60 years) had only the COL-1A1 mutation and osteoporosis with vertebral fractures. The grandmother (paternal) had also osteoporosis and was heterozygous for the COL-1A1 and the CRTAP mutations.

Conclusion: The described mutations in the COL-1A1 and LRP5 genes are associated with decreased BMD, but do not fully explain the juvenile osteoporosis. It appears likely, that the new variant c.540G>A: G/A (p.Met180Ile) in the CRTAP gene is associated with juvenile osteoporosis or with a mild form of OI.

P1179

OSTEOPROTEGERIN AND BMD IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM

E. V. Brutskaia-Stempkovskaya¹, A. P. Shepelkevich¹, N. A. Vasilyeva², T. A. Leonova³, N. V. Rekechinskaya⁴, Y. V. Dydyshka¹, N. S. Karytska¹
¹Belarusian State Medical University, ²Republic Center of Medical Rehabilitation, ³Minsk City Clinical Oncologic Dispensary, ⁴City Clinical Oncologic Dispensary, Minsk, Belarus

Objective: to study relationship between osteoprotegerin (OPG) and BMD in postmenopausal women with primary hyperparathyroidism (PHPT) compared postmenopausal women without PHPT.

Methods: We studied 30 postmenopausal women with PHPT, average age 62.5±6.12 years. The control group were 16 postmenopausal women without PHPT, mean age 59.7±6.28 years in physiological menopause. Examination: total calcium, phosphorus, albumin, creatinine, PTG, OPG, vitamin D, BMD measurements in the lumbar spine, femoral neck, total hip, and distal 1/3 radius by DXA.

Results: The were no differences in the age, years (U=138.5, p=0.052), height, m (U=216.5, p=0.99), weight, kg (U=202.5, p=0.72), BMI kg/m² (U=196.5, p=0.61), duration of menopause in both group, years (U=146.5, p=0.08). Osteoporosis of axial skeleton was founded in 43%, osteopenia in 33% in postmenopausal women with PHPT (T-score_{L1-L4}=-2.1 (-2.9 - -0.9), T-score_{Right femur total}=-1.1 (-1.7 - -0.2)), and osteoporosis was no founded in the control group, osteopenia in 12.5% (T-score_{L1-L4}=-0.1 (-0.8 - 0.7), T-score_{Right femur total}=-0.1 (-0.5 - 1)). Significant differences was detected in the BMD in postmenopausal women with PHPT compared postmenopausal women without PHPT (U_{L1-L4}=57.0, p=0.0001; U_{Right femur total}=88.5, p=0.0015). We detected correlation between OPG level and axial skeleton BMD: r_{s L1-L4}=0.5, p<0.05, r_{s Right femur total}=0.5, p<0.05.

Conclusion: The results of the study confirmed increased risk of osteoporosis in postmenopausal women with PHPT compared control group. The results may indicate association between OPG level and axial skeleton BMD.

P1180

OTHER ENTHESITIS THAN ACHILLES' IN PSORIATIC ARTHRITIS: AN ULTRASONOGRAPHIC STUDY

B. A. Chisalau¹, C. D. Parvanescu², S. C. Firulescu¹, C. Criveanu¹, S. C. Dinescu¹, A. L. Barbulescu³, A. Rosu¹, R. A. Ionescu⁴, H. V. Popoviciu⁵, L. Streba⁶, P. Ciurea¹, F. A. Florentin Ananu¹

¹Rheumatology Department, University of Medicine and Pharmacy Craiova, Craiova, ²Rheumatology Department, Emergency County Hospital Craiova, Craiova, ³Pharmacology Department, University of Medicine and Pharmacy Craiova, Craiova, ⁴Rheumatology Department, University of Medicine and Pharmacy Carol Davila, Bucharest, ⁵Rheumatology Department, University of Medicine and Pharmacy of Targu Mures, Targu Mures, ⁶Internal Medicine Department, University of Medicine and Pharmacology, Craiova, Romania

Objective: Enthesal involvement is a frequent and distinctive feature of psoriatic arthritis (PsA), frequently underdiagnosed using only clinical tools. Over the last decade, ultrasonography (US) has been increasingly been used in rheumatology, for assessing articular and periarticular involvement in patients with chronic arthritis and is lately gaining favor in the evaluation of enthesitis in patients with spondyloarthritis. Subclinical enthesitis detected using MSUS, particularly with a power Doppler signal inside, has proved to be of a predictive value for the development of structural damage in patients with psoriatic arthritis. The aim of this study is to find and to describe sonographic structural and inflammatory changes in other entheses than of Achilles in patients recently being diagnosed with psoriatic arthritis (PsA), patients with established PsA, according to currently used criteria and patients with other non-inflammatory chronic diseases.

Methods: The study included 10 patients with early PsA (ePsA), 30 with established PsA (PsA) (according to CASPAR criteria) and 20 patients with no inflammatory joint disease, as the control group were enrolled in the study. All patients underwent, besides clinical and paraclinical evaluation, an US examination of the following enthesal sites: common extensor and flexor tendon at the insertion at the lateral and medial humeral epicondyle; proximal and distal patellar tendon entheses.

Results: There was a rather poor relationship between clinical based enthesitis involvement and US findings, including loss of normal fibrillar echogenicity, hypoechoic swelling of the tendon insertion, effusions, bursitis, and increased blood flow detectable with a PD signal. Loss of fibrillar echogenicity was more frequent in the ePsA group, when compared to control group (p<0.01), and the presence of enthesophytes at the level of the elbow entheses, was more frequently identified in the PsA group, in comparison to ePsA and control group (p<0.05; p<0.01). Doppler signal showed high prevalence in the psoriatic patients, compared to controls, but with no difference in between psoriatic groups.

Conclusion: Structural ultrasound changes and PD in entheses are common in both new and established PsA. The present study confirms that US allows detecting structural and inflammatory abnormalities of entheses in PsA patients. Only the clinical examination is not enough for a certain diagnosis, precisely in the early stages.

P1181

MINERAL DENSITY OF BONE IN CHILDREN WITH DISPLASIA SYNDROME OF CONNECTIVE TISSUE

T. Rymbaeva¹, A. Ospanova¹, M. Madiyeva¹
¹Semey Medical University, Semey, Kazakhstan

Objective: To assess the state of mineral bone density (MBD) during connective tissue dysplasia (CTD) in children living in the city of Semey. We studied the condition of MBD in 84 children aged 1 to 14 years (mean age - 7.5±0.6 years), including 46 boys (54.8%) and 38 (45.2%) - girls. The control group consisted of 80 children without signs of CTD (mean age - 7.2±0.5 years), including 46 boys (57.1%) and 34 girls (42.9%). In the studied groups of children, there were no fractures in the anamnesis.

Methods: All children were assessed the blood content of total calcium, magnesium, phosphorus (reagents BioSystems S.A. [QSC according to ENISO 13485 and ENISO 9001 standards] were used). BMD was examined on the SONOST-2000 apparatus (OsteoSys Co., Ltd, Korean Republic). The BMD is compared with reference values from healthy youth of the same age, sex, and race/ethnicity to calculate a z-score, the number of SDs from the expected mean. At z-score, <-2.0 SD was considered as a state of "bone density reduction for a given age" (z-score that is > 2 SDs below expected (<-2.0) is referred to as "low for age").

Results: In children with CTD, the microelements in the blood were lower than in the control group and below normal. So, Ca (n 2.15-2.58 mmol/l) in children with CTD was 2.11±0.12 and in the control group - 2.43±0.10 (p=0.05). Mg (n 0.7-0.98 mmol/l) in children with CTD - 0.63±0.02 and 0.77±0.03, respectively (p<0.05). The content of P (n 1.29 -2.25

mmol/l) in children with CTD was at the lower limit of the norm - 1.27 ± 0.06 and in the control 2.04 ± 0.09 ($p < 0.01$). From the 84 children with CTD, a decrease in BMD (Z-score between -1.0 and -2.0 SDs) was observed in 59 (70.2%) children. In 3 children with DST Z-score was > -2 SD, which was 3.6%. In 22 children (26.2%) normal BMD was observed. In the group of children without DST, a decrease in BMD was observed in only 6 children (7.5%), (Z-score < -2.0 SD). Normal BMD was in 74 children (92.5%).

Conclusion: In children with CTD, a moderate decrease in biochemical and BMD indexes prevailed below the age norm. We believe that reduced bone density is a concomitant syndrome in children with connective tissue dysplasia.

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P1182

INVESTIGATION OF MYOLYSIS: A CASE SERIES

Y. Cherif¹, M. Mrouki¹, F. Ben Dahmen¹, M. Abdallah¹

¹Department of Internal Medicine, Regional Hospital of Ben Arous-Yesminet, Ben Arous, Tunisia

Objective: Myolysis is a well known clinical syndrome of muscle injury. Their etiologies are several. The objective of our study is to describe the aetiological spectrum of myolysis, their clinical and biological consequences.

Methods: This is a retrospective study that recorded 16 cases of myolysis over 3 years (2015-2017). Myolysis was diagnosed by elevation of serum creatine phosphokinase (CPK) level.

Results: Our study concerned 5 men and 11 women. The mean age at diagnosis was 47 years (15-73 years). The average CPK was 2313.67 IU/l (309-6152 IU/l). Myolysis was diagnosed incidentally in 10 patients. The other patients presented myalgias. Only 1 patient had an associated hepatic cytolysis. The myolysis is due to drugs in 4 cases, hypothyroidism in 3 cases, undifferentiated connectivitis in 1 case, neuromuscular pathology in 1 case and coronary disease in another case. The offending drugs were: famotidine in 1 case, simvastatin in 1 case and irbesartan in 2 cases. Inflammatory myopathy was identified in 3 cases: a case of dermatomyositis, a case of anti-SRP myositis and another case of antisynthetase syndrome. Moreover, Electrolyte abnormalities led to myolysis in 2 cases.

Conclusion: The rate of myolysis is underestimated. In order to stop ongoing muscle destruction, its cause must obviously be detected and treated as soon as possible.

P1183

LYME BORRELIOSIS IN A PATIENT WITH PAGET DISEASE – DIAGNOSTIC PROBLEMS: CASE REPORT

M. Sokalska-Jurkiewicz¹

¹Institut of Rheumatology, Prague, Czech Republic

Objectives: Paget disease of bone (PDB) is a chronic bone disorder of uncertain aetiology, characterized by bone *remodelling* that typically begins with excessive *bone resorption* followed by an *increase in bone formation*. Lyme borreliosis is an infectious disorder caused by bacteria of the *Borrelia* type, spread by ticks, which mostly affects skin, joints and nervous system.

Methods: The case report of a 67-year-old male patient with inactive Paget disease and no history of tick bite, admitted to our ward with the recent complaint of arthralgia and myalgia of the right arm, left hip and thigh. The initial anti-*Borrelia* serology results were slightly positive; therefore he was treated with oral antibiotics with no effect.

Results: Clinically patient presented with night sweating, recurrent subfebrile temperature, arthralgia and myalgia with limited range of motion

of the hip dated from spring 2017. Blood analysis revealed CRP elevation, eosinophilia and high titers of anti-*Borrelia* antibodies in all methods, furthermore there was an elevation of bone turnover markers. The coxitis was confirmed by sonography. On the other hand there was region of increased density in the Th11 on the RTG and CT scan. The bone scintigraphy confirmed coxitis on the left side and active Paget disease in the skull and vertebral bone. The patient received intravenous antibiotic therapy altogether with zoledronic acid with clinical and laboratory improvement.

Conclusions: Due to symptoms mimicry and growing incidence of *Borrelia* infection one should consider this disease in the differential diagnostics of bone and muscle pain even in patients with already diagnosed chronic disease of musculoskeletal system and with no history of the thick bite.

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P1184

NEW ULTRASOUND METHOD FOR EVALUATING THE BMD AND T-SCORE OF THE LUMBAR SPINE IN A GROUP OF PATIENTS WITH RHEUMATOID ARTHRITIS: A PILOT STUDY

R. Decianu¹, M. Bojinca², S. Daia-Iliescu¹, D. Mazilu¹, M. M. Negru¹, M. Duna¹, A. R. Balanescu¹, V. C. Bojinca¹

¹"Sfanta Maria" Clinical Hospital, Department of Rheumatology and Internal Medicine, ²"I. Cantacuzino" Clinical Hospital, Department of Rheumatology and Internal Medicine, Bucharest, Romania

Objective: Applying a recently introduced echosound approach for diagnosing osteoporosis. This new method integrates ultrasound imaging with radiofrequency signals from an echographic scan. We evaluated the BMD in patients with rheumatoid arthritis (RA), using a ultrasound based technique, instead of DXA. Also, we set ourselves to contribute to the related literature with data from our clinic.

Methods: We evaluated 50 women with RA and 50 age matched controls, without an inflammatory disease and with no history of corticotherapy. All women in both studies were in menopause. The patients with RA were under monotherapy with a conventional synthetic DMARD: methotrexate or leflunomide. All evaluations were done using a quantitative ultrasound Echolight machine, by only two evaluators for both groups.

Results: All patients in the study group are (13%) or have been (87%) under corticotherapy during the evolution of RA. The medium dose followed for >2 weeks was 8.6 (5-10) mg prednisone/day. The corticotherapy was followed over an average period of 2.6 (0.5-14) months. The average T-score in the study group was -1.71 (0.8 – -3.5), closer to the osteoporosis cutoff than the control group, which had a T-score of -1.06 (1.0 – -3.1). Regarding the BMD, the results were 0.72 (0.68-1.05) g/cm² in the study group and 0.96 (0.82-1.12) g/cm² in the control group.

Conclusions: Although both groups had an average T-score included in the osteopenia interval, the difference is significant with regard to the fracture risk and also to the treatment duration. Currently, DXA is considered the gold standard for diagnosing osteoporosis, but there are several limits to this technique: ionising radiation, massive machine, needing dedicated spaces, specialized operators and all in all, high costs. These limitations prevent DXA from becoming a screening technique, in spite of the need of a screening programme for osteoporosis. This is a preliminary study for evaluating the BMD. Using this new, portable, radiation-free technique, we plan to prove the cost-effective superiority of this method in a screening programme. In order to do so, further studies are necessary.

P1185

COMPARISON OF QUANTITATIVE ULTRASOUND (QUS) OF CALCANEUS AND DXA IN POSTMENOPAUSAL WOMEN WITH RECENT FRACTUREA. Tabain¹, D. Tabak², I. Glavinić², I. Dumić-Čule³, A. Balenović², S. Vukičević³¹Polyclinic Medikol, ²Health Center Zagreb, ³Laboratory for Mineralized Tissue, University of Zagreb, School of Medicine, Zagreb, Croatia

Objective: The aim of this study was to compare QUS and DXA results in postmenopausal women, which recently had spontaneous or low trauma fracture. Our intention was to investigate if there is any difference between results in various groups of women, regarding menopause duration.

Methods: Study included 103 postmenopausal women, age between 47-84 years. All of them were referred to diagnostic procedures by general practitioner (GP), because of the occurrence of recent fracture and other relevant risk factors for osteoporosis. QUS was performed with Sahara Hologic ultrasound device, mostly at the GP office. The data obtained were quantitative ultrasound index (QUI), BMD and T value according to the manufacturer chart, following criteria of high, medium and low risk for osteoporosis ($T < -1$, $-1 > T < 0$, $T > 0$). DXA was performed with Hologic Delphi system, with BMD and T values obtained in lumbar and femoral neck regions, following standard criteria for osteoporosis ($T < -2.5$, $-2.5 < T < -1$, $T > -1$). Patients (pts) were divided in two groups. Group A was consisted of 32 women which were in their first 10 postmenopausal years (average 5, median 5), when the bone loss is very enhanced, while group B included 71 women in period of 10-38 postmenopausal years (average 22, median 22).

Results: Out of 32 women from the group A, 22 had QUS results consistent with high, 8 with medium and 2 with low risk for osteoporosis/osteopenia. DXA confirmed osteoporosis in 8 cases, while 12 pts had osteopenia and the rest 12 had regular result. Sensitivity and specificity of the QUS method were 73.3% and 33.3%. Out of 71 women in group B, QUS detected 61 with high, 7 with medium and 3 with low risk for osteoporosis/osteopenia. Osteoporosis was confirmed by DXA in 21 out of 71 examinees, osteopenia in 31 while 19 had normal findings. Sensitivity and specificity in this group of pts were 82.2% and 11.4%.

Conclusion: Although QUS is a valuable screening method, it wasn't sufficient enough to confirm or eliminate osteoporosis in our study group. Slightly better specificity of QUS method was observed in group of women in earlier postmenopausal phase.

P1186

HOW TO IMPROVE ADHERENCE IN AN ORTHOPEDIC CLINIC – A 3 YEARS RETROSPECTIVE OBSERVATIONAL STUDY (UNICENTER CLINICAL TRIAL) ON OP THERAPY MANAGEMENT IN HIP FRACTURED PATIENTS: EFFECTIVENESS OF TPTD VS. DNB ON A HOMOGENEOUS COHORTC. Coppola¹¹St Maria Loreto Nuovo General Hospital - Department of Orthopedics & Traumatology - ASL Napoli 1 Centro, Napoli (Italy), Napoli, Italy

Objectives: A dedicated “Proforma” was developed to individuate the fragile patient since the admission, verify the mortality rate of lateral vs. medial proximal femur fractures, presence of primary OP drug therapy prevention and, finally, to give an appropriate post-operative prescription, putting then the patient under the FLS care. Antiresorptive & DNB or anabolic treatment (TPTD) are the available drugs, subjected to their eligibility criteria, for secondary fracture prevention, but literature is still contrasting on which choice represents the most appropriate in terms of clinical results improvement and BMD/femoral strength increasing.

Methods: Between 2013-2015, 750 patients were admitted (avg. age 77.7, 3:1 female to male ratio) with proximal femur fracture (433 lateral, 317 medial) and adherence was checked by a six-monthly examination and/or phone interview. A homogeneous cohort of 180 patients between age of 70-79 years (avg. 77) with severe osteoporosis, intertrochanteric fracture (31A2-3 AO classification) and a 5-points Charlson comorbidity index (pre-injured active) was selected to assess mobility by the TGU-test (timed get up and go) at 6-12-24 months after surgery (intramedullary locked nailing) and under OP therapy. Patients were equally divided into 3 groups of 60: group 1 under TPTD+Vit D, group 2 under DNB+Vit D and group 3 Ca+Vit D (control group). BMD was checked on admission and after 2 years.

Results: Adherence to OP therapy was 98%. Group 1 showed better TGU-test findings than both groups 2-3. BMD slightly improved at the hip after 2 years TPTD therapy, comparing to DNB and Vit D groups.

Conclusions: This observational study evidenced that: primary OP prevention is still poor; to improve adherence, FLS must be established inside the hospital; lateral proximal femur fractures are correlated to worst prognosis; in the analyzed cohort, Teriparatide group showed a faster clinical recovery and a slightly higher increasing of BMD/femoral strength, comparing to the DNB group after 2 years administration.

P1187

THE MUSCLE-BONE INTERACTION IN PATIENTS WITH TURNER SYNDROME AFTER CONSIDERATION OF SELECTED HORMONAL AND METABOLIC PARAMETERSE. Sowińska-Przepiera¹, M. Syrenicz², E. Andrysiak-Mamos¹, B. Kiedrowicz¹, K. Sagan¹, A. Przepiera³, E. Soszka³, A. Syrenicz¹¹Department of Endocrinology, Metabolic Disorders and Internal Diseases, Pomeranian Medical University in Szczecin, ²Department Laboratory of Propedeutics of Children's Diseases, Pomeranian Medical University in Szczecin, ³Students' Research Organization at the Department of Endocrinology, Metabolic Disorders and Internal Diseases, Pomeranian Medical University in Szczecin, Szczecin, Poland

Turner syndrome (TS), resulting from complete or partial loss of X chromosome, occurs in 1 per 2000-2500 live born female neonates. Most patients with TS, especially those untreated with growth hormone, present with osteoporosis or osteopenia, and are at increased risk of bone fractures. Available evidence suggests that depletion of bone mass may be associated with inadequate level of physical activity, and consequently, with too low muscle mass and strength. The aim of the study was to analyse an association between muscle strength and BMD in patients with TS, after consideration of selected hormonal and metabolic factors. The study included 103 subjects (age 28-45 years), among them 32 women with TS (45,X karyotype; Group A) and 70 controls (Group K). The list of analysed variables included body height, body weight, BMI, BMD (BMD L1-4 and BMD Total), total body fat (BF) and visceral adipose tissue (VAT) volumes determined by means of DXA, hand grip strength measured with a manual dynamometer, and laboratory parameters: TSH, FT4, FSH, oestradiol, testosterone, DHEA-SO4, ACTH, cortisol, PTH, vitamin D3 concentrations, lipidogram, levels of glucose and insulin during OGTT. Patients from Group A presented with significantly lower left ($p=0.001$) and right handgrip strength ($p<0.000$), lower BMD ($p<0.000$), lower concentrations of testosterone ($p<0.000$) and DHEA-SO4 ($p=0.006$), larger VAT volumes ($p=0.005$), higher BMI ($p=0.05$), higher levels of insulin ($p=0.026$) and FSH ($p=0.000$). The study groups did not differ in terms of their TSH, FT4, ACTH and cortisol concentrations, and the only significant difference in lipidogram pertained to triglyceride level, higher in Group A ($p=0.032$). Right handgrip strength in Group A correlated significantly with BMD L1-4 ($r=0.1318$, $p=0.0486$), VAT volume ($r=0.1478$, $p=0.0360$) and BMD Total ($r=0.1921$, $p=0.0154$). These findings suggest that handgrip strength may constitute a predictor of osteoporosis in patients with TS.

P1188

PRECISION OF BMD MEASUREMENTS AROUND TOTAL ANKLE ARTHROPLASTY USING DXAC. Messina¹, D. Albano², V. Chianca³, A. Corazz¹, L. M. Sconfienza¹¹IRCCS Istituto Ortopedico Galeazzi, Milan, ²Scuola di Specializzazione in Radiodiagnostica, Università degli Studi di Palermo, Palermo,³Dipartimento di Scienze Biomediche Avanzate, Università Federico II, Naples, Italy

Objective: Joint replacement survival is associated with the quality of the surrounding bone. DXA can measure periprosthetic BMD (PBMD) with metal removal software. We evaluated short-term reproducibility of the periprosthetic BMD measurements after total ankle arthroplasty (TAA) in 15 patients.

Methods: Each ankle was measured thrice in two projections (frontal and lateral) by means of DXA (Hologic Discovery W). We evaluated PBMD at up to 6 different regions of interest (ROIs) in the two projections, at the level of tibia, talus and calcaneus. Metallic elements were excluded with dedicated software ("metal removal"). Precision is expressed as a coefficient of variation (CV%).

Results: In the frontal projection, the average precision error was 1.88%, with the lowest value at the tibial side (0.77%) and the highest value at the talus side (4.19%). In the lateral projection, the average precision error was 1.74%, with the lowest CV values at the calcaneus (1.08%) and the highest CV value at the anterior tibial side (3.37%). Both in the frontal and lateral projection the highest variability was found in the nearby of metallic implants (screws, plates).

Conclusions: As for previous studies at different joints, our results show that DXA is able to precisely measure small bone mineral changes around TAA, making it possible to monitor bone remodeling DXA and may provide a feasible method for monitoring TKA in the future.

P1189

OSTEOPROTEGERIN IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISME. V. Brutskaya-Stempkovskaya¹¹Belarusian State Medical University, Minsk, Belarus

Objective: To study osteoprotegerin (OPG) in postmenopausal women with primary hyperparathyroidism (PHPT) compared postmenopausal women without PHPT.

Methods: We studied 30 postmenopausal women with PHPT, average age 62.5±6.12 years. The control group were 16 postmenopausal women without PHPT, mean age 59.7±6.28 years in physiological menopause (mean age of starting 50±3.1 years). We analyzed anthropometric data and history of fractures. Examination: total calcium, phosphorus, albumin, creatinine, PTG, OPG, vitamin D, BMD measurements in the lumbar spine, femoral neck, total hip, and distal radius by DXA.

Results: There were no differences in the age, years (U=138.5, p=0.052), height, m (U=216.5, p=0.99), weight, kg (U=202.5, p=0.72), BMI, kg/m² (U=196.5, p=0.61), duration of menopause in both group, years (U=146.5, p=0.08). OPG concentration in postmenopausal women with PHPT was 73.0 (67.0-82.0) pg/ml, in the control group 107 (84-129) pg/ml. Significant differences was detected in the level of OPG in postmenopausal women with PHPT compared control group (U=41.5, p=0.000014).

Conclusion: The results of the study show a suppressed level of OPG in postmenopausal women with PHPT compared control group.

P1190

HIP FRACTURE DUE TO PRIMARY OSTEOPOROSIS: CLINICAL AND MORPHOLOGICAL ASPECTSD. Mate¹, S. Patru¹, R. Marcu¹, A. Bighea¹¹University of Medicine and Pharmacy Craiova, Craiova, Romania

Objective: Primary or idiopathic osteoporosis stands for >75% of all osteoporosis cases and represents the involution osteoporosis. The hip fracture is associated with an important disability and a death rate of 20-24% in the first year that follows its occurrence, whereas mortality due to fractures in the vertebrae is double. This study aims to show possible correlations between clinical parameters and bone structure modifications in patients diagnosed with osteoporosis.

Methods: The study involved a number of 73 patients that suffered from femoral neck fractures, had replacement arthroplasty and then needed a complex rehabilitation programme. Even all the patients considered for this study had been diagnosed with osteoporosis, only 53 were on antiosteoporotic medication.

Results: Gathering all clinical and biological data, we can say that there is a large number of factors involved in the appearance and evolution of osteoporosis, some partly unknown. Also, osteoporosis affects mostly women, especially after menopause. Starting from the fact that cellular injuries and tissue changes vary from one part of the bone system to another and that these changes are more severe in the neck and head of the femur, we analyzed fragments of bone tissue from 16 patients (12 women and 4 men), with ages between 49 and 87. The microscopic study enabled us to highlight the changes in quantity and quality appeared in the trabecular and compact bones from the femoral neck and head.

Conclusions: Hip fractures are due to low bone resistance by the appearance of osteoporosis, especially in advanced stages and after the age of 50. The most frequent cause that led to fracture was falling from one's height and the trauma intensity was evaluated as minor in most patients. In the spongy bone, we could notice a reduction in the bone rod number, the decrease in thickness for the ones left, areolar space increase and a colourless aspect of the trabecular architecture.

P1191

PERSISTENCE REGARDING OSTEOPOROSIS TREATMENT IN REHABILITATION CONSULTATION, SECONDARY PREVENTIONC. P. Parra Soto¹, E. G. García Álvarez¹, J. A. Acosta Rueda¹, R. E. Espada Zaragoza¹, E. N. Navarro González¹, C. G.-K. González-King Garibotti¹¹Hospital Clínico Universitario Lozano Blesa, Zaragoza, Spain

Objective: To determine persistence to osteoporosis pharmacotherapy after osteoporotic fracture.

Methods: Retrospective observational study of patients treated in a rehabilitation consultation from March 2014 to December 2017. The pharmacy dispensaries of the treatment prescribed in a Rehabilitation consultation were evaluated monthly, according to recommendations of SEIOM (Spanish Society of Bone Research) and patient preferences. Persistence was defined as continuation of treatment without a >30-day gap in prescription refills.

Results: 53 patients (82.6% women). Mean age 68 (±9.12 years). Derivatives from Traumatology (52.2%), Primary Care and Rheumatology (13% respectively). The most frequent reason for consultation was fracture (52.2%). 39.1% of patients had secondary osteoporosis and 47.8% had previous fracture. 30.4% had previously received pharmacological treatment of osteoporosis. Pharmacological treatment were prescribed: oral bisphosphonates 39.1%, teriparatide 39.1%, denosumab 21.8%. As a complementary treatment: 43.5% were prescribed cholecalciferol and 30.4% cholecalciferol+calcium. In 30.4% of the patients it was necessary to change medication mainly due to side effects or difficulty in administering the drug. The average treatment time was 29.78 months (± 14.44). 75.62% persisted with osteoporosis pharmacotherapy regimen and 65.62% with complementary treatment. Treatment with teriparatide presented the highest persistence rate (96.78%). Of 21 patients prescribed oral bisphosphonates, 72.37% persisted with treatment; and of 12 patients prescribed denosumab, 68.81% persisted with treatment.

Conclusion: Persistence among patients attending our rehabilitation consultation was higher than that reported in the literature. This could be due to the fact that it includes patients with the intention of secondary prevention, sensitized with the complications of osteoporotic fractures and with outpatient follow-up.

P1192

IMPACT OF THE NEW TRABECULAR BONE SCORE ALGORITHM USING A DIFFERENT CORRECTION MODEL BASED ON SOFT TISSUE THICKNESS ON THE PREDICTION OF INCIDENT ATRAUMATIC FRACTURE RISK IN ELDERLY WOMEN: THE OSTEOLAUS PROSPECTIVE STUDY

E. S. Shevroja¹, O. L. Lamy¹, B. A. R. Aubry-Rozier¹, E. G. R. Gonzalez Rodriguez¹, D. S. Stoll¹, D. H. Hans¹

¹Center of Bone diseases, Bone & Joint Department, Lausanne University Hospital, Lausanne, Switzerland, Lausanne, Switzerland

Objective: Trabecular bone score (TBS) is an indirect index of bone microarchitecture measured from spine DXA images. TBS iNsight[®] v3.0 and older versions account for soft tissue variability by integrating a correction for BMI (TBS_{BMI}) in the TBS algorithm. A residual negative correlation has been reported between TBS and BMI. To deal with this issue, a new correction of TBS

based on the tissue thickness as estimated by the DXA machine (TBS_{TH}) is developed. Our aim was to explore and compare the validity of TBS_{TH} and TBS_{BMI} in fracture prediction.

Methods: This study was embedded in the OsteoLaus Study, a prospective population-based cohort of 1500 Caucasian women living in Lausanne, Switzerland. All women had data on lumbar spine (LS) BMD, TBS, incident fractures and FRAX. Binary logistic regression models were used to obtain the risk estimates for major osteoporotic fractures (MOF) per standard deviations decrease in TBS_{BMI} or TBS_{TH} in three different models: adjusted for age, osteoporotic (OP) treatment; adjusted for age, OP treatment and LS-BMD; adjusted for OP treatment and FRAX_{BMD-MOF}. Then, we evaluated the fracture risk prediction models and the performance of both TBS_{BMI} and TBS_{TH} in MOF prediction by calculating the area under the receiver-operating-characteristic (ROC) curve (AUC) for the model adjusted for age and LS BMD (M0), M0+TBS_{BMI}, and M0+TBS_{TH}.

Results: This analysis included 1331 women (mean age=64.6±7.5 y; mean BMI=25.9±4.5 kg/m²). During the mean follow-up of 2.5 years, 128 women suffered a MOF. BMI was correlated negatively with the standard TBS_{BMI} (r=-0.21) and positively with the new TBS_{TH} (r=+0.26). Overall, lower TBS scores were significantly associated with increased risk for incident fractures, but TBS_{TH} was shown to be a better predictor of fracture risk than TBS_{BMI} (Table 1). The AUC (95%CI) for M0 was 0.620 (0.569;0.670); M0+TBS_{BMI} 0.650 (0.601;0.700); and M0+TBS_{TH} 0.659(0.610;0.709).

Table 1. The results of the logistics regression analysis

	Model 1	Model 2	Model 3			
TBS _{BMI}	TBS _{TH}	TBS _{BMI}	TBS _{TH}	TBS _{BMI}	TBS _{TH}	
OR (95% CI)	1.38 (1.13;1.68)	1.39 (1.14;1.69)	1.50 (1.21;1.86)	1.73 (1.35; 2.22)	1.49 (1.20; 1.63)	1.69 (1.31;2.17)

Model 1: adjusted for age, osteoporotic treatment; Model 2: adjusted for age, osteoporotic treatment, lumbar spine bone mineral density; Model 3: adjusted for osteoporotic treatment, FRAX_{BMD} of MOF; OR odds ratio; CI confidence interval; TB_{BMI} trabecular bone score corrected for body mass index; TBS_{TH} TBS corrected for the soft tissue thickness.

Conclusion: The residual negative correlation between BMI and TBS_{BMI} disappeared with the new TBS_{TH}. Furthermore the superiority of TBS_{TH} vs. TBS_{BMI} in MOF risk prediction was demonstrated. Larger, multiethnic studies in men and women, with longer follow-up periods would be of help to further validate our findings.

Disclosures: Didier Hans is co-owner of the TBS patent and has corresponding ownership shares.

P1193

FORENSIC MEDICINE IMPLICATIONS IN CALCANEAL FRACTURES

J. P. C. Judea Pusta¹, C. D. Nistor-Cseppento², J. A. Judea¹

¹University of Oradea, Faculty of Medicine an Pharmacy, ²Faculty of Medicine Oradea, Oradea, Romania

Introduction: Calcaneal fractures, a rare entity in the forensic medicine traumatic pathology, are one of the most frequent fractures of the foot. The forensic context is represented by road traffic accidents, labor or home accidents, aggressions, falls from a certain height. The most common mechanism of wound production is the indirect one by falls from height in the standing-up position or by a below-upwards injury (motorcycle/ bicycle pedal). Often, regarding comminuted fractures, the shear stress theory is applied.

Methods: We elaborated a clinical and statistic study in the Bihor County Forensic Service, for a 5 years period, including alive victims of traumatic

calcaneal injury who requested a forensic examination. We analyzed the following parameters: the context and the mechanisms of wound production, the diagnosis, associated injuries, age, sex, profession, pathological personal history, complications.

Results: For the subjects in the present study, the most frequent context for the mechanisms of calcaneal wound production was consisted by road traffic accidents, followed by aggressions, labor accidents and fall from a certain height injuries. In the framework of road traffic accidents, calcaneal fractures were produced by direct mechanisms- compression between the hard parts of the vehicle, as well as by indirect mechanisms- a below-upwards injury (motorcycle/ bicycle pedal). Aggressions imply a direct mechanism- injury inflicted by a hard object, as well as an indirect mechanism- fall during heteropropulsion. Falls from height in the standing-up position were produced by labor or home accidents, suicide attempts or heteropropulsion. Some of the labor accidents implying calcaneal fractures were due to a direct mechanism of compression between hard objects. We identified the following injuries: extra-articular fractures (anterior process, tuberosity, medial process), intra-articular fractures. In most cases, the victims were middle-aged men, with thalamic calcaneal fractures, associated with other inferior limb injuries. First forensic medicine evaluation implied the type of the traumatic injury, Boehler and Glissane angle values, the surgical/orthopedic treatment and the associated injuries. The second forensic medicine evaluation, after about 8 months to 1,5 years, we concluded that in all cases with balneofiziokinetic recovery treatment there were positive results up to 97%. We established a clinical score considering: pain, the resumption of physical activity, the

necessity of arthrodesis, complications (arthritis, peroneal tendonitis, loss of subtalar joint mobility), permanent posttraumatic complications (vicious callus with valgus flat foot, functional deficit). The association of osteoporosis, metabolic diseases, feminine gender, advanced age, obesity consists of aggravating factors in the evolution of calcaneal fractures. All these elements allowed the correct estimation of the number of medical care days and the legal framing.

Conclusions: The calcaneal bone represents an anatomical entity of great importance in the walking biomechanics. Balneofiziokinetic treatment has a major role in the recovery of the posttraumatic sequelae of the calcaneal fractures, fostering the social reintegration and the adjustments for the victim to resume work.

P1194

FOOT PAIN IN A YOUNG MALE REVEALING SOLITARY CHONDROGENIC LESION: CLINICAL CASE REPORT

A. Holub¹, J. Marante Fuertes², A. Pérez Alcántara³

¹Primary Care Center La Granja, Jerez de la Frontera, ²University of Cádiz, General Hospital in Jerez de la Frontera (Cádiz), ³General Hospital in Jerez de la Frontera, Cádiz, Spain

Objectives: An osteochondroma is a benign tumor that develops during childhood or adolescence and is often diagnosed as an incidental finding. Osteochondromas account for approximately 35% of benign bone tumors and 9% of all bone tumors. Most are asymptomatic, but they can cause mechanical symptoms depending on their location and size. As a child grows, an osteochondroma may grow larger, as well. Once a child has reached skeletal maturity, the osteochondroma typically stops growing, too. Osteochondromas can develop as a single tumor (osteocartilaginous exostosis) or as many tumors (multiple osteochondromatosis). Presentation of a case of incidentally diagnosed osteochondroma.

Case report: A 14 year old male with no significant past medical history presents to his primary medical doctor after suffering a traumatism in his right foot while he was playing football with his friends 2 weeks ago. Diagnosed 13 days ago with a low grade ankle sprain treated with rest, local cold, immobilization and oral analgesics (NSAIDs) refers only partial alleviation of his symptoms. Physical examination revealed mild symptoms with some pain on direct palpation and little or swelling. There were no appreciable secondary neurological or muscular deficiencies noted. The range of motion of the ankle and subtalar joint appeared to be unaffected. Due to persistent symptoms X-rays was performed and revealed a well defined exostosis in the right lateral distal tibia. The patient was derived to the Traumatology Department with suspected osteochondroma. CT and MRI confirmed the suspicion. As long as it remained asymptomatic no specific treatment was required.

Results: During 1 year of follow up the patient remained asymptomatic. Conclusion: In most cases of osteochondroma, no treatment is required other than regular monitoring of the tumor to identify any changes or complications that may end up in surgical excision. Occasionally these benign tumors may become malignant. Therefore, it is important to make an accurate and early diagnosis. The differential diagnosis for osteochondroma includes myositis ossificans, juxtacortical chondroma, parosteal osteosarcoma, and peripheral chondrosarcoma.

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P1196

EFFECT OF PRIMARY HYPERPARATHYROIDISM SURGERY IN OSTEOPOROSIS

B. Varas de Dios¹, M. Martín Fuentes², R. Sánchez Almaraz², J. L. Porrero Carro³

¹Rheumatology Department, Santa Cristina University Hospital,

²Endocrinology Department, Santa Cristina University Hospital,

³Department of Surgery, Santa Cristina University Hospital, Madrid, Spain

Objective: We analyze the surgical experience of the primary hyperparathyroidism in Santa Cristina University Hospital of Madrid.

Methods: A retrospective study was conducted on 60 patients operated of primary hyperparathyroidism (PHPT) from January 2005 to January 2017. We collected epidemiological and clinical data, biochemical parameters, the surgical characteristics included the measurement of intra-operative PTH (ioPTH) and osteoporosis data (fracture risk factors, densitometric data and drugs). All statistical analyses were run using Statistical Package for the Social Sciences (SPSS 22.0 version). The quantitative variables are expressed as means and standard deviation and the qualitative values as percentages. Quantitative variables comparisons were carried out using t student test or non-parametric Mann Whitney test. The comparison of qualitative variables was done by chi-square test or Fisher exact test. P values<0.05 were considered to be statistically significant.

Results: Sixty operated patients aged 55.5±15.3 years (85% female) were studied. The main surgical criterion was the hypercalcemia, but 15% of the patients had normocalcemic hyperparathyroidism. Patients who achieved healing after surgery were significantly younger. Patients with normocalcemic hyperparathyroidism had lower PTH in all measurements, higher levels of vitamin D and creatinine. We compared the clinical characteristics in patients with osteoporosis with respect to those who did not have it. Patients with OP received significantly more vitamin D supplements. They had more peripheral fractures (No significant results for vertebral and hip fractures). In addition, we found significant results in terms of the age of the patients. It was higher in those with osteoporosis (63±11.6 years vs. 49±15.6; p<0.000). The preoperative calciuria was

lower in patients with OP ($220.4 \text{ mg/24h} \pm 107.6$ vs. 446.7 ± 214.7 ; $p < 0.000$) and iPTH at 15 min was significantly higher in patients with smaller bone masses ($82.9 \text{ pg/mL} \pm 58.0$ vs. 45.3 ± 39.0 con una $p < 0.013$). Patients with PPH had a worse densitometric value in the lumbar spine before surgery (BMD in femoral neck preoperative -1.7 ± 0.9 vs. BMD in lumbar spine -2.5 ± 1.1). There was improvement in both the femoral neck (BMD -2.1 ± 1.1) and the lumbar spine (-2.1 ± 1.1) after surgery although it was not significant.

Conclusions: Primary hyperparathyroidism occurs in clinical practice with an increasingly broad spectrum. As it is demonstrated in the literature, the densitometric results after the PHPT surgery of our series, improve and especially at lumbar spine. The measurement of iPTH is a useful tool in the surgical treatment and it provides a prognostic value in the follow-up of these patients. We must select the candidates for surgery accurately, in order to obtain the greatest clinical benefit.

P1197

THE IMPORTANCE OF OSTEOPOROSIS TREATMENTS PRIOR TO LIVER TRANSPLANTATION

V. Culafic Vojinovic¹, D. Culafic², M. Stulic², N. Ilic¹, J. Aleksic³, J. Elez⁴, F. Gojkovic³

¹Euromedik General Hospital, ²Clinic of Gastroenterohepatology, Clinical Center of Serbia, ³Railway Healthcare Institute, Department of Physical Medicine and Rehabilitation, ⁴Railway Healthcare Institute, Department of Internal Medicine, Belgrade, Serbia

Objective: Approximately 30% of cholestatic liver disease (prevalence from 10–56%, depending on the nature of liver disease) patients have reduced bone density. In the first three months after liver transplantation there is a significant reduction in BMD which substantially affects morbidity and mortality. Our aim was to highlight the importance of a timely diagnostics and osteoporosis therapy in pre-transplant patient preparation.

Case report: Our patient performed osteodensitometry on Hologic Discovery A on both segmental lumbar spine and hip in the Euromedik General Hospital. At the Institute of Biochemistry Clinical Center of Serbia, determined the total and ionized calcium concentrations, phosphorus, PTH, vitamin D and bone markers (osteocalcin and β -crosslaps). The patient is 27 years old and has been treated with corticosteroids therapy for ulcerative colitis and primary sclerotic cholangitis. Due to the development of secondary biliary cirrhosis of the liver (MELD score 18) with portal hypertension and varices of the esophagus gr III/IV is an indication for a liver transplant. Z-score on lumbar spine on osteodensitometry was -2.9 SD and Z-score neck was -3.5 SD. In laboratory, value of the PTH was elevated 91 pg/ml ($N=15-65 \text{ pg/ml}$) with reduced vitamin D 11 ng/L ($N \geq 32 \text{ ng/L}$), and normal total (2.48 mmol/l) and ionized calcium 1.3 mmol/l . Osteocalcin was decreased, β -crosslaps elevated. Applied parenteral therapy with zoledronate 4 mg/ml i.v. in 100 ml of $0.9\% \text{ NaCl}$, with calcium supplement in dose 1 g/d two days before and two days after administration of bisphosphonates, as well as vitamin D supplementation 3000 IU/d . Following the transplantation, the pulses dose of corticosteroids for three days, with dose reduction and complete withdrawal in the four months post transplantation with calcineurin inhibitors. Despite the use of immunosuppressive drugs with strong resorptive characters no pathological fractures occurred.

Conclusion: All patients with liver transplantation indication should be done BMD measurement.

P1198

HORMONAL AND METABOLIC FACTORS DETERMINING BMD AND TRABECULAR BONE SCORE IN YOUNG WOMEN

E. Sowińska-Przepiera¹, M. Syrenicz², E. Andrysiak-Mamos¹, B. Kiedrowicz¹, K. Sagan¹, M. Niedzielska¹, A. Przepiera³, E. Soszka³, M. Patalong-Wójcik¹, A. Syrenicz¹

¹Department of Endocrinology, Metabolic Disorders and Internal Diseases, Pomeranian Medical University in Szczecin, ²Department Laboratory of Propedeutics of Children's Diseases, Pomeranian Medical University in Szczecin, ³Students' Research Organization at the Department of Endocrinology, Metabolic Disorders and Internal Diseases, Pomeranian Medical University in Szczecin, Szczecin, Poland

Objectives: Until recently, quality of the bone has been assessed on the basis of BMD. However, recent studies resulted in development of more accurate marker of bone microarchitecture, trabecular bone score (TBS), a measure extracted digitally from densitometric images. The aim of this study was to determine which hormonal and metabolic parameters exert a significant effect on BMD in women with hyperandrogenism, and to verify if these factors also influence TBS, a marker of bone microarchitecture.

Methods: The study, conducted in 2013–2017, included 213 women with hyperandrogenism, treated at the Department of Endocrinology, Metabolic and Internal Diseases, Pomeranian Medical University in Szczecin (Poland). Age of the study subjects ranged between 19–37 years (mean 27.08 ± 4.33). BMD of all the study subjects was determined both for the lumbar spine (L2–L4) and entire skeleton by means of DXA. Quantitative body composition, i.e., overall volume of body fat, volumes of android and gynoid fat, were determined by means of DXA whole body scan.

Results: TBS correlated positively with both BMD ($R=0.334$, $p < 0.001$) and BMD z-score ($R=0.263$, $p < 0.001$). Statistically significant positive correlations were found between TBS, BMI, overall volume of adipose tissue, volume of gynoid fat and TSH concentration. BMD correlated positively with age, BMI, volume of adipose tissue overall, volumes of both android and gynoid fat, fasting concentration of insulin, estradiol level and FAI. An inverse correlation was found between BMD and SHBG concentration. Multivariate regression analysis demonstrated that TBS correlated positively with volume of gynoid fat and BMI, and showed an inverse correlation with total adipose tissue volume. The only independent predictor of BMD identified on multivariate regression analysis was BMI.

Conclusions: TBS seems to be more a reliable determinant of bone quality in patients with this condition, since contrary to BMD, it is less susceptible to confounding effects of altered hormonal and metabolic parameters.

P1199

OSTEOPOROSIS IN BREAST CANCER PATIENTS

N. Kryeziu¹, M. Kryeziu-Rrahmani², F. Rrahmani², R. Kryeziu³, D. Kryeziu²

¹College of Medical Sciences - Rezonanca, ²Rheumatology Cabinet, Center for Family Medicine, ³National Institute of Public Health, Prishtina, Kosova

Objective: This study determined the frequency of osteoporosis in breast cancer patients using ultrasound technique.

Methods: Here we have analyzed 154 females with breast cancer treated with anticancer and antiresorptive therapy at the Institute of Oncology, University Clinical Center Kosovo, throughout the period August 2013 to January 2017. Heal bone (os calcaneus) density was measured by ultrasound technique (Sonost 2000) at the office of Kosovo Osteoporosis Association. This is a retrospective epidemiological study of data on bone density (T-score) and some anthropometric features.

Results: The group of studied patients had an average age of 56 (27–80 years old). The vast majority (96.1%) were obese, according to BMI values. This group comprised 4/5 of the investigated individuals within osteopenic and osteoporotic bone density values. Overall, 33.77% of the cases were within osteoporotic bone density values, 47.40% within the osteopenic values, whereas only 18.83% had normal bone density. Odds were higher with aging, especially correlating with the years after

menopauses. Anamnesis reveals that 20.78% of these cancer patients have experienced bone fractures, while fractures were also reported in family members of 38.96% of the studied group. Smoking showed to be an insignificant factor in osteoporosis.

Conclusions: We have found a high osteoporosis prevalence of 33.77% among the 154 chemotherapeutically treated cancer patients included in this study, despite concurrent antiresorptive treatment. Osteoporosis prevalence is slightly higher in this group (33.77%) than in non-cancer females (28.9%; a previous study on 5900 females with an average age of 57.3 years old). Bone density should be routinely checked in cancer patients as to prevent osteoporosis complications. Detailed analysis of factors leading to osteoporosis in cancer patients should be further investigated.

P1200

INDEX OF THE OSTEOPOROTIC RISK (IOR) IN THE EVALUATION OF THE POSTMENOPAUSAL OSTEOPOROSIS

S. S. Shubeska Stratrova¹, M. S. Markovik¹, J. M. S. Jovanovska Mishevska¹, M. I. Mladenovska¹

¹Clinic of Endocrinology, Diabetes and Metabolic Disorders, Skopje, Macedonia

Objective: Assessing bone marker levels and their relationship is useful in predicting and diagnosing osteoporosis. The aim of this study was to discover IOR and the importance of the bone markers relationship determination in the early detection of the high osteoporotic risk (OR) individuals in postmenopausal women (PM).

Methods: Bone turnover markers and IOR were evaluated in PM women with osteoporosis (PMOP) and osteopenia (PMOS), and were compared to control groups of young women (C) and PM controls (PMC). PMOP and PMOS were not different according to their age. Bone turnover markers N-MID osteocalcin (O) and β -CrossLaps (CTX) were determined, as well as their ratio IOR=O/CTX. O and CTX levels were expressed in ng/ml. Higher IOR levels indicated lower osteoporotic risk.

Results: O levels were (27.98 $\pm$ 9.31 ng/ml), CTX (0.51 $\pm$ 0.18 ng/ml), and IOR levels (53.95 $\pm$ 4.9) in PMOP, as well as in PMOS, O (24.39 $\pm$ 5.98 ng/ml), CTX (0.4 $\pm$ 0.11 ng/ml) and IOR levels (61 $\pm$ 4.78). Control group had O (18 $\pm$ 5 ng/ml), CTX (0.24 $\pm$ 0.1 ng/ml), and IOR (70 $\pm$ 7.8). O values in PMC were (19.5 $\pm$ 5.97 ng/ml), CTX (0.27 $\pm$ 0.1 ng/ml) and IOR (71.98 $\pm$ 6.4). PMOP had highly significantly higher CTX and O values compared to C and PMC (p<0.0001), and significantly higher compared to PMOS (p<0.001). IOR was highly significantly lower in PMOP compared to C, PMC and PMOS (p<0.0001).

Conclusion: PMOP were characterized with highest CXT and lowest IOR levels indicating highest OR associated with osteoporosis in this group. IOR differentiated best the increased OR in PMOP compared to the other groups, confirming its predictive and diagnostic importance in determining the OR in PM women. CTX and O levels were higher in PMOP women, but O were higher less compared to CTX, and consecutive IOR values were lower, confirming predomination of bone resorption in relation to bone formation in PMOP, which indicated increased bone turnover and consecutive osteoporosis.

P1201

RELATIONSHIP BETWEEN FALLS RISK, FEAR OF FALLING AND PHYSICAL ACTIVITY IN ELDERLY PEOPLE

I. Tamulaityte-Morozoviene¹, K. Tamosiunaite¹, M. Tamulaitiene¹, J. Dadoniene¹, V. Alekna¹

¹Faculty of Medicine, Vilnius University, Vilnius, Lithuania

Objective: To investigate the associations between falls risk, fear of falling and physical activity in community-dwelling elderly people.

Methods: The study involved community-dwelling people aged 65 years and over, without diseases or conditions which could dramatically

decrease their mobility. Timed up & go test was used to evaluate fall risk while physical activity was assessed by Physical Activity Scale for the Elderly (PASE) questionnaire. Fear of falling was evaluated using short version of the Falls Efficacy Scale-International (Short FES-I). The statistical analysis was performed using SPSS software for Windows (version 18.0).

Results: The study population consisted of 107 people (73 women and 34 men) aged from 65-89 years (mean age 74.2 $\pm$ 6.3 years). Falls during the previous 12 months were reported by 58.9% (n=63) subjects. Of those who fell during the previous year, 43 (68.3%) reported one fall, the others had fallen twice or more. Fallen respondents more often stated they feel pain, depression or anxiety, and 90.2% of them reported fear of falling (comparing to 60.5% of non-fallers, p=0.015). When two age groups – under 75 years old (n=56, mean age 68.93 $\pm$ 3.56 years) and aged 75 years and over (n=51, mean age 82.26 $\pm$ 3.84 years) – were compared, it was found that one or more falls during previous 12 months were experienced by all subjects in the older age group and by 24 (42.9%) subjects in younger group. Physical activity was negatively associated with falls risk in subjects aged 75 years and over (r=-0.61; p<0.001), but no statistically significant relationship was found in younger group. The mean result of timed up & go test was lower in younger group (p<0.05).

Conclusions: In community-dwelling elderly people who had fallen during the previous year, the falls risk and fear of falling was higher than in those who have not experienced fall. In people aged 75 years and older, higher physical activity was associated with lower risk of falling.

P1202

PREVALENCE AND PATTERN OF COMORBIDITIES IN PATIENTS WITH AVASCULAR NECROSIS OF THE FEMORAL HEAD: A CROSS-SECTIONAL STUDY

K. V. Gudkevich¹, N. A. Martusevich¹, A. E. Murzich²

¹Belarusian State Medical University, ²RSPC for Traumatology and Orthopedics, Minsk, Belarus

Objectives: This study aimed to analyze the prevalence and pattern of comorbidities in patients affected by avascular necrosis of the femoral head (ANFH) and to determine if there is a differential pattern of comorbidities in patients with bilateral and unilateral ANFH.

Materials and Methods: This was a cross-sectional study, including adult patients with a diagnosis of ANFH according to Ficat and Arlet criteria. Data on comorbidities were collected from medical records and processed with STATISTICA 10.0 using descriptive and nonparametric statistics.

Results: Among a total of 104 patients, aged 48 (38-59), a significant prevalence of comorbidities (86.27%) was found. The number of comorbidities was associated with age (ρ =0.42, p<0.001) and BMI (ρ =0.29, p<0.001). In patients with bilateral (n=45), compared with those affected by unilateral ANFH (n=59), prevalence of younger age (43.5 (36-51) vs. 54 (43-62), p<0.01) and male gender (odds ratio (OR) 2.99 (95%CI 1.28-6.99), p<0.05) were detected. A history of cardiovascular diseases (CVD) was more frequent in patients with unilateral ANFH (63.79% vs. 40.91%, OR 3.62 (95%CI 1.67-7.88), p<0.05), as well as hypertension (62.07% vs. 34.09%, OR 3.16 (95%CI 1.40-7.17, p<0.01). Patients with unilateral ANFH were more likely to have higher number of comorbidities (3.80 (1.17-6.43) vs. 2.89 (0.73-5.05)) and Charlson comorbidity index (0.72 (0.43-1.47) vs. 0.52 (0.43-1.87)).

Conclusions: CVD, including hypertension, were more likely to be found in patients with unilateral ANFH, as well as higher comorbidity burden. It can be explained by the fact that patients with CVD received treatment according to national guidelines, including antihypertensive drugs, anticoagulants, statins, etc. This indicates that performing secondary prevention of CVD can be important in both CVD and ANFH, as such treatment can influence on intraosseous blood circulation in the contralateral joint.

P1203

VITAMIN D3 25(OH) LEVELS AND PRESENCE OF OSTEOPOROTIC FRACTURES IN GOUTY AND HYPERUREMIC PATIENTS: A PILOT STUDY

E. Biernat-Kaluza¹, K. Kałaska², K. Wiertel³, N. Schlesinger⁴¹Departement of Rheumatology; Nutritional and Lifestyle Medicine Center-ORLIK, Warsaw, ²Nutritional and Lifestyle Medicine Center, Warsaw, Poland, ³Jozef Pilsudski University of Physical Education, Warsaw, Poland, ⁴Rutgers- Robert Wood Johnson Medical School, New Brunswick, USA

Objectives: Vitamin D3 has pleiotropic influence on organisms, affects >1000 metabolic pathways and impacts nearly 1000 genes. Nowadays, vitamin D3 deficiency is not uncommon. Our aim was to assess vitamin D3 levels in gouty and hyperuremic patients and presence of osteoporotic fractures in perspective of features of metabolic syndrome.

Methods: In a pilot study, we retrospectively analyzed the medical documentation of 90 individuals presenting to two Polish outpatient rheumatological clinic. In each patient we checked BMI, history of osteoporotic fractures blood pressure, IHD, hyperglycemia/DM2 and dyslipidemia. Checked parameters included: SUA, vitamin D3 25(OH), serum creatinine, GFR, glucose and lipid profile.

Results: Ninety individuals aged 25-95 years, mainly man (68.8%) were divided into 3 groups: Group A: gout patients, Group B: individuals with hyperuricemia, Group C: control: patients with RA, AS and PsA. Osteoporotic fractures were noticed in 3 patients in gouty group; in 5 hyperuremic individuals and 3 patients in control group with GIOP.

Table1: Vitamin D3 25 (OH), UA, creatinine and GFR

Laboratory parameters Group	UA (min-max) mg/dL	Vit.D3 (min-max) ng/ml	Crea (min-max) ml/min	Number of pts with reduced GFR <60ml/min
Group A (Gout)	4.1 - 9.9 =7.5	8.3-32 =17.86	0.64-2.0 =1.104	7
Group B (Hyperuricemia)	6.3-8.2 =7.2	8.8-37 =19.93	0.65-1.4 =1.01	2
Group C (Control)	4.2-5.9 =5.4	9-32 =21.14	0.65-1.26 =0.944	0

Conclusion: Data is limited regarding vitamin D3 25 (OH) levels and presence of osteoporotic fractures in gout patients and individuals with hyperuricemia. In this study the lowest vitamin D3 levels were found in gouty patients, a bit higher levels were found in hyperuricemic individuals and the highest but still deficient levels in control group. Vitamin D3 25(OH) with its pleiotropic properties might have influence on various physiological processes but we still do not know if it effects purine metabolism. Large randomized controlled trials are needed to further evaluate:

1. the significance of low vitamin D3 25(OH) levels on the purine metabolism and the metabolic syndrome and whether supplementation should be used as an adjuvant in the management of gout; 2. the correlation between gout, hyperuricemia and osteoporotic fractures.

P1204

FRAGILITY HIP FRACTURE AFTER THE AGE OF 90: THE EXPERIENCE OF A FRACTURE LIAISON SERVICE

F. Aguiar¹, M. Guerra², S. Ganhão¹, D. Rosa-Gonçalves³, T. Martins-Rocha¹, R. M. Ferreira¹, T. Meirinhos⁴, A. Águeda⁵, R. Vieira², G. Terroso⁶, C. Vaz¹, L. Costa⁶¹Rheumatology Department of Centro Hospitalar São João; Faculty of Medicine of Porto University, Porto, ²Rheumatology Department ofCentro Hospitalar Gaia/Espinho, Gaia, ³Centro Hospitalar de Trás-os-Montes e Alto Douro, Vila Real, ⁴Rheumatology Department of Centro Hospitalar Baixo Vouga, Aveiro, ⁵Rheumatology Department of Centro Hospitalar Baixo Vouga; Faculty of Medicine of Porto University, Aveiro, ⁶Rheumatology Department of Centro Hospitalar São João, Porto, Portugal

Objective: To describe the outcomes in nonagenarian patients with proximal femur fragility fracture evaluated in a fracture liaison service, and compare it with those of younger patients.

Methods: Retrospective study including patients with fragility proximal femur fractures admitted in our hospital from March 2015 to March 2017 who were referred to the Rheumatology outpatient clinic. In this setting patients were evaluated with laboratorial and imagological workup and afterwards anti-osteoporotic therapy was started. The group of nonagenarians was compared with the group of patients aged 65-89 years attending the same outpatient clinic.

Results: Among 522 patients referred to our outpatient clinic, 130 were aged 90 years or older (110 females, median age 92 years, range 90-104). The median length of hospital stay was 11 days (range 0-129) and median Charlson comorbidity index (CCI) 5 (range 3-11). Ninety-one patients were discharged to their home, 29 were discharged to short/medium-term care facilities and 10 patients died during hospitalization. Fifty patients were evaluated in the outpatient clinic and 34 started anti-osteoporotic treatment. Comparing nonagenarians with younger patients time to intervention was significantly shorter ($p=0.020$), the level of physical autonomy after the fracture was lower ($p<0.0001$), total femur T-score was lower ($p=0.016$), vitamin D levels were lower ($p=0.003$), osteocalcin and β -CrossLaps levels were higher ($p=0.029$ and $p=0.049$, respectively). There were no statistically significant differences in the following parameters: gender, length of hospital stay, CCI, previous level of physical autonomy, discharge outcome, previous or new fragility fractures during follow-up, femoral neck bone density, anti-osteoporotic treatment.

Conclusions: The outcomes of patients aged 90 years or older after fragility hip fracture had some differences comparing with those of younger patients, which must be confirmed in larger studies.

P1205

EFFECT OF LAUGHTER YOGA AND CLAPPING EXERCISE IN OSTEOPOROSIS PATIENTS IN SOUTH DELHI POPULATION

V. Sharma¹¹Shri Maha Maya Vaishnav Devi Mandir Research Institute, Department of Applied Sciences, New Delhi, India

Purpose: To study new methods of controlling osteoporosis complications by laughter yoga and clapping exercise in osteoporosis patients in south Delhi metro population.

Methods: For this purpose, we used laughter yoga, which includes respiratory laughing and fun exercises. Using a cross-sectional design, which includes age, family history of osteoporosis, Bone markers (BMs) especially osteocalcin (BGP), alkaline phosphatase (ALP), tartrate resistance acid phosphatase (TRAcP), bone weight, bone calcium concentration, serum electrolytes (calcium, sodium and potassium) and serum estradiol (E2) level and histopathological examination of bones were recorded for 45 aging patients (subject) between 60-75 years old. A 30-min lecture was followed by 30-min intense clapping workout for those participants who had laughter yoga included in the program.

Results: Present study by laughter yoga and clapping exercise one's physical and inner elements balance and a person is filled with the positive energy which makes him/her active enough to burn the required calories ultimately helping one to be fit without having any physical consumption of chemical salt. After one month treatment there were significant changes in bone weight, calcium concentration and serum electrolytes levels compare to normal levels with changes in life style

and increase concentration for study. Present study highlight that the successful treatment of osteoporosis patients not only requires drugs; but also family care, life style education, harmonised mind-body-soul, preventive approach toward activity of daily living.

Conclusion: Our study indicated the importance of daily opportunities for laughter in patients with osteoporosis.

P1206

A TWO-YEAR PROSPECTIVE STUDY ASSESSING BONE HEALTH IN PREMENOPAUSAL BRCA MUTATION CARRIERS UNDERGOING PROPHYLACTIC SALPINGO-OOPHORECTOMY

J. Srighanthan¹, M. Q. Bernardini¹, J. Kotsopoulos², G. E. V. Ene¹, S. Cohen¹, I. Ho¹, A. Finch², B. Rosen¹, P. Harvey², S. A. Narod², K. J. Murphy¹, A. M. Cheung¹

¹University Health Network, ²Women's College Research Institute, Toronto, Canada

Objectives: To assess the effects of prophylactic salpingo-oophorectomy (PSO) on spine and hip BMD in women with *BRCA1* or *BRCA2* mutation.

Methods: This is a pilot 2-year cohort study that assesses musculoskeletal health outcomes annually in pre-menopausal BRCA carrier women undergoing PSO as compared to premenopausal non-oophorectomized non-carrier women. Here we present our 1-year preliminary findings. The changes in lumbar spine, total hip, femoral neck, and total body BMD and trabecular bone score (TBS) from baseline to one-year were calculated for oophorectomized BRCA carriers and non-oophorectomized non-carriers and expressed as percent change.

Results: A total of 34 PSO BRCA carriers and 30 non-carriers have completed the baseline visit. Mean age was 41.6 (SD 4.5) years for PSO BRCA carriers and 41.6 (SD 8.11) years for noncarriers. 91% of the participants are Caucasian. A total of 22 PSO BRCA carriers and 12 noncarriers have completed the 1-year visit. Below table shows the percent changes in BMD at the lumbar spine, total hip, femoral neck and total body, as well as TBS.

	PSO BRCA carriers	Non-oophorectomized non-carriers	p value
Lumbar spine	-4.5%	-0.2%	0.001
Total Hip	-2.1%	-0.7%	0.20
Femoral Neck	-2.6%	-0.4%	0.13
Total Body	-2.3%	-0.4%	0.03
TBS	-1.8%	-0.03%	0.19

Conclusions: Our preliminary analyses showed that loss of BMD at the lumbar spine and total body can be seen as early as one year following PSO. While the changes in total hip and femoral neck BMDs as well as TBS were not significantly different between the two groups, they were consistently lower among those who underwent PSO. Women undergoing PSO should be advised and monitored for bone loss.

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P1207

IS *APAL* VDR GENE POLIMORPHISM A BASIS OF TAILORING DENOSUMAB TREATMENT IN POSTMENOPAUSAL OSTEOPOROSIS?

A. Wawrzyniak¹, I. Krela-Kaźmierczak², M. Marcinkowska¹, M. Skrzypczak-Zielińska³, M. Michalak⁴, R. Słomski⁵

¹Department of Family Medicine, University of Medical Sciences,

²Department of Gastroenterology, Human Nutrition and Internal Medicine, Poznań University of Medical Sciences, ³Institute of Human

Genetics Polish Academy of Sciences, ⁴Department of Computer Sciences and Statistics, Poznań University of Medical Sciences,

⁵Department of Biochemistry and Biotechnology, Poznań University of Life Sciences, Institute of Human Genetics Polish Academy of Sciences, Poznań, Poland

Objective: The tailoring treatment in osteoporosis is a dream because of poor efficacy and side effects in some osteoporotic patients. The aim of this study was to examine how VDR *Apal* gene polymorphism influences the efficacy of one-year denosumab therapy in postmenopausal osteoporotic women.

Methods: 63 osteoporotic postmenopausal women aged 74. 97 (57-86 years) were treated one year with denosumab 60 mg s.c. every six months and 1.250 mg of calcium carbonate and 2000 IU of vitamin D3. One-year denosumab treatment efficacy were assessed as increase in BMD in lumbar spine and femoral neck in subgroup with different *Apal* VDR gene polymorphism. DNA was isolated from peripheral blood leukocytes by the guanidine isothiocyanate method, *Apal* VDR gene polymorphism analysis was performed by PCR-RFLP.

Results: The increase in all group after one-year denosumab therapy in L1L4 BMD were 0.029 g/cm² and 0.042g/cm² in femoral neck, the differences between BMD in the both sides for and after one-year treatment was statistically significant (p=0.000). Higher increase in BMD in lumbar spine were observed in carriers aa (n=15) *Apal* VDR gene -0.0568g/cm², in Aa (n=22) carriers were 0.0458g/cm² and in AA (n=26) -0.0333 g/cm². In femoral neck in Aa -0.079g/cm², in AA -0.067 and aa -0.047g/cm². This differences between increase in BMD in groups according to *Apal* VDR gene polymorphisms in Wilcoxon-test were no statistically significant.

Conclusions: No statistically significant differences in BMD changes were observed between the carriers of AA, Aa and aa *Apal* VDR polymorphisms in postmenopausal osteoporotic polish women treated with denosumab for one-year. To assess the influence of *Apal* VDR polymorphism on the effectiveness of denosumab treatment fader research is needed especially a higher number of patients and longer time of observation.

P1208

SHOULDER INSTABILITY AND DISLOCATION AND ITS MANAGEMENT: CLINICAL CASE PRESENTATION

A. Holub¹, J. Marante Fuentes², A. Pérez Alcántara³

¹Primary Care Center La Granja, Jerez de la Frontera, ²University of Cádiz, General Hospital in Jerez de la Frontera (Cádiz), ³General Hospital in Jerez de la Frontera, Cádiz, Spain

Objectives: Shoulder dislocation, also known as glenohumeral joint dislocation, is the most common large-joint dislocation seen in the emergency department. The dislocation can be anterior, the most common 95 - 98%, posterior (around 4%) and inferior (<1%). Posterior shoulder dislocations are considerably less common than anterior, accounting for no >4% of all shoulder dislocations. Perhaps for this reason, many posterior shoulder dislocations are initially missed by treating physicians, and diagnosis is delayed in nearly all cases. Failure to diagnose and treat posterior dislocations promptly can result in complications, including recurrent dislocations, avascular necrosis of the humeral head, degenerative disease, and chronic pain. Chronic dislocation is generally classified as a dislocation lasting >3 weeks. Our aim is to determine the diagnostic methods what would enable not to miss and to increase awareness of the diagnostic features, investigations and management of posterior shoulder dislocation. Presentation of a case of chronic posterior dislocation of the glenohumeral joint in a 56 year old man.

Case report: A 56 year old male with no relevant medical history with a left shoulder pain for over a year. No previous trauma known.

Examination: the patient was holding his arm in an internally rotated position unable to externally rotate or abduct his arm; posterior shoulder prominence and flattening of anterior deltoid with subsequent coracoid process prominence was noted. X-rays revealed no fracture however the CT and MRI suggested posterior shoulder dislocation and the patient underwent a surgical treatment with reduction of humeral head and reappearing the subscapularis tendon with McLaughlin technique. Together with postoperative rehabilitation including immobilization of the shoulder with an external rotation brace for 6 weeks followed by progressive passive, active-assisted, and active range of motion and rotator cuff strengthening exercises for another 6 weeks, this technique resulted in pain-free range of motion, a stable shoulder, and good joint congruency.

Results: At 6 months the patient had regained a full motor power and at last follow-up 18 months after the surgery the patient remains asymptomatic.

Conclusion: Careful history of mechanism (including seizure, electrocution and trauma) and correct examination with proper diagnostic methods should raise clinical suspicion because early diagnosis is essential to avoid chronic dislocation, osteoarthritis and avascular necrosis of the humeral head and finally the surgery.

P1209

A NOVEL TISSUE-NONSPECIFIC ISOENZYME OF ALKALINE PHOSPHATASE (TNSALP) MUTATION IN ADULT PATIENT WITH LOW BONE MASS AND MUSCULOSKELETAL SYMPTOMS

L. Masi¹, F. Franceschelli², G. Leoncini², F. Cioppi¹, S. Ottanelli², G. Marcucci², F. Giusti², M. L. Brandi²

¹University Hospital of Florence, AOU-Careggi (AOU-C), ²Department of Surgery and Translational Medicine, University of Florence, Florence, Italy

Alkaline phosphatase (ALP) play an important role in the regulation of bio-mineralization hydrolyze inorganic pyrophosphate (PPi) to generate Pi, needed for hydroxyapatite crystallization. Hypophosphatasia (HPP) is a heterogeneous rare metabolic bone disease caused by mutations in the tissue-nonspecific alkaline phosphatase gene (ALPL: MIM 171760). It is variable in its clinical presentation, ranging from severe disease to mild in adulthood. In patients with the adult form of HPP BMD is often osteopenic, and the disease is misclassified as primary osteoporosis and mistreated, for example with bisphosphonates.

We report the case of a 67-year-old woman who was evaluated at the Bone and Mineral Diseases Unit of the AOU-Careggi in Florence for an history of low BMD. She had no history of fragility fractures. DXA showed a low BMD compatible with osteoporosis at the lumbar spine (L1-L4: 0.678 g/cm² T-score -3.36SD) and femoral neck (0.635 g/cm² T-score -2.6). Dorsal and Lumbar X-ray showed the presence of low mineralization and osteoarthritis with osteophytes. She was treated with i.v. Ibandronate: 3 mg every 3 months for 3 years. Patients referred severe musculoskeletal pain and fatigue. She stopped the therapy in April 2014. The value of serum bone specific alkaline phosphatase (BAP) was low and also after 3 years suspension of bisphosphonate treatment, it remained lower than the normal range (2.5±1.2 µg/L; normal range: 4.5-22.4). The level of vitamin B6 in the serum was upper than the normal range (53.6 µg/L normal range 3.6-18). We decided to analyze the ALP gene. Genomic DNA was extracted from peripheral blood collected from patients using the microvolume extraction method QIAamp DNA Mini Kit (Qiagen GmbH, Hilden, Germany), according to the manufacturer's instructions. Primer sequences utilized were described by Mornet et al. (1). Mutation analysis revealed a heterozygous exon 3 mutation in TNSALP gene: codon 55 ATC>ACC (Ile>Thr) so far not described in the literature.

We describe a novel TNSALP gene mutation in an adult patient with osteoporosis and with musculoskeletal symptoms. This case emphasizes the importance of viewing persistent low alkaline phosphatase as an indicator in order to avoid the risk of complication and perform a correct therapy.

Reference: 1. Mornet E et al. Eur J Human Gen 1998;6:308

P1210

INTRA-ARTICULAR PLATELET-RICH PLASMA IS SUPERIOR TO CORTICOSTEROIDS IN KNEE OSTEOARTHRITIS: A COMPARATIVE STUDY

S. Stănciugelu¹, D. Cojocaru¹, J. M. Pătraşcu¹

¹Orthopedics and Traumatology Clinic, Emergency Clinical County Hospital, Timisoara, Romania

Objective: To compare the efficacy of using platelet-rich plasma (PRP) injection with intra-articular corticosteroid injection in the treatment of early osteoarthritis.

Methods: A total of 57 cases diagnosed with early knee osteoarthritis were included in our study. The patients were randomly divided into 2 groups: first group of 31 patients who received PRP injection solution, and a second group of 26 patients who received intra-articular corticosteroid injection. Each group had 3 administrations of substance at a 7 days interval of time. The volume of injected substance was 4 ml for each group (4 ml PRP for the first group and 2 ml of corticosteroid + 2 ml of 2% lidocaine for the second group). Both groups were evaluated before the injections and at 1 month and 6 months postinjection, using WOMAC pain and knee function score, visual analogue scale (VAS), International Knee Documentation Committee (IKDC).

Results: Our study showed that at 1-month follow-up, PRP and corticosteroid intra-articular injection had similar effects on pain relief at WOMAC pain score and WOMAC functional improvement score. Both solutions gave significant pain relief (VAS) at 1-month (p<0.01), with no significant differences between the two groups. Both PRP and corticosteroid solutions had offered pain relief, but PRP showed better results in pain relief at all scales scores at 6 months follow-up.

Conclusion: Compared with corticosteroid intra-articular injection, intra-articular PRP injection has superior results regarding pain relief and functional improvement in patients with early osteoarthritis at a minimum of 6 months after injection.

P1211

THE POLISH VALIDATION OF THE SARQOL[®], A QUALITY OF LIFE QUESTIONNAIRE SPECIFIC FOR SARCOPENIA: THE EVIDENCE OF A GOOD UTILITY

J. Konstantynowicz¹, P. Abramowicz¹, W. Glinkowski², E. Taranta³, L. Marcinowicz², J.-Y. Reginster⁴, O. Bruyere⁴, C. Beaudart⁴

¹Department of Pediatric Rheumatology, Immunology, and Metabolic Bone Diseases, Medical University of Białystok, Białystok, ²Department of Medical Informatics and Telemedicine, Medical University of Warsaw, and Department of Orthopedics and Traumatology of Locomotor System, Baby Jesus Clinical Hospital, Warsaw, ³Department of Primary Health Care, Medical University of Białystok, Białystok, Poland, ⁴Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium

Objective: The SarQoL[®] (Sarcopenia and Quality of Life), a quality of life (QoL) questionnaire specific to sarcopenia, which has initially been developed in French, has been translated into other language versions and successfully validated. There was a need to translate and validate this questionnaire to other languages and evaluate its clinical utility. Our aim was to translate the SarQoL into Polish and to check its validity for the assessment of sarcopenic individuals in Polish population, with regard to its psychometric properties.

Methods: A total of 106 community-dwelling individuals (74.2±5.46 years; 64% females) were recruited. Among them, 60 participants (56.6%) were sarcopenic. The translation was carried out through five phases according to specific guidelines: 1) two independent translations from English to Polish; 2) synthesis process of one translated version; 3) two independent backward translations into English; 4) expert committee review comparing backward translations with the original questionnaire; and 5) the test of the pre-final version. The validation of psychometric properties of the Polish SarQoL consisted of the assessment of the discriminative power, the internal consistency, the potential floor and ceiling effects as well as the construct validity based on convergent validity measurement and comparison with other commonly accepted QoL questionnaires, and finally test-retest reliability.

Results: The data confirmed a good discriminant validity of the questionnaire i.e., significantly lower scores for all domains (reduced global QoL in sarcopenic subjects compared to non-sarcopenic; 54.9±16.5 vs. 63.3±17.1, $p=0.013$), high internal consistency (Cronbach's α coefficient 0.92). The strong correlation of the SarQoL scores with the other questionnaires (SF-36 and EuroQoL-5) indicated the consistent construct validity of Polish SarQoL questionnaire. No floor/ceiling effects were found. An excellent agreement was found between the test and the re-test (ICC=0.99).

Conclusions: The first Polish version of the SarQoL questionnaire is valid and consistent and therefore may be applied with confidence for clinical and research purposes regarding QoL assessment of sarcopenic individuals. However, further research in a larger population is necessary to determine suitability of this new tool to the Polish specificity.

P1212

PREDICTORS OF BMD VARIATION IN A SPONDYLOARTHRITIS COHORT

T. Martins Rocha¹, M. Bernardes², F. Aguiar², R. Ferreira², S. Santos², A. Águeda³, M. Guerra⁴, A. Bernardo², R. Lucas⁵, L. Costa²

¹Centro Hospitalar de São João, Porto, ²Rheumatology Department, Centro Hospitalar de São João, Porto, ³Rheumatology department, Centro Hospitalar Baixo Vouga, Aveiro, ⁴Rheumatology Department, Centro Hospitalar de Vila Nova de Gaia, Vila Nova de Gaia, ⁵Institute of Public Health of the University of Porto, Porto, Portugal

Objectives: To assess the BMD variation and study its predictors in SpA. **Methods:** Observational, retrospective study was performed including SpA patients (according to the modified New York and ASAS classification criteria) followed at our Rheumatology Department. Two time separated BMD (g/cm²) measurements (by DXA) of the lumbar spine (LS) and total hip (TH) and disease activity/functional scores from the respective date were collected. Predictors of: Δ BMD/year, % BMD variation/year superior to the median value (gain vs. no gain-1yr) and FF were studied using univariate and multivariate linear and logistic regression.

Results: Eighty-three SpA patients were included, 39 (47%) were women with a mean baseline age of 41.6±11.5 years and median disease duration of 14 years [0-37]. Fifty seven (67%) had Ankylosing Spondylitis (AS), 24% Psoriatic Arthritis (PsA), 6% Inflammatory bowel disease-SpA and 1% had Undifferentiated SpA. Seventy-four (89%) were treated with TN inhibitors (TNFi) and 45% with glucocorticoids (GC). During the study period, 21 (25%) patients had a FF. The mean time between the two DXA was 5.7±2.8 years. The mean Δ BMD/year for LS was 0.020±0.04 g/cm²/year and 0.007±0.02 g/cm²/year for TH. The median % BMD variation/year was 1.1% [-5.0-18] for LS and 0.4% [-4.0-11] for TH. Male gender was a positive predictor of LS Δ BMD/year ($\beta=0.021$, $p=0.04$). Time exposure to GC was a negative predictor of LS Δ BMD/year ($\beta=-0.030$ $p=0.04$). Comparing to AS, PsA had an inverse association with LS Δ BMD/year ($\beta=-0.024$, $p=0.04$), with no differences for other SpA subtypes. Comparing to adalimumab, etanercept and infliximab groups were negative predictors of LS Δ BMD/year ($\beta=-0.028$ and -0.035 , $p<0.05$), not remaining significant after adjustment for GC. BASFI, and ASDAS CRP/ESR (DXA2) were positive predictors of FF (gender and

GC adjusted) ($\beta=0.282$, $\beta=0.644$ and $\beta=0.897$, $p<0.05$). ASDAS CRP/ESR (DXA2) had lower odds of TH gain-1yr (OR: 0.53 and OR: 0.64, $p<0.05$). LS and TH gain-1yr were negative predictors of FF (gender adjusted) (OR: 0.32 for both, $p<0.05$).

Conclusions: Disease activity was an independent predictor of FF and had lower odds of TH BMD gain/year. No differences were found concerning TNFi possibly due to the small size of the control group.

P1213

THE INCIDENCE AND HOSPITALIZATION DURATION IN CASES OF HIP FRACTURES IN POLAND BETWEEN 2008-2015

J. Narloch¹, M. Glinkowski²

¹Center of Excellence "TeleOrto", Medical University of Warsaw, Warszawa, ²Faculty of Health Sciences and Physical Education, Kazimierz Pulaski University of Technology and Humanities in Radom, Radom, Poland

Objectives: To determine the incidence of proximal femur fracture and length of associated hospitalization in Polish population over the age of 50 between 2008-2015.

Methods: National Health Fund and National Institute of Public Health – National Institute of Hygiene data for Poland for the time period between 2008-2015 were analyzed in this study. Data derived from hospital-based only ICD-10 codes of proximal femur fractures (S72) in men and women over the age of 50 admitted and hospitalized in Poland, the 38.5 million population Central-European country [1].

Results: Between 2008-2015, 112518 cases were hospitalized due to the proximal femur fractures in Polish population aged of 50 years of age or (on average 14065 cases/year, SD 869, range 13405-15922). Among those were 45690 cases of femoral neck fractures (mean 2856/year, SD 1213), 41033 cases of intertrochanteric fractures (mean 2565/year, SD 1176). Most femoral neck and intertrochanteric fractures were noted in the age group of 80-89 years. With the gradual increase in age, the inter-gender differences in proximal femur fractures deepened until 89 years. The incidence of overall femoral fractures was higher in men than in women in age group of 50-59. The average hospitalization time due to proximal femur fracture was 12.4 days (SD 0.89, range 11.3-14). In men, it lasted on average 12.2 days (SD 0.73, range 11.3-13.4). Women were hospitalized 12.5 days (SD 0.9, range 11.3-14.1). There is noted the hospital stay gradually decreased in the period from 2008 to 2015.

Conclusions: The number of proximal hip fractures in Polish men and women aged over 50 years is considered as relatively low, however, due to increasing life expectancy a specific projection has to be made to implement a fragility fracture prevention programs.

Reference: 1. Concise statistical yearbook of Poland 2013, H. Dmochowska, Editor. 2013.

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P1214

RELATIONSHIP BETWEEN AUTOIMMUNITY AND OSTEOPOROSIS IN RHEUMATOID ARTHRITIS

M. C. Carrasco Cubero¹, S. M. Rojas Herrera², J. Malave Calzada², P. Pérez David², I. Braña Abascal², E. Chamizo Carmona²

¹Servicio de Reumatología, CHU de Badajoz, SES, Badajoz, ²Servicio de Reumatología, Hospital Ciudad de Mérida, SES, Mérida, Spain

Objective: Osteoporosis (OP) is more prevalent in patients with rheumatoid arthritis (RA) than in the general population. Positive anti citrullinated peptide antibody (ACPA) has been related with juxta-articular OP, but their relationship with systemic OP in AR is controversial. Our aim was to determine if RA autoantibodies (FR and ACPA) are associated with BMD in a cohort of patients with established RA diagnosed following the ACR 1987 criteria.

Methods: Observational study. We analyzed the relationship between FR and/or ACPA with the DXA BMD values of the femoral neck (CF) and lumbar spine (CL) (GE Lunar Prodigy®). We perform the analysis using logistic regression, bi and multivariate models, and correlation models. The control variables were sex, body mass, age, duration of RA, prednisone and vitamin D.

Results: We included 294 patients with RA who had all the tests, with a mean age of 63.4 (± 10.9) years and duration of RA of 9.8 (± 7.9) years. There were 229 (77.9%) women, 229 (77.9%) positive-RF, 196 (66.7%) positive-ACPA, 109 (37.1%) deficient in 25-OH cholecalciferol (< 20 ng / ml) and 59 (20.1) smoker patients. They received corticosteroids at low doses 207 (70.4%) and suffered some bone fracture 42 (14.3%) patients. In the BMD, 226 (76.9%) patients had a T-score < -1 , of who 86 (27.6%) reached a T-score < -2.5 in lumbar spine and / or in femoral neck. Lumbar OP was associated with the female sex (OR=3.6). The femoral neck T-score (and, to a

lesser extent, lumbar T-score), showed a correlation with age ($r = -0.515$, $p < 0.01$). No differences were found in the mean values of BMD, T-score y Z-score of FN and LS between positive or negative patients for FR or ACPA (t-student), neither between their possible combinations (one-way ANOVA). Association between positivity of RF, anti-CCP or their combinations and T-score < -1 (osteopenia) or T-score < -2.5 (OP) in LS or FN were not found. A negative weak correlation was found between the FR and lumbar BMD values (-0.121 , $p = 0.04$) and a positive weak correlation between ACPA and CF (0.136 with BMD, 0.131 with T-score and 0.138 with Z-score; $p < 0.05$ for all)

Conclusion: OP was very common in our RA population, especially in women and elderly. It was not associated with the use of low doses of prednisone or the. Any association was demonstrated between OP and the presence/titer of autoantibodies (FR and ACPA) and low dose of corticosteroids treatment.

	Patient s n (%)	BMD FN g/cm ² mean (SD)	BMD LS g/cm ² mean(SD)	T-score<-1 n (%)	T-score<-2,5 n (%)
Total	291	0,805(0,16)	1,063(0,21)	226(76,9)	81(27,6)
FR+	229	0,806(0,15)	1,061(0,21)	175(76,4)	62(27,1)
ACPA+	194	0,808(0,15)	1,065(0,21)	151(77,0)	49(25,0)
FR+y ACPA+	185	0,813(0,14)	1,065(0,22)	143(76,5)	48(25,7)
FR+o ACPA+	51	0,767(0,21)	1,049(0,20)	40(78,4)	15(29,4)
FR+y ACPA-	56	0,815(0,16)	1,074(0,18)	43(76,8)	18(32,1)

P1215

CAUSE OF NONSIGNIFICANT RESULTS OF 24-MONTH FOLLOW UP OF TERIPARATIDE TREATMENT IN GIOP AND POSTMENOPAUSAL OSTEOPOROTIC PATIENTS AFTER BISPHOSPHONATE TREATMENT FAILURE

V. V. Vyskocil¹, Z. Z. Zbozinkova²

¹Charles University Hospital Bone Disease Centre, Plzen, ²Institute of Biostatistics and Analyses, Faculty of Medicine, Masaryk University, Brno, Czech Republic

The authors observed 109 patients treated with teriparatide (rh-PTH 1-34) out of which 70 were treated for GIOP (64.2%), 32 for postmenopausal osteoporosis bisphosphonate treatment failure (34.9%) and 1 (0.9%) for men osteoporosis. Patients were treated with a once-daily subcutaneous injection of 20 µg of teriparatide and with 600 mg calcium carbonate and 400 IU vitamin D.

There were 87 females (79.8%) and 22 males (20.2%). BMD of total hip, femoral neck and spine was measured at the beginning and after 6, 12, 18 and 24 months. Vitamin D, sCa, uCa, PINP were measured in the same time interval. There were 37.6% of patients with at least one fracture at the beginning of the observation. There were 2 patients with osteoporotic fractures during follow up period. The first patient experienced 1 and the second patient 2 fractures. Statistical significance was evaluated by p-value, statistical significance of differences in time by Wilcoxon pair test. Statistically significant difference ($p < 0.001$) in vitamin D and sCa levels was achieved only after 6 months of observation. Despite of high compliance to treatment only 50 patients came to final blood and DXA testing, which is less than half of the original group.

Results were influenced by the analysis of all patients including those who did not complete their treatment or did not provided the data. The authors did not have access to the separate statistical analysis of patients who underwent the control on time and completed full 24 months of treatment. It might be interesting to explore dependence between the

length of previous bisphosphonate treatment and the level of treatment failure such as BMD decrease and number of compressive fractures.

The authors proved significant changes in calcium, vitamin D, PINP and spine BMD only within the first 6 months after treatment initiation. Minimum change in the hip area is not surprising because of previous bisphosphonate treatment, possibility to indicate teriparatide only in case of failure or in case of 3 months glucocorticoid treatment with the outlook for minimum 2 year duration. Number of patients on teriparatide is limited by sick fund per year. Teriparatide treatment lasts 24 months. Reimbursement of markers and BMD measurement is usual once per 12 and 24 months. Evaluation of BMD in particular spot might be distorted by area increase. There is a detailed analysis required to find out the root of reason for patients' low compliance, as $< 50\%$ of patients completed the therapy. According to the database, this should not be caused by side effects or loss of contact with patients.

P1216

A NATION-WIDE QUALITY ASSURANCE PROJECT FOR BONE DENSITOMETRY IN HUNGARY BY USING THE ESP PHANTOM

C. Horvath¹, E. Hosszu², Z. Arany¹, E. Gal¹, V. Ferencz¹, K. Bors³, E. Csopor⁴, S. Meszaros¹

¹1st Department of Medicine, Semmelweis University, Budapest, ²2nd Department of Medicine, Semmelweis University, Budapest, ³Rehabilitation Hospital, Visegrad, ⁴Buda Endocrine Center, Budapest, Hungary

Internal errors of bone densitometers frequently develop slowly, so sometimes they will be recognized after a significant time only. Our project has been planned for the earliest detection of instrumental shifts, preventing false results in the patients' management. A second aim was to give data for the densitometry labs about the precision error on their densitometer

used, as this error determines the least significant change (LSC) and the monitoring time interval (MTI) during the follow-up of a patient's treatment. For this aim, we prepared a standard protocol to scan and analyze the European Spine Phantom (ESP) 11 times, without reposition, on 28 Lunar and 17 Hologic bone densitometers (> 75% of all devices in Hungary). Group-specific average and standard deviation was separately calculated for both two groups of machines. For Lunar, 2 devices were found out of ± 2 SD range and 5 out of ± 1 SD range, while for Hologic there was no device out of ± 2 SD but 6 out of ± 1 SD. The results have been given to the labs for using to call an urgent service work, followed by a control measurement of ESP. The in vitro CV taken by ESP scanning was found to 0.52% for the Lunar and 0.43% for the Hologic densitometers. All participating labs received the calculated LSC and MTI values representing the following ability of their densitometer in vitro. A comparison of these result to similar data collected in the previous years will be the next evaluation of our project on the route developing a long-term quality assurance protocol in Hungary.

P1217

FUNCTIONAL ASSESSMENT OF THE SPINE OF PATIENTS WITH SEVERE HIP OSTEOARTHRITIS

M. Dymitrowicz¹, M. Glinkowski²

¹Center of Excellence "TeleOrto", Medical University of Warsaw, Warszawa, ²Faculty of Health Sciences and Physical Education, Kazimierz Pulaski University of Technology and Humanities in Radom, Radom, Poland

Background: The hip-spine syndrome is relatively infrequently recognized in patients with diagnosed arthritis of the hip. Little is known about the links of lumbar spine function in severe hip OA confirmed by clinical and radiographic findings just before total hip replacement. **OBJECTIVE:** The objectives were to describe and compare spine- and hip-related functions in the subset of patients with severe hip OA.

Design: Prospective cohort study with a cross-sectional design.

Setting: University orthopedic clinic.

Material and methods: Patients were recruited among those who were waiting for THR surgery due to the severe hip osteoarthritis (Kellgren III and IV only). The results of the static 3 Dimensional structured light postural evaluation were obtained using the developed system with the 3D Orthoscreen software. Multipositional examination and functional measurements of the spine were performed using the spinal diagnostic system - Spinal-Mouse® (Idiag, Volkswill, Switzerland). The obtained clinical results were analyzed in terms of physical function, sex, age, and BMI. An examination and validated questionnaires of the spine and hip pain and function including PROMIS, Oswestry Disability Index were completed. Hip radiographs were assessed by an independent examiner for hip OA by the Kellgren. This study was approved by IRB (KB 22/2012). It was a part of the project NR13-0109-10/2011 funded by the National Center for Research and Development.

Aim: The aim of the study was to assess the functional status components of the spine in cases with severe osteoarthritis (Kellgren 3 and 4) of the hip joint. The reduction of the range of motion of the lumbar spine as well the decrease of the lumbar lordosis angle was anticipated. Comparisons of lumbar spine function were completed for patients with radiographic findings of hip OA.

Results: 166 patients, including 99 women (59.6%) and 67 men (40.4%) were included in the study. The average age of patients was 62.6 years, with radiologically confirmed advanced osteoarthritis of the hip. Flexion contractures of the hip joints, decreased lumbar lordosis angle, increased thoracic kyphosis and tilting the entire torso forward were examined. Statistically significant differences in the surface topography lumbar lordosis angle of the sagittal plane were found. The average value in women was 29.56° (SD 10.8), while in men, 25.6° (SD 8.33), the thoracic kyphosis angle in women was 34.9° (SD 13.3), and in men 39.2° (SD 9.6). In obese patients a reduced range of motion in the lumbar spine has been

demonstrated, e.g., bending from an intermediate position was 37.6 degrees (SD 13.2), and in patients with a normal weight 45.25 degrees (SD 12.5), the range of motion of maximum bend from the erect position to the maximum flexion in obese persons was 39.9 (SD 13.8).

Conclusion: The link between the hip and the spine affecting function were found in patients with severe osteoarthritis. Physical examination findings indicating spine dysfunction are common in patients presenting with hip osteoarthritis. In patients with advanced degenerative changes of the hip joint, there are accompanying restrictions on the mobility of the spine. The use of diagnostic equipment (including Spinal-Mouse® (Idiag, Volkswill, Switzerland) allows for the quantitative assessment of the static posture and dynamic characteristics of the spine's mobility. Further investigation is needed to better understand these links and their potential impact on prognosis and treatment of cases suffering hip and back pain.

P1218

REVIEW OF PROXIMAL FEMUR AND FEMORAL NECK FRACTURES: CLINICAL DIAGNOSIS AND MANAGEMENT

A. Holub¹, J. Marante Fuertes², A. Pérez Alcántara³

¹Primary Care Center La Granja, Jerez de la Frontera, ²University of Cádiz, General Hospital in Jerez de la Frontera (Cádiz), ³General Hospital in Jerez de la Frontera, Cádiz, Spain

Objectives: Hip fractures in young adults are uncommon and often the result of energy trauma (Patient 1) however it can occur due to bone fragility caused by transient osteoporosis (TO) especially during the pregnancy (Patient 2). It is known that Transient Osteoporosis can put patients at greater long-term risk for fractures in different areas of the body. Both of the fractures mechanisms are associated with higher incidences of femoral head osteonecrosis and nonunion. Multiple factors can play a significant role in preventing these devastating complications and contribute to a good outcome. Presentation of two cases of fracture of the hip with its different mechanism.

Case reports: Patient 1: 49 year old female with no relevant medical history who suffers a fatal fall in her work. Examination at Urgency Unit: unilateral hip pain exacerbated by activity, motion of the hip limited. Review of systems was negative for fever, chills, fatigue, headache, chest pain, palpitations, abdominal pain, paresthesia, or any other symptoms. X-rays of the pelvis and hips revealed subcapital right hip fracture and underwent a surgical treatment. Patient 2: 35 year old female in her third trimester of pregnancy, with no significant medical history, presented to her clinician with a 3 week long left hip pain associated with knee pain that became more severe in the last 24h. Treated with analgesics (paracetamol and opioids) for the last two weeks that did not alleviate her symptoms. Examination: left hip pain exacerbated by activity, hip motion limited. Review of systems was negative for other symptoms. Evaluated by physical therapy, she was assigned physical exercises and recommended to use a walker. Given her unrelenting pain, which had progressively worsened over time, an X-rays of the pelvis and hips was performed that revealed subcapital left hip fracture and necrosis of femoral head that needed to undergo a surgical treatment. (previous densitometry (T-score 3.2, Z-score 2.3)

Results: Both patients presented a favorable evolution with full recovery of the movement along the first year of follow-up.

Conclusion: Hip fractures can be due to a different mechanism. Both trauma and transient osteoporosis of the hip (TOH) can be responsible factor. The screening and the early diagnosis during the routine checkup it is crucial in prevention of the side effects of the hip fracture at the early age.

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P1219

THE EFFICIENCY OF TREATMENT WITH DIACEREIN ON COURSE OF OSTEOARTHRITIS AND TYPE 2 DIABETES MELLITUS

M. Oliinyk¹, L. Zhuravlyova¹¹Kharkiv National Medical University, Kharkov, Ukraine

Objective: To study the effect of diacerein on the course of the disease and the dynamics of the cytokines profile in patients with combined course of osteoarthritis (OA) and type 2 diabetes mellitus (T2DM).

Methods: The study was performed on 28 patients (4 males) aged 58.60 ± 1.19 with combined OA and T2DM in the Regional Hospital of Kharkov. Baseline characteristics of patients included history of OA (7.39 ± 0.52 years), T2DM (9.85 ± 0.97 years). All the patients have performed a X-ray examination of the knee. Patients were evaluated by the WOMAC questionnaire (scoring of pain, stiffness, lack of joint function and total score). The survey plan included: level of C-reactive protein (CRP), indices of carbohydrate exchange (insulin, glucose, HbA1C, HOMA-IR). The level of TNF-α and IL-1β was determined by ELISA. The level of HbA1C was < 7.5% in all patients. Patients were assigned for diacerein, 50 mg 1 time per day during the first two weeks and then 50 mg twice daily within 3 months. All adverse events reported were documented during the study period.

Results: The effect of treatment was observed in 4-5 weeks and increased throughout the treatment period. The treatments were evaluated by WOMAC-index and showed that diacerein was associated with a significant reduction of pain intensity and stiffness by 3 months, on 23.6%, and 26.4% respectively. The improvement in functional abilities by WOMAC-index (functional insufficiency) was significantly better with diacerein by day 30 and 90, 32% and 25% respectively. Within 3 months after treatment, the CRP level decreased significantly from 14.6 ± 1.99 mg/ml to 3.12 ± 0.58 mg/ml ($p=0.00004$). As for the level of proinflammatory cytokines, their blood serum levels also changed, so that IL-1β was significantly reduced by 11% ($p=0.00004$), while the TNF-α level reduced by 6.6% ($p=0.00006$). Diacerein was well tolerated and during the 3-month follow-up period there was 1 adverse event, which was associated with diarrhea.

Conclusion: The findings suggest that diacerein is an effective treatment for knee OA, has a positive effect on the reduction of pain and improvement in functional abilities of patients and associated with decrease level of proinflammatory cytokines.

P1220

ADVANTAGES OF PULSED ELECTROMAGNETIC FIELD IN REHABILITATION OF DISTAL RADIAL OSTEOPOROTIC FRACTURES

I. M. Borda¹, V. Ciortea¹, L. Irsay¹, I. Onac¹, R. Ungur¹¹University of Medicine and Pharmacy Iuliu Hatieganu, Cluj-Napoca, Romania

Objective: To assess the effects of Pulsed Electromagnetic Field (PEMF) on pain, oedema, range of movement and functional performance in patients with distal radial osteoporotic fractures.

Methods: 56 women (62.2 ± 8.4 years) with distal radial osteoporotic fractures, treated by reduction and immobilization, were included (after cast removal) in a prospective randomized controlled study. Osteoporosis was confirmed by DXA method. Patients were randomly assigned to either PEMF (32 patients) or control group (24 patients). PEMF therapy or sham therapy (in the control group) was applied 10 min/d, for 10 days. Patients from both groups received a standard exercise programme. Parameters assessed on the first and on the last day of treatment were: pain (SAV), oedema (displacement method), range of motion (goniometry), function (patient-rated wrist evaluation score – PRWE).

Results: After the rehabilitation programme, improvement of all measured parameters was recorded in both groups, but with constant significant differences in favour of PEMF group: pain ($p<0.01$), oedema ($p<0.001$), range of motion ($p<0.05$), PRWE ($p<0.05$).

Conclusion: PEMF provided important additional benefits in rehabilitation of patients with distal radial osteoporotic fractures.

P1221

PREVALENCE OF OSTEOPOROSIS AND OSTEOPENIA FROM JANUARY TO DECEMBER 2017 IN A POPULATION OF WOMEN GREATER THAN 50 YEARS WHO COME TO THE ISSSTE CLIDDA UNIT

G. González¹¹ISSSTE, México, Mexico

Dra. Enedina Michaux Martínez, Dra. en C María Georgina González Zárate, Dr. Juan Carlos Paredes Palma, Dr. en C Carlos Ramírez Velázquez, Dr. en C Osvaldo Eric Sánchez Hernández, Dra. En C Irene Sánchez Trampe, Dr. Mario Alberto Huesca Rodríguez, Dra. Lorena Balladares Macedo, Dra. Claudia Paredes Palma, Dr. Moisés Ramos Abarca, Dra. Ma Elena Hernández Espinosa, Dra. Ma de los Ángeles López Sánchez.

Objective: To estimate the prevalence of osteoporosis and osteopenia from January to December 2017 in women over 50 years of age who attend the CLIDDA ISSSTE automated detection and diagnosis clinic and analyze its relationship with some known risk factors.

Methods: Observational, descriptive, retrospective, cross-sectional study carried out in the CLIDDA ISSSTE automated detection and diagnosis clinic. The following variables were analyzed: age, BMI, place of birth and time with hormone replacement therapy. The information was compared with the result of the bone mineral densitometry.

Results: A total of 6602 women were studied, of which 2943 were normal, 2699 with osteopenia and 960 with osteoporosis. A prevalence of 40.88% was obtained for osteopenia and 14.54% for osteoporosis, similar to that reported in Mexico¹. Overweight was an important risk factor, since the percentage of osteopenia and osteoporosis was higher than in women of normal weight. Women who received hormone replacement therapy had a lower risk of developing osteoporosis. Women from the southern areas of the country showed a higher percentage of osteoporosis.

Conclusions: the prevalence obtained in this study of osteopenia and osteoporosis was slightly higher than that reported in other Mexican studies^{1,2}. Diagnosis and timely detection are the best tools for the prevention of these problems.

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P1222

FRACTURE LIAISON SERVICES (FLSS) IN ENGLAND AND WALES: INEQUITY OF ACCESS AND QUALITY OF CARE AFTER A FRAGILITY FRACTURE

K. Javaid¹, N. Vasilakis², C. Gallagher^{1,2}

¹Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, UK, ²Falls and Fragility Audit Programme, Clinical Effectiveness and Evaluation Unit, Royal College of Physicians, London, UK

Objectives: The Fracture Liaison Service Database (FLSDB) aims to measure the volume and quality of care in secondary fracture prevention delivery across England and Wales.

Methods: In 2015 a facilities audit of all acute trusts and LHBs in England and Wales was completed in order to establish where fracture liaison services are commissioned, the services they provide and how they are resourced. In 2016 the FLSDB started to collect patient level data on a continuous basis. We looked at the number of patients seen by an FLS between January 2016 and December 2016.

Results: 56 FLSs are currently participating in the FLSDB and have entered over 89,000 patient records to date. Based on 2016 data, this

represents an estimated 40% of all fragility fractures that should have been submitted by the participating FLSs, from a total of 107,745 fractures. Nationally only around 1/3 of NHS trusts and LHBs in England and Wales participate in the audit, therefore only an estimated 13% of all fragility fractures in the NHS are being identified and entered on to the FLSDB. Of those submitted, there was marked variability in the performance of key indicators of quality secondary fracture prevention with some FLSs able to deliver high quality care for specific indicators.

Conclusion: This audit has enabled unprecedented insight into secondary fracture prevention in England and Wales, with over 89000 patient records currently included in the audit. The initial findings have highlighted the marked great variation in the availability and delivery of secondary fracture prevention by FLSs in England and Wales. The FLSDB has gone some way to achieve its objective to highlight inequity of access to FLSs. Importantly; the audit has demonstrated the need for continuous service measurement to inform a) the components of the pathway to prioritise both locally and nationally and b) provide the necessary data feedback to measure the impact of service improvement initiatives. Already the findings of the audit have led to more services being commissioned and this is increasing awareness of the benefits of participating in the FLSDB. The implications of this study are that more needs to be done to improve the equity of access to secondary fracture prevention services for patients across England and Wales.

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P1223

VALIDATION OF THE ROMANIAN SARQOL QUESTIONNAIRE

G. Mihai¹, I. M. Pascanu¹, R. M. Pop², A. I. Gasparik³

¹Department of Endocrinology, University of Medicine and Pharmacy, Tîrgu Mures, Romania, Tîrgu Mures, Romania, ²Department of Research methodology, University of Medicine and Pharmacy, Tîrgu Mures, Romania Mures, Romania, Tîrgu Mures, Romania, ³Department of Public Health and Health Management, University of Medicine and Pharmacy Tîrgu Mures, Romania, Tîrgu Mures, Romania

Introduction: SarQoL (Sarcopenia Quality of Life) is the first disease-specific questionnaire for sarcopenia and recently we provided a translated and culturally adapted version of the original SarQoL questionnaire in Romanian language.

Objective: To validate the SarQoL questionnaire in Romanian language. **Methods:** Sarcopenia was defined according to the EWGSOP-proposed definition: low muscle mass and either low physical performance and/or low muscle strength. The sample size included 100 volunteers of both sexes, 65 years old or above who completed the Romanian SarQoL questionnaire. Muscle strength was evaluated using a Hand dynamometer with the following cut off-values (for women < 20 kg and for men < 30 kg) and to estimate the muscle mass we used Lee equation ($\leq 6.37 \text{ kg/m}^2$ for female patients and $\leq 8.90 \text{ kg/m}^2$ for male patients). To assess physical performance, we used the gait speed test. Values under < 0.8 m/s indicated poor physical performance.

Results: The median age of the patients was 72 (67–79) years. Gender distribution: 69% of the participants were female, and 31% male. Thirteen subjects fulfilled the criteria for sarcopenia according to the EWGSOP definition. In our study group, sarcopenic subjects were significantly older and had a lower BMI compared to non-sarcopenic individuals (80 (76–88.5) vs 71 (66–77) years, $p = 0.002$ and 22.1 (19.8–23.1) vs 26.6 (24.8–29.1) kg/m^2 , $p < 0.0001$). Mean SarQoL scores were significantly lower compared with non-sarcopenic individuals ($n=87$) which shows a good discriminative power of the Romanian SarQoL questionnaire (54.92 $\pm$ 18.2 vs 68.64 $\pm$ 17.59, $p=0.018$). The Cronbach's alpha

value of 0.946, considered excellent, indicates a high internal consistency. Other properties we tested were construct validity as well as floor and ceiling effects.

Conclusions: The Romanian version of the SarQoL questionnaire is comparable regarding the content and accuracy with the original instrument.

P1224

RELATIONSHIP BETWEEN KNEE PROPRIOCEPTION, PAIN AND FUNCTION IN PATIENTS WITH PATELLOFEMORAL PAIN SYNDROME

S. Karakas¹, T. Kurucolak¹

¹Marmara University Physiotherapy and Rehabilitation, Istanbul, Turkey

Aim: The aim of this study was to evaluate the relationship between pain, functional level and joint position sense in patellofemoral pain syndrome. **Material and Method:** Twenty healthy volunteers and twenty patients with patellofemoral pain syndrome (PFPS) who met the inclusion criteria were included in the study. Visual Analogue Scale (VAS) for pain assessment, Kujala Patellofemoral Score (KPS) and Lower Extremity Functionality Scale (LEFS) for functional assessment, step down, anteromedial lunge and bilateral squat tests for clinical functional assessment, universal goniometer for knee joint angle and a digital goniometer was used for joint position sense of the knee joint.

Results: When the evaluations were analyzed, statistically significant difference was found between KPS, LEFS ($p = 0.000$; 0.000), clinical functional test measurements ($p = 0.000$) and knee joint flexion angle ($p = 0.043$). There was no statistically significant difference between the groups with respect to knee joint position sense values ($p>0.05$).

Conclusions: Decreased functional levels in patients with patellofemoral pain syndrome were associated with increased pain intensity. However, there was no correlation between measure of joint position sense and functional level and pain. Our results that patients with PFPS have functional decline in their healthy limbs and that patients with PFPS should be compared with a healthy control group properly interpret the assessments and treatment results.

Key Words: Knee Joint, Patellofemoral Pain Syndrome, Proprioception, Pain, Functionality.

P1225

HORMONE THERAPY AS A RISK FACTOR FOR SECONDARY OSTEOPOROSIS IN RHEUMATOID ARTHRITIS FOR PRIMARY CARE

A. A. Aktulaeva¹, K. S. Ansarov¹

¹Volgograd state medical University, Volgograd, Russia

Objective: to Study the effect of hormone therapy on the development of secondary osteoporosis in rheumatoid arthritis in the study sample.

Rheumatoid arthritis (RA) occupies a special place among the various diseases that can cause secondary osteoporosis. The clinical significance of osteoporosis is a high risk of skeletal fractures, which significantly reduces the quality of life and worsens the prognosis in patients with RA. Osteoporosis and joint destruction in RA have common pathogenetic mechanisms associated with the activation of the immune system, the overproduction of "pro-inflammatory" cytokines and insufficient synthesis of "anti-inflammatory" cytokines, leading to the activation of osteoclastogenesis and increase of bone resorption. In addition, the pain and loss of joint function and disease lead to immobility, which also increases the risk of osteoporosis. The glucocorticosteroids (GCS), which are often prescribed for RA, can also cause significant loss of bone mass occurring primarily in the area of the damaged joint.

Materials and methods: analysis of medical records of 90 patients with a documented diagnosis of RA according to EULAR criteria (2010), the American College of Rheumatology (1987) observed in different clinics

of the region. All patients had been deployed or late-stage RA, disease duration from 3 to 15 years. They considered results of x-ray examination. We evaluated the adequacy of hormone therapy.

Results and discussion: Analysis of medical records of 90 patients with RA demonstrated that 17 patients had secondary osteoporosis in RA, of which 14 were on long-term intake of systemic corticosteroids, suppressive force on the bone formation. As for dosages, I should point out that when applying low doses (7 persons) and high doses of corticosteroids (7 persons), osteoporosis was found equally often. It is important to stress that, among the 17 patients with secondary osteoporosis, 3 patients did not receive any hormonal therapy.

Conclusions: Thus, the obtained results show that, in most cases, the use of systemic CS has a suppressive effect on bone formation, despite the effectiveness in suppressing chronic inflammation. In addition, it was found that, regardless of the dosages of corticosteroids, osteoporosis occurred with the same frequencies.

P1226

PYODERMA GANGRENOUSUM AND CHRONIC NON-BACTERIAL OSTEOMYELITIS IN A PATIENT WITH RHEUMATOID ARTHRITIS

P. Athanassiou¹, P. Tsakiridis¹, C. Gerodimos¹, M. Kotsiou²

¹Department of Rheumatology, St. Paul's Hospital, Thessaloniki, Greece,

²Department of Hyperbaric Medicine, St. Paul's Hospital, Thessaloniki, Greece

Objective: Pyoderma gangrenosum is an ulcerative, gangrenous non-infectious lesion which is observed in patients with systemic autoimmune diseases. Chronic non-bacterial osteomyelitis is a non-infectious inflammatory osteomyelitis observed in the context of autoimmune diseases. The aim was to describe the case of a patient with rheumatoid arthritis who developed pyoderma gangrenosum and subsequently non-bacterial osteomyelitis, both successfully treated with immunomodulatory agents.

Case report: A patient, female, aged 55 years with rheumatoid arthritis, presented with necrotic lesions of both lower extremities, an ulcer on the dorsal surface of the left foot, arthritis of the right knee, fever and pain in the lower extremities. Laboratory investigation revealed rheumatoid factor negative, anti-CCP antibodies negative, hematocrit 30.2%, hemoglobin 9.3 g/dl, white blood cells 9050/mm³, ESR 52 mm/h, CRP 5.8 mg/dl (normal range <0.5 mg/dl), negative blood cultures and negative cultures of specimens derived from the lesions in the lower extremities. Prednisolone and cyclosporine were administered and the patient underwent sessions of hyperbaric oxygen. The lesions healed, except for the ulcer on the dorsal surface of the left foot. Two months later the patient presented again with oligoarthritis of the right knee and the left ankle, new necrotic bullae in the left leg with attendant subcutaneous tissue edema, infiltration and intense pain, hematocrit 23.9%, hemoglobin 7.6 g/dl, ESR 87 mm/h and CRP 21.2 mg/dl. MRI of the left lower extremity showed osteitis. Pulse methylprednisolone was administered 1 g iv for 3 consecutive days. Chronic non-bacterial osteomyelitis was diagnosed. Prednisolone, cyclosporine and methotrexate were administered and the lesions improved.

Conclusions: Pyoderma gangrenosum is an ulcerative, gangrenous skin lesion observed in patients with autoimmune systemic diseases. In the case described the patient was successfully managed with immunomodulatory treatment and sessions of hyperbaric oxygen.

P1227

EFFECTS OF ANTIPSYCHOTICS ON THE BONE MINERAL DENSITY, CORTISOL AND PROINFLAMMATORY CYTOKINES IN PHENCYCLIDINE ANIMAL MODEL OF SCHIZOPHRENIA

N. Petronijevic¹, T. Nikolic¹, J. Sopta¹, M. Velimirovic¹, G. Jevtic Dozudic¹, T. Stojkovic¹, M. Zivkovic¹, M. Petronijevic²

¹School of Medicine, University of Belgrade, Belgrade, Serbia, ²Military Medical Academy, University of Defence, Belgrade, Serbia

Objective: Decreased bone mineral density, inflammation and dysregulation of hypothalamic–pituitary–adrenal (HPA) axis are described in schizophrenia (SCH). Long-term treatment with antipsychotics is often required for disease control. Perinatal phencyclidine (PCP) administration to rodents represents an animal model of SCH. The aim of this study was to assess the effects of chronic haloperidol and clozapine treatment on bone mass, concentrations of IL-6, TNF- α and corticosterone in serum and the expression of the glucocorticoid receptor (GR), phosphorylated GR (pGR), chaperone and co-chaperone proteins (HSP70, HSP90, FKBP51) and glucocorticoid metabolising enzyme (11 β -HSD1) in the brain of adult rats perinatally treated with PCP.

Material and methods: Male Wistar rats were subcutaneously treated on 2nd, 6th, 9th and 12th postnatal day (PN), with either PCP or saline. Antipsychotics were applied from PN35. Dual X-ray absorptiometry measurements were performed on PN98. Animals were sacrificed on PN100. Concentrations of corticosterone, TNF- α and IL-6 were measured in the serum using ELISA kits. Expressions of proteins were assessed by Western blot.

Results: Perinatal PCP administration caused a significant decrease in bone mass and deterioration in bone quality. It didn't have influence on the interleukine and corticosterone concentrations but changed the expression of GR related proteins indicating increased sensitivity of GR signaling system. Haloperidol had deleterious, while clozapine had protective effect on bones. Both haloperidol and clozapine caused decrease of the sensitivity of GR signaling system but clozapine caused significant increase of corticosterone and TNF- α concentrations.

Conclusion: Taken together our findings confirm that antipsychotics have complex influence on bone and metabolism. Haloperidol showed a greater impact on the bones while clozapine affected HPA axes and inflammatory markers. Evaluation of potential markers for individual risk of antipsychotics induced adverse effects could be valuable for improvement of therapy of this life-long lasting disease.

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P1228

PREVALENCE OF SARCOPENIA IN PATIENTS WITH DIAGNOSIS OF PRIMARY OSTEOPOROSIS

A. P. Gonzalez¹, A. Medina¹

¹Hospital San Jose/Servicio Endocrinologia/Fundacion Universitaria Ciencias de la Salud, Bogota, Colombia

Osteoporosis and sarcopenia are common diseases in older adults, which generate a high burden of morbidity due to an increase in the risk of fractures. Currently, the world population is 7.5 billion and an increase to 10.5 billion is estimated for the year 2050, with an increase in the elderly population, so an increase in osteoporosis of 15-29% is expected. 28-49% for the year 2050 secondary to an increase in the population over 70 years old (1)

It has been established that the presence of sarcopenia increases the risk of fracture 3.5 times. When femoral neck fractures occur (the most frequent fracture in this age group), only functional recovery is achieved in 50% of cases. In addition, when osteoporosis occurs concomitantly with syndrome of secondary decline to low muscle mass with decreased physical performance, the mortality associated with fractures increases exponentially (2). Finally, in addition to morbidity and mortality, fractures generate a high health cost which amounts to \$ 205,602,914,414 pesos in treatment of patients with hip fracture) and \$ 1,370,947,862 pesos, in patients with vertebral fracture requiring surgical management, and with non-surgical management \$ 11,653,771,426 pesos and for fractures of distal radius \$ 122,858,360,231 pesos (1)

Osteosarcopenia is considered an entity of high public health impact in which programs to reduce fracture risk should be implemented, since the current pharmacological treatment of osteoporosis only achieves a 50%

reduction in fracture risk (1). For this reason, it is very important to know the prevalence of sarcopenia in patients with osteoporosis in our population, which would allow the development and implementation of multidisciplinary approach programs (nutrition, sports medicine, endocrinology) in order to reduce the incidence of fractures and, therefore, improve the quality of life of the elderly.

Objective: To determine the prevalence of sarcopenia in patients with postmenopausal osteoporosis attending the Endocrinology Service.

Active search for Sarcopenia was performed in patients with a diagnosis of Osteoporosis determined by percentage of muscle mass measured by bioimpedance, isometric strength of grip (measured with dynamometer) and muscle function (measured by gait speed test).

Type of study: Analytical cross-sectional observational.

Results: of the patients analyzed (thirty, 30), the minimum age was 56 and the maximum age was 80, with an average age of 70 years. Regarding the history of falls in the last year, 25% of the population presented with a history of fractures in 45% of the patients, of which 55% corresponded to a femur fracture and 44% to a forearm fracture. 35% of the patients had overweight with BMI greater than 25, and 55% had abdominal obesity defined by abdominal perimeter greater than 90 cm. Regarding the findings in bone mineral density at the level of the lumbar spine, a minimum of 0.630 g/m² and a maximum of 1.060 g/m² was found, with an average of 0.830 g/m². In the femoral neck a minimum bone mineral density of 0.590 g/m² and a maximum of 0.900 g/m². As for the skeletal muscle mass index results, an average of 6.28 gr/m² was obtained. The walking speed was obtained a minimum of 0.41 m/sec and a maximum of 7.53 m/sec. In the measurement of force an average of 17 KG was presented with a minimum of 4.1 kg and a maximum of 35.7 kg. Of the patients with Osteoporosis it was found that 35% had Sarcopenia and 65% Presarcopenia. Conclusion Sarcopenia is a common comorbidity in patients with Osteoporosis present in 35% of patients with a history of fractures in 45% of the population, which increases the risk of fracture 20 times, requires diagnosis and early treatment for prevent functional disability.

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P1229

RELATIONSHIP BETWEEN PEAK EXPIRATORY FLOW, PHYSICAL CAPACITY AND INCIDENCE OF FRAILTY AMONG NURSING HOME RESIDENTS

A. Charles¹, F. Buckinx¹, D. Cataldo², J.-Y. Reginster¹, X. Rygaert¹, O. Bruyère¹

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Belgium. WHO Collaborating Centre for Public Health Aspects of Musculoskeletal Health and Ageing, Liège, Belgium,

²Department of Clinical Sciences, Laboratory of Tumor Biology and Development, University of Liège, Liège, Belgium

Objective: Previous studies have suggested some association between physical capacity and frailty. However, the association between peak expiratory flow (PEF) and incidence of frailty has not been extensively studied. The objective of this study is to correlate low PEF and decreased physical capacity with the incidence of frailty among nursing home residents.

Material and methods: Clinical and demographic data collected from the SENIOR cohort at baseline and after one year of follow-up were

analyzed. PEF was measured with a peak flow meter (Mini-Wright meter). The theoretical values of PEF (taking into account age, sex and height) were calculated by including only non-smoking subjects of our population with no diagnosed respiratory diseases. For each individual subject, an observed PEF value of less than 80% of the theoretical value was considered "low". Physical capacity was evaluated using the Short Physical Performance Battery and the Timed Up and Go test. Balance and gait were assessed by Tinetti test. Maximum handgrip strength was measured using a Jamar type dynamometer. Frailty status was assessed with the Fried's criteria. The incidence of frailty in the year of follow-up was defined as the transition from a "robust" or "pre-frail" status to a "frail" status.

Results: Among subjects with complete evaluations at baseline (646 subjects (83.2 ± 9 years and 72.1% of women)), 297 subjects (45.7% of the population) displayed a low PEF. In this subgroup, calf circumference (p=0.03), physical capacity (p-values from 0.01 to <0.001), muscle strength (p<0.001), balance and gait score (p<0.001) were significantly lower as compared to subjects displaying normal PEF. Subjects who became frail after one year displayed, at baseline, a lower percentage of the theoretical PEF value as compared to those that do not become frail (respectively 88.52 ± 45.06 vs 102.78 ± 50.29, p=0.03). However, after adjustment for confounding variables, the percentage of the theoretical PEF value was no longer associated with the occurrence of frailty.

Conclusion: Decreased PEF values are correlated with the occurrence of frailty and might be an interesting and convenient predictive parameter to collect in the absence of classical physical tests. Other studies are needed to understand whether PEF measurement has a predictive value that can be compared to classical physical tests.

P1230

THE EFFECT OF PHYSICAL ACTIVITY ON BONE STRUCTURE IN OVERWEIGHT AND OBESE POST-MENOPAUSAL WOMEN

L. Flores¹, S. Nelson¹, K. Kupzyk², N. Waltman², L. Bilek¹

¹College of Allied Health Professions, University of Nebraska Medical Center, Omaha, United States, ²College of Nursing, University of Nebraska Medical Center, Omaha, United States

Recent reports and our recent findings indicate that adiposity may negatively impact trabecular structure in post-menopausal women. Our objective was to investigate the effect of various modes of activity on trabecular structure of the spine in post-menopausal women and determine if anthropometric characteristics influence this effect.

Methods: The trabecular bone score (TBS), which is calculated from DXA and indicates the trabecular structure of the spine, was obtained from 590 women in the first 5 years of menopause who screened to participate in a large randomized controlled trial. Physical activity habits were assessed by the Human Activity Profile questionnaire and compared to TBS with the sample stratified by BMI (< or > 25 kg/m²) or waist circumference (< or > 35", an indicator of risk according to the National Heart, Lung, and Blood Institute).

Results: TBS negatively correlated with % body fat (r = -.398, p < .001). Walking 1 or 2 miles had no effect on BMD in women with BMI < or > 25 kg/m². Activity appears to influence TBS in women with BMI > 25, as overweight and obese women who walked 1 or 2 miles had a significantly higher TBS. TBS significantly correlated with waist circumference (r = -.482, p < .001) which could be related to the effect of adiposity on bone or the influence of body tissue on TBS measurement. Therefore, to minimize this effect, we analyzed the effect of activity on TBS stratifying by waist circumference. The effect of walking 2 miles on TBS was not significant for those with waists < 35". For women with larger waists, however, the effect of walking 2 miles on TBS was significant (p = .026).

Conclusions: Walking 2 miles is associated with significantly higher TBS scores for women with > 35" waist circumference, and walking 1 or 2 miles is associated with significantly higher TBS for women with BMI > 25. Aerobic type exercise may have a positive effect on trabecular bone structure for obese or overweight post-menopausal women, suggesting anti-inflammatory modes of exercise rather than bone-loading exercises may be important for bone health in this population.

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P1231

THERAPEUTIC POTENTIAL OF SIRT1 GENE IN POSTMENOPAUSAL WOMEN WHO SUSTAINED HIP FRACTURE

V. Dixit¹, M. El-Haj², I. Gurt², E. Cohen-Kfir², H. Artsi^{2,3}, L. Kandel², O. Yakubovsky^{2,3}, O. Safran², R. Dresner-Pollak³

¹Department of Orthopaedics, All India Institute of Medical Sciences, New Delhi, India, ²Orthopedic Surgery, Hadassah-Hebrew University Medical Center, Jerusalem, Israel, ³Endocrinology and Metabolism Service, Department of Medicine, Hadassah-Hebrew University Medical Center, Jerusalem, Israel

Introduction: The aim of the study are to investigate the role of Sirtuin1 (Sirt1), an anti-aging factor and a player in age-associated diseases, in osteoporotic hip fractures, and test the hypothesis that Sirt1 is a negative regulator of sclerostin, a bone formation inhibitor, in human femoral bone marrow mesenchymal cells (BM-MSCs).

Methods: Sirt1 and sclerostin were determined by western blot in bone samples obtained intra-operatively from the inferior medial cortex of the femoral neck (calcar region) in female patients undergoing partial hip replacement for fractured neck of femur (N = 10) or hip replacement for osteoarthritis (N = 8) (mean ± SD age 81 ± 8.1 vs. 68 ± 9.3 years; BMI 26.2 ± 3.6 vs. 25.9 ± 7.1 kg/m² in osteoporotic and osteoarthritis patients). Calcar thickness and femoral bone mineral density (BMD) were determined preoperatively by X-ray using a digital TraumaCad(TM) software and DEXA. Femoral BM-MSCs were collected intra-operatively and treated with SRT3025, a Sirt1 activator. Sclerostin and dentin matrix acidic phosphoprotein (DMP1) were determined by western blot and messenger RNA (mRNA) expression of Lef1 and DMP1 was evaluated by quantitative real-time PCR.

Results: Osteoporotic (OP) patients had reduced cortical thickness, femoral neck, and total hip BMD compared to osteoarthritis (OA) patients. Calcar Sirt1 expression was significantly reduced, while sclerostin was markedly increased in OP compared to OA patients. Sirt1 and sclerostin expressions were inversely correlated ($r = -0.49$, $P = 0.047$). SRT3025 administration down-regulated sclerostin and up-regulated DMP1 protein level and increased LEF1 and DMP1 mRNA expressions in OP patient-derived BM-MSCs.

Conclusions: Reduced femoral neck Sirt1 may play a role in osteoporotic hip fractures in part via influencing local sclerostin expression. The therapeutic potential of Sirt1 activation in osteoporosis warrants further investigation.

Keywords: Femoral neck; Osteoarthritis; Osteoporotic hip fracture; Sclerostin; Sirtuin1

P1232

THE NEW ALGORITHM FOR THE MANAGEMENT OF STRESS FRACTURES OF FOOT

V. Dixit¹, J. Pegrum², N. Padhiar², I. Nugent²

¹Department of Orthopaedics, All India Institute of Medical Sciences, New Delhi, India, ²Oxford John Radcliffe Hospitals Orthopaedic Trauma Rotation, Stoke Mandeville Hospital, Aylesbury, Buckinghamshire, United Kingdom

Introduction: There is an increasing prevalence of osteoporosis, and with it a rise in the diagnosis of stress fractures. Postmenopausal women are particularly at risk of stress fractures. This review article describes the pathophysiology of foot stress fractures and the latest diagnostic and treatment strategies for these common injuries.

Discussion: There are numerous risk factors for stress fractures that have been identified in the literature. Reduced bone mineral density is an independent risk factor for delayed union. Prevention of stress fractures with training periodization and nutritional assessment is essential, especially in females. Diagnosis of stress fractures of the foot is based on history and diagnostic imaging, which include radiographs, ultrasound, therapeutic ultrasound, computed tomography, and bone scans; however, magnetic resonance imaging is still the gold standard. Treatment depends on the bone involved and the risk of nonunion, with high-risk fractures requiring immobilization or surgical intervention. Patients presenting with underlying bone mineral deficiency treated without surgery require a longer period of activity modification. Training rehabilitation protocols are described for those with low-risk stress fractures.

Results: A useful algorithm is presented to guide the clinician in the diagnosis and management of such injuries.

P1233

ADVERSE EVENTS ASSOCIATED WITH SYMPTOMATIC SLOW-ACTING DRUGS IN OSTEOARTHRITIS (SYSADOA): A SYSTEMATIC REVIEW AND STRATIFIED META-ANALYSIS OF RANDOMISED, PLACEBO-CONTROLLED TRIALS

G. Honvo^{1,2}, V. Rabenda^{1,2}, A. Geerinck^{1,2}, C. Cooper^{2,3,4}, J.-Y. Reginster^{1,2}, O. Bruyère^{1,2}

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium, ²WHO Collaborating Centre for Public Health Aspects of Musculoskeletal Health and Aging, Liège, Belgium, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton, United Kingdom, ⁴National Institute for Health Research (NIHR) Musculoskeletal Biomedical Research Unit, University of Oxford, Oxford, United Kingdom

Objective: To assess the clinical safety of various oral SYSADOAs in the management of osteoarthritis (OA).

Material and Methods: We performed a systematic review and meta-analysis of randomised, double-blind, placebo-controlled, parallel-group trials evaluating oral SYSADOAs in patients with OA. The databases MEDLINE, CENTRAL and Scopus were searched, without date restriction. Clinical trial registries and recent meta-analyses were also checked. Outcomes of interest were the following MedDRA SOC related adverse events (AEs): gastrointestinal (GI), vascular, cardiac, nervous system, skin and subcutaneous tissue, musculoskeletal and connective tissue (MSCT), renal and urinary, along with total, overall severe and serious AEs and withdrawals due to AEs. Authors and/or sponsors of studies were contacted for full report of AEs.

Results: An initial 25 studies that did not allow concomitant anti-OA treatments during the trial were selected, in accordance with the protocol. An additional 37 studies with concomitant anti-OA treatments (mainly oral NSAIDs) were included in parallel analyses. In the end, 13 and 18 studies respectively had adequate data for meta-analyses. Glucosamine sulfate (GS) and chondroitin sulfate (CS) were not associated with increased odds of AEs, compared to placebo. Patients who received diacerein had 2.53 times (OR 95% CI: 1.43-4.46) more GI (diarrhoea, abdominal pain, soft stools) and 3.16 times (OR 95% CI: 1.93-5.15) more urinary disorders (urine discolouration), than those on placebo. When considering studies with concomitant anti-OA treatments, diacerein was associated with more withdrawals due to AEs (OR: 3.18; 95% CI: 1.85-5.47) and more skin disorders (OR: 2.47; 95% CI: 1.42-4.31). However, reduced odds of MSCT disorders (OR: 0.53;

95% CI: 0.35-0.82) and no serious AEs was found for diacerein. All avocado/soybean unsaponifiables (ASU) studies allowed concomitant NSAIDs, and no statistically significant OR was found for any AEs.

Conclusion: GS and CS can be considered as safe treatments for patients with OA. The harmlessness of ASU has to be confirmed in future studies without concomitant anti-OA treatment, but current evidence seems to support its safety. Diacerein should be considered taking into account the nature of the product, its dosage and patient characteristics.

P1234

ADVERSE EVENTS ASSOCIATED WITH TOPICAL NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS) IN OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED, PLACEBO-CONTROLLED TRIALS

G. Honvo^{1,2}, V. Leclercq^{1,2}, A. Geerinck^{1,2}, V. Rabenda^{1,2}, C. Beaudart^{1,2}, C. Cooper^{2,3,4}, J.-Y. Reginster^{1,2}, O. Bruyère^{1,2}

¹Department of Public Health, Epidemiology and Health Economics, University of Liège, Liège, Belgium, ²WHO Collaborating Centre for Public Health Aspects of Musculoskeletal Health and Aging, Liège, Belgium, ³MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton, United Kingdom, ⁴National Institute for Health Research (NIHR) Musculoskeletal Biomedical Research Unit, University of Oxford, Oxford, United Kingdom

Objective: To assess the clinical safety of topical Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) in the treatment of osteoarthritis (OA).

Material and Methods: Randomised, double-blind, placebo-controlled, parallel-group trials evaluating topical NSAIDs in patients with OA were included in this meta-analysis, after having been identified through a comprehensive literature search, with no date restriction, in MEDLINE, CENTRAL and Scopus. Clinical trial registries and very recent meta-analyses were also checked. The following MedDRA System Organ Class (SOC) related adverse events (AEs) were investigated: gastrointestinal, vascular, cardiac, nervous system, skin and subcutaneous tissue, musculoskeletal and connective tissue. Assessments of overall severe and serious AEs, withdrawals due to AEs and total AEs were also performed. Authors of manuscripts and/or sponsors of studies were contacted to obtain the full safety report.

Results: A total of 25 studies responded to the selection criteria, of which 19 had adequate data for the meta-analysis: 8 were on Diclofenac, 4 on Ketoprofen, 3 on Ibuprofen, and one study each on Etenac, Piroxicam, Nimesulide and S-Flurbiprofen. There were more total AEs (OR: 1.16; 95% CI: 1.04-1.29; $I^2 = 0.0\%$) and more withdrawals due to AEs (OR: 1.49; 95% CI: 1.15-1.92; $I^2 = 0.0\%$) for all topical NSAIDs analysed together, compared to placebo. However, no statistically significant effects were observed for severe or serious AEs, or for the specific SOC investigated. Diclofenac, Ketoprofen and Ibuprofen were analysed independently, with no specific harm found for any of the SOC considered.

Conclusion: Topical NSAIDs can be considered as safe in the management of OA, especially regarding gastrointestinal disorders. Even though, the use of topical NSAIDs has to be considered taking into account the benefit/safety profile, in comparison with other anti-OA treatments.

P1235

HIP FRACTURES AT YANGON GENERAL HOSPITAL (YGH): A DRIVE TOWARDS INTEGRATED CARE

E. Mitchell¹, Z. W. Soe², T. T. Hlaing³, T. W. Nyunt⁴, A. Htet⁵

¹Improving Global Health Fellow, Thames Valley and Wessex Leadership Academy, Yangon, Myanmar. Elderly Care Registrar, Severn Deanery, UK, ²Rector of University of Medicine 1 and

Professor of Trauma and Orthopaedics, Yangon General Hospital, ³Trustee of Brighter Future Foundation and Honorary Lecturer and Consultant in Chemical Pathology and Metabolic Medicine, Yangon General Hospital, ⁴Professor of Geriatric Medicine, Yangon General Hospital, ⁵Consultant Anaesthetist, Yangon General Hospital

Objective: To introduce integrated, multidisciplinary team working to benefit the care of hip fracture patients at YGH.

Material and Methods: Increasing incidence of fragility fractures worldwide poses significant health and economic burden. Incidence of hip fractures alone is set to increase to more than 6 million by 2020. At Yangon General Hospital (YGH), fragility hip fractures accounted for 8% total orthopaedic admissions during a 4-month period. There is significant associated morbidity and mortality; around 10% patients die in hospital within 1 month. This largely reflects the fact that patients are typically elderly with multimorbidity.

Interventions:

1. Analysis of existing care (hip fracture database)
2. Special Interest Group.
3. Revision of clinical practice guidelines.
4. Twice-weekly orthogeriatric ward rounds.
5. Creation of an 'Integrated Care Pathway for Hip Fracture Patients.'

Results: 305 patients were admitted between 10th January – 31st August 2017. Average time to surgery (TTS) reduced from 10 (range 1-15) to 8 (range 3-13) days. Average length of stay (LOS) remained 11 days (range 2-18 days in August) (patients discharged 2 days postoperatively).

Promising results were seen for elderly patients. Between 1st March – 31st May, 54% patients were >70 years of age, 58% were managed surgically and TTS was 13 days. In June, 64% were managed surgically and TTS was 10 days.

Regular special interest group meetings enabled a platform to identify care challenges and also the revision/generation of clinical practice guidelines such as echocardiogram requesting (previously done for all patients ≥60 years of age and incurring up to a 2-week preoperative delay) and osteoporosis assessment.

To unify the multidisciplinary team and promote consistent, evidence-based practice, an integrated care pathway has been produced.

Conclusion: This project has uncovered perioperative barriers for hip fracture patients at YGH. These are reflected in large variations in TTS and LOS. Whilst twice-weekly orthogeriatric input has shown promising early results, the full multi-disciplinary team must be engaged. Data collection needs to be maintained and training delivered cyclically. This project has brought the wider multidisciplinary team closer than ever before. This will be key to future success in a high pressure, resource-limited setting.

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P1236

HIP OSTEOPOROTIC FRACTURES TREATED IN A REGIONAL HOSPITAL ALONG ONE YEAR

Luis Eduardo de la Torre López¹, Isabel C. Sánchez Fuentes², Emilio Justicia Rulls³

¹Physical Medicine and Rehabilitation, Hospital Infanta Margarita from Cabra, Cordoba ²Family Doctor in C. S. Herrera, Sevilla, Spain,

³Rheumatology, Hospital Infanta Margarita

Objective: The main objective is to know the incidence of osteoporotic hip fracture in our regional hospital. The secondary objective is to determine clinical and epidemiological variables that helps to identify areas of improvement in clinical management.

Design Prospective and descriptive study. Study period along one natural year from 1-January-2016 to 31-December-2017.

Material and Methods: Study population is whole of fragility hip fractures treated in Infanta Margarita Hospital of Cibra (South of Córdoba), excluding pathological fractures and high-energy trauma. Variables studied are sex, age, history of osteoporosis, type of fracture, hospital treatment, mortality per year, previous treatment and after discharged from the hospital. Cases have been located by the Clinical Documentation Service. The data has been obtained with the authorization of the Ethics Committee, reviewing the Digital Health History. Statistical treatment carried out with the R Commander program. Incidents calculated based on the published data of the census.

Results: Incidence in patients more than 65 years old was 804 / 100,000 in women and 389 / 100,000 in men. In older than 85 years was 2173 / 100,000 and 1267 / 100,000. At the time of fracturing, 8.4% of women had treatment compared to 0% of men. These percentages would be 17.9% and 2.2% at discharge and 18.7% and 6% per year.

Conclusion: The osteoporotic hip fracture in our area is a serious health problem and it is necessary to improve both primary and secondary prevention.

P1237

APPROACH AND TREATMENT OF LONG – TERM EFFECTS AND COMPLICATIONS IN A PATIENT WITH PROGRESSIVE RHEUMATOID ARTHRITIS. CLINICAL CASES PRESENTATION

J. Marante Fuertes¹, A. Holub², G. Beltran Sanz³, A. Perez Alcantara⁴

¹University of Cádiz (Cádiz, Spain) and The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz) Spain, ²Primary Care Center La Granja, Jerez de la Frontera, Cádiz, Spain, ³General and Emergency Practitioner in D.C.C.U (Emergency and Critical Care Units), Jerez de La Frontera, Cádiz, Spain, ⁴The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz), Spain

Objective: *Rheumatoid arthritis* (RA) is a chronic autoimmune multisystemic inflammatory disease which affects many organs but predominantly attacks the synovial tissues and joints. If there is a unsufficient response to the treatment the progression of the disease can not be easily detained. In the end stage of *rheumatoid arthritis*, the inflammatory process ceases and joints stop functioning. The knee is one of the most commonly affected joints in patients suffering from chronic rheumatoid arthritis (RA) that frequently presents *Ankylosis* or ankylosis - a stiffness of a joint due to abnormal adhesion and rigidity of the bones of the joint, in last stages of the disease. Despite recent improvement in biological agents and treatment modalities in the field of rheumatology, progressive joint destruction continues to occur in a subgroup of RA patients, who eventually require joint surgery. In advanced disease, when synovectomy is of no benefit, total knee arthroplasty (TKA) has proven to be the most successful intervention that reduces knee pain and improves physical function in RA patients.

The aim of our work is to present a case of 49 year-old female suffering from RA for the last 20 years with not satisfactory response to the treatment, diagnosed with bilateral knee joint *ankylosis* unables her to walk properly and its management.

Material and Methods: A 49 year-old female suffering from RA for the last 20 years who underwent various treatments to prevent the long term side effects of RA without satisfactory clinical response. Clinical examination revealed long term mechanic unremitting bilateral knee pain. Left knee with joint deformity due to severe *ankylosis with range of motion*

limited to 15° of flexo extension of the knee. The patient is unable to walk on her own requiring a wheelchair for displacements. The patient undergoes surgical treatment with total left knee arthroplasty.

Results: After the surgery the patient presented a favorable evolution during the first year of follow up, being able to walk short distance using crutches and actually is on the waiting list to the replacement of the right knee.

Conclusion: Rheumatoid arthritis (RA) is a chronic multi-system disease with predominant musculoskeletal manifestations. Being a disease that primarily attacks synovial tissues, RA affects synovial joints, tendons and bursae. The course of rheumatoid arthritis varies from mild disease to severe joint destructive variant that progresses rapidly, eventually leading to unremitting pain and joint deformity that may result in joint ankylosis that unables the mobilization of the patient. In advanced disease, total knee arthroplasty has proven to be the most successful intervention that reduces knee pain and improves physical function in rheumatoid arthritis patients.

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DELAYED POST – TRAUMATIC AVASCULAR OSTEONECROSIS OF THE L1 VERTEBRAL BODY IN A OSTEOPOROTIC PATIENT. CLINICAL CASE PRESENTATION

J. Marante Fuertes¹, A. Holub², G. Beltran Sanz³, A. Perez Alcantara⁴

¹University of Cádiz (Cádiz, Spain) and The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz) Spain, ²Primary Care Center La Granja, Jerez de la Frontera, Cádiz, Spain, ³General and Emergency Practitioner in D.C.C.U (Emergency and Critical Care Units), Jerez de La Frontera, Cádiz, Spain, ⁴The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz), Spain

Objective: Avascular osteonecrosis also known as Kummell's disease is a rare clinical entity that affects the vertebral body, and it is secondary to a vertebral compression fracture. The disease is characterized by the gradual vertebral body collapse following a trivial spinal trauma, involving a worsening back pain associated to a progressive kyphosis. *Vertebral fracture* is by far and away the most prevalent osteoporotic fracture result of the *weakened vertebrae due to a low bone density*. Following the progressively ageing population the prevalence of osteoporosis is increasing and as a consequence, the incidence of spinal crush fractures; therefore evidence of Kummell's disease is quite common, also favoured by the great accuracy of modern diagnostic equipment.

Material and Methods: We highlight a case of a 58 year-old patient with diabetes mellitus type 2, hypertension, hypothyroidism and osteoporosis, following a slight spinal trauma secondary to a fall in home, suffered a progressive necrosis of the L1 body; although the first radiological exams did not showed any changes a constant worsening pain of the thoracic lumbar spine and a restriction of motion lead to extended investigation.

After 10 days from the traumatism, the patient returned to the emergency room with worsening pain. Radiographs and CT scan demonstrated interval collapse of the L1 vertebral body. A linear vacuum cleft was noted on X-rays and CT. On the basis of both his medical history and radiological and histological findings, Kummell's disease was diagnosed.

Results: The patient was treated conservatively, including bracing with thoracolumbosacral orthosis (TLSO) and pain medications (paracetamol, NSAIDs and opioids) with a great response and favorable evolution desestimating surgical treatment. During one year of follow up the patient reestablished painless and full lumbar motion.

Conclusion: It is very importante and necessary for both the emergency unit practitioners and traumatologists to have a complete knowledge of the clinical, pathological and radiological characteristics of Kummell's disease, as to follow a correct diagnostic course enabling to prepare the most suitable therapy.

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P1239

OSTEOCLASTOMA OF THE FIRST METACARPAL – A CASE REPORT WITH LITERATURE REVIEW

J. Marante Fuertes¹, A. Holub², G. Beltran Sanz³, A. Perez Alcantara⁴

¹University of Cádiz (Cádiz, Spain) and The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz) Spain, ²Primary Care Center La Granja, Jerez de la Frontera, Cádiz, Spain, ³General and Emergency Practitioner in D.C.C.U (Emergency and Critical Care Units), Jerez de La Frontera, Cádiz, Spain, ⁴The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz), Spain

Objective: Osteoclastoma also called a giant cell tumour (GCT) is a benign but locally aggressive tumour with a tendency for local recurrence. Almost 90% of cases occur in long bones, being lower extremity of femur, upper extremity of tibia, distal radius and proximal humerus the most commonly affected parts of bones in descending order of frequency. GCT in hand can be hardly find. GCT of bone accounts for 5% of all primary bone tumour and almost 80% of patients are above the age of 18 years, and it is commonly diagnosed in young adults (between 20 and 40 years of age). We want to report a case of osteoclastoma of the first metacarpal which is very rare site for this kind of tumour and its management with the results of the treatment as there are not many cases reported in the literature.

Material and Methods: A 35-year-old male presented to the Emergency Room with the complaints of pain and swelling of his left thumb after suffering a fatal fall landing on his outstretched left hand. On his arrival to the hospital the swelling had gradually increased in size and there was a gross restriction of movements of the affected thumb. No constitutional symptoms were found.

On physical examination, there was a localized swelling over the right first metacarpal with variable consistency. The overlying skin was free and the movements of the metacarpophalangeal and trapeziometacarpal joints were painful and restricted. Plain radiographs revealed an expansile osteolytic lesion of the first metacarpal. These features were suggestive of an osteoclastoma, giant cell tumor and therefore fine needle aspiration cytology was performed and the diagnosis confirmed.

Results: The patient underwent a surgical treatment with local resection of the involved metacarpal with autograft replacement from iliac crest. After one year of follow up by the Traumatology and Orthopaedics Service the patient presented favorable evolution and reestablished painless and full first metacarpal motion.

Conclusion: Osteoclastomas are very rare bone tumours complicated to treat and in occasions can turn aggressive so that early diagnosis and therapy is the key to a comprehensive treatment for organ and hand-function preservation.

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P1240

TILLAUX – CHAPUT FRACTURE IN A 15 – YEAR OLD BOY. THE IMPORTANCE OF EARLY RECOGNITION AND CORRECT MANAGEMENT IN THE EMERGENCY ROOM. CLINICAL CASE REPORT

J. Marante Fuertes¹, A. Holub², G. Beltran Sanz³, A. Perez Alcantara⁴

¹University of Cádiz (Cádiz, Spain) and The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz) Spain, ²Primary Care Center La Granja, Jerez de la Frontera, Cádiz, Spain, ³General and Emergency Practitioner in D.C.C.U (Emergency and Critical Care Units), Jerez de La Frontera, Cádiz, Spain, ⁴The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz), Spain

Objective: Tillaux- Chaput fracture is a fracture of the anterolateral tibial epiphysis that is commonly seen in adolescents. The fragment is avulsed due to the strong anterior tibiofibular ligament in an external rotation injury of the foot in relation to the leg. This kind of fracture should be diagnosed in the Emergency Department. The fracture requires careful evaluation with awareness of associated injury. Standard radiological views (antero-posterior and lateral) of the ankle may not clearly show the fracture displacement hence, an oblique view is required. The fracture should be managed by the emergency physician, if the displacement is less than 2 mm, by immobilising with a non-weight bearing cast or ankle braces for 6 weeks. If the fracture fragment is displaced more than 2 mm, it should be treated by closed reduction failing which open reduction and internal fixation is the standard practice.

We present a case of a teenage boy who suffers Tillaux -Chaput fracture while sport practicing. We want to put an emphasis on the early diagnosis and highlight the clue points in the management.

Material and Methods: A 15-year-old male with no significant medical history presented to the emergency department after falling down while he was playing football twisting his ankle. His left ankle swelled immediately and he was unable to bear weight. It was a low-energy closed injury. On examination, there was a

swelling over the lateral malleolus with limited and painful ankle movements. He had tenderness over the anterior-inferior tibiofibular ligament with no tenderness over the medial and lateral malleoli.

A plain radiography of the ankle joint was carried out, which revealed a suspicious anterolateral fracture of tibial plafond (Tillaux fracture). CT performed clearly demonstrated anterolateral fracture of tibial plafond associated with incomplete fracture of posterolateral portion of distal tibia (Chaput fracture). Displacement was minimal, at less than 2 mm. The patient underwent surgical treatment with fracture reduction and fixation of the fractured part with 2 screws.

Results: After 14 months of follow up the patient presented favorable evolution and reestablished full and painless left ankle motion.

Conclusion: Tillaux fractures are relatively uncommon Salter Harris III fractures of the distal tibia. This fracture should be managed by the emergency physician, if the displacement is less than 2 mm, by immobilising with a non-weight bearing cast or ankle braces for 6 weeks. If the fracture fragment is displaced more than 2 mm, it should be treated by closed reduction failing which open reduction and internal fixation is the standard practice.

Key points in the management of Tillaux – Chaput fracture:

Plain radiographs of the ankle may not reveal this fracture and if there is a high degree of suspicion, then additional oblique views must be taken.

If the fracture displacement is less than 2 mm, it can be managed conservatively by immobilisation in a non-weight bearing cast or ankle braces for 6 weeks.

If the displacement of the fragment is more than 2 mm, then CT scan may be performed to assess the fracture pattern and displacement accurately.

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CASE REPORT ON EWING'S SARCOMA OF PROXIMAL FEMUR IN A 16 – YEAR OLD TEENAGE BOY

J. Marante Fuertes¹, A. Holub², G. Beltran Sanz³, A. Perez Alcantara⁴

¹University of Cádiz (Cádiz, Spain) and The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz) Spain, ²Primary Care Center La Granja, Jerez de la Frontera, Cádiz, Spain, ³General and Emergency Practitioner in D.C.C.U (Emergency and Critical Care Units), Jerez de La Frontera, Cádiz, Spain, ⁴The General Hospital in Jerez de la Frontera, The Department of Orthopaedics and Traumatology, Jerez de la Frontera (Cádiz), Spain

Objective: Ewing sarcoma of bone is a permeative lesion in the diaphysis of long bones that occurs mostly in children and young adults. The permeative nature of the lesion can elicit new bone formation creating a partially sclerotic appearance, cortical expansion presenting as a “Codman triangle,” or have an “onion-skin” type of aggressive periosteal reaction/periostitis. Ewing sarcoma is rarely seen without an associated soft-tissue mass and is even rarer to just have benign-appearing periostitis. The aim of our work is present a clinical case of Ewing sarcoma in a young male, its management and the results of the treatment.

Material and Methods: A 16-year-old male with a four-month history of right groin pain that occasionally radiated into the hip and anterior right thigh. The pain was intermittent but worsening. He was treated with paracetamol and NSAIDs with no clear improvement. He denied history of trauma, fever, chills, night sweats, weight loss, or night pain. Plain radiographs of the right hip and femur were normal. The MRI of the right hip revealed a large marrow-replacing lesion extending from the intertrochanteric region into the proximal diaphysis with surrounding edema in the bone and soft tissues and the CT of the right hip revealed a focal bone lesion involving the right intertrochanteric region and proximal right femoral diaphysis with cortical irregularity. With a suspicion of a malignant lesion the fine-needle biopsy of the lesion was performed and revealed small round blue cells surrounding a central focus of necrosis. The immunoperoxidase staining was positive for CD99 by microscopic examination. Leukemia and lymphoma cell markers were negative. The whole body bone scan revealed distinct high radiotracer uptake in the proximal right femur without evidence of metastasis. Further testing included fluorescence in situ hybridization (FISH) study which resulted to be positive for the EWSR1 gene at chromosome 22q12 and he was diagnosed with the Ewing sarcoma. He underwent surgical treatment with wide resection of proximal femur with total hip arthroplasty.

Results: After 2 years of follow up the patient presents favorable evolution and had regained a full motor power of the lower limb letting him leading a normal life.

Conclusion: Ewing's sarcoma is a highly malignant primary mesenchymal neoplasm of bone. Although it is a very aggressive tumor with variable prognosis depending on stage, site, size, microscopic feature, and biologic features the rapid diagnosis and resection may give very good results if diagnosed at the early stage.

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World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2018): Satellite Symposia Abstracts

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SY1

INAPPROPRIATE CLAIMS FROM NON-EQUIVALENT MEDICATIONS IN OSTEOARTHRITIS

L. Gallelli¹

¹Department of Health Science, School of Medicine, University of Catanzaro, Catanzaro, Italy

Osteoarthritis (OA) is a progressive joint disease, that occurs frequently in the aging population and is a major cause of disability worldwide. Both glucosamine and chondroitin are biologically active molecules that are substrates for proteoglycan an essential component of the cartilage matrix. Evidence supports the use of prescription glucosamine sulfate and chondroitin as symptomatic slow-acting drugs for osteoarthritis (SYSADOAs) with impact on OA symptoms and disease-modifying effects in the long term.

In a recent publication, ESCEO has noted that, while many studies are published on the use of SYSADOAs, the efficacy of this class, and notably of glucosamine and chondroitin, has been called into question largely due to inherent differences in the formulations employed in trials. It would appear that careless, uninformed and scientifically inaccurate analysis of the evidence base may still occur in the OA community, and a more considered approach to addressing the complexities of selected biologically active agents is required.

Among glucosamine preparations, only the prescription pCGS formulation is proven to be efficacious for the treatment of OA symptoms of pain and functional impairment, and may even offer protection from disease progression in the long term. For all other glucosamine preparations, the evidence repeatedly demonstrates an effect close to zero. For chondroitin sulfate, the available evidence points towards a similar.

Conclusion: Only the pharmaceutical-grade CS should be used for treatment of knee OA. Thus, it is ESCEO opinion that from careful consideration of the evidence base, judicious choice of glucosamine and chondroitin formulation is essential to maximise treatment benefit.

In particular, in consideration of future research, ESCEO recommends that complex molecules with biological activity such as pCGS may be treated as “biosimilars” akin to EMA

guidance for biological medicinal products, for which any other preparations must demonstrate comparability with the reference product in terms of physico-chemical, in vitro, non-clinical and clinical studies, in order to be considered suitable for substitution.

In accordance with the 2010 European regulatory guideline on clinical investigation of medicinal products for OA, future clinical trials of SYSADOAs should measure the effect on symptom outcomes, pain and function, for a minimal duration of 6 months, and may determine structural changes over 2 years with JSN measurement. A placebo arm, and/or an active comparator arm must be included, as appropriate. In addition, we recommend the effect of SYSADOAs on symptom outcomes should be measured at multiple time points over 6 to 12 months to reflect a sustained clinical benefit.

In the meantime, for current clinical practice we recommend using only SYSADOA formulations with proven efficacy and safety data.

SY2

COST-EFFECTIVENESS EVALUATION OF GLUCOSAMINE IN OSTEOARTHRITIS BASED ON SIMULATION OF DATA COMING FROM PUBLISHED STUDIES

O. Bruyère¹

¹Department of Public Health, University of Liège, Liège, Belgium

In a world with limited resources and health care budgets, it is important to allocate scarce resources efficiently. Economic evaluation is a method for comparing different strategies in terms of cost (i.e. intervention costs and disease costs) and consequences [i.e. life years or quality-adjusted life year (QALY)]. These evaluations play, in particular, an increasing role in pricing and reimbursement decisions as regulatory agencies rely more on pharmacoeconomic data to make decisions about limited resources.

So far, only one study explored the cost-effectiveness of crystalline glucosamine sulphate (pCGS) compared with

paracetamol and placebo (PL) in the treatment of knee osteoarthritis (Scholtissen et al 2010). The authors showed that when comparing pCGS with PL, the mean baseline and after bootstrapping ICER were 3617.47 and 4285 € / QALY, respectively. They concluded that GS is a highly cost-effective therapy alternative compared with paracetamol and PBO to treat patients diagnosed with primary knee osteoarthritis. In this particular study, to calculate the number of QALY for each subject, WOMAC scores were first translated into Health Utilities Index (HUI) scores using the formula of Grootendorst et al. Subsequently, the utility estimates were used to calculate the QALY using the area-under-the-curve method.

In order to go further in the economics evaluation of treatments with different glucosamine formulations (GLUCO), we should theoretically have access to individual patient data. Unfortunately, this is most of the time not possible. Consequently, we developed and validated a methodology to simulate individual HUI score based on the data provided in published studies.

Individual data were used to compute the means, SD and covariances between values (WOMAC indexes, age and years since OA) at baseline and 6 months after the start of the study for individuals in the placebo and treatment group, separately. The simulated data obtained with our model provide results consistent to what could be observed in the literature. For most of the clinical trials, the changes in HUI score over time are going in the same direction that the results of the WOMAC score observed in these clinical trials. More particularly, the differences of HUI changes between GLUCO and PL are only always in favour of GLUCO in the clinical trials performed with pCGS, as it was the case in the meta-analysis of Eriksen, 2014.

This confirmed that our methodology provides reliable results that could be used in economics evaluation: the simulated data have been used to calculate QALYs and assess the cost-effectiveness of different GLUCO products.

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SY3

SAFETY OF ANTI-OSTEOARTHRITIS MEDICATIONS: RESULTS OF ESCEO 2017 WORKING GROUPS

J.-Y. Reginster¹

¹Department of Public Health, Epidemiology and Health Economics, University of Liege - WHO Collaborating

Center for Public Health Aspects of Musculoskeletal Health and Aging, Liège, Belgium

The 2016 version of the ESCEO guidelines for the management of knee OA recommends, as first-line treatment, to consider the use of Paracetamol with the SYSADOAs, which were shown to reduce pain and improve function, i.e. prescription Crystalline Glucosamine Sulfate and pharmaceutical-grade Chondroitin Sulfate. Since then, several publications draw the attention of the prescribers on the lack of innocuity of Paracetamol use, stressing the importance of gastro-intestinal (i.e. liver), cardiovascular and renal adverse reactions, when Paracetamol is used for prolonged periods. ESCEO decided to conduct, with the help of the Liège, Belgium, and Southampton/Oxford Universities, UK, a serie of meta-analyses reassessing the safety of all medications currently used for the management of knee osteoarthritis. Glucosamine Sulfate was shown to be absolutely safe, with no adverse reactions, serious adverse reactions or premature withdrawal from studies. This was shown to be true when patients used Crystalline Glucosamine Sulfate as a stand-alone medication or when it was coupled with other anti-osteoarthritis medications. Chondroitin Sulfate and avocado-soybean unsaponifiables showed also a very strong safety profile while more adverse reactions were observed with the use of Diacerein, most of them being of mild to moderate severity. These meta-analyses, challenge the role of Paracetamol as first-line treatment for knee osteoarthritis, whereas prescription Crystalline Glucosamine Sulfate and pharmaceutical-grade Chondroitin Sulfate appear to be the appropriate choice for long-term background treatment of this disorder.

SY4

AGN1 LOCAL OSTEO-ENHANCEMENT PROCEDURE (LOEP): AN EMERGING, MINIMALLY-INVASIVE SURGICAL TREATMENT TO ADDRESS OSTEOPOROSIS-RELATED BONE LOSS IN PROXIMAL FEMURS

S. Ferrari¹, E. McCloskey², M. Bouxsein³, J. De Schepper⁴, J.-Y. Reginster⁵

¹Service of Bone Diseases, Geneva University Hospital, Geneva, Switzerland, ²University of Sheffield, Sheffield, United Kingdom, ³Department of Orthopedic Surgery/Harvard Medical School, Boston, United States, ⁴Orthopaedic Surgeon, AZ Nikolaas, Sint-Niklaas, Belgium ⁵Department of Public Health, Epidemiology and Health Economics, University of Liege - WHO Collaborating Center for Public Health Aspects of Musculoskeletal Health and Aging, Liège, Belgium,

Objectives: Osteoporosis reduces bone strength, increasing fracture risk. 1.6 million hip fractures occur annually, increasing patient morbidity and mortality¹. Systemic therapies are effective

but do not address fracture risk fully. Protection is not immediate² or complete even with compliant use³. New approaches compatible with systemic therapies are needed. A prospective cohort study was conducted to evaluate long-term safety and efficacy of a local osteo-enhancement procedure (AGN1 LOEP) to treat osteoporosis-related bone loss in proximal femurs.

Materials and Methods: 12 postmenopausal women with osteoporosis of the hip (mean T-score -3.1) underwent AGN1 LOEP. One femur was treated; the other was the control. Follow-up was 5–7 years. Outcomes included medical history review, BMD by DXA, and x-ray and QCT assessment. BMD data are reported as mean $\pm$ SD. $N=12$ at 1 and 2 years; $N=10$ at 5–7 years. QCTs were obtained before and 12, 24 and 315 weeks after treatment. Hip strength was evaluated in simulated sideways fall via QCT-based non-linear finite element analysis (FEA).

Results: Femoral neck BMD of treated hips significantly exceeded controls: 0.88 ± 0.13 vs. 0.52 ± 0.07 g/cm² ($p < 0.001$) at 1 year; 0.85 ± 0.12 vs. 0.52 ± 0.08 ($p < 0.001$) at 2 years; and 0.83 ± 0.13 vs. 0.53 ± 0.04 , ($p < 0.001$) at 5–7 years. QCTs showed near full AGN1 resorption by 25 weeks and full resorption at 315 weeks in all subjects. FEA analysis of QCTs at 5–7 years showed an increase in sideways-fall strength in treated vs. control femurs $36.5 \pm 14.5\%$ ($\alpha = 1.0$, $p < 0.001$). No procedure or device-related SAEs occurred.

Conclusions: DXA, QCT, and FEA analysis showed that AGN1 LOEP treatment led to bone formation, rapidly, substantially and durably strengthening proximal femurs. AGN1 LOEP is an emerging treatment option.

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Acknowledgements: 1. Huber: AgNovos investigator

Disclosures: S.F., M.B., consult AgNovos; J.D., AgNovos investigator

SY5

CLINICAL EFFICACY AND EFFECTIVENESS OF TERIPARATIDE: NEW RESULTS 2018

Eli Lilly and Company

We hope that you can join us, and our distinguished faculty for what promises to be an exciting Symposium. We are sure you agree that whilst progress has been made in recent years in the treatment of patients with severe osteoporosis, much remains to be understood about the comparative effects of the different available osteoporosis drugs as well as their effectiveness and safety in real clinical practice. This symposium will address a

number of recent clinical advances in the management of osteoporosis patients using teriparatide, including the latest analysis of the recent head-to-head clinical trial comparing an oral bisphosphonate and teriparatide in postmenopausal women with established osteoporosis (VERO).

In addition, we will discuss the results of a pooled analysis of nearly 9,000 patients treated with teriparatide and included in four prospective, observational studies, which reflect the real-life clinical use of this drug in several regions including Japan, the USA and Europe.

A distinguished faculty of speakers will review the latest data and provide their expert opinion on these topics.

Through participation in this symposium, it is hoped that the attendees will leave better equipped to:

1. Review and understand the efficacy and safety results of teriparatide compared with risedronate, in postmenopausal women with severe osteoporosis, through the VERO multinational trial, including the subgroups pre-planned analyses.
2. Review and understand the effectiveness of teriparatide regarding fracture reduction in regular clinical practice, including the fracture results in several clinically relevant subgroups of patients, such as patients with diabetes mellitus, rheumatoid arthritis or prior hip fractures.

The ultimate aim of the symposium is to help clinicians make informed decisions for their patients with severe osteoporosis. *Forsteo prescribing information can be found on the Lilly booth at the WCO-IOF-ESCEO congress, booth number 11. This symposium is sponsored by Eli Lilly and Company Ltd. PP-TE-PL-0009 January 2018*

SY6

UCB-SPONSORED SYMPOSIUM – HOW DO WE STRENGTHEN OUR APPROACH TO FRAGILITY FRACTURES?

UCB¹

¹UCB, Brussels, Belgium

Please join us and our esteemed expert faculty for what promises to be an exciting and highly interactive symposium focused on improving our communication around fracture risk assessment. Ensuring every patient at high risk of fracture is effectively treated remains a global healthcare challenge. During this session, we will review the impact of fragility fractures and focus on strategies doctors, nurses, and other healthcare professionals can use to work more effectively and efficiently with their patients. We will provide an update on the considerations that need to be taken into account to assess an individual patient's risk for subsequent fracture and possible management approaches.

Through illustrative videos, we will also hear a patient's views on fragility fracture and risk, and invite a state of the art update from a health psychologist's perspective. We will review what may underlie patients' perceptions of fragility fractures and risk, the degree of patient understanding that can be achieved with a brief consultation, and possible approaches to strengthen our approach so that patients see treatment as a necessity.

Following active discussions, we will summarise key learnings from the symposium and consider how you can use these insights to benefit your individual patients' understanding of subsequent fracture risk and their ability to make informed decisions about their bone health.

We hope that after participating in this symposium, attendees will be able to answer the following questions:

1. How would you describe the immediate and long-term consequences of fragility fractures to patients and the healthcare system?
2. How would you explain the concept of risk of further fractures to your patients to encourage them to take action?
3. What specific next steps will you and your team take to make conversations with patients about risk more effective?

This symposium is sponsored by UCB

SY7

REALIGNING OUR THINKING: XLH, A LIFELONG DISEASE - XLH: A PROGRESSIVE DISEASE

R. Oheim¹

¹Department of Osteology and Biomechanics, University Medical Center Hamburg- Eppendorf, Hamburg, Germany

X-linked hypophosphatemia (XLH) is a chronic, progressive disorder of renal phosphate wasting¹ resulting from loss of function of the Phosphate-regulating gene with Homology to Endopeptidases located on the X chromosome (*PHEX*).¹ Disruption of the *PHEX* gene leads to elevated circulating fibroblast growth factor 23 (FGF23) levels.^{1, 2} This results in hypophosphatemia, as well as low or inappropriately normal levels of 1,25(OH)₂D due to decreased synthesis and increased catabolism.^{1, 3} As a consequence of hypophosphatemia, these patients may suffer lifelong from osteomalacia.³⁻⁵

A diagnosis of XLH is typically made in the first two years of life, when lower-extremity bowing becomes evident with the onset of weight-bearing.² Clinical assessment of children is aimed at distinguishing pathological deformities from normal physiological development.⁶ In adults, clinical manifestations are often a result of unresolved

complications during childhood.⁷ Adults may experience musculoskeletal symptoms such as pain and joint stiffness;^{2,7,8} other symptoms – for example, enthesopathy, fractures, severe dental abnormalities or hearing loss – may be the initial presenting complaint in adults.^{2,8} It is important to raise awareness of XLH to facilitate timely diagnosis and appropriate treatment.⁹

This symposium is sponsored by Kyowa Kirin International plc

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IM/IM-M2/0220

SY8

REALIGNING OUR THINKING: XLH, A LIFELONG DISEASE - QUALITY OF LIFE MATTERS

K. Javaid¹

¹NDORMS, University of Oxford, Oxford, United Kingdom

X-linked hypophosphatemia (XLH) is a chronic and disabling disorder,¹ and the consequences of chronic phosphate wasting persist life long.² The majority of adults with XLH exhibit short stature and lower extremity bowing.³ Consequently, pain, stiffness and gross motor impairment are prominent features of the disease.³ Adults with XLH and musculoskeletal symptoms or structural lesions (e.g. insufficiency fractures) report severely impaired quality of life (QoL) following assessment using questionnaires such as HAQ, RAPID3 and SF36.⁴ Factors associated with a worse QoL in these patients include increased age, female gender, musculoskeletal fatigue and the presence of enthesopathies.⁴ In adults with XLH, QoL is most negatively affected by the physical dimensions of health rather than the emotional dimensions.⁵ Axial spondyloarthritis (axSpA) is a chronic rheumatic disease with a similar radiological phenotype to XLH; both diseases include ossifications and enthesopathies.⁴ Comparisons of QoL data in patients with XLH and axSpA suggest that patients with XLH have a significantly worse QoL compared with axSpA patients.⁴ An important observation is the

increasing availability of effective mainstream therapies for axSpA patients;⁶ by comparison, conventional therapy is sub-optimal for patients with XLH.¹

This symposium is sponsored by Kyowa Kirin International plc

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IM/IM-M2/0221

SY9

REALIGNING OUR THINKING: XLH, A LIFELONG DISEASE - CHALLENGES OF MANAGING A CHRONIC CONDITION

D. Haffner¹

¹Department of Pediatric Kidney, Liver and Metabolic Diseases, Hannover Medical School, Hannover, Germany

X-linked hypophosphatemia (XLH) requires long-term therapeutic management¹ to counteract the consequences of fibroblast growth factor 23 (FGF23) excess.² Early diagnosis and treatment compliance are essential to optimise outcomes¹⁻³ but the potential risks and complicated monitoring requirements must also be considered.¹ Conventional therapy in children consists of oral phosphate and vitamin D supplementation.^{1, 2} Goals of therapy include increasing growth velocity, normalising lower-extremity bowing and decreasing bone pain.² Continuing conventional therapy into adulthood is controversial due to limited clinical trial data and potential toxicity.^{1,4} Risks of long-term conventional therapy include hypercalcaemia, hypercalciuria, nephrolithiasis, nephrocalcinosis and hyperparathyroidism.¹ Treatment in adults is therefore usually reserved for patients experiencing insufficiency fractures or disabling skeletal pain, or with pending orthopaedic procedures or osteomalacia.¹ Patients often require management of pain and joint stiffness,² as well as orthopaedic surgery and dental care;¹ however, only a minority of patients take analgesics or non-steroidal anti-inflammatory drugs (NSAIDs) because they consider these treatments ineffective.⁵ Therapies that are more efficacious and convenient are needed.¹

Burosumab, is a fully human anti-FGF23 IgG₁ monoclonal antibody designed to bind and inhibit FGF23.⁶ In doing so, burosumab reduces the loss of phosphate from the kidney and other metabolic abnormalities considered causative of the bone changes observed in XLH.^{6,7}

This symposium is sponsored by Kyowa Kirin International plc

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IM/IM-M2/0223

SY10

REALIGNING OUR THINKING: XLH, A LIFELONG DISEASE - BEYOND CONVENTIONAL THERAPY: ADDRESSING THE UNMET MEDICAL NEED IN XLH

A. Linglart¹

¹Hôpital Bicêtre-Paris-Sud, Paris, France

Conventional therapy for paediatric patients with X-linked hypophosphatemia (XLH) consists of oral phosphate and vitamin D supplementation¹⁻³ aimed at compensating for renal phosphate wasting and vitamin D deficiency.³ Although these treatments can improve rickets, growth and osteomalacia, treatment is suboptimal, requiring complicated monitoring, with risks associated with long-term use.¹ Also, conventional therapy does not address the underlying pathophysiology of XLH (increased levels of circulating fibroblast growth factor 23 [FGF23]).^{3,4} Burosumab (KRN23) is a fully human, anti-FGF23 IgG₁ monoclonal antibody designed to bind and inhibit excess FGF23 activity.⁵ By inhibiting excess FGF23, and thereby targeting the underlying pathophysiology of XLH, the aim is for renal reabsorption of phosphate to be normalised and for serum 1,25(OH)₂D to increase.⁵⁻⁷

The efficacy and safety of burosumab in paediatric patients with XLH has been investigated in ongoing clinical trials: UX023-CL201 and UX023-CL205 are Phase II studies of burosumab in paediatric XLH patients with rickets and/or bone disease, the key endpoints of which include pharmacodynamic parameters (e.g. serum phosphorous), change in severity of rickets and functional and safety outcomes.^{8,9}

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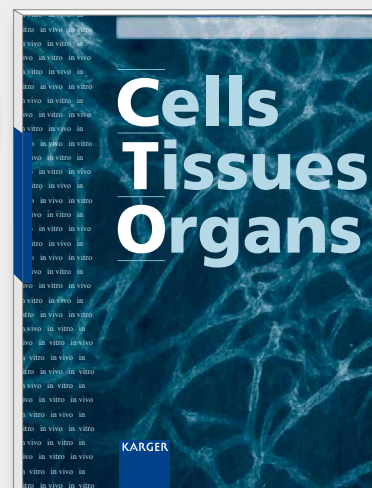


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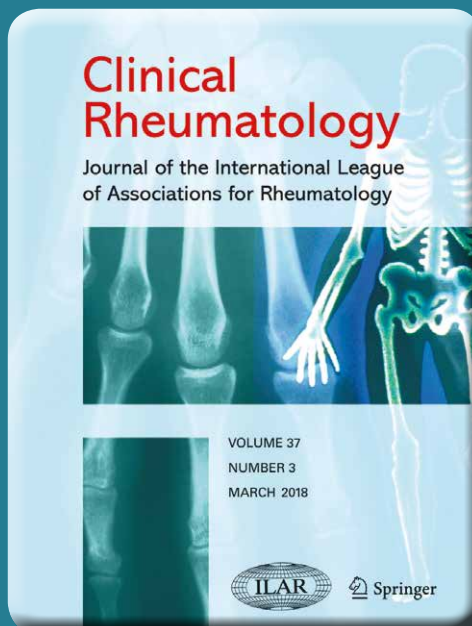
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- Stimulation of the Nonneuronal Cholinergic System by Highly Diluted Acetylcholine in Keratinocytes: **Uberti F.; Bardelli C.; Morsanuto V.** (Novara) et al.
- Analysis of Senescence-Related Differentiation Potentials and Gene Expression Profiles in Human Dental Pulp Stem Cells: **Yi Q.** (Changsha/Beijing); **Liu O.; Yan F.** (Changsha/Beijing) et al.
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Bone Research Society Events

BONE RESEARCH SOCIETY CLINICAL TRAINING COURSE

OSTEOPOROSIS & OTHER METABOLIC BONE DISEASES

This annual 3-day residential training course provides trainees in medical specialties such as rheumatology, endocrinology, care of the elderly, gastroenterology, orthopaedics, respiratory medicine and clinical chemistry with the knowledge and understanding to manage patients with osteoporosis and other metabolic bone diseases.

The course focuses on practical issues relating to patient management and is strongly recommended for any trainee who foresees that patients with these disorders will form a significant part of their workload in future.

Specialist nurses in osteoporosis and falls will also find this course valuable, as well as newly qualified consultants or others wishing to update their knowledge.

See the Bone Research Society website for details of the 2019 course.



SOME COMMENTS FROM THOSE WHO
ATTENDED PREVIOUS COURSES:

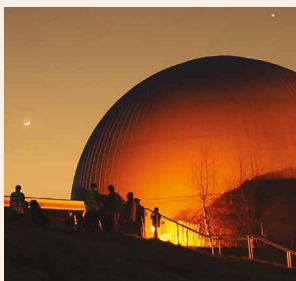
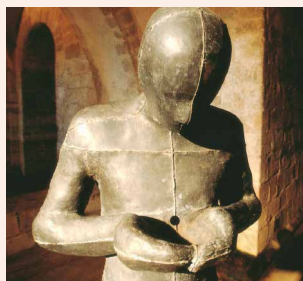
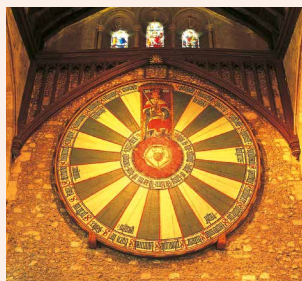
"Fantastic course, probably the best I have ever been on"

"Brilliant course set at the right level, knowledgeable speakers, will definitely recommend it"

"Excellent, relevant course – I have already started recommending it to my peers"

BONE RESEARCH SOCIETY ANNUAL MEETING 2018

27-29 JUNE 2018, WINCHESTER, UK



UNIVERSITY OF
Southampton

Local Organising Committee

CO-CHAIRS:

Nick Harvey & Kate Ward

Claire Clarkin

Cyrus Cooper

Richard Oreffo

SPEAKERS TO INCLUDE

Lynda Bonewald (Indianapolis, USA)

Mark Bradley (Edinburgh, UK)

Michael Briggs (Newcastle upon Tyne, UK)

Cyrus Cooper (Southampton, UK)

Steven Cummings (San Francisco, USA)

Elaine Dennison (Southampton, UK)

Serge Ferrari (Geneva, Switzerland)

Celia Gregson (Bristol, UK)

Mark Hanson (Southampton, UK)

Nick Harvey (Southampton, UK)

Markus Heller (Southampton, UK)

Wolfgang Högl (Birmingham, UK)

Kassim Javaid (Oxford, UK)

Sundeep Khosla (Rochester, USA)

Karen Lillycrop (Southampton, UK)

Janet Lord (Birmingham, UK)

Sumeet Mahajan (Southampton, UK)

Christa Maes (Leuven, Belgium)

Ivan Martin (Basle, Switzerland)

Eugene McCloskey (Sheffield, UK)

Ken Poole (Cambridge, UK)

Anke Roelofs (Aberdeen, UK)

Philipp Schneider (Southampton, UK)

Richard Scott (Cambridge/London, UK)

Aphrodite Vasiliki (Liverpool, UK)

Matthew Warman (Boston, USA)

For more information please visit our website or email events@boneresearchsociety.org



Bone Research Society
www.boneresearchsociety.org



Both events endorsed by
**International Osteoporosis
Foundation**

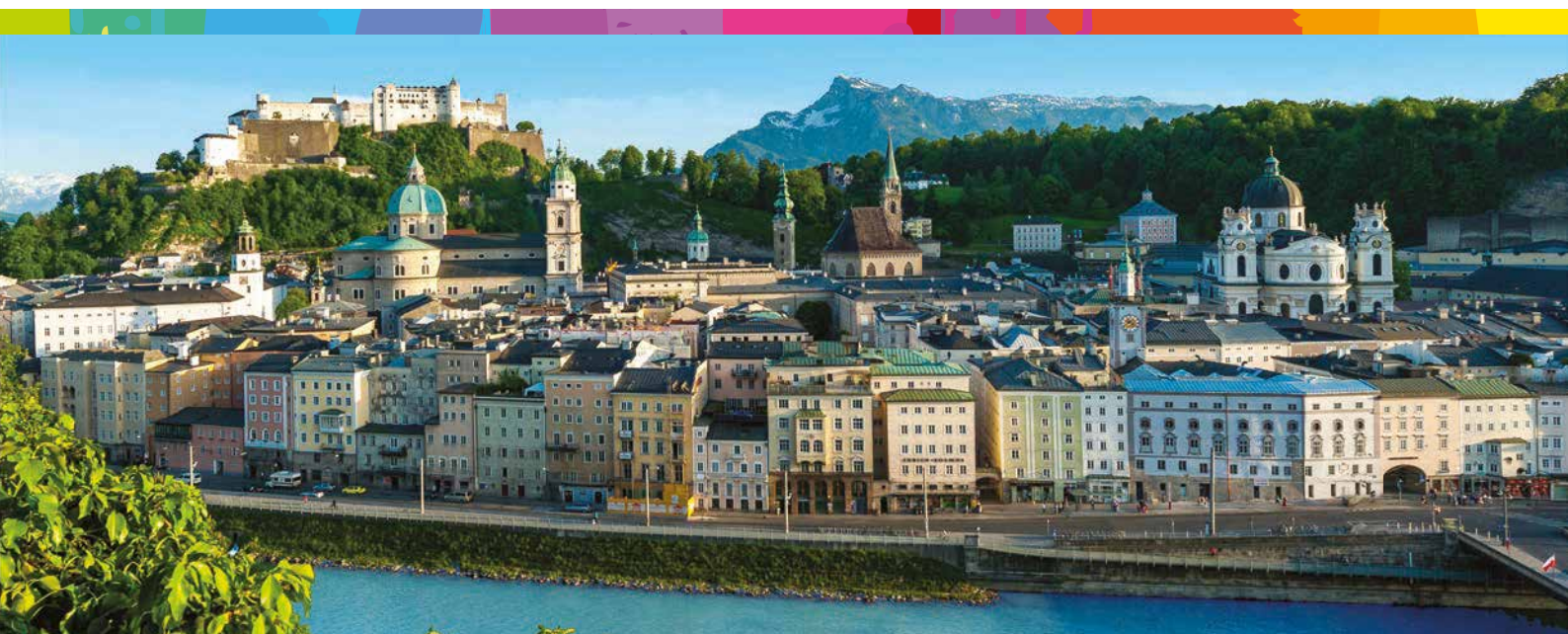


ICCBH

9TH INTERNATIONAL CONFERENCE
ON CHILDREN'S BONE HEALTH

22-25 June 2019

SALZBURG, AUSTRIA



DEADLINE FOR ABSTRACTS:

11 February 2019



www.iccbh.org

In association with the European Calcified Tissue Society  **ECTS**

WORLD CONGRESS ON OSTEOPOROSIS,
OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

WCO
IOF-ESCEO

2019 PARIS

April 4-7, 2019

Palais des Congrès

www.WCO-IOF-ESCEO.org



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WORLD'S LEADING CLINICAL CONFERENCE ON BONE, JOINT AND MUSCLE HEALTH