Lilly is a proud sponsor of FFN. We salute your efforts to optimize a multidisciplinary approach to preventing secondary fragility fractures.

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To achieve this, we have defined three broad aims:

- To disseminate globally the best multidisciplinary practice in preventing and managing fragility fractures
- To promote research aimed at better treatments of osteoporosis, sarcopenia and fracture
- To drive policy change that will raise fragility fractures higher up the healthcare agenda in all countries

Our Philosophy

The starting point for FFN thinking is the patient who presents to the health service, having sustained a fragility fracture. The first priority is to respond to this acute situation by treating both the fracture and any comorbidities (of which there may be many in an elderly population) and restoring the patient to the maximum achievable functional capacity. The second priority is to prevent the next fragility fracture, by treating osteoporosis and the tendency to fall. This perspective makes the FFN uniquely appealing to orthopaedic surgeons, compared to other international organisations in the field of osteoporosis and fragility fractures, and they form the largest professional group within our membership. However, good care cannot be given properly without the participation of experts from other fields.

Multidisciplinary co-management is at the heart of our philosophy. The ageing population presents us with an epidemiological emergency in terms of the predicted incidence of fractures, particularly hip fractures. This emergency is at its most acute in the emerging economies. We are therefore working hard to extend the Network, to assist the professional champions who are rising to the challenge in those areas.

Membership of the FFN is open to individual professionals in any field relevant to fragility fractures. Details may be found at our website.

For further information about FFN, please contact

FFN – Fragility Fracture Network
Central Office
Schaffhauserstrasse 550
8052 Zurich, Switzerland
T: +41 44 8094287
F: +41 44 8094201
ff-network@mci-group.com
www.fragilityfracturenetwork.org

What is FFN?

FFN is an international non-profit network organisation based in Switzerland. Its purpose is connect up all the activists across the world who are working to ensure that people suffering from fragility fractures get high quality, cost-effective care.

Our Mission Statement

To promote globally the optimal multidisciplinary management of the patient with a fragility fracture, including secondary prevention.

Welcoming Address

Dear Colleagues,
Dear Ladies and Gentlemen,

FFN invites you to join the 6th FFN Global Congress 2017 in Malmö, Sweden from 24–26 August 2017. The annual meeting is an international congress addressing the full pathway of care for fragility fracture patients. Its themes include perioperative care, surgical treatment, rehabilitation, secondary prevention, research and policy change. The FFN Global Congress consists of invited international experts, plenary discussions, update sessions and free papers. The congress provides a unique platform to learn about new technical developments, state-of-the-art procedures and interaction with leading clinicians, researchers and other professional health workers and stake holders. This year’s motto is “Bridging the Gap”.

We are looking forward to welcoming you in Malmö in August 2017!

Kristina Åkesson  Henrik Palm
Congress Chair  President of the Fragility Fracture Network (FFN)
The organisers of the 6th FFN Global Congress 2017 gratefully acknowledge the support of the following companies:

**FFN Sponsors**

- AMGEN
- UCB Pharma
- Zimmer Biomet

**FFN Supporters**

- Intramedic AB
- LILLY (€ 12,700)
- Merit Medical

**FFN Exhibitors**

- SBU
- Smith & Nephew
- SWEMAC INNOVATION

### Scientific Organisation

- **FFN – Fragility Fracture Network**
- Schaffhauserstrasse 550
- 8052 Zurich, Switzerland

### Congress Chair

- Kristina Akesson, Sweden

### Scientific Committee

- Nicola Bopoli, Italy
- Louise Brent, Ireland
- Opinder Sahota, UK
- Lauren Beaupre, Canada
- Ellen Binder, USA
- Jay Magaziner, USA
- Stuart White, UK
- Matthew Costa, UK
- Miguel Fernandez, UK

### Local Organising Committee

- Jonas Åkeson, Sweden
- Kristina Akesson, Sweden
- Söve Elstläh, Sweden
- Nicolai Bang Foss, Denmark
- Ami Hommel, Sweden
- Morton Tange Kristensen, Denmark
- Henrik Palm, Denmark
- Cecilia Rogmark, Sweden
- Björn Rosengren, Sweden

### Executive Committee

- Henrik Palm, President
- Paolo Falaschi, President-Elect
- Karsten Dreinhöfer, Past President
- Kristina Akesson, Congress Chair
- David Marsh, General Secretary
- Dieu Donné Niesten, Treasurer
- Matthew Costa, Scientific Committee Chair
- Maria Crotty, Nominations Committee Chair

### Board

- Louise Brent
- Jay Magaziner, Research SIG
- Paul Mitchell, Website Editor
- Nicola Napoli
- Monica Perracini
- Kilian Rapp
- Opinder Sahota, Vertebral Fragility Fractures SIG
- Hannah Seymour
- Stuart White
- Anthony Woolf, Bone and Joint Decade Liaison

### Cooptees

- Takeshi Sawaguchi, FFN-Japan
- Aparajit Dey, FFN-India
- Colin Currie, Hip Fracture Audit Database Project
- Cathie Sherrington, SIG Physiotherapy
- David Hak, Intern Society for Fracture Repair
- Ami Hommel, Intern Collaboration of Orthopaedic Nurses
- Anita Meehan, Nurses Improving Care for Healthsystem Elders
- Simon Mears, Intern Geriatric Fracture Society
- Annette Hylen Ranhoff, European Union Geriatric Medicine Society
- Robyn Speerin, Fracture Liaison Service Nursing

### Legal Organiser (PCO)

- MCI Deutschland GmbH
- MCI | Germany – Berlin
- Amira Hussein
- Markgrafenstrasse 56
- 10117 Berlin
- T: +49 30 20459323
- F: +49 30 2045950
- ffn-congress@mci-group.com

### Sponsoring

- T: +49 30 2045937
- ffn-sponsoring@mci-group.com

### Exhibition Hours

- Thursday, 24 August 2017 8.00–18.00
- Friday, 25 August 2017 8.00–19.00
- Saturday, 26 August 2017 8.00–13.30
### General Information

#### Certificate of Attendance
All registered attendees, whether they register in advance or on-site, will receive a certificate of attendance, 1–2 weeks after the congress by e-mail.

#### Congress Homepage
www.ffn-congress.com

#### Congress Language
The official congress language will be English. All PowerPoint presentations have to be prepared in English only. There will be no simultaneous translations.

#### Internet/WiFi
Free wireless internet is available throughout the congress venue.

#### Liability Disclaimer
The organisers cannot be held liable for any hindrance or disruption of congress proceedings arising from political, social or economic events or any other unforeseen incidents beyond their control. The organisers will accept no liability for any personal injuries sustained or for loss or damage to property belonging to congress participants, either during or as a result of the congress or during all tours and events. Registration of a participant entails acceptance of these conditions.

#### Lost and Found
For lost and found items, please refer to the registration counter.

#### Lunch/Catering
Lunch during the Congress is not included in the registration fee. You are able to pre-order lunch within the registration for Thursday, 24 August and Friday, 25 August 2017. Other bars and restaurants can be found nearby.

#### Name Badge
For identification purposes, badges have to be worn during all congress activities. Admission to the congress will not be allowed without badge identification.

#### Speakers Media Check
The media check is located on the 3rd floor in room Inclusion. Speakers are asked to hand in their presentation at the media check at least 2 hours before the session. All rooms are equipped for PowerPoint presentation (data projection).
- Thursday, 24 August 2017: 7.00–18.00
- Friday, 25 August 2017: 7.00–18.00
- Saturday, 26 August 2017: 7.00–13.00

#### Plenary Poster Presentation/Poster Walk
The presentation of the top 6 posters takes place on Friday, 25 August 2017 from 17.30 to 18.00 in Ballroom A–D and is followed by a poster walk (18.00–19.00).

### Payment On-site
Please note that paying the registration fee on-site is possible in Euro (€) only.

### Photography, audio, video and mobile phone policy
Audio, photo and video recording by any device (e.g. cameras, laptops, PDAs, mobile phones, watches) is strictly prohibited during all oral and poster sessions, unless prior permission is obtained from the congress organiser. Use of mobile phones is strictly prohibited during scientific sessions. Mobile phones must be switched off while attending sessions.

### Video Recordings
Please note that video recordings will be made during the congress and published on social media channels and the FFN website. In case you do not agree, kindly inform MCI at the registration desk.

### Poster Exhibition
The Poster Exhibition (including top 6 posters and poster walk) is located on the 3rd Floor. Posters shall be prepared in size DIN A0 (841×1189mm), portrait format, in paper, in English. Posters should be mounted on Thursday, 24 August 2017 by 10.00 and will remain accessible to all attendees until Saturday, 26 August 2017, 12.00.

### Registration

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<tr>
<td>Member</td>
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<tr>
<td>Non-Member</td>
<td>€ 540</td>
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<tr>
<td>Nurse* (Member)</td>
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<tr>
<td>Nurse* (Non-Member)</td>
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<td>AHP* (Member)</td>
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<td>AHP* (Non-Member)</td>
<td>€ 350</td>
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<tr>
<td>Student*</td>
<td>€ 250</td>
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</table>

* An appropriate proof of status must be presented to be entitled to the reduced registration fee.

Please note that paying the registration fee on-site is possible in Euro (€) only.
Located in the very south, Malmö is Sweden’s third largest city seen to population. For all expansion, Malmö is a small, friendly city with a good choice of cultural attractions. The city is part of the expanding Öresund region and is joined to Copenhagen in Denmark by the mighty, arching Öresund Bridge. Look out for Malmö’s many quality restaurants, bistros and great cafés. Malmö is famous in Sweden for the eclectic mix of international food cultures and traditions that come together in this south Sweden city. And the shopping isn’t bad either, especially if you’re looking for Swedish design-ware and hip, new Swedish fashion labels. Things to do in Malmö include visiting its city centre parks and strolling its beautiful cobbled street areas. Malmö attractions are easy to get to on foot, by bike or even in a kayak. The 2.5 kilometre long Ribersborg beach is where the young, the old, the bold and the beautiful of Malmö and visitors from around the world enjoy swimming, sunbathing, or just generally lazing around in the summer months. It is a walk from the city centre. If you want to do the Malmö Art Museum, the City Museum, the Museum of Natural History and the Science and Maritime House Museum in one day, you’re in luck. They all reside in the imposing Malmöhus Castle building. The Turning Torso in Malmö is the tallest building in Scandinavia. The twisted tower in the Western Harbour of Malmö is one of Skåne’s most visited landmarks. A former industrial city that is now full of exciting attractions.

**Sightseeing in Malmö**

**Malmö City Hall**

Also known as the Government Building, the attraction is the most important building in Malmö. It is the center for all administrative activities. It is the place where all the decisions of the government are taken. The building is also a popular tourist attraction and definitely worth a visit if you have some time.

The Networking Dinner will be hosted by the City of Malmö in the Old City Hall. It will be held on Thursday, 24 August 2017 from 19.00 to 22.00.

**Address**

Gamla Staden
Malmö, Sweden

**Public Transportation**

By foot (10min)

**Malmöhus**

With its characteristic butterfly plan, the Malmöhus Castle is Scandinavia’s oldest surviving Renaissance castle. Here Denmark’s coins were minted in the Middle Ages and here Crown Prince Frederick held wild parties in the 16th century. Prisoners were beheaded in the courtyard in the 19th century. Today Malmöhus forms part of Malmö Museer. The castle is part of Sweden’s cultural heritage and is managed by the National Property Board.

**Address**

Malmöhus, Malmöhusvägen 6
211 18 Malmö, Sweden

**Public Transportation**

Bus line 2 or 7 (Stop: Högskolan B)
General Information

Scientific Programme

Thursday, 24 August 2017

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<td>Arthroplasty in the fragile hip fracture patient – to cement or not?</td>
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<td>Recommendations for physical rehabilitation and outcome measures in daily clinical practice after hip fractures? (Physiotherapy SIG)</td>
<td>Frailty – comorbidities and sarcopenia</td>
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Thursday, 24 August 2017

8.00–9.30 PLENARY SESSION I

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<td>Ballroom A–D</td>
<td>Welcome to the FFN and to the Global Congress Henrik Palm, Kristina Åkesson</td>
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<td>8.00–8.15</td>
<td>Henrik Palm, Kristina Åkesson</td>
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<td>8.15–8.25</td>
<td>Welcome – The importance of best hospital practice based on evidence Ingemar Petersson, Director of Research Skåne University Hospital</td>
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<td>8.25–8.45</td>
<td>The global challenge of fragility fractures David Marsh</td>
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<td>Secondary prevention Kristina Åkesson</td>
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<td>Call for action! – The FFN, EFORT, EUGMS, IGFS, IOF white paper Karsten Dreinhöfer</td>
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<td>Global collaboration to prevent disease – WHO perspective TBC</td>
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9.30–10.15 COFFEE BREAK AND POSTERS

10.15–11.15 SESSION 1

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<td>Anette Hylen Ranhoff, Antony Johansen</td>
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<td>10.15–10.35</td>
<td>Pre-operative geriatric assessment and care: How, when and where? Susanne van der Mark</td>
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<td>10.35–10.55</td>
<td>Post-operative geriatric assessment and care: The geriatric team approach Ingvild Saltvedt</td>
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<td>Assessment instruments and domain of assessment; the interface between the orthopedic surgeon, the anaesthesiologist and the geriatrician Anthony Johansen</td>
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<td>Randomised trial of Furlong uncemented hemiarthroplasty versus cemented hemiarthroplasty Martyn Parker</td>
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<td>11.33–11.41</td>
<td>A systematic review of short versus long intramedullary fixation in the management of pertrochanteric fractures Mark Sohatee</td>
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11.41–11.49 Preliminary results with augmented cephalomedulary nails for intertrochanteric fractures in geriatric hip fracture patients
Daniel Schweitzer

11.49–11.57 Hansson Pinloc fixation in stable femoral neck fractures. A 1 year follow-up study of 33 cases
Yoshinori Yasuhara

11.57–12.05 Conservative treatment allowing weight bearing in fit patients with undisplaced femoral neck fracture
Paolo Pignedoli

12.05–12.13 Functional outcomes following surgical treatment of periprosthetic femoral fractures
Petros Kapsetakis

12.13–12.21 Floating shoulder – a scoping review and treatment algorithm
Roberto Enrique López Cervantes

12.21–12.29 Fixation or hip replacement for undisplaced fractures of the femoral neck in elderly patients: a national, multicentre, randomised controlled trial
Frede Frihagen

11.25–11.33 Thrombembolic complications after hip fracture surgery
Liv Rlisager Wahlsten

11.33–11.41 The impact of renal impairment on withdrawal of Direct Oral Anticoagulants (DOACs) in patients with hip fracture
Antony Johansen

11.41–11.49 Peri-operative apixaban and rivaroxaban levels in patients over the age of 65 years presenting with an acute fracture
Sarah Hitchen

11.49–11.57 Do anticoagulants affect outcome of hip fracture surgery? A cross-sectional analysis
Yingyi Wendy Yap

11.57–12.05 Does anaesthetic type influence the development of post operative cognitive dysfunction, measured as a peri operative change in abbreviated mental test score (AMTS), in fractured neck of femur surgery? – A retrospective cohort study
Mark Sohatee

12.05–12.13 Causes for delayed surgery of hip fracture in Japan
Hiroshi Hagino

12.13–12.21 Atrial fibrillation after hip surgery
Alessandro Cartei

12.21–12.29 Effect of methylprednisolone on postoperative delirium in elderly patients under-going hip fracture surgery: a randomised, double-blind, placebo-controlled trial
Christopher Clemmesen

11.25–11.33 Low risk of nonunion with lateral locked plating of distal femoral fractures – a retrospective study of 191 consecutive patients
Sanet Andersson

11.33–11.41 Epigenetic variation associated with the onset of postoperative delirium: a longitudinal pilot study of DNA methylation
John Charity

11.41–11.49 Reduced kidney function is associated with increased risk of fractures in older women
Linnea Malmgren

11.49–11.57 Exploring the knowledge, skills and attitude of orthopaedic nurses towards caring for older hip fracture patients with delirium
Taran Oberai

11.57–12.05 What worsens mortality when hip fracture surgery is delayed?
Katie J. Sheehan

12.05–12.13 Waiting time for surgery in patients with osteoporotic hip fractures and mortality, quality of life and new fractures
Aikaterini Bavelou

12.13–12.21 Acetabular fractures in patients aged over 60 years
Jenny Thain

12.21–12.29 Re-fracture events: results of a provincial fracture-reduction screening programme
Rebekka Sujic

12.30–13.30 LUNCH BREAK AND POSTER

12.30–13.20 SYMPOSIUM SUPPORTED BY ZIMMER BIOMET INSTITUTE
Room: Embrace Complexity! Advancing Fragility Fracture Care
Speakers: Michael Blauth & Stefaan Nijs
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<td>13.30–14.30</td>
<td><strong>SESSION 6</strong></td>
<td>Flexible</td>
<td>FFN Regionalisation – results from local network initiatives&lt;br&gt;FFN Regionalisation Working Group&lt;br&gt;Chairs: David Marsh, Henrik Palm&lt;br&gt;13.30–13.40 Why does the world need local FFNs?&lt;br&gt;David Marsh&lt;br&gt;13.40–13.50 Current status of FFN-Japan&lt;br&gt;Takashi Matsushita, Takeshi Sawaguchi&lt;br&gt;13.50–14.00 Current status of FFN-India&lt;br&gt;Rajesh Malhota, Santosh Rath&lt;br&gt;14.00–14.30 Roundtable of progress and obstacles in other countries and regions:&lt;br&gt;Monica Perracini, Adriana Braga de Castro Machado (Brazil)&lt;br&gt;Maroun Rizkallah, Mirvat al Khoury (Lebanon)&lt;br&gt;Elias Panagiotopoulos, Panagiota Copanitsanou (Greece)&lt;br&gt;Maria Nuotio, Anne Harjuja (Finland)&lt;br&gt;Luca Pietrogrande, Carmelinda Ruggiero (Italy)</td>
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<td><strong>14.30–14.40</strong></td>
<td><strong>BREAK</strong></td>
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### Thursday, 24 August 2017

**Scientific Programme**

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<th>Session/Topic</th>
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<td>14.40–15.45</td>
<td><strong>SESSION 9</strong></td>
<td>Ballroom A–D</td>
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<td></td>
<td>Room: <strong>Frailty – comorbidities and sarcopenia</strong></td>
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<td></td>
<td>Flexible Chairs: Fiona McGuigan, Paolo Falaschi</td>
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<tr>
<td>14.40–14.55</td>
<td>Frailty – a concept and a measure</td>
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<td>Kristina Åkesson</td>
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<td>14.55–15.05</td>
<td>Frailty and/or sarcopenia as a predictor of falls and fracture – which is most informative?</td>
<td></td>
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<tr>
<td></td>
<td>Fiona McGuigan</td>
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<tr>
<td>15.05–15.20</td>
<td>The fracture patient, frailty and the potential for screening</td>
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<tr>
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<td>Mellick Chehade</td>
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<tr>
<td>15.20–15.40</td>
<td>Interventions to reduce frailty after fracture – can outcome be improved?</td>
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<tr>
<td></td>
<td>Anette Hylen Ranhoff</td>
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<tr>
<td>15.40–15.45</td>
<td>Discussion</td>
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<tr>
<td>15.45–16.45</td>
<td><strong>COFFEE BREAK AND POSTERS</strong></td>
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<tr>
<td>15.50–16.40</td>
<td><strong>SYMPOSIUM SUPPORTED BY UCB</strong></td>
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<td></td>
<td>Room: <strong>Improving the conversation: how can we help each other to capture all fragility fractures?</strong></td>
<td>Ballroom CD</td>
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<tr>
<td></td>
<td>Speakers: Matthew Costa &amp; Kassim Javaid</td>
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<tr>
<td>16.45–18.00</td>
<td><strong>PLENARY SESSION II</strong></td>
<td>Ballroom AB</td>
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<tr>
<td></td>
<td>Room: <strong>Blood – NOAC, transfusion and tromboprophylaxis</strong></td>
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<tr>
<td></td>
<td>Chairs: Björn Rosengren, Stuart White</td>
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<tr>
<td>16.45–17.10</td>
<td>Transfusion</td>
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<tr>
<td></td>
<td>Nicolai Bang Foss</td>
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<tr>
<td>17.10–17.35</td>
<td>NOAC – how to pause and who to stop?</td>
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<td></td>
<td>Tord Juhlin</td>
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<tr>
<td>17.35–18.00</td>
<td>Tromboprophylaxis – for all or for whom</td>
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<tr>
<td></td>
<td>Eva Zetterberg</td>
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<tr>
<td>19.00–22.00</td>
<td><strong>OTHERS</strong></td>
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<td></td>
<td>Malmö Networking dinner</td>
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<td></td>
<td>City Hall Hosted by the City of Malmö</td>
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### Friday, 25 August 2017

**Scientific Programme**

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<th>Session/Topic</th>
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<tbody>
<tr>
<td>8.00–9.30</td>
<td>PLEINARY SESSION III Bridging the gap between ideas, research and implementation</td>
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<tr>
<td>10.15–11.15</td>
<td><strong>SESSION 10</strong></td>
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<td></td>
<td>Falls prevention</td>
<td>Ballroom AB</td>
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<tr>
<td>11.15–12.30</td>
<td><strong>FREE PAPER SESSION OP 4</strong> Fracture management</td>
<td>Ballroom AB</td>
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<tr>
<td>12.30–13.30</td>
<td><strong>FREE PAPER SESSION OP 5</strong> Prevention of new fractures</td>
<td>Ballroom AB</td>
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<td>13.30–14.30</td>
<td><strong>FREE PAPER SESSION OP 6</strong> Changing policy</td>
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<tr>
<td>14.40–15.45</td>
<td><strong>FREE PAPER SESSION OP 7</strong> Fracture management</td>
<td>Ballroom AB</td>
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<tr>
<td>14.40–15.45</td>
<td><strong>FREE PAPER SESSION OP 8</strong> Research in fragility fractures</td>
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<td>14.40–15.45</td>
<td><strong>PLEINARY SESSION IV</strong></td>
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<td>16.30–17.30</td>
<td><strong>POSTER WALK RECEPTION</strong></td>
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<td>17.30–18.00</td>
<td><strong>FREE PAPER SESSION OP 9</strong> Top 6 poster presentations</td>
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**Friday, 25 August 2017**

#### 8.00–9.30  **PLENARY SESSION III**

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<tbody>
<tr>
<td>8.00–8.20</td>
<td>How to implement scientific findings into clinical practice</td>
<td></td>
<td>Matthew Costa</td>
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<tr>
<td>8.20–8.50</td>
<td>The value of large RCTs in fragility fracture – general challenges</td>
<td></td>
<td>Mohit Bhandari</td>
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<td>8.50–9.10</td>
<td>Qualitative studies in fragility fracture research – benefits and limitations</td>
<td></td>
<td>Julie Santy-Tomlinson</td>
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<tr>
<td>9.10–9.30</td>
<td>Burning issues in rehab research</td>
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<td>Sarah Lamb</td>
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#### 9.30–10.15  **COFFEE BREAK AND POSTERS**

#### 10.15–11.15  **SESSION 10**

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<th>Speaker(s)</th>
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<tbody>
<tr>
<td>10.15–10.30</td>
<td>Fall and fracture prevention in nursing homes: long-term results of the ‘Bavarian Falls and Fracture Prevention Programme’</td>
<td></td>
<td>Patrick Roigk, Killian Rapp</td>
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<tr>
<td>10.30–10.45</td>
<td>Falls and fragility fracture outcomes for New Zealand’s older people – a whole of system approach</td>
<td></td>
<td>Gill Hall, Ken Stewart, Paul Mitchell</td>
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<tr>
<td>10.45–11.00</td>
<td>Implementation of fall and fracture prevention in rural areas: first results of ‘The Osteoporotic Fracture Prevention Program in Rural Areas (OFRA)’</td>
<td></td>
<td>Killian Rapp</td>
</tr>
<tr>
<td>11.00–11.15</td>
<td>Primary care based screen and treat options for fall prevention: lessons from recent and on-going trials</td>
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<td>Sarah Lamb</td>
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#### 10.15–11.15  **SESSION 11**

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<th>Speaker(s)</th>
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<tbody>
<tr>
<td>10.15–10.25</td>
<td>Fragility fracture in low and middle income countries – a growing concern</td>
<td></td>
<td>Rehan Ul Haq</td>
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<tr>
<td>10.35–10.45</td>
<td>Differences in management of fragility hip fractures based on living residence</td>
<td></td>
<td>Thierry Bégué</td>
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<td>10.55–11.05</td>
<td>Evidence of treatment of upper extremity fractures in the elderly</td>
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<td>Per-Olof Josefsson</td>
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<td>11.05–11.15</td>
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#### 10.15–11.15  **SESSION 12**

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<th>Time</th>
<th>Session</th>
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<th>Speaker(s)</th>
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<tbody>
<tr>
<td>10.15–10.20</td>
<td>Welcome and Introduction</td>
<td></td>
<td>Lyn March</td>
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<tr>
<td>10.20–10.30</td>
<td>Identification of VFF – overview: detection and reporting of VFF</td>
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<td>Andrew Pearson</td>
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<tr>
<td>10.30–10.35</td>
<td>Identification of VFF – update on VFF identification guidance from NOS</td>
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<td>Sonya Stephenson</td>
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<tr>
<td>10.35–10.40</td>
<td>Identification of VFF – evaluation of an electronic detection tool for VFF</td>
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<td>Lillias Nairn</td>
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<td>10.40–10.45</td>
<td>Discussion</td>
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<tr>
<td>10.45–10.55</td>
<td>Acute management of VFF – overview: current evidence for VFF management</td>
<td></td>
<td>Opinder Sahota</td>
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<tr>
<td>10.55–11.05</td>
<td>Acute management of VFF – setting the scene: the problem and the patients</td>
<td></td>
<td>Terence Ong</td>
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<tr>
<td>11.05–11.10</td>
<td>Discussion</td>
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<tr>
<td>11.10–11.15</td>
<td>Discussion of draft statements for endorsement</td>
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<td>Gabor Major</td>
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Friday, 25 August 2017

11.15–11.25 BREAK

11.25–12.30 FREE PAPER SESSION OP 4

Room: Rehabilitation after fracture
Ballroom AB Chairs: Louise Brent, Karsten Dreinhöfer

11.25–11.33 The efficacy of fascia iliaca block in geriatric hip fracture patients: a retrospective matched case control study
Bryan Yijia

11.33–11.41 Regain of the pre-fracture basic mobility at the time of acute hospital discharge is associated with the risk of 30-day mortality and readmission – a 1-year nationwide register study of 5,554 Danish patients with hip fracture
Morten Tange Kristensen

11.41–11.49 Barthel Index and the Cumulated Ambulation Score are superior to the de Morton Mobility Index for the early assessment of outcome in patients under acute hospitalization following surgery for a hip fracture
Signe Hulsbaek

11.49–11.57 Screening for delirium after hip fracture surgery – using the 4AT test as part of a national clinical audit
Antony Johansen

11.57–12.05 Cut-points for maximal knee-extension strength indicating sarcopenia is associated with functional performance four months after hip fracture
Jan Arnholtz Overgaard

12.05–12.13 Chronic pain experience after hip fracture surgery and its correlation with physical functioning
Monica Perracini

12.13–12.21 Satisfaction and utility of a session of recommendations and instructions in patient handling at home in caregivers of patients with an acute hip fracture
Patrocinio Ariza-Vega

12.21–12.29 TOP 6 ORAL PRESENTATION
Fracture in the Elderly Multidisciplinary Rehabilitation (FEMuR): a phase II randomised feasibility study of a multidisciplinary rehabilitation package following hip fracture
Catherine Sackley

Scientific Programme

Friday, 25 August 2017

11.25–12.30 FREE PAPER SESSION OP 5

Room: Prevention of new fractures
Ballroom CD Chairs: Jay Magaziner, Robyn Speerin

11.25–11.33 Bridging the gap from novice to expert: developing the role of the fracture prevention practitioner
Debbie Stone

11.33–11.41 Romosozumab rapidly reduces clinical vertebral fracture incidence: Results from the FRAME study
Piet Geusens

11.41–11.49 Fracture Liaison Service database – developing a national clinical audit to measure secondary fracture prevention provision
Kassim Javaid

11.49–11.57 Fracture Liaison Service: Report on the first successful experience from the Middle East
Maroun Rizkallah

11.57–12.05 Assessing the potential impact of prescribing anti-osteoporosis medication after an index fracture as part of a national clinical audit
Kassim Javaid

12.05–12.13 How efficient is the FLS in identifying the high fracture risk individuals suitable for preventive measures?
Anna Holmberg

12.13–12.21 Updates on the Norwegian Capture the Fracture® Initiative (NoFRACT)
Lene B. Solberg

12.21–12.29 TOP 6 ORAL PRESENTATION
Comparative effectiveness of nurse case-manager vs multifaceted intervention to increase osteoporosis treatment in older patients with upper extremity fracture: results of a randomized trial
Lauren Beaupre
Scientific Programme  
**Friday, 25 August 2017**

**11.25–12.30** **FREE PAPER SESSION OP 6**

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<tbody>
<tr>
<td>11.25–11.33</td>
<td>Changing policy Fracture Liaison Services – an analysis of the cost consequences from the perspective of the Australian Health System&lt;br&gt;<strong>Gabor Major</strong></td>
</tr>
<tr>
<td>11.33–11.41</td>
<td>Establishment of a fragility fracture liaison service in a tertiary care hospital of India&lt;br&gt;<strong>Vijay Sharma</strong></td>
</tr>
<tr>
<td>11.41–11.49</td>
<td>Premium payments for meeting 6 clinical standards in hip fracture patients took 5 years to improve time to operation across three teaching hospitals in Western Australia&lt;br&gt;<strong>Hannah Seymour</strong></td>
</tr>
<tr>
<td>11.49–11.57</td>
<td>Lessons from India fragility hip fracture audit: the need for a health systems approach to bridge evidence practice gaps&lt;br&gt;<strong>Santosh Rath</strong></td>
</tr>
<tr>
<td>11.57–12.05</td>
<td>Outcome after hip fracture in the new millennium&lt;br&gt;<strong>Martyn Parker</strong></td>
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<tr>
<td>12.05–12.13</td>
<td>The international diffusion of best practices to improve the care of patients with fragility hip fracture&lt;br&gt;<strong>Santosh Rath</strong></td>
</tr>
<tr>
<td>12.13–12.21</td>
<td>Cost-effectiveness analysis of Alendronate and Denosumab in the treatment of osteoporotic Japanese women at high risk of fragility fractures&lt;br&gt;<strong>Tomohiro Yoshizawa</strong></td>
</tr>
<tr>
<td>12.21–12.29</td>
<td>TOP 6 ORAL PRESENTATION Using national hip fracture registries and audit databases to develop an international perspective&lt;br&gt;<strong>Antony Johansen</strong></td>
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**12.30–13.30** **LUNCH BREAK AND POSTER**

**12.30–13.20** **SYMPOSIUM SUPPORTED BY AMGEN**

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<tr>
<td>13.30–13.40</td>
<td><strong>SESSION 13</strong>&lt;br&gt;<strong>Room:</strong> Changing policy Preoperative scenarios – battle discussion&lt;br&gt;<strong>Chair:</strong> Martyn Parker</td>
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<tr>
<td>13.30–13.40</td>
<td>Introduction to the debate&lt;br&gt;<strong>Martyn Parker</strong></td>
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<tr>
<td>13.40–14.30</td>
<td>Preoperative scenarios – battle discussion&lt;br&gt;<strong>Martyn Parker, Hannah Seymour, Nicolai Bang Foss, Richard Griffiths</strong></td>
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**13.30–14.30** **SESSION 14**

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<tr>
<td>13.30–13.40</td>
<td><strong>SESSION 13</strong>&lt;br&gt;<strong>Room:</strong> Changing policy Hip Fracture Audit: What can we learn from each other?&lt;br&gt;<strong>Chair:</strong> Colin Currie</td>
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<tr>
<td>13.30–13.40</td>
<td>Introduction&lt;br&gt;<strong>Colin Currie</strong></td>
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<tr>
<td>13.40–13.55</td>
<td>Emerging National Audits: report from Spain&lt;br&gt;<strong>Cristina Ojeda-Thies</strong></td>
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<tr>
<td>13.55–14.10</td>
<td>Emerging National Audits: report from Japan&lt;br&gt;<strong>Takashi Matsushita</strong></td>
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<td>14.10–14.20</td>
<td>The FFN Hip Fracture Audit Database: web-based international audit – experience and developments: audit and service improvement: Celje, Slovenia&lt;br&gt;<strong>Drago Brilej</strong></td>
</tr>
<tr>
<td>14.20–14.30</td>
<td>The FFN Hip Fracture Audit Database: web-based international audit – experience and developments: audit and the German fragility fracture initiative: Stuttgart, Germany&lt;br&gt;<strong>Peter Schulz</strong></td>
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<td>Discussion included with Tim Bunning and Jonathan Roberts</td>
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**13.30–14.30** **SESSION 15**

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<td>13.30–13.45</td>
<td><strong>SESSION 15</strong>&lt;br&gt;<strong>Room:</strong> Changing policy Confusion and dementia – consequences and treatment&lt;br&gt;<strong>Chairs:</strong> Sölve Elmståhl, Paolo Falaschi</td>
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<tr>
<td>13.30–13.45</td>
<td>Diagnosis and incidence of confusion and dementia&lt;br&gt;<strong>Sölve Elmståhl</strong></td>
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<tr>
<td>13.45–14.10</td>
<td>Risk factors and consequences of confusion and dementia for fall and fractures&lt;br&gt;<strong>Lars Nyberg</strong></td>
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<tr>
<td>14.10–14.30</td>
<td>Confusion, dementia and mobilisation&lt;br&gt;<strong>Lauren Beaupre</strong></td>
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<td>14.30–14.40</td>
<td><strong>BREAK</strong></td>
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<td>14.40–15.45</td>
<td><strong>FREE PAPER SESSION OP 7</strong></td>
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<tr>
<td>Room: Fracture management</td>
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<td>Ballroom AB</td>
<td>Chairs: Matthew Costa, Thierry Bégué</td>
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<tr>
<td>14.40–14.48</td>
<td>Frailty status predicts falls in older women: a study in the Osteoporosis Prospective Risk Assessment (OPRA) cohort Patrik Bartosch</td>
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<td>14.48–14.56</td>
<td>Planning the trauma week – variation in hip fracture presentations through the week Chris Boulton</td>
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<td>14.56–15.04</td>
<td>Management of the dislocated hemiarthroplasty Martyn Parker</td>
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<td>15.04–15.12</td>
<td>Mortality in patients treated with cemented or uncemented hemiarthroplasty – a nationwide study from the Danish Interdisciplinary Registry for Hip Fractures Bjarke Viberg</td>
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<td>15.12–15.20</td>
<td>High failure rate after internal fixation and beneficial outcome after arthroplasty in displaced femoral neck fractures in patients 55 to 70 years. 2713 patients treated with internal screw fixation, bipolar hemiarthroplasty or total hip arthroplasty from the Norwegian Hip Fracture Register Frede Frihaugen</td>
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<td>15.20–15.28</td>
<td>Using clinical audit to improve hip fracture care in Ireland: The Irish Hip Fracture Database (IHFD) Louise Brent</td>
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<td>15.28–15.36</td>
<td>Implementing your FLS program: what works and what doesn’t work Kathy Williams</td>
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<td>15.36–15.44</td>
<td><strong>TOP 6 ORAL PRESENTATION</strong></td>
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<td>14.40–15.45</td>
<td><strong>FREE PAPER SESSION OP 8</strong></td>
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<tr>
<td>Room: Research in fragility fractures</td>
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<tr>
<td>Ballroom CD</td>
<td>Chairs: Nicola Napoli, Killian Rapp</td>
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<tr>
<td>14.40–14.48</td>
<td>Functional outcomes in total hip arthroplasty: a matched cohort study between neck of femur fractures and osteoarthritis Chun Hong Tang</td>
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<td>14.48–14.56</td>
<td>The estimated need for DXA scans, epidemiology, treatment and complications of long bone fractures among older adults in Stavanger region Ane Djuv</td>
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<td>14.56–15.04</td>
<td>Changes in basic patient-related characteristics of older hip fracture patients during eight years of orthogeriatric collaboration Maria Nuotio</td>
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<td>15.04–15.12</td>
<td>Can user-involvement help bridge the gap in the osteoporosis continuum? Charlotte Myhre Jensen</td>
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<td>15.12–15.20</td>
<td>Bone geometric properties of the femoral neck in underweight eumenorrheic women Abir Alwan</td>
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<td>15.20–15.28</td>
<td>Recovery from extracapsular hip fracture. A longitudinal qualitative study of patients’ experiences Rebecca Fox</td>
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<td>15.28–15.36</td>
<td>Epidemiology of hip fractures in Ukraine: results of two retrospective studies Vladyslav Poveroznyuk</td>
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<td>15.36–15.44</td>
<td>Orthopaedic surgeons perceptions of frailty and frailty screening in the Australian practice context Melick Chehade</td>
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<td>14.40–15.45</td>
<td><strong>SESSION 16</strong></td>
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<td>Room: Flexible</td>
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<tr>
<td>14.40–15.05</td>
<td>Cognition and psycho-social changes after hip fracture Jay Magaziner</td>
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<td>15.05–15.25</td>
<td>Setting the agenda for recovery research in older adults with hip fractures: Considering the bigger picture – results of the FFN membership survey Mohammad Aualis</td>
</tr>
<tr>
<td>15.25–15.45</td>
<td>Supporting caregivers through education and web-based initiatives Patrocinio Ariza-Vega</td>
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</table>
Dear Colleagues,

FFN invites you to join the 7th FFN Global Congress 2018 in Dublin, Ireland from 5–7 July 2018. The annual meeting is an international congress addressing the full pathway of care for fragility fracture patients. Its themes include perioperative care, surgical treatment, rehabilitation, secondary prevention, research and policy change. The FFN Global Congress consists of invited international experts, plenary discussions, update sessions and free papers. The congress provides a unique platform to learn about new technical developments, state-of-the-art procedures and interaction with leading clinicians, researchers and other professional health workers and stake holders. This year’s motto is “Patient centred multidisciplinary care”.

We are looking forward to welcoming you in Dublin in July.

Emer Ahern and Conor Hurson
Congress Chairs

Paolo Falaschi
President of the Fragility Fracture Network (FFN)
### Scientific Programme

**Saturday, 26 August 2017**

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<td>8.30–9.30</td>
<td><strong>PLENARY SESSION V</strong> FLS and secondary fracture prevention</td>
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<td>10.15–11.15</td>
<td><strong>FREE PAPER SESSION OP 10</strong> Top 6 oral presentations</td>
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<tr>
<td>11.25–12.30</td>
<td><strong>PLENARY SESSION VI</strong> Time to act! Future needs in research and management</td>
</tr>
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<td>12.30–13.30</td>
<td><strong>CLOSING CEREMONY</strong> Price ceremony</td>
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<td><strong>OFFICIAL CLOSE OF THE ANNUAL MEETING</strong></td>
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**Room:** Ballroom A–D

1. Welcome address
2. Nominations of minutes taker and vote counter
3. Annual report since last congress
4. Annual statement of accounts 2016 and budget 2017
5. Regionalisation report
6. Strategic plan
7. Elections following the report from the nominations committee
8. Handover of presidency from Henrik Palm to Paolo Falaschi
9. Introduction of next year’s congress
10. AOB

**Room:** Ballroom A–D

8.30–9.30 **PLENARY SESSION V**

**Chairs:** Kristina Åkesson, Paul Mitchell

- 8.30–8.55 Strategies to increase secondary fracture prevention (Joint with IOF)
  - Kassim Javaid, Masaki Fujita
- 8.55–9.10 Implementing a national plan of action to reduce the next fracture – the experience from New Zealand
  - Paul Mitchell
- 9.10–9.15 The FFN survey and audits
  - Kassim Javaid
- 9.15–9.25 Using national fracture registries to improve secondary care
  - Michael Möller
- 9.25–9.30 Discussion

**Room:** Ballroom A–D

9.30–10.15 **COFFEE BREAK AND POSTERS**
Scientific Programme  
Saturday, 26 August 2017

10.15–11.15 FREE PAPER SESSION OP 10  
Room: Ballroom A–D  
Chairs: Matthew Costa, Jay Magaziner

10.15–10.25 Effect of methylprednisolone on postoperative delirium in elderly patients undergoing hip fracture surgery: a randomised, double-blind, placebo-controlled trial  
Christopher Clemmesen

10.25–10.35 The AIM Trial extended follow-up: Three year outcomes from an equivalence randomized clinical trial comparing close contact casting with internal fixation surgery for unstable malleolar fractures in patients over 60 years  
David J. Keene

10.35–10.45 Fracture in the Elderly Multidisciplinary Rehabilitation (FEMuR): a phase II randomised feasibility study of a multidisciplinary rehabilitation package following hip fracture  
Catherine Sackley

10.45–10.55 Comparative effectiveness of nurse case-manager vs multifaceted intervention to increase osteoporosis treatment in older patients with upper extremity fracture: results of a randomized trial  
Lauren Beaupre

10.55–11.05 Re-fracture events: Results of a provincial fracture-reduction screening program  
Rebeka Sujic

11.05–11.15 Using national hip fracture registries and audit databases to develop an international perspective  
Antony Johansen

11.15–11.25 BREAK

11.25–12.30 PLENARY SESSION VI  
Room: Ballroom A–D  
Chairs: Henrik Palm, Kristina Åkesson

11.25–11.40 The needs and next level in calcified tissue research (Joint with ECTS)  
TBC

11.40–11.55 Geriatric terra incognita – and how to conquer the centre of future healthcare  
Finbarr Martin

11.55–12.10 The black holes in surgical fragility fracture research  
Frede Frihagen

12.10–12.25 Patient perspectives getting back to life – time to know more?  
Karen Hertz

12.30–13.30 OTHERS  
Room: Ballroom A–D  
Closing ceremony

Price ceremony  
Henrik Palm, Kristina Åkesson  
FFN Global Congress 2018 – what to expect?  
Paolo Falaschi, Emer Ahern, Conor Hurson
Thursday, 24 August 2017

FREE PAPER SESSION 1

OP 1.1
Randomised trial of Furlong uncemented hemiarthroplasty versus cemented hemiarthroplasty

Parkin M.
Peterborough City Hospital, Peterborough, United Kingdom

Introduction: Continued controversy exists between cemented versus uncemented hemiarthroplasty for an intracapsular hip fracture. To assist in resolving this controversy 300 patients were randomised between an cemented polished tapered stem hemiarthroplasty and an uncemented Furlong hydroxypapitate coated hemiarthroplasty. Follow-up by a nurse blinded to the implant used is being continued for up to three years from surgery. Results to date indicate no difference in the pain scores between implants but a tendency to a greater reduction in mobility for those treated with the unemented arthroplasty. There was no difference in early mortality but a tendency to a higher later mortality for the unemented implants. Peri-prosthetic fracture was more common in the unemented group (5 cases versus none). These results to date suggest that even a modern unemented hemiarthroplasty produced results that are inferior to that for a cemented hemiarthroplasty.

OP 1.2
A systematic review of short versus long intramedullary fixation in the management of pertrochanteric fractures

Schuette M.1,2, Bennett J.1
1University Hospital of North Durham, Durham, United Kingdom, 2The Newcastle upon Tyne NHS Foundation Trust, Newcastle, United Kingdom

Introduction: Both short & long intramedullary nails can be used in the management of pertrochanteric femur fractures. The aim of this review was to determine, based on current literature, whether the choice of a short or long intramedullary device had an impact on clinical outcomes when used in the management of such fractures.

Methods: A systematic literature search was performed in April 2016. This utilised PubMed & Embase & all papers comparing long versus short nails for pertrochanteric femoral fractures were studied. Only papers published in English were eligible for inclusion. There were a total of 9 eligible papers. Various outcomes measures were looked at, including; blood loss & transfusion requirement, operative time, length of stay, incidence of delayed or non-union, incidence of avascular necrosis (AVN) or infection & incidence of fracture or metalware failure. The data from each of the papers was pooled & statistically analysed looking for any differences in outcome between long & short nails. A student T test was used & a p value of <0.05 was considered statistically significant.

Results: Considering perioperative factors; for transfusion requirement there was a statistical difference (p=0.02) with this requirement being less in the short nail group. Despite this there was no significant difference in intraoperative blood loss (p=0.33) There was a difference in operative time between groups (p=0.004) with operative time for the short nail being quicker. Length of stay in hospital was no different for both groups (p=0.41). When looking at post-operative complications & fixation outcomes there was no difference in delayed union rates (p=0.29) & non-union rates, (p=0.19) no difference for infection (p=0.38) no difference in metalware failure (p=0.41) & no difference in periprosthetic fracture (p=0.14) There was insufficient data to comment on AVN.

Discussion: Our review would suggest that use of both nails should be considered safe, demonstrated by no significant difference in post-operative complications. The short nail, however, may have some benefits when considering perioperative factors, particularly operative time and transfusion requirement, presumably related to acute post-operative blood loss with no difference in intraoperative loss. Whilst our review is useful in aiding clinicians with their decision making for these fractures, the authors feel that further information could be gained from a prospective randomised control trial.

Oral Presentations

Abstracts

OP 1-3
Preliminary results with augmented cephalomedullary nails for intertrochanteric fractures in geriatric hip fracture patients

Schweitzer D.1,2, Klaiber I.1, Amenabar P.P.1, Botello E.T, Zamora T.T., Ruiz C.2
1Pontificia Universidad Católica de Chile, Orthopaedic Surgery, Santiago, Chile, 2Pontificia Universidad Católica de Chile, Intern, School of Medicine, Santiago, Chile

Introduction: Intertrochanteric fractures (ITF) represent approximately 50% of hip fractures. There is consensus about osteoosynthesis being the proper treatment for most of them. The former controversy of which is the best implant to use has evolved to cephalomedullary nails being recommended for unstable fractures. Surgical treatment with these implants have a complication rate between 4 and 18%. Cut out and cut through are the most important mechanical complications reported for cephalomedullary nails. In the last few years cement augmentation has been described as a technique allowing for enhancing the mechanical properties of the nail, theoretically leading to better outcomes with less mechanical failures. The aim of the present study is to report the initial experience with the augmented TFNas (Synthes®), describe short term outcomes and complications.

Materials and Methods: Approval by the institutional ethics committee was obtained for this study. A retrospective analysis from a prospective geriatric hip fracture database was performed. All cases of intertrochanteric fractures in which the TFnas with augmentation were used were analyzed. Fractures were classified according to the AO. Intra/periorperatory and up to 1 year complications including mechanical failure were documented. Blade migration was measured until fracture healing was met.

Results: 29 patients were included. 89 years old (76-98). Fractures were classified as follows; 9 A1, 15 A2, 5 A3. The median follow-up was 9 months (6-12). In the same timeframe 12 patients in which TFNas were used was not augmented. All patients were femoral neck fractures with full body weight bearing on day 1 after surgery. The TAD had a mean of 18.3±5.7mm. There were no intraoperative complications, specifically there was no cardiovascular changes related to the cement. Intrahospitalary mortality was 2/29, 30-day mortality was 3/29 and 1-year mortality was 5/29. There was up to 7mm impaction during follow-up and up to 2mm medial migration of the blade. There were neither cut-through nor cut-outs in this patient series.

Conclusion: The TFNas with augmentation appears to be a safe alternative for unstable osteoporotic bone intertrochanteric fractures. In this preliminary report presented a low complication rate. There’s still yet to be determined if the increase in operative time and the cost of the cement augmentation is cost-effective.

OP 1-4
Hansson Pinloc fixation in stable femoral neck fractures. A 1 year follow-up study of 33 cases

Yasuhara Y., Nagayama R., Shoji Y.
Saiseikai Senri Hospital, Suita, Japan

Background: Until recently, since it was difficult to keep good reduced position after reduction of displaced femoral neck fractures with the use of 2 pins, we had been using 2 pins to undisplaced femoral neck fractures with no reduction. But, we found Hansson Pinloc with 3 pins can keep the reduced position for longer periods than the bone healing after reduction of undisplaced fractures. The purpose of this retrospective study was to analyze the clinical results of patients with undisplaced femoral neck fractures after reduction treated with the Hansson Pinloc.

Methods: From January 2015 to April 2016, 50 consecutive patients underwent ORIF with Hansson Pinlock. Outcome assessments were measured with minimum follow-up of 12 months. 1 patient died and 16 patients were not able to be followed in 1 year. Therefore, total 33 were completed follow-up with average 14 month (range, 12 to 24 months). The mean patient age was 78(54-96). The patients include 6 males and 27 females. There were 25-Garden classification stage 1, and 8-stage 2 patients. There were 15 patients treated with accurate closed reduction and 18 patients treated with in-situ position without reduction. The prevalence of complications and mobility were prospectively assessed during the period of the final follow-up. Mobility of patients was scored by a scale of 1 to 5 at the time of admission and the final follow-up.

Results: We confirmed bone union in all cases at the final follow-up. At the final follow-up, patients who required assistance for walk increased compared to the mobility before injury. 15 patients dropped on average one level of mobility. Three
patients had major complications. There was no “Cut-out” of the pin at the site of the femoral head. 2 cases had avascular necrosis of the femoral head, 1 case had a fracture at the level of inferior pin. Those 2-4VN cases underwent surgery treated at in-situ position without reduction.

Conclusions: Use of the Hansson Pinloc for stable femoral neck fractures could reduce the postoperative complications and maintain mobility of patients. Two cases with avascular necrosis of the femoral head treated at in-situ position without reduction. On the other hand, the patients after accurate closed reduction could keep good reduction and had no avascular necrosis. We consider the Hansson Pinloc are suitable for the treatment of these stable femoral neck fractures after accurate closed reduction.

OP 1-5
Conservative treatment allowing weight bearing in fit patients with undisplaced femoral neck fracture

Pignedoli P.1, Pioli G.2, Benidini C.2, Ferri A.2, Bergonzini E.1, Cappa M.1, Groppi G.1, Paterlini M.1, Pinto F.1, Bondoli S.1, Lancellotti E.1, Gazzotti G.1, Adelﬁ. R.1, Bertoldi E.1, Sabetta E.1
1Arcispedale Santa Maria Nuova – IRCCS Reggio Emilia Italy, Orthopedic Unit, Department of Neuromotor Physiology, Reggio Emilia, Italy, 2Arcispedale Santa Maria Nuova – IRCCS Reggio Emilia Italy, Geriatric Unit, Department of Neuromotor Physiology, Reggio Emilia, Italy

Introduction: Undisplaced femoral neck fractures are usually treated with internal ﬁxation using screws. However up to 15% of patients are reoperated within 1 year of their injury and, in long time survivors, conversion to arthroplasty is estimated in 1 out of 4. Moreover patients frequently have hip pain when walking or even at rest. On the other hand, nondisplaced or valgus impacted fractures may be stable enough to permit walking without surgical treatment. We studied the outcomes of elderly patients treated conservatively allowing protected, crutch or walker assisted weight bearing. We performed a prospective cohort study of all consecutive patients ≥65 yrs, admitted with undisplaced neck fracture over 18 months and walking independently before fracture. After checking the stability of fracture, patients were treated conservatively (group 1) or surgical treatment (group 2). Outcomes during 6 month follow-up were compared between the two groups including complications, early hospital readmission, ambulation and functional recovery. During study period 36 undisplaced femoral neck fractures were admitted, 18 of them were addressed to non-operative treatment. For 4 patients non-operative choice was soon changed to surgical treatment because of pain when walking or dislocation had occurred within a few days. The final groups were 14 (Group 1) and 22 (Group 2) patients. Basal characteristics of 2 groups were comparable in terms of age, disability in activities of daily living and comorbidity. Patients of group 1 had a signiﬁcantly shorter LOS (5.2 vs 11.4 days, p<0.001) and less readmission rate within 6 months after fracture (7% vs 17% p<0.05). Moreover almost all were discharged to pre-fracture living accommodation while 72% of patients of group 2 were transferred to rehabilitation facilities. At the end of follow-up 2 patients in each group had died and no secondary displacement occurred up to 6 months. Patients of group 1 showed also a better trend in functional recovery even mean results between 2 groups were not signiﬁcantly different (full ambulation recovery 70% in group 1 vs 56% in group 2, p=0.01; average loss of activities of daily living 0.9 vs 1.6, p=NS). Patients treated conservatively had less medical complications and at least similar functional recovery compared to patients who underwent surgical procedure. Conservative treatment allowing weight bearing may be a choice in ﬁt older patients with stable undisplaced neck fracture.

OP 1-6
Functional outcomes following surgical treatment of periprosthetic femoral fractures

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1General Hospital Iraklion – Venizelo Greece, Orthopedic, Iraklion, Greece, 2University Hospital of Crete, Orthopaedic, Iraklion, Greece

Periprosthetic geriatric fractures constitute a major source of disability and diminished quality of life for the elderly. The incidence of this category of fractures is rising given the increasing life expectancy and the increased risk of falls in the elderly population. The aim of this study is to review the functional outcomes of geriatric patients after surgical treatment of periprosthetic fractures and the complications rate associated with treatment. Material and Method: During period 2014-2016 we treated 31 periprosthetic fractures (5 men, 25 women, with a mean age 83 years old). 21 fractures localized around the femur and 10 were supracondylar femoral fractures. Based on Vancouver classiﬁcation for periprosthetic femoral fractures patients had 1 A6 fracture, 10 had B1, 4 had B2 and 6 had C fractures, while in supracondylar fractures we based on Su & associated classiﬁcation (3 types i, 1 type ii and 2 types III). The mean time to operation were 3.7 days(2-6 days). Open reduction and internal ﬁxation (locking plates, cerclage wires) was the treatment for Vancouver A,B1,C and revision hemiartroplasty for Vancouver B2, while in supracondylar fractures internal ﬁxation(locking plates and 5 cases cimentoplasty) were the treatments. Results: We used the Barthel index and Parker mobility Scale to investigate activity of daily living limitation, radiological control to evaluate union of fracture and complication rates. Clinical and radiological control was evaluated at two, six weeks, three months and at one year. The mean time to union in fractures around the femur were 6.2 months(range 3.5-9 months), while in supracondylar were 4.6 months(range 3.5-8 months). Among the complications were: 4 surgical infestations, two nonunion, 1 fracture and one had aseptic loosening of femoral prostheses. Final at one year for periprosthetic femoral fractures the Barthel index were 75(range 80-55) and Parker score were 5, 5(range 8-3.5), while in supracondylar group the scores were 70(75-45) and 4.5(5.5-3).

Conclusions: Periprosthetic fractures present a difficult clinical problem because they had high risk for postoperative complications and mortality. Time to union of periprosthetic fractures will often be prolonged and functional outcomes can be lower of patient expectation. Careful preoperative planning and appropriate intraoperative management may increase the chances of successful treatment.
Introduction: Clinical outcomes and reoperation rates are unsatisfactory after internal fixation of undisplaced femoral neck fractures (FFN). We investigated the effect of a bipolar hemiarthroplasty (HA) versus two cancellous screws (IF) on hip pain and function, mobility, quality of life, and reoperation rates.

Methods: We enrolled patients aged 70 years or older with an undisplaced Garden I-II FFN from three public hospitals in Norway. Patients were randomly assigned to receive a bipolar HA or IF. Surgeons and patients were not blinded but the investigator recording the Harris Hip Score (HHS), Timed Up & Go (TUG) test, EQ-5D, and numeric pain scale (NPS), after 3 months, one year, and two years, remained blinded to treatment groups. Analyses followed the intention-to-treat principle and this trial was registered with ClinicalTrials.gov NCT01770769.

Results: Between February 6, 2012, and 2015, we randomly allocated 219 patients to receive IF (n=111) or HA (n=18). Hip scores differed significantly between groups after 1 year (16.6 vs 21.9 seconds) – the adjusted mean difference of 5.3 seconds (95%CI -0.5 to 11.1, p=0.08). The median time to an event was 22 days for IF. The rate of complications was significantly lower in the HA group. 19 of the reoperations in the IF group required a reoperation. Thromboembolism and deep venous thromboembolism), venous thromboembolism (e.g. pulmonary embolism and deep venous thromboembolism), myocardial infarction, and stroke in 4.93%, mortality was 29%. Event rates were highest in the early follow-up period. The median time to an event was 22 days for venous thromboembolism, 33 days for myocardial infarction, and 60 days for stroke. The strongest risk factor of any thromboembolic complication was having a previous history of the same event, leading to hazard ratios at HR 6.82 (CI 5.34-8.70) for previous venous thromboembolism, HR 3.10 (CI 1.54-6.33) for previous myocardial infarction, and HR 3.99 (CI 3.77-4.23) for previous stroke.

Conclusion: Thromboembolism seems to occur early after hip fracture surgery. It seems possible to identify patients at high risk indicating an opportunity to individualize future antithrombotic prophylaxis.
blood transfusion rates compared to historical 46.8 hours. Further analysis will be presented of 59-64umol/L and no medication interactions. apixaban t½ of 32-60 hours, despite a normal Scr value, from which elimination half-lives (t½) were fi

Results: 2346 patients with a mean(SD) age of 82.1(9.9) years were identified. 202 (8.6%) patients were anticoagulated, of which 168 patients were on warfarin. 81.2% of anticoagulation was indicated for atrial fibrillation. Comparing patient characteristics of those anticoagulated with those not anticoagulated, there were less women (anticoagulated 62.9% vs not anticoagulated 71.9%); lower prevalence of dementia (17.4% vs 25.6%); higher prevalence of cardiovascular disease (77.2% vs 54.1%) and polypharmacy (77.2% vs 54%). There was no difference in pre-operative haemoglobin and renal function in either group. Both groups had similar time to operation (median(IQR) anticoagulated 27.1(17.4)hours vs not anticoagulated 24.6(15.2)hours). With regards to transfusion outcomes, there was no difference in pre-operative transfusion (anticoagulated 4.0% vs not anticoagulated 3.3%, p=0.54) and post-operative transfusion (anticoagulated 28.5% vs not anticoagulated 23.4%, p=0.11). Post-operative complications were similar in both groups (anticoagulated vs not anticoagulated) except acute kidney injury, 19.3% vs 13.4%, p=0.03; and heart failure 5% vs 1.4%, p=0.01. There was no difference in mortality, length of stay and overall discharge destination.

Discussion: There were no reported differences in hospital outcome between those anticoagulated or not, except for an increase in acute kidney injury and heart failure. Further analysis of patients anticoagulation management per-operatively will help identify good principles currently delivered within the orthogeriatric model. Surgical repair of the hip fracture can be delivered within UK best practice tariffs in those taking anticoagulation prior to admission.

OP 2-5 Does anaesthetic type influence the development of post-operative cognitive dysfunction, measured as a peri-operative change in abbreviated mental test score (AMTS)?

Aim: To investigate whether or not they had died (mortality) at 30 days. From the pre/post-op AMTS, a “change in AMTS” was calculated & patients were divided into those that received a “GA” & those who received “no GA”. Data was analysed to see if there was a difference in “change in AMTS” based on anaesthetic type & whether operation type influenced anaesthetic choice.

Results: 1364 patients were eligible for inclusion. 870 patients received a GA & 494 received no GA. There was no difference between groups for age, sex, ASA (p=0.362) & ASA (p=0.18). Change in AMTS in the “GA” group ranged from (9) to (9) vs (-10) to (+8) in the “no GA” group. There was no statistical difference between groups. (p=0.390). Regarding deaths, there was no statistical difference in mortality at 30 days. (p=0.103). There was a statistically significant difference in whether the patient would receive a GA or not based on their operation type (p=0.021) & when analysing the reason for this, there was a statistical difference in pre-operative AMTS between operative groups. (p=0.000021).

Conclusions: As there is no difference in change in AMTS between anaesthetic groups, we propose that either choice of anaesthetic is acceptable to use when considering cognitive impairment in isolation. Despite this, we also recognise that some patients are receiving a specific anaesthetic based on their operation type, which appears to be related to the presence of pre-existing cognitive impairment. of cognitive impairment, hence a clinician should always be conscious to reduce the risk of further worsening of this.
of each patient who waited for surgery for more than 3 days cited difficulty in securing operating rooms most frequently as the cause for delay in surgery (849 patients; 50.2%), followed by comorbidities (414; 24.5%), anesthetist availability (49; 24.2%), anticoagulant use (378; 22.4%), surgeon availability (325; 19.2%). Multiple answers allowed)

Conclusion: The most frequent cause for delay in surgery was difficulty in securing operating rooms. To solve this problem, the facility should make efforts to secure operating rooms for hip fractures based on the understanding that hip fractures require emergency surgical treatment.

**OP 2-7**

Atrial fibrillation after hip surgery
Carette A.1, Rostagno C.2, Polidori G.L.1

*Background*: Post-operative atrial fibrillation (POAF) is a common and well-studied complication following cardiac surgery. However, few studies have analysed its incidence and long-term prognosis in trauma surgery.

**Study objectives**: To evaluate incidence, clinical-anamnestic, laboratory and echocardiographic risk factors, and in-hospital and 1-year prognosis of atrial fibrillation following major hip fracture surgery.

**Methods**: We enrolled the patients that, between February 2012 and July 2016, were hospitalized in the SOD of Traumatology and Pre and Post-Surgery Medicine AOU Careggi (Florence) and that developed atrial fibrillation after major hip fracture. Patients were in sinus rhythm at the pre-operative ECG. The group with POAF with its onset, with genetic variation in dopaminergic pathways, was associated with a higher risk of developing POAF in patients undergoing hip fracture surgery. The onset of the arrhythmia is associated with increased length and costs of stay, and, clinically relevant element, with a higher long-term mortality.

**FREE PAPER SESSION 3**

**OP 3-1** Low risk of nonunion with lateral locked plating of distal femoral fractures – a retrospecive study of 191 consecutive patients
Anderson S.1, Wenger D.2

*Background*: The rate of nonunion following lateral locked plating (LLP) of distal femoral fractures have been documented. Nonunion rates of up to 17% have been published. We aimed to study the risk of nonunion, and risk factors thereof, in a Swedish population, where osteoporotic fractures are increasingly common.

**Methods**: All patients aged 16 years or older presenting with an acute distal femoral fracture at our department from 2004 through 2013 were eligible for the study. Hospital files and radiographs were retrospectively reviewed. Fractures were classified according to the AO/OTA classification. Potential patient risk factors and the presence of pre-existing arthroplasties and implants were registered for those treated with LLP. Follow-up was >2 years in all cases. The primary end point was reoperation for nonunion.

**Results**: In total, there were 441 distal femoral fractures in 428 patients. The female to male ratio was 4:1 and the median age was 79 years. 191 fractures were treated with LLP, of whom 8 (4%) had reoperation for nonunion. A lower age and the presence of an open fracture were associated with nonunion. No patient over 80 years age had an intervention for nonunion after LLP.

**Conclusion**: In this patient cohort, comprising all distal femoral fractures in a geographic area, the risk of nonunion after LLP was fairly low. Young patients with open fractures are at increased risk of nonunion.

**OP 3-2**

Epigenetic variation associated with the onset of Post-operative delirium: a longitudinal pilot study of DNA methylation
Sadahiro R.1, Knight B.2, Smart N.3, Charity J.4, Daniels I.5, Hannon E.5, Burrage J.5, Underwood Z.6, Mill J.7

*Background*: Delirium status was assessed via the Standardised Confusion Assessment Method (sCAM) and, clinically relevant element, with a higher long-term mortality.

**Methods**: All patients aged 16 years or older presenting with an acute distal femoral fracture at our department from 2004 through 2013 were eligible for the study. Hospital files and radiographs were retrospectively reviewed. Fractures were classified according to the AO/OTA classification. Potential patient risk factors and the presence of pre-existing arthroplasties and implants were registered for those treated with LLP. Follow-up was >2 years in all cases. The primary end point was reoperation for nonunion.

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**OP 3-3**

Reduced kidney function is associated with increased risk of fractures in older women
Malmgren L.1,2, McGuigan F.1,2, Christesson A.1,2, Åkesson K.1

*Background*: Reduced kidney function is associated with an increased risk of fracture surgery. The onset of the arrhythmia is associated with increased length and costs of stay, and, clinically relevant element, with a higher long-term mortality.

**Methods**: Serial pre and post-operative whole blood samples were obtained from 30 patients aged >60 years undergoing hip fracture repair, elective total hip replacement and colorectal surgery. Delirium status was assessed via the standardised Confusion Assessment Method (sCAM). Genome-wide DNA methylation was profiled on sodium bisulphite treated DNA from peripheral blood mononuclear cells using the Illumina Infinium Human-Methylation450 BeadChip to interrogate >450,000 CpG sites. Multiple linear regression models including key covariates (surgery type, age, sex, batch effects and blood cell compositions) identified differentially methylated positions (DMPs) and regions (DMRs) associated with POD. Specific DMPs were validated by bisulphite pyrosequencing.

**Results**: 5 (17%) patients developed POD at a mean of 2.6 days after surgery with a mean duration of 2.4 days. Multiple DMPs and DMRs were associated with POD, with an enrichment of loci in pathways related to neurotransmitters. Dopamine metabolism related genes, COMT, MAO, NRA42 and NR4A3 were found to be differentially methylated in POD. In every identified DMP, absolute effect size was larger in the delirium group and many of the candidate POD-associated changes in DNA methylation were reversed towards discharge, indicating a predominance of acute effects occurred in delirium patients.

**Conclusion**: We identified methylocenic changes associated with postoperative delirium. Identifying the molecular signatures of POD will ultimately aid in the identification of epigenetic biomarkers, which could lead precipitate direct implications for improved clinical care.

**OP 3-4**

Reduced kidney function is associated with increased risk of fractures in older women
Malmgren L.1,2, McGuigan F.1,2, Christesson A.1,2, Åkesson K.1

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**OP 3-5**

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Malmgren L.1,2, McGuigan F.1,2, Christesson A.1,2, Åkesson K.1

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**Methods**: Serial pre and post-operative whole blood samples were obtained from 30 patients aged >60 years undergoing hip fracture repair, elective total hip replacement and colorectal surgery. Delirium status was assessed via the standardised Confusion Assessment Method (sCAM). Genome-wide DNA methylation was profiled on sodium bisulphite treated DNA from peripheral blood mononuclear cells using the Illumina Infinium Human-Methylation450 BeadChip to interrogate >450,000 CpG sites. Multiple linear regression models including key covariates (surgery type, age, sex, batch effects and blood cell compositions) identified differentially methylated positions (DMPs) and regions (DMRs) associated with POD. Specific DMPs were validated by bisulphite pyrosequencing.

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**OP 3-6**

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Malmgren L.1,2, McGuigan F.1,2, Christesson A.1,2, Åkesson K.1

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**Conclusion**: We identified methylocenic changes associated with postoperative delirium. Identifying the molecular signatures of POD will ultimately aid in the identification of epigenetic biomarkers, which could lead precipitate direct implications for improved clinical care.
Abstracts

75. Kidney function was estimated using cystatin C based estimates of glomerular filtration rate (mL/min/1.73m²) using the CKD-EPI formula; and values were available for n=981 women. Kidney function was categorized as: normal (CKD stage 1-2; eGFR ≥60), mild-moderate (stage 3a; eGFR 45-59), and poor (stage 3b-5; eGFR<45). Fracture risk was estimated using Cox proportional hazard models, adjusted for weight, smoking and vitamin D.

Results: At baseline investigation, n=570 (56%) of women had normal kidney function; 252 (26%) intermediate and 159 (16%) had poor kidney function. Kidney function was associated with fracture risk not in a dose-response manner. Compared to those with normal function, women with mild-moderate function had a two-fold increased risk of hip fracture (HR=2.00, 95% CI 1.00-3.98) and 1.5 times increased risk of osteoporotic fracture (HR=1.51, 1.04-2.18) in the 5-year period between age 75-80. However, poor kidney function was not associated with increased risk of fracture, either hip or osteoporotic. Kidney function, neither intermediate nor poor, was associated with 10-year fracture risk, either hip or osteoporotic. Kidney function, neither intermediate nor poor, was associated with 10-year fracture risk, either hip or osteoporotic.

Conclusion: The presence of otherwise healthy women with even mild-moderate reduction of kidney function are at increased fracture risk, particularly of the hip. The increased risk is apparent in a 5-year perspective, but may not extend beyond this.

OP 3-4 Exploring the knowledge, skills and attitude of orthopaedic nurses towards caring for older hip fracture patients with delirium

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Delirium, an acute decline in attention and cognition is common, serious, expensive and potentially preventable. The application for hospitalized older patients. Delirium is also the most frequent complication among patients undergoing surgery following hip fracture. Although delirium is associated with poor clinical outcomes, health service planners and clinicians have hugely ignored its existence and it continues to be under-recognised. Clinical practice and research demonstrates that nurses are effective in identifying patients in their care who are confused but without the use of objective assessment tool. Not many studies have assessed the gaps in levels of knowledge about factors such as definition, assessment tools and its related risk factors.

Methods: In this nonexperimental, descriptive study researchers distributed questionnaires in the orthopaedic unit to nurses.

Findings: Of the targeted 60 orthopaedic ward nurses, 49 (82% approx.) completed survey questionnaires.

Twenty two questions specifically required participants to answer general knowledge questions about delirium. The average number of knowledge questions answered correctly was 72%. Eighteen (36%) respondents scored 75% or more on the general knowledge of delirium questions. Fourteen questions required correct identification of delirium risk factors. The average number of risk factors questions answered correctly was 51%. However, only six (12%) of the respondents scored 75% or more on the knowledge of delirium related risk factors. Overall, 70% of the respondents perceived themselves as knowledgeable, competent and confident in caring for older hip fracture patients with delirium. The average number of respondents who believe that they have ability to identify delirium and understand its consequences was 59%.

Conclusion: We demonstrated that there is deficit in nursing knowledge regarding characteristics of delirium and its risk factors and use of appropriate screening tool to measure delirium. Education of nurses in orthopaedic setting is essential for early recognition, prevention and primary prevention of delirium. Education strategies should focus on assessment as well as prevention strategies in caring for patients with delirium.

OP 3-S What worsens mortality when hip fracture surgery is delayed?

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Introduction: In hip fracture care it is disputed whether mortality worsens when surgery is delayed. Previous observational studies adjusted for structure, process, and patient factors contributing to death, but not for relationships between structure and process factors, or between patient and process factors. Such relationships may produce a statistical association between time and death in the absence of causation. We sought to identify factors which influence both time to surgery and postoperative in-hospital death, directly and through the network of relationships among them.

Methods: First, we completed two scoping reviews of studies which identified factors that influence both timing of surgery and occurrence of death. Second, we constructed a dependency graph of relationships among these factors based explicitly on the existing literature. Third, we identified factors with a potential to induce co-variation of time to surgery and occurrence of death, directly or through the network of dependencies.

Results: Based on existing literature age, sex, dependent living, fracture type, hospital type, surgery type, and treatment era can influence both time to surgery and occurrence of death through chains of dependencies.

Conclusion: Failure to account for these factors may produce a timing-death association in the absence of causation. Further, comparing survival benefit of early surgery across subgroups defined by these factors will inform effective resource allocation policy that targets patients who would benefit most from expedited access to hip fracture surgery.

OP 3-6 Waiting time for surgery in patients with osteoporotic hip fractures and mortality, quality of life and new fractures

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Purpose: There are controversial studies on whether or not, waiting time for surgery (WTS) in patients with osteoporotic hip fractures, affects mortality and postoperative outcome. The purpose of this study is to prove whether there is a correlation with the (WTS) and mortality (M), the patients’ quality of life/health (QL) and new osteoporotic fractures (NOF).

Materials and methods: The study included 324 male and female patients from 52 to 102 years old hospitalized in an orthopaedics clinic for osteoporotic hip fractures from 01/01/2014 to 31/12/2015 who underwent operation. The WTS was calculated from the date beginning hospitalization until the date of the operation. Patients were divided into three groups, depending on the WTS: Group A with WTS less than 2 days, Group B with a WTS from 3 to 7 days, and Group C with a WTS of 8 days or more. The WTS has been calculated for each patient by the data system. Patients were called and completed a questionnaire about their state of health and quality of life (EuroQol 5D 5L) from 2 to 3 years after discharge from the clinic. Furthermore, they were asked if they had a new fracture after this hospitalization. 149 of the 324 patients have been called answered to the questionnaire, 106 of which were health caregivers. 39 of the patients have died. Statistical analysis was performed by the one way anova method.

Results: Waiting time is not associated with mortality (P=0.87 significant at the 0.05 level), the quality of life (P=0.071 significant at the 0.05 level), health self-perception (P=0.193 significant at the 0.05 level) and number of new fractures (P=0.828; 95% CI: -2.648 to 2.48, significant at the 0.05 level); but is related to the self-care (P=0.028 significant at the 0.05 level). The overall mortality rate was around 26.2%, was higher in men 46.28%, and was related to the age and gender (P=0.000 significant at the 0.05 level). Age was related with quality of life (P=0.02 significant at the 0.05 level).
and each one of these parameters of EQ-5D-5L separately: mobility (P=0.005 significant at the 0.05 level), self-care (P<0.0001 significant at the 0.05 level), usual activities (P=0.000 significant at the 0.05 level).

**OP 3-7**

**Acetabular fractures in patients aged over 60 years**

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Acetabular fractures in older adults are associated with increased risk of morbidity and mortality. Classification and surgical management of these fractures are well described; however, the risk factors predisposing older adults to acetabular fractures remain unknown. We conducted a retrospective cohort study to determine the characteristics of patients aged 60 years and older who sustained acetabular fracture. We identified 79 patients (37 women, 42 men) admitted to acute care hospitals in southwestern Ontario between January 1, 2013 and December 31, 2015. Mean age of patients was 81 years (range, 60–99y). Low-energy trauma, such as falls from standing height, was the most common mechanism of fracture, as reported in 58 (74%) patients. Eleven (14%) patients fell from greater than standing height, such as from a ladder, and nine (11%) reported high-energy trauma, such as motor vehicle accident. Eleven patients (14%) had metalwork in the hip on the same side as the acetabular fracture. Fifteen patients (80% women) had a diagnosis of osteoporosis prior to fracture incidence, of which twelve of were being treated pharmacologically for osteoporosis at the time of hospital admission. Twelve of the 15 patients with osteoporosis (80%) had metalwork in the hip, whereas 3 of 14 (21%) patients without osteoporosis had metalwork in the hip (P=0.005). These data suggest that age and osteoporosis predispose to acetabular fractures. In contrast to hip fractures that predominantly occur in women, our findings showed that acetabular fracture incidence is higher in men. One explanation is variability in hip geometry that may influence risk of sustaining an acetabular fracture versus hip fracture. Alternatively, a relatively well-maintained BMD within the femoral cortex may transmit the fall force through to the acetabulum. Since availability of BMD data is limited for our cohort, investigating hip geometry may be useful for identifying risk factors for acetabular fracture.

**Friday, 25 August 2017**

**FREE PAPER SESSION 4**

**OP 4-1**

**The efficacy of fascia iliaca block in geriatric hip fracture patients: a retrospective matched case control study**

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Objectives: Hip fractures are common orthopaedic injuries in the elderly. Opioids are commonly used for peri-operative pain relief in hip fracture patients, but they have numerous side effects which may lead to complications in the elderly. Nerve blocks such as the Fascia Iliaca Block (FIB) are gaining importance as a peri-operative analgesia modality. We compare the efficacy of FIB on peri-operative pain relief, opioid usage and early rehabilitation goals in geriatric hip fracture patients.

Materials and method: In this retrospective matched case control study, 40 elderly patients with hip fractures who had received the FIB from Nov 2014 to April 2016 were matched with a 1:3 ratio with similar patients from our hip fracture database during the same period of time, but whom had not received the FIB.

Results: A total of 157 patients in both the FIB group (N=40) and the control group (N=118) were studied. The post-operative pain scores and total opioid consumption in the FIB group were significantly less than that of the control group (p<0.0001 respectively). The complications in

**Abstracts**

**OP 4-2**

**Regain of the pre-fracture basic mobility at the time of acute hospital discharge is associated with the risk of 30-day mortality and readmission – A 1-year nationwide register study of 5,554 Danish patients with hip fracture**

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Introduction: Few smaller studies have shown that the regain of pre-fracture basic mobility status at acute hospital discharge is considered an important first step for patients recovering from a hip fracture (HF). The Cumulated Ambulation Score (CAS) is a validated measure of basic mobility used in all patients with hip fracture in Denmark and registered in the nationwide Danish Multidisciplinary Hip Fracture Database (DMHFD). The aim of the study was to examine the association between the regain of pre-fracture basic mobility at the time of acute hospital discharge, and mortality and readmission within 30 days post-discharge in patients with HF.

Methods: Using the DMHFD we identified 5,554 patients, aged ≥65 years admitted with an acute HF from Dec.1, 2015 to Nov. 30, 2016, at the 25 Danish HF operating hospitals. Only patients with both a pre-fracture and discharge CAS score were included. The CAS score is calculated as; getting in and out of bed, sit-to-stand-to-sit from a chair with armrests and walking with or without an appropriate aid. Each of these three activities is scored as (0), can with person aid (1) or can independently (2) reaching a total CAS score of 0 to 6 points. Regain of basic mobility was defined as achieving the same or above the total pre-fracture CAS score at discharge.

Results: Only 37.9% (n=2,107) patients regained their pre-fracture basic mobility level. These patients were younger, had fewer comorbidities at the time of fracture, were more often living in their own home, and more often treated with hemi/total hip replacement, compared to those who did not regain their pre-fracture basic mobility level. Also, their 30-day mortality was 2.3% (n=48) compared with 7.2% (n=246) of patients who did not regain their pre-fracture basic mobility level (p<0.001). Correspondingly, 14.5% (n=300) and 17.6% (n=556) of patients who did and did not regain their pre-fracture basic mobility level, were readmitted within 30 days of discharge (p<0.001). Crude and adjusted odds ratio for death and readmission will be presented during the FFN Congress.

Conclusion: In this large national HF registry study of 5,554 Danish patients we found that the regain of pre-fracture basic mobility level before acute hospital discharge was strongly related to both 30-day mortality and readmission. This indicates the importance of basic mobility independence as a primary early rehabilitation goal, and that the CAS could be considered as an outcome parameter in other HF registries.

**OP 4-3**

**Barthel Index and the Cumulated Ambulation Score are superior to the de Morton Mobility Index for the early assessment of outcome in patients under acute hospitalization following surgery for a hip fracture**

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Introduction: An increasing number of settings organize their treatment of acute hip fracture (HF) patients in orthogeriatric or geriatric units. This means that e.g. data of functional capacity of HF
patients is reported to the Danish hip fracture database using the Cumulated Ambulation Score (CAS), but not the corresponding Danish database of geriatrics using the modified Barthel Index (BI) and 30’s- Chair-Stand Test (CST). Further, a new score for assessing mobility; de Morton Mobility Index (DEMMI) was recently added to the geriatric database and thereby also used for patients with HF, although not validated in that context. The aim of this study was to examine the validity of DEMMI in patients with HF in comparison with BI, CST and CAS.

Methods: Data of 273 consecutive patients with a HF admitted to a Geriatric Department following surgery were collected from October 2014 until August 2015. 51 patients were excluded (main reasons for exclusion were transfer to other departments, no ability to walk prior to fracture and death before discharge), leaving 222 patients (57 from nursing homes) for analysis. Patients, 64 men and 158 women with a mean age of 82 (SD 8.7) years, were assessed with the 4 measurements on post-surgery day 1 and at discharge (mean of 9 days (SD 5.1) post-surgery).

Results: 98% and 89% of patients were not able to perform the CST at baseline and at discharge (lack of floor effect), respectively. Corresponding floor effects (score=0) were 39% and 31% for DEMMI, 12% and 5% for BI, and 22% and 6%, respectively for CAS. Convergent validity was strong between DEMMI and CAS (r=0.76, 95% CI 0.69-0.81), and moderate between DEMMI and BI (r=0.58, 95% CI 0.48-0.66) and CAS and BI (r=0.49, 95% CI 0.39-0.59). Responsiveness, as indicated by the Effect Size was 0.76 for DEMMI, 1.78 for BI and 1.04 for CAS. Baseline scores of DEMMI, BI and CAS showed similar properties in predicting discharge destination of patients from own home.

Conclusion: Dealing with 4 outcome measures in short hospital stays is extremely time-consuming for the health-care staff. The value of using DEMMI and CST in patients with HF during the acute hospitalization seems limited in comparison with BI and CAS. However, both measures of mobility, seem to assess similar constructs. We suggest the CAS be used for assessment of basic mobility and the BI for activities of daily living in acute care setting of patients with hip fracture.

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OP 4-8 Screening for delirium after hip fracture surgery – using the 4AT test as part of a national clinical audit

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Introduction: Delirium is the commonest complication of surgery and anaesthesia in older people, but is often poorly recognised by the staff looking after such patients. The 4AT tool (Belleguie et al. Age Ageing 2014;43:496-502. doi: 10.1093/ageing/afu021) provides a simple and straightforward approach to delirium assessment. To encourage routine delirium assessment, and to improve staff training in and understanding of delirium the National Hip Fracture Database (NHFD) has adopted 4AT assessment as a new indicator in its dataset from 2016.

Methods: For all patients presenting with hip fracture to all 177 hospitals in England, Wales and Northern Ireland we asked for the 4AT test be performed during the first week after surgery.

Results: The NHFD collected data on 64,922 patients in 2016. Their average age was 82.7 years, and 71% were women. All but 14 of the hospitals (8%) recorded 4AT testing in at least some of their patients. As a result just over half (54.7%) of all patients were screened in this year. The 4AT was abnormal (a score of 4 or more out of 12) in 23.6% of these, though in this first year after introduction of 4AT testing rates of delirium varied hugely (from 0-100%) between units. Some units with relatively lower rates of 4AT completion appeared to be preferentially recording delirious cases, which introduced a bias in overall figures, but in units where more complete recording was achieved the rates of delirium identified with 4AT clustered around a figure of 20%.

Discussion: Introduction of a national programme for delirium screening using any tool will face a steep learning curve whatever tool is used. However, the 4AT is a validated tool which has proven acceptable to most units, and when routinely performed suggests delirium in nearly a quarter of patients. From April 2017 the performance of this assessment will be incentivised by NHS England’s ‘Best Practice Tariff’ (BPT) and this is likely to improve completion rates still further and provide a unique dataset with which to examine this serious complication.

OP 4-5 Cut-points for maximal knee-extension strength indicating sarcopenia is associated with functional performance four months after hip fracture

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Introduction: Controversy exists regarding the definition of sarcopenia and especially when to be sarcopenic. Lately, Menant et al. (1) introduced that isometric knee-extension muscle strength cut-points with cut-points of the lowest sex-specific quintile; <23.64kg for men and <15.24kg for women was effective in prediction of sarcopenic conditions. We investigated if the same cut-points give similar associations in the outcome of older adults with a hip fracture after ceased municipality-based rehabilitation.

Method: Eighty (62 women) older adults with a mean (SD) age of 76.6 (7.8) years (46 with a femoral neck – and 34 with a trochanteric fracture) were evaluated approximately four months after fracture. The majority of these older adults had a high pre-fracture functional level. Minimal isometric knee-extension strength in the non-fractured limb with cut-points by Menant et al. were compared with the Timed Up & Go (TUG) test; the 6MWT.

Results: The maximal knee-extension strength was on average 27.7 (14.1)kg in men and 16.8 (7.4)kg in women (p=0.005), and of whom 28% and 26% respectively, had signs of sarcopenia (p=0.8). Older adults with hip fracture and signs of sarcopenia performed significantly (p<.03, worse than measurements resulting in poorer TUG times (mean diff. 3.02 [95%CI: -1.67 to -4.37]) seconds, walked slower in the 10mWT (0.23 [0.1 to 0.35]) meter per seconds, and a shorter distance in 6MWT (66.64 [29.9 to 103.19]) meters, compared to the non-sarcopenic group. All differences exceed the standard error of measurement and/or the minimal clinically important difference for the three outcome measures in older adults with hip fracture.

Conclusion: Although confirming the findings by Menant et al. in older adults with hip fracture and that lower estimates of knee-extension strength is associated with poorer functional performance, our findings are probably underestimating the presence of sarcopenia in the hip fracture population. Thus, the estimate of approximately 25% with signs of sarcopenia was established in a selected group of older adults with a high pre-fracture functional level, which underlines the importance of muscle strength exercises offered to all older adults with hip fracture.

1) Menant JC et al. Strength measurements are better than muscle mass measures in predicting health-related outcomes in older people: time to abandon the term sarcopenic? Osteoporosis Int 2016.

OP 4-6 Chronic pain experience after hip fracture surgery and its correlation with physical functioning

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Introduction: After a fall-related hip fracture surgery older adults experience significant pain, mobility limitation and disability, demanding long-term health care with high costs. However the characteristics of chronic pain on this population has been poorly investigated. The aim of this study is to explore the intensity and characteristics of chronic pain and its correlation with disability and physical functioning in older adults after hip fracture surgery in the sub-acute phase of recovery.

Methods: A cross-sectional study was conducted with men and women aged 60 and older, after 4 months of a hip fracture surgery. Pain was assessed using the Visual Analog Scale (VAS), the McGill Pain Questionnaire and the algometry (mean of 6 points in hip region). Physical function was evaluated using the Short Physical Performance Battery (SPPB), and participants were classified as having a low (0-12 points), moderate (13-7 points) and severe limitation (0-4 points). A descriptive
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Oral Presentations

FREE PAPER SESSION 5

OP 5-1

Bridging the gap from novice to expert: Developing the role of the fracture prevention practitioner

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Introduction: The National Osteoporosis Society (NOS) works to ensure that everyone aged over 50 who breaks a bone is assessed for osteoporosis and managed with a Fracture Liaison Service (FLS). To underpin this ambition, in 2015 the NOS published Clinical Standards for FLS which included: ‘Standard 9 – The FLS team will have appropriate competencies in secondary fracture prevention and are supported to maintain relevant CPD.’ The NOS has developed resources for Fracture Prevention Practitioners (FPs) to consolidate the (primarily nursing) specialty. Online FFP training worth 4 CPD credits in the UK was made available in 2015, with examination and accreditation at foundation and advanced levels. This course includes multi-media resources from leading clinicians and covers 6 areas: Epidemiology of Osteoporosis, Fracture Risk Assessment, Osteoporosis Management, Falls Assessment and Management, Special Cases and Rare Side Effects. In 2016 the NOS published a Competency Framework for FPPs, outlining skills in the core competency areas of the FPP training. Methods: Data on registration for the NOS FPP training has been collected on a monthly basis between January 2015 and December 2016. Results: Over 24 months, 711 professionals registered for access to the online training. 200 professionals registered to take the examination in the Foundation module, with a 22% increase from year 1 to year 2. 78 professionals registered for the Advanced module, with a 323% increase from year 1 to year 2. Pass rates over 24 months are 71% (Foundation) and 63% (Advanced). 88% of those registered to take the Advanced module were from the UK, 12% from other countries. Professionals registering for the training included nurses (39%), primary and secondary care doctors (16%), physiotherapists (11%), osteopaths (9%) and radiographers (5%). Conclusion: The sustainability of FLSs in the current economic climate requires consolidation of the FPP specialism. The results demonstrate the demand for training across a range of disciplines involved in secondary fracture prevention. Consideration by NOS with FPPs has highlighted a lack of funding for training. Furthermore, as well as addressing clinical competency, consideration must be given to skills and knowledge required by the profession to streamline services including independent prescribing. DEXA reporting by FPPs, leadership skills, clinical redesign and use of audit for quality improvement.

OP 5-2

Romasozumab rapidly reduces clinical vertebral fracture incidence: results from the FRAME study

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Objectives: Romosozumab (ROMO) inhibits sclerostin and has a dual effect on bone, increasing formation while decreasing resorption, resulting in significant increases in bone mineral density (BMD) at <6 months (m), which at 12m reach 13.3% vs placebo (PBO) at the spine.¹ Using high resolution quantitative computed tomography, BMD increases were observed at both trabecular and cortical compartments of the spine, explaining the significant reductions in radiographic vertebral fracture (VFx) risk in women with osteoporosis (OP) enrolled in the FRAME study (NCT01575834). Here, we report the effect of ROMO on clinical (clin) VFx incidence over 12m in women in FRAME with back pain.

Methods: FRAME enrolled 7180 postmenopausal women with OP, mean age 70.9 yrs (total hip T-score -2.5 to -3.5) and no severe VFx. Patients received monthly ROMO (n=3589; 210mg) or PBO (n=3591) for 12m. At monthly visits, women with back pain consistent with a clin VFx had a confirmatory spinal X-ray. Clin VFx risk (ROMO vs PBO) was calculated by Cox-proportional hazards model.

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Results: Of 119 women in FRAME reporting back pain suggestive of a potential clinical vertebral fracture over 12m, 20 were confirmed by radiography to have experienced a new or worsening VFx. Of these, 3 clin VFx (<0.1%) occurred in the ROMO group vs 17 (0.5% at 12m) with PBO. Accordingly, clin VFx risk was 83% lower in the ROMO group vs PBO at 12m (hazard ratio 0.17; 95% CI, 0.05-0.58; p=0.001). The 3 clinical vertebral fractures in the ROMO group occurred within the first 2m with no additional clin VFx throughout the year of rosmosozumab administration. In women with clin VFx vs no clin VFx, the lumbar spine T-score was numerically lower and the FRAX score higher at baseline; other baseline characteristics were comparable among all women who reported back pain.

Conclusions: ROMO treatment for 12m was associated with rapid and large reductions in clin VFx risk vs PBO. In the ROMO group, all clin VFx occurred early (all within the first 2m); clin VFx risk was ≥5 times higher with PBO vs ROMO. Monthly study visits in FRAME allowed for a robust and timely radiologic confirmation of a suspected clin VFx.


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OP 5-3  
Fracture Liaison service – developing a national clinical audit to measure secondary fracture prevention provision  
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Introduction: Secondary fracture prevention delivered by a fracture liaison service (FLS) requires effective identification, investigation, treatment initiation and monitoring of patients. The Fracture Liaison Service Database (FLS-DB) was commissioned to measure the delivery of secondary fracture prevention and adherence to guidelines with a view to informing quality improvement.

Methods: The audit criteria were based on NIce technology assessments and guidance on osteoporosis, and the National Osteoporosis Society clinical standards for FLSs. Selection of the audit criteria was also informed by the consensus of a multi-disciplinary group of experts. Data is collected in FLSs and entered into a secure web-based data portal. Individual sites can view their submitted data using live run charts with national averaged data.

Results: Data collection began in January 2016. To date 35,221 records have been entered by 57 FLSs. The first report is due to be published in April 2017. This will include data from 18,356 patients seen by 38 FLSs between January and June 2016. The report will address the following questions, what proportion of patients:
• presenting with a fragility fracture are identified by the FLS?
• are assessed with a DXA?
• are assessed for falls risk factors?
• are followed up within 4 months of index fracture?
• are on a bone protection treatment within 4 months of index fracture?
• are initiated on a falls intervention within 4 months of index fracture?

Conclusion: The FLS-DB aims to provide a feedback mechanism for FLSs. This is the first step in understanding current secondary fracture prevention care, improving its efficacy and ultimately preventing those who suffer a fragility fracture from experiencing further fractures. Further work is needed to review the dataset and data completeness for some fields could be improved; however the first year of data collection has shown it is possible to answer questions on the assessment, treatment and management of patients who sustain a fragility fracture.

OP 5-4  
Fracture Liaison Service: Report on the first successful experience from the Middle East  
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Introduction: Secondary fracture prevention delivered by a fracture liaison service (FLS) requires effective identification, investigation, treatment initiation and monitoring of patients. The Fracture Liaison Service Database (FLS-DB) was commissioned to measure the delivery of secondary fracture prevention and adherence to guidelines with a view to informing quality improvement.

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• are on a bone protection treatment within 4 months of index fracture?
• are initiated on a falls intervention within 4 months of index fracture?

Conclusion: The FLS-DB aims to provide a feedback mechanism for FLSs. This is the first step in understanding current secondary fracture prevention care, improving its efficacy and ultimately preventing those who suffer a fragility fracture from experiencing further fractures. Further work is needed to review the dataset and data completeness for some fields could be improved; however the first year of data collection has shown it is possible to answer questions on the assessment, treatment and management of patients who sustain a fragility fracture.

OP 5-5  
Assessing the potential impact of prescribing anti-osteoporosis medication after an index fracture as part of a national clinical audit  
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Introduction: Fragility fractures are a common and potentially life-changing experience for those who suffer them. Any fragility fracture approximately doubles the risk of another fracture, and these fractures are most likely to occur in the next 2 years. This highlights the need for rapid assessment and initiation of anti-osteoporosis medication to those in need.

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 June 2016. As part of the audit we asked whether the patient was recommended bone therapy by the FLS.

Results: The FLS-DB collected data on 18,356 patients from 39 FLSs. Anti-osteoporosis medication was considered inappropriate for 4,704 (26%) patients and this information was missing for 6,89 (33%). Of the patients with a recorded treatment outcome, 29% were recommended bone therapy and 21% required further clinical input.

Discussion: The highest treatment rate of any FLS was 51%. If all fracture patients in England received a comparable service, we estimate that 21,848 fractures would be prevented over 5 years (up to 2020), including 9,157 hip fractures. The prevention of hip fractures alone would be expected to lead to a saving of over £151 million over the same period. (All benefits are gross and do not take account of costs of FLS provision. All benefits are calculated compared with usual care.) This would be a substantial reduction, leading to benefits for patients, families and carers, as well as a reduction in emergency admissions and acute hospital and social care demand for beds within the NHS.

OP 5-6  
How efficient is the FLS in identifying the high fracture risk individuals suitable for preventive measures?  
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Fracture screening programmes applied to acute fracture patients help to identify individuals at high risk of future fracture and to initiate suitable preventive measures. Skåne University Hospital serves 600,000 citizens and treats >5000 fractures annually (~1200 hip). In Nov-2013, FLS is established at Bellevue hospital in Beirut in July 2013. This study aims to assess its clinical benefits and efficacy.
an FLS programme was introduced screening fracture patients >45y. For logistic reasons, start-up was extended – fully operational in 2016. The FLS identify and investigate: patients are referred to primary care for intervention. Despite our efforts, the pharmacological treatment rate has increased only marginally. What are the reasons? To investigate this we analysed the results of FLS during 2016. Of the screened 976 patients, 371 were selected for DXA, the remaining were already on medication, treated directly, lifestyle intervention or information. However, when the DXA time was scheduled many declined, 163 (44%) patients were actually scanned – 49 men and 114 women. Six of the very young individuals with hip fractures and were excluded from further analysis. Fracture types in the scanned were: hip (74), lower extremity (20) ankle (19), humerus (17), pelvis (10), vertebral (8), upper extremity (5), wrist (4). Fifty-two of 157 (33%) had adequate bone density and were not recommended osteoporosis medication. This group was younger (65.5 vs 73.4yrs), included more males (38 vs 24%) and had a different fracture type pattern than the treatment group (humerus, ankle and lower extremity fractures more common, fewer hip fractures). In the future, based on the differences based on fracture type: patients with wrist and pelvic fractures had higher mean ages (77-79 vs 71); those with wrist fractures had lower body weight (58 vs 70.5kg) compared to the whole fracture group. Estimation of risk using FRAX (major OP fx) showed highest risk scores for wrist and pelvis fractures (34-39%) and lowest for ankle fractures (19%), although the low numbers in each group makes conclusions uncertain. The FLS is good at identifying the high risk fracture individuals, but motivating further examinations and treatment is less easy. A large group of the screening population declined further investigation after initially agreeing, due to frailty, old age or not understanding the purpose of the scan. The results indicate that in high risk individuals, osteoporosis management soon after the fracture without performing a bone scan may be a better way to increase treatment levels.

### OP 5-7

**Updates on the Norwegian Capture the Fracture® Initiative (NoFRACT)**

Solberg, Lena B.1-2, Frihagen, Frede1-2, Bassø, Trude1-2 Gjesdal, Ciara G.1, Eriksen Erik F.1-2, Nordseth Lars1-2, Omsland Tone K.1, Borgen Tove T.1, Wislaff Torbjørn1, Hagen Gunhild1, Bjerremer Å1-2

**Materials and methods:**

NoFRACT is ongoing at 7 hospitals in Norway from May 1st 2015 to Dec 31st 2017 aiming to address approximately 20,000 fracture cases. The study is a stepped wedge cluster randomized controlled trial with the intervention hospitals randomized on startup date. All fracture patients over 50 years will be identified and offered assessment and treatment for osteoporosis according to the SIP. AOD is recommended in patients with i) hip fracture, vertebral fracture or ≥2 low-energy fractures (regardless of FRAX or BMD score), ii) one is a low energy fracture and FRAX 10-year probability of major osteoporotic fracture ≥20% or BMD T-score <−1.5. To optimize persistence to treatment, patients started on AOD will conduct follow-up after 3 months and 1 year. The effect of the intervention on recurrent fractures and mortality will be measured based on national registers (208-2019).

### OP 6-1

**Fracture Liaison Services – An analysis of the cost consequence from the perspective of the Australian Health System**

Major G.1,2, Ling R.3, Niddrie F.1, Searle A.3, Kelly A.1,3, Holland E.1, Atta J.1,4, Bogduk N.2

**Materials and methods:**

From 1st of May 2015 to 31st of Dec 2016 13,452 fracture cases were identified, 2382(18%) of them were hip fractures, 738(5%) were lost, 958(7%) were judged too sick for assessment and 1627(12%) did not want to participate in the program. 6346(47%) were referred to DXA and 2 out of 3 had a T-score <-1.5 and were offered treatment with AOD. In total 1 out of 3 patients (4249) in the program have been prescribed or treated with AOD while in hospital.

**Conclusion:** So far, the program has been a success – 88% of the fracture patients identified have been offered assessment on site for osteoporosis. The prescription of AOD to more than 30% of the patients reflects the high prevalence of increased fracture risk in this group. We believe the project will generate new knowledge on how to improve secondary fracture prevention and hopefully reduce the accelerating fracture-related health care costs in Norway.

### Free Paper Session 6

**OP 6-2**

**Establishment of a fragility fracture liaison service in a tertiary care hospital of India**

Sharma V

**Introduction:** 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 FLS is a coordinated care model to guide the patient through osteoporosis management after a fragility fracture to help prevent future fractures.

**Methodology:** 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...
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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 1st, 2016 in our institute. Till date, 284 patients have been enrolled in the FFLS and are under regular follow-up. The drop-out rate is ~5% – a drastic improvement from our previous experience. The patients included 28 number of spine fractures, 88 number of hip fractures, 122 number of distal radius fractures and 66 number of patients having fractures other than these three major fragility fractures. A total of 276 patients underwent DEXA 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.

OP 6-3
Premium payments for meeting 6 clinical standards in hip fracture patients took 5 years to improve time to operation across three teaching hospitals in Western Australia

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Introduction: A Best Practice Payment in the UK for meeting six clinical standards in each hip fracture patient has been shown to improve time to operation and reduce mortality. A similar approach was adopted in WA commencing in July 2012. An additional $200 was paid directly to the hospital if the following criteria were met in a patient with a hip fracture who was aged over 85 years of age:
- Time to surgery within 36hrs from arrival in ED, or time of diagnosis if an inpatient
- Admitted under the joint care of a consultant geriatrician and an orthopaedic surgeon
- Admitted using an assessment protocol agreed by geriatric medicine, orthopaedic surgery and anaesthesiology
- Assessed by a geriatrician in the peri-operative period (within 72 hours of admission)
- Post-operative geriatrician-directed multi-professional rehabilitation team
- Fracture prevention assessments (falls and bone health)

Methods: Data was collected at two tertiary hospitals from July 2012 using an electronic data collection tool developed locally. The third teaching hospital collected data consistently from January 2014.

Results: In 2014 across the three hospitals the hip fracture dataset was collected on 1165 patients. Of those 694 had an operation within 36 hours of admission to the operative hospital (59.6%). By 2016, 1269 patients had an operation and of those 1013 had an operation within 36 hours (75.4%). Similarly time to surgery in 48 hours of admission increased from 78.6% to 92.3%.

Conclusion: Significant improvement in time to operation occurred but there was a delay from the start of data collection at two hospitals to adoption by a further site and then sustained improvement. Overall from the start of work to improve care of these patients to delivering data to demonstrate improvement took 5 years. The $200 payment was 1% of the average total payment to the hospital for the care of an acute hip fracture. Further discussion around the factors which drive change and reasons for successful implementation will be presented.

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OP 6-4
Lessons from India fragility hip fracture audit: the need for a health systems approach to bridge evidence practice gaps

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An epidemic of fragility hip fracture looms in developing economies. Health policy makers have the potential to prevent the looming disaster by learning from the experience of integrated care pathways [ICP] in the UK. The authors draw upon two studies in India, a fragility hip fracture audit to determine evidence practice gaps and a care seeking behaviour study to identify barriers to ICP. A mixed methods study collected data from 3 healthcare providers, patients, carers in Delhi. All patients aged ≥50 years admitted to these hospitals over a 10-week period were recruited. Patients’ data were collected at admission, discharge and 30-day post injury. Eleven key informant interviews and 4 focus group discussions were conducted with healthcare providers. Descriptive data for key quantitative variables were computed and qualitative data were analysed and interpreted using a behaviour change wheel framework. A qualitative study on care seeking behaviour for 30 fragility hip fracture was conducted in 7 healthcare facilities in Odisha, India. Data was categorized using NVIVO software and analysed by thematic analysis.

Results: A total of 136 patients, 74 (54%) men and 62 women, with hip fracture were identified in the 3 hospitals and only 85 (63%) were admitted for treatment with a mean age of 66.5 years (SD 11.9). Of these, 30% received surgery within 48 hours of hospital admission, 95% received surgery within 39 days of hospital admission and two (3%) had died by 30-days of injury. None had orthogeriatric care. Only 10% had falls assessment and received medication for osteoporosis. According to the health care providers, inadequate resources and overcrowding prevent adequate caring of the hip fracture patients. Participants in the care seeking behaviour study perceived hip fracture injury will heal on its own, does not require surgery and were unaware of the consequences of this injury. The delay from time injury till accessing care varied from few hours to months. People with a hip fracture and their relatives have strong faith and belief in traditional health care system, i.e. traditional bonesetters within their local community.

Conclusions: This exploratory study provides estimates of evidence practice gaps and insight into health systems and behavioural issues beyond in-hospital care pathways. The findings underline the need for health systems strengthening and public education as a prerequisite to enable an environment to adopt ICP.

OP 6-5
Outcome after hip fracture in the new millennium

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A consecutive series of 2,435 patients with a hip fracture admitted to a single centre over a six year period were followed up till one year from injury. Surviving patients were evaluated by a telephone survey at one year for the degree of residual pain, regain of mobility and social independence using a specific hip fracture assessment method. The mean age of the patients was 81 years, 31% were male. 99% were treated surgically. The one year mortality was 26%. The mean pain score in the hip was 1.7 on a scale of 1-8. This corresponded on the pain scale to occasional and slight pain in the hip and may sometimes take mild analgesia such as paracetamol. Mobility was assessed on a 10 point scale. The mean score on admission was 3.2, corresponding to the occasionally uses of a walking aid when out walking. At one year the mean score was 4.6 corresponding to normal use of one or two walking sticks or aids. Mean social independence score on admission was 2.8 on a scale of 0 to 6. This corresponded to requiring moderate assistance at home more than twice a week but less than seven times a week with some activities of daily living such as bathing, washing or heavy housework. At one year the mean score had increased marginally to 3.5.

This study clearly documents the current outcome after hip fracture treated by contemporary
The present day outcome after a hip fracture is not as bad as has been reported before

OP 6-6 The international diffusion of best practices to improve the care of patients with fragility hip fracture

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With the increasing burden of chronic diseases associated with old age, health systems will have to find solutions to help the elderly stay healthy longer, while mitigating the increase in healthcare costs. These issues are relevant for fragility fractures as they represent a significant share of health care costs worldwide. Since the late 1980s, orthopedic surgeons and geriatricians have championed the adoption of a national-level hip fracture audit in combination with clinical guidelines to optimize healthcare quality and costs. These best practices, first developed in Sweden and the United Kingdom (U.K.) are now diffusing internationally. Given concerns over the consequences of an aging population, a growing number of epidemiological studies evaluate the relative merit of these best practices. Outside of the biomedical literature, there is, however, no account of the factors driving the cross-national diffusion of hip fracture audits. Drawing on theories of policy diffusion, we consider this issue more broadly by probing new hypothesis emerging from the data. Also, we provide public health specialists additional evidence on how medical knowledge translates into actual practices. Substantively, this study infomes the health policy of emerging nations such as India or China, whose elderly population is predicted to rise rapidly in the near future. Our analyses to examine the influence of parameter uncertainty on the base case results. Outcomes were discounted at a rate of 3%.

Results: In the base case analysis, we calculated ICERs for Denosumab treatment compared with Alendronate as ¥6,332,046 per QALY (US$57,564 per QALY). We ran the model with different combinations of age and BMD. For 70, 80, 85 year-old women with BMD of 60% of the YAM, the ICERs were ¥4,102,555 (US$37,295), ¥3,68,638 (US$33,015) and ¥4,102,555 (US$37,295) per QALY, respectively.

Conclusions: We judge cost-effectiveness according to the suggested value of social willingness to pay for one QALY gain in Japan at US$50,000. We find that Denosumab was not as cost-effective as weekly Alendronate in the base case analysis. Denosumab can be a good value in osteoporotic elderly women with BMD of 60%. These results were sensitive to the efficacies of drugs (relative risk of fragility fracture). For cost-effectiveness, treatment with Denosumab can be considered for a more selective population based on higher age and lower BMD.

FREE PAPER SESSION 7

OP 7-1 Frailty status predicts falls in older women: a study in the Osteoporosis Prospective Risk Assessment (OPRA) cohort

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Introduction: With aging comes an inevitable functional decline in the musculoskeletal and other organ systems. Frailty can be considered a state of higher vulnerability that puts an individual at higher risk for adverse health outcomes including fractures and mortality. Since almost every second woman will suffer a fracture by age 80, a vicious circle of frailty, falls, and further fractures can develop. One way of preventing fractures may be to identify those frailest women who are vulnerable to falls for personalised fracture management.

Methods: We calculated lifetime costs, quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios (ICERs) using a Markov model among hypothetical cohorts of osteoporotic Japanese women with prior vertebral fractures at the age of 75 with a bone mineral density (BMD) of 65% of the young adult mean (YAM) over a lifetime horizon. We estimated ICERs of Denosumab treatment for five years compared with weekly oral Alendronate treatment for five years in the treatment of osteoporotic elderly Japanese women at high risk of hip fracture. The model was condition of a patient and accounts for fracture and mortality. We estimated calculations for a hypothetical cohort of 1,044 women, from Malmö, all aged 75 at baseline.

Results: Frailty increased, equivalent to an annual progression of 0.7% over 10 years (0.17; 0.24; 0.30 at 75y, 80y and 85y). Balance, muscle strength and polypharmacy differed between the least and most frail women (all p<0.001). Falls were significantly more common among the highly frail women at baseline compared to the least frail (14.2% vs 45.2%; p<0.001). This trend was observed also at follow-up at age 80y (26.8% vs 41%, p=0.012) and age 85y (38.2% vs 63.6%, p=0.017).

Conclusion: Assessment of frailty may be an important instrument in fracture management to prevent or minimise falls in community-dwelling older individuals.

OP 7-2 Planning the trauma week – variation in hip fracture presentations through the week

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Introduction: Hip fracture is the commonest reason for an older person to need emergency admission to hospital and prompt emergency anaesthesia and surgery is associated with improved outcomes. Seasonal and diurnal variation in hip fracture incidence is well recognised, but we set out to examine how numbers of people presenting with a new fracture varied across the days of the week.

Methodology: The National Hip Fracture Database (NHFD) collects data on all over 60 year olds with hip fracture in England, Wales and Northern Ireland. In this study we examined data for 2015 – identifying the date on which patients first attended the Emergency Unit or presented to the inpatient orthopaedic team with a hip fracture.

Results: A total of 64,848 patients presented to 177 hospitals during 2015. Their mean age was 83 years, and 72% were women. The total number of patients presenting on weekdays (47,577) was 10.2% higher than we recorded at the weekend: 8,848 on Saturday and just 8,432 on Sunday. This pattern was not apparent when data for individual hospitals were examined, indeed the proportion of patients presenting on a Sunday varied across the week, p<0.01, but varied between 7.3%.
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OP 7-4
Mortality in patients treated with cemented or uncemented hemiarthroplasty – A nationwide study from the Danish Interdisciplinary Registry for Hip Fractures

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Introduction: Hemiarthroplasty (HA) is widely used for displaced femoral neck fractures in the elderly and this study compares mortality after treatment with cemented and uncemented HA in hip fracture patients above 65 years. Methods: The study is a population-based cohort study with data from 2004-2013 reported to the Danish Interdisciplinary Registry for Hip Fractures (DIRHF). The primary outcome was death after 1 day, 2-7 days, 8-30 days, 31-365 days, and 1-5 years. Cox regression analyses were performed adjusted for age, sex, Charlson Comorbidity Index (CCI), Body Mass Index (BMI), and medication. Multiple imputation was performed on BMI due to 29% missing values.

Results: There were 8,751 uncemented HA and 8,532 cemented. There were respectively 1.2% and 0.8% mortality within the first postoperative day and 95% Confidence Interval (CI) of 1.48 (1.10;2.00). In addition, patients above 85 years old, male sex, increasing CCI, treated with antihypertensive or antibiotics had significantly higher HR within the first postoperative day. After one week, there is no difference comparing cemented HA with uncemented HA and after one month the HR is 0.82 (0.72;0.92), after one year 0.86 (0.80;0.93), and after 5 years 0.97 (0.92;1.02).

Conclusion: Cemented HA has a higher rate for perioperative death compared to uncemented HA but this changes after 1 month where cemented HA have lower risk of death up to 5 years after surgery.

OP 7-5
High failure rate after internal fixation and beneficial outcome after arthroplasty in displaced femoral neck fractures in patients 55 to 70 years. 2713 patients treated with internal screw fixation, bipolar hemiarthroplasty or total hip arthroplasty from the Norwegian Hip Fracture Register

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Introduction: The treatment of patients between 55-70 years with displaced intercapital femoral neck fracture remains controversial. We aimed to compare the impact of two surgical options, THA and bipolar hemiarthroplasty, with a control group treated with IF, a simple stabilization method. Patients treated with THA or IF were more satisfied than patients treated with HA. This selection bias should be considered when interpreting the outcome.

Conclusion: This study showed higher reoperation rate after IF and better functional results after both THA and HA with medium follow-up. Patients selected to HA represented a frailer group than patients treated with THA or IF. This selection bias should be considered when interpreting the outcome.

OP 7-6
Using clinical audit to improve hip fracture care in Ireland: The Irish Hip Fracture Database (HIFD)

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Aim: The aim of the HIFD is to use clinical data to optimise surgical, medical, nursing, rehabilitation and secondary prevention care for all hip fracture patients in order to achieve maximal recovery for patients with hip fractures and to prevent further falls and fractures. It is modelled on the UK NHFD, which demonstrated that the synergy of care standards, audit and feedback drive measurable improvements in hip fracture outcomes including mortality and cost of care. In 2016, 3,610 patients over the age of sixty were hospitalised with a hip fracture in Ireland. The acute hospital care costs are in excess of €45 million and growing. This doesn’t include the long term costs of rehabilitation, convalescence, community care and long term care. The HIFD is a clinically led, web based audit of hip fracture casemix, care and outcomes. It is supported by the Irish Gerontological Society (IGS) and the Irish Institute of Trauma and Orthopaedics (ITOS) and the National Office of Clinical Audit (NOCA) provides governance and operational support for the HIFD. The most recent HIFD report 2015 published in 2016 is comprised of data from 2,962 hip fracture cases from all 16 hospitals. The coverage of the data for 2015 was 81%. The mean length of stay was 20 days and the median length of stay was 13 days in 2015. Preliminary data for 2016 shows the coverage has increased to 86.5%.

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and 20% across the country. To cross check this unexpected result we have subsequently examined Health Episode Statistics (HES) data from hospital patient administration systems for the same year. This independently collected data confirmed our finding, with just 12.3% of cases presenting on a Sunday.

Conclusions: These finding might have resulted from poorer capture of patients presenting at weekends. However, we approached the 20 units in which the weekend pattern was most marked to question whether this might reflect problems with data quality at weekends. Most described rigorous processes to identify new cases, and none accepted that their weekend patients would be missed. Confirmation of our result using HES data suggests that this variation warrants further study so that its causes and the implications for hip fracture prevention are to be understood. This pattern contributes to our observation that half of all new hip fractures present between 8am and 8pm Monday to Friday – something that doesn’t include the data for 2015 was 81%. The mean length of stay was 20 days and the median length of stay was 13 days in 2015. Preliminary data for 2016 shows the coverage has increased to 86.5%.
The 2015 report showed that 70% hip fractures were female, 83% patients were admitted from home and 48% were independently mobile, 37% fractures were intracapsular displaced, 72% of medically fit patients received surgery within 48 hours, 36% of arthroplasties were cemented, 39% of patients were reviewed by a geriatrician at any time during their admission but only 15% pre-operatively and 30% patients were discharged directly home. Along with the annual report, each hospital is issued with its own hospital report comparing performance against the national data. Quarterly reports are sent to each hospital and hospital group also. Each hospital has a clinical lead and a data coordinator are supported to utilise their live data locally to continually make improvements in care. A national facilities audit underway. In 2017, the focus continues to be on improving data quality and increasing coverage nationally to 100% for all sites. To ensure all suspected hip fracture patients should be brought directly to the trauma operating hospital. Each hospital should establish a hip fracture working group to review and utilise the IFHD data locally to improve patient care.

**OP 7-7 Implementing your FLS program: what works and what doesn’t work**

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**Introduction:** The aim of this study was to identify and determine the extent to which effective steps to change were and were not present in the implementation of the Kaiser Permanente Southern California Healthy Bones Model of Care as perceived by physician champions and Healthy Bones Care Managers.

**Methods:** The subjects in the study included 20 Physician Champions and 35 Healthy Bones Care Managers employed in the Kaiser Permanente Southern California Healthy Bones Model of Care. The instrument for interviewing was an email interview.

**Results:** Each participant was asked to respond to a set of nine standard questions. The results of their written responses were used to develop a set of themes characterizing steps and procedures thought to be particularly effective in support of a change initiative, and those thought to be particularly ineffective or counterproductive.

**Conclusions:** These steps will greatly increase the likelihood of success and long-lasting sustainability of a Disease Management Program. The results of the study also support effective guides for healthcare reform initiatives at the national, corporate, and medical center levels. At this time there are many opportunities for the incorporation of Disease Management Programs in many avenues. Proponents of improvements to any healthcare system can use recommendations from this study to remove obstacles and barriers to change and foster supportive participation from involved health care professionals.

**FREE PAPER SESSION 8**

**OP 8-1 Functional outcomes in total hip arthroplasty: a matched cohort study between neck of femur fractures and osteoarthritis**

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**Introduction:** Total Hip Arthroplasty (THA) is gradually becoming commonplace in the management of neck of femur fractures. The total number of THA has increased by 33% from 2007 to 2015, with 4.5% of all THA performed in 2015 due to traumatic neck of femur fractures. There is also a recent randomized controlled trial that shows THA having superior functional outcomes compared to hemiarthroplasty. However, there are fewer studies directly comparing the functional outcomes of patients receiving THA for neck of femur fractures against a matched elective cohort of osteoarthritis patients. We set out to determine the comparison in functional outcomes between these groups.

**Methods:** A total of 33 patients with neck of femur (NOF) fractures in our unit were treated with a THA (Trauma cohort). This was compared with an age and sex-matched cohort of a randomly selected group of 31 patients who underwent THA for osteoarthritis (OA) electively (Elecctive cohort).

The end point of the study was the post-operative functional outcomes, using the Oxford Hip Score (OHS) tool. The OHS was documented at the 8 week and one year follow up reviews. Patients with poor documentation of their OHS were surveyed over the telephone. The post-operative complications that developed were also studied.

**Results:** A total of 23/33 and 22/31 patients in the trauma and elective cohort respectively, responded. The average OHS score documented was done at the 5 month post-operative time period. The OHS in both cohorts were the same at 40.6 and 40.3 in the trauma and elective cohort respectively. There was no significant difference between the two.

There was a single case of THA dislocation in the trauma cohort that was treated with revision surgery. There were no complications noted in the elective group. There were also 3 patients that reported a subjective leg length discrepancy, in the trauma cohort, compared to 1 patient, in the elective cohort. One patient died within a year in the trauma cohort, with no mortalities recorded in the 30-day period.

**Conclusion:** Patients receiving THA for both traumatic NOF fractures and OA have the same functional outcomes at the 5-month follow up period. THA is recommended in a select group of patients sustaining a neck of femur fracture, as per current national guidelines.

**OP 8-2 The estimated need for DXA scans, epidemiology, treatment and complications of long bone fractures among older adults in Stavanger region**

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**Introduction:** Implementing DXA scans to patients with long bone fractures (LBFs) and age ≥ 50 years, requested an estimation of the additional DXA scan referrals to our hospital. The epidemiology of these fracture patients, treatment and any complications was also analyzed.

**Methods:** The Fracture Registry in Stavanger (FRES) includes all LBFs managed by Stavanger University Hospital, which provides all fracture management to a population of 360 000 people, 18 000 age ≥ 50 years, both in rural and suburban areas. LBFs in patients age ≥50 years (older adults) in the period 2009.01.01 to 2015.12.31 were included. The follow-up time was ≥ 1 year. The most commonly AO segments fractured and intention to treat, were analyzed. The negative outcome was measured as the conversion-rate to operative treatment for the nonoperative managed LBFs; and the amount of non-intended re-operations ≥1 for the operative managed LBFs. Taking into account the prevalence of impaired cognition/dementia, we calculate referral rate of 85% to DXA scan.

**Results:** A total of 10.820 LBFs were registered, giving an incidence of 143/10.000/year. The most frequently reported LBFs were in distal antibrachial (30%), proximal femur (29%), ankle (14%) and proximal humerus (12%). Female patients outnumbered the males in a ratio ≥1. Fractures in proximal humerus (88%), distal

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OP 8-3

Changes in basic patient-related characteristics of older hip fracture patients during eight years of orthogeriatric collaboration

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Introduction: As a part of development and implementation of orthogeriatric collaboration in the care of older hip fracture patients at Seinäjoki Central Hospital, Finland, systematic population-based data have been collected including the basic baseline patient-related characteristics. The aim here was to compare the patient-related characteristics between the later and earlier half of the eight-year orthogeriatric collaboration.

Methods: The data comprise 1644 consecutive patients aged 65 years and over and sustaining their first hip fracture during the follow-up period between 2007 and 2015. Seinäjoki Central Hospital is the only hospital in the area providing trauma surgery for a population of ca 200 000. The basic baseline patient characteristics were compared between patients sustaining their hip fracture in 2012-2015 (n=803) and in 2007-2011 (n=841) using the Mann-Whitney, Pearson’s chi-square of Fisher’s exact test.

Results: The median age of the patients was 84 years in both the first and the second half of the follow-up. Compared to the first half, the proportion of male patients was greater (29% vs.23%; p=0.034) in the second half. The patients in the second half were more likely to have American Society of Anesthesiologists (ASA) scores 1-3 (79% vs. 73%; p=0.001) and prefracture diagnosis of memory disorder (30% vs. 25%; p=0.006). They were also more likely to live in their own home with or without organized home care (73% vs.67%; p=0.001). There were no significant differences in the number of regularly taken medications or in the mobility level of the patients when categorized as independent or assisted only.

Conclusions: Within the older, hip fracture patients appeared to have less severe health conditions at least when measured by the ASA scores. The number of regularly taken medications also did not increase. The proportion of memory disordered patients increased which may in part reflect improvements in the diagnostics. The greater proportion of patients living in their own home could be a result of the ongoing changes in the service structure of the Finnish health and social care, where the proportion of long term institutional care has been reduced. Male hip fracture patients are known to have poorer prognosis compared with their female counterparts. The observation of the present study on the increase in the proportion of male hip fracture patients calls for more efforts to improve their outcomes.

Abstracts

OP 8-4

Can user-involvement help bridge the gap in the osteoporosis continuum?

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In future healthcare systems individuals are expected to be more involved in managing their osteoporosis and prevent fragile fractures. Healthcare systems therefore require a paradigm shift in the way healthcare services are delivered to counteract demographic changes in patient populations and the increasing complexity of healthcare by making use of the latest technological advancements. This presented study reports from an inter-scientific, cross-sectional and multi-disciplinary collaboration of three sub-studies covering a continuum of osteoporosis from individuals diagnosed with osteoporosis but with no experienced symptoms to individuals with severe fractures caused by osteoporosis. User-involvement in development of solutions to cover needs was focus in the collaborative study.

The aim of the study was to identify needs for users to be able to perform self-management in the osteoporosis continuum and to demonstrate a method to cover these needs by user-involvement. All three sub-studies used participatory design (PD) as the overall research design. In the presented collaboration we describe the first and second phase of the PD process where focus is on identifying needs (phase 1) and designing a solution to these needs (phase 2). A qualitative approach guided the research process and data analysis. Data in the first phase was generated from field studies (80 hours), interviews (n=67) and focus groups (n=5). Subsequently, workshops (n=10) were conducted based on the identified needs and with representatives of all users on the osteoporosis continuum.

Data from the first phase from all three sub-studies revealed the following needs among individuals: tailored and targeted information, and knowledge about osteoporosis in the different stages of the osteoporosis continuum; what to expect in order to manage osteoporosis, and how to live your life with or without fracture. In all, individuals needed: ‘The right information – at the right time – for the right patient’. In the second phase user-involvement can help identify needs and address these needs in the development of novel technology-based healthcare services and thereby help bridge the gaps in the osteoporosis continuum.

OP 8-5

Bone geometric properties of the femoral neck in underweight eumenorrhoeic women

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Thin individuals are at risk of low bone mass and incidence of osteoporotic fractures. Underweight women with constitutional thinness seem to present low bone mass and selective bone structural impairment without a clear description of their hip geometry. This study aims to compare the femoral neck (FN) geometry among eumenorrhoeic young women.

Material and methods: A total of 36 women aged between 20 and 35 years were evaluated. Twelve individuals with preserved physiological menses had low BMI (<18.5 kg/m²) and 23 were healthy control women (18.5≤BMI≤25kg/m²). FN geometry was determined for all participants using DXA (GE Healthcare, Lunar iDXA System, 0) and included an evaluation for cross-sectional area (CSA, mm²), sectional modulus (Z, mm³), moment of inertia (CSMI, mm⁴), buckling ratio (BR), neck-shaft angle (deg), and strength index(SI). Bodycomposition was also measured by DXA including lean mass (LM; kg) and fat mass (FM; kg,percentage).

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### Results:

Mean BMI of underweight women was 17.6±0.4kg/m² vs 20.5±1.7kg/m² in healthy control women (p<0.05). Age and height did not differ significantly. Underweight women had significantly lower body weight (p<0.001), LM (p<0.01) and FM (p<0.05). The geometry assessment of FN revealed a CSA, CSMI, and Z that were significantly lower in underweight women (p<0.05). The difference between both cohorts of participants was -14.2%, -19.8%, and -18.6% for CSA, CSMI, and Z respectively, SI, BR, and neck-shaft angle did not differ significantly between the two groups (p>0.05). BMI was positively correlated to CSA, CSMI, and Z (r=0.435, p<0.05). BR and SI did not correlate respectively) and to neck-shaft angle to CSA, CSMI, Z (r=0.611, r=0.576, r=0.575; p<0.01 respectively) and to neck-shaft angle (r=0.343, p<0.05). BR and SI did not correlate neither to BMI nor to LM.

### Discussion:

The present study demonstrates that thinness is associated with low resistance to axial forces (CSA) and bending load (Z and CSMI) in adult eumenorrhoeic women. Multivariable analysis retained LM as the main predictor of the differences observed between the two cohorts. This finding supports the view that bones adapt to reduced dynamic loads in thin women.

### Conclusion:

The implementation of interventions that promote physical activity to increase LM may be beneficial to increase FN strength in underweight women, and therefore to promote their bone health and prevent fragility fractures in them.

### OP 8-6

**Recovery from extracapsular hip fracture. A longitudinal qualitative study of patients’ experiences**

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**Introduction/Research Question:** Evaluating recovery from hip fracture is important to ensure optimum care and the best outcomes for patients. Measuring outcomes is difficult due to heterogeneity in the hip fracture population and confounders such as ageing and co-morbidities. Current consensus recommends measuring mortality, pain, mobility, activities of daily living and quality of life using the EuroQol 5 Dimension score (EQ-5D) after hip fracture. However there is currently a lack of understanding of the longitudinal experience of recovery from hip fracture and the implications that this might have for outcome measurement. The object of this study was to explore patients’ experiences of recovery in the year following hip fracture.

**Methods:** Longitudinal qualitative semi-structured interviews were conducted with eleven extracapsular hip fracture patients (six men, five women age 69-92 years) in three phases over twelve months (2, 6 and 12 months). Using thematic analysis, the data were coded and grouped into themes cross-sectionally within each phase and longitudinally across the phases.

**Results:** The findings suggested there was a sequential experience in recovery. Early priorities focused on a theme of ‘physical and functional recovery’. Later, participants focussed on recovering the ‘effect on lifestyle’ and ‘emotional response’ from the fracture. This supported participants to regain their sense of identity – adapting to and accepting the injury, in the context of their individual health and age – essential for a feeling of having recovered. Successful recovery was described as having achieved a satisfactory ‘new normal’.

**Conclusions:** This study highlighted a breadth of experience not currently included in consensus recommendations for health measurement, and that experiences continued to change across the 12 months. Findings from this study suggested that measuring outcomes with the EQ-5D up to four months post injury may oversimplify the patient’s experience of, and priorities for, recovery following a hip fracture.

### OP 8-7

**Epidemiology of hip fractures in Ukraine: results of two retrospective studies**

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**Background:** Hip fracture is one of the most serious complications of osteoporosis, which has important medical, social and economic complications. It is well known that incidence of hip fractures gradually increases with age and depends on the sex, but similar epidemiological studies in Ukraine are limited.

**Objectives:** The aim of the present study was to estimate age- and sex-specific hip fracture rates in Ukrainian population.

**Study Design:** We conducted two Ukrainian retrospective studies. The first study was performed in Vinnytsia city and contains the information from the 1997-2002 years. The second study (Study of The prevalence of Osteoporotic fractures in Ukrainian Population – STOP-Study) was conducted in 2011-2012. It was organized by Ukrainian Association of Osteoporosis with the support of the Ukrainian Association of Orthopaedics and was gathering the information about incidence of hip fractures in different parts of Ukraine. The results of this study give full information in two regions – Uzhhorod city and Vinnytsia Rayon.

**Results:** It was established that incidences per 100000 persons in both sexes progressively increased with age. At younger ages, up to 67 years, incidence rates were higher in men than in women; but thereafter they were much higher in women, almost double at the age of 80-85 years. Overall incidence of hip fracture was comparable with data from neighbouring countries (Poland and Romania).

**Conclusions:** As hip fractures are a serious health problem in Ukraine and around the world, the regional epidemiological data about hip fractures incidence is an important basis for the development of a national system of prevention and treatment of osteoporosis and its complications.

### OP 8-8

**Orthopaedic surgeons perceptions of frailty and frailty screening in the Australian practice context**

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**Introduction:** Over the past decade, there has been significant growth in the awareness and understanding of frailty among orthopaedic surgeons, in the context of osteoporotic fractures, and with it, improvements in the recognition and management of fragility fractures. Emerging as a major clinical and research focus in aged care is the concept of “frailty” and its association with sarcopenia, fragility fractures, falls and rehabilitation. Currently, research on how frailty, as perceived by orthopaedic surgeons, and the role of frailty screening in decision-making; understandings of frailty and the ability to define, identify and manage frailty are still evolving. A baseline understanding of these perceptions is needed to inform future approaches to research, education of patients and healthcare professionals and translational efforts aimed at improving prevention and treatment.

**Methods:** An exploratory qualitative design was used to conduct 15 semi-structured telephone and in-person interviews across three orthopaedic surgeon subgroups (registrars, junior and senior consultants) (mean interview time=34 minutes). Interview method was dependent on the time constraints of the surgeon. Data collection and analysis were iterative and guided by thematic saturation. Data analysis was guided by qualitative description, involved three analysts, and was inductive in nature.

**Results:** Preliminary results revealed that orthopaedic surgeons have a disparate understanding of frailty. Between colleagues, “frailty” is often referred to non-specifically to suggest a general state of risk to the patient. Frailty screening was generally regarded as unfeasible in the orthopaedic environment. Easy-to-administer frailty screening tools that are not exclusive
assessments of functional status were viewed most favourably. However these tools are rarely used.

**Conclusion:** There is little understanding among orthopaedic surgeons of frailty as a phenotype. Beliefs around the modifiability of frailty were dissimilar, as was the influence of related risk factors (such a cognitive status, chronic disease, social isolation, and environmental factors). This in turn may significantly impact on the occurrence and treatment outcomes of fragility fracture, a common orthopaedic problem in older populations. This study highlights the need for knowledge translation efforts (e.g. education) to achieve a cohesive understanding of frailty among health professionals.

**Introduction:** Postoperative delirium is the most common complication in elderly patients after hip fracture surgery. Neuroinflammation due to stress response might be a key element in the pathophysiological mechanisms to most postoperative delirium. We investigated if prophylactic high single dose methylprednisolone could attenuate the stress response and thereby lower the severity of postoperative delirium in elderly patients after hip fracture surgery.

**Methods:** We conducted a randomised, double-blind, placebo-controlled single center trial in a University Hospital in the Capital Region, Denmark. We recruited patients aged 65 years or older, who were admitted with hip fracture and able to give informed consent. We randomly allocated patients using a computer-generated algorithm (ratio 1:1) to receive either intravenous methylprednisolone (125mg), or placebo (saline) as soon as possible after admission and confirmed hip fracture. All participants, care providers, attending physicians, investigators, and data collectors were blinded to group assignment. The primary outcome was severity of postoperative delirium assessed once daily with the Confusion Assessment Method delirium severity scoring system (CAM-S long form, score 0-19 per day) for the first three postoperative days. Safety was assessed in all patients who received the intervention. Analyses were conducted as per the intention-to-treat principle. ClinicalTrials.gov: NCT02317801.

**Results:** Between Dec 28, 2014 and Mar 5, 2016, 720 patients were screened for inclusion in the study and 120 patients were randomized into the two equal sized groups. There was no significant difference in median cumulated CAM-S score between the methylprednisolone group (1 [IQR 0-6]) and the placebo group (2 [IQR 0-9.5]), p=0.294. However, the incidence of postoperative delirium (defined as CAM-S >5) was significantly lower in the methylprednisolone group (10 out of 59 [16.7%]) compared with the placebo group (19 out of 58 [31.7%]), p=0.048. Also the median cumulated postoperative fatigue score (Verbal Ranking Scale, 0-4 points per day) was significantly lower in the methylprednisolone group (5 [IQR 2-6]) compared with the placebo group (6 [IQR 4-8]), p=0.006. No serious adverse effects were observed.

**Conclusion:** Prophylactic high-dose methylprednisolone to elderly patients with hip fracture might have a preventive effect on postoperative delirium and fatigue after hip fracture surgery in elderly patients.

**Introduction:** Results of the AIM Trial were published in *JAMA* (2016). Close contact casting (CCC), a novel casting technique, was compared with open reduction and internal fixation (ORIF) surgery for the initial treatment of unstable malleolar fracture in older adults. There was equivalence between the treatment groups in terms of ankle function at the primary endpoint of 6 months. There were no differences in secondary outcomes of quality of life.
Abstracts

TO 10-3

Fraction and the Elderly Multidisciplinary Rehabilitation (FEMuR): a phase II randomised feasibility study of a multidisciplinary rehabilitation package following hip fracture

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To conduct a rigorous feasibility study for a future definitive parallel-group randomised controlled trial (RCT) and economic evaluation of an enhanced rehabilitation package for hip fracture.

Setting: Recruitment from 3 acute hospitals in North Wales. Intervention delivery in the community.

Participants: Older adults (aged ≥65) who received surgical treatment for hip fracture, lived independently prior to fracture, had mental capacity (assessed by clinical team) and received rehabilitation in the North Wales area.

Intervention: Remote randomisation to usual care (control) or usual care+enhanced rehabilitation package (intervention), including six additional home-based physical therapy sessions delivered by a physiotherapist or technical instructor, novel information workbook and goal-setting diary.

Primary and secondary outcome measures: Primary: Barthel Activities of Daily Living (BADL). Secondary measures included Nottingham Extended Activities of Daily Living scale (NEADL), EQ-5D, ICECAP capability, a suite of self-efficacy, psychosocial and service-use measures and costs. Outcome measures were assessed at baseline and 3-month follow-up by blinded researchers.

Results: 62 participants were recruited, 61 randomised (control 32; intervention 29) and 49 (79%) completed 3-month follow-up. Minimal differences occurred between the 2 groups for most outcomes, including BADL (adjusted mean difference 0.5). The intervention group showed a medium-sized improvement in the NEADL relative to the control group, with an adjusted mean difference between groups of 3.0 (Cohen’s d 0.63), and a trend for greater improvement in self-efficacy and mental health, but with small effect sizes. The mean cost of delivering the intervention was £231 per patient. There was a small relative improvement in quality-adjusted life year in the intervention group. No serious adverse events relating to the intervention were reported.

Conclusion: The trial methods were feasible in terms of eligibility, recruitment and retention. The effectiveness and cost-effectiveness of the rehabilitation package should be tested in a phase III RCT.

TO 10-4

Comparative effectiveness of nurse case-manager vs multifaceted intervention to increase osteoporosis treatment in older patients with upper extremity fracture: results of a randomized trial

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Introduction: About 10% of older patients are treated for osteoporosis following fragility fracture even though they are at high-risk of recurrent fracture. To address this secondary prevention gap, experts and guidelines recommend “Fracture Liaison Service (FLS)”. However, FLS vary widely in design, effectiveness, and costs. Therefore, we compared a nurse case-manager (3i [typeA] FLS) to a previously proven cost-saving multifaceted quality improvement intervention (1i [typeC] FLS).

Methods: We included outpatients ≥50-years with distal radius or proximal humerus fractures recruited from Emergency Departments and Fracture Clinics in Edmonton, Alberta, Canada; we excluded those already taking bisphosphonates. We conducted a randomized trial with blinded outcomes ascertainment, and compared case-managers (who saw patients in clinic, arranged and interpreted bone mineral density (BMD) tests, and independently prescribed osteoporosis treatment when indicated) to a multifaceted intervention (that included telephonic education for patients and opinion-leader based guidelines and reminders for family physicians). Primary outcome was bisphosphonate treatment at 6-months; secondary outcomes included “appropriate care” (predefined as bisphosphonate treatment or normal BMD precluding treatment or fully informed treatment refusal) and intervention costs.

Results: We allocated 180 patients to case-manager and 181 patients to multifaceted intervention. Mean ages were 73 years, 43% were female, 43% had prior fracture, and 76% presented with distal radius fracture. At 6-months, 86 (48%) case-managed patients were newly treated with bisphosphonates vs 51 (28%) multifaceted intervention patients (20% difference, Number Needed to Treat [NNT]=5, Risk Ratio [RR]=1.7, 95%CI 1.3-2.2, p<0.001). Case-managed patients were more likely than multifaceted intervention patients to receive appropriate care (76% vs 44%, p<0.001) although case-management also cost more ($65CAD per patient vs $18CAD for the multifaceted intervention).

Conclusion: A case-manager (3i [typeA] FLS) was far more effective than a multifaceted (1i [typeC] FLS) intervention for improving osteoporosis care in high-risk outpatients with fragility fracture, although this was achieved at triple the cost.

TO 10-5

Re-fracture events: results of a provincial fracture-reduction screening program

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Introduction: We sought to describe re-fracture events among fragility fracture patients screened as part of a provincial osteoporosis and fracture screening program. Baseline and follow-up data was collected on patients age ≥50 years who were referred for clinical evaluation and were found to be at high risk for osteoporosis.

Methods: This longitudinal cohort study was based on data from fragility fracture patients aged 50 years and over. All patients were screened as part of a provincial osteoporosis and fracture reduction screening program between 2007 and 2010 and consented to their data being linked to provincial healthcare administrative databases.

Results: We observed 720 re-fracture events within 5 years among 6,543 patients enrolled in...
our fracture reduction screening program. The most common re-fracture was wrist/forearm (38.6%), followed by hip (26.5%), shoulder/humerus (17.9%), pelvis (4.7%) and spine (4.4%). Although the most common re-fracture site was wrist/forearm, those with an index hip or shoulder fracture sustained more hip re-fractures. Of 90 re-fracture events in the index hip fracture group, 43 (47.8%) were another hip fracture while 21 (23.3%) were wrist fractures. Of 134 re-fracture events in the index shoulder fracture group, 55 (41%) were hip fracture while 48 (35.8%) were wrist fractures. In other major index fracture groups, wrist re-fracture was the most common re-fracture event, ranging from 38.9% of re-fracture events in the index femur group to 47.9% in the index ankle fracture group.

Conclusion: This analysis describes re-fracture events of patients screened through a provincial fracture-reduction screening program. We found that the rate of hip re-fractures in index shoulder fracture patients is almost as high as the hip re-fracture rate in hip fracture patients. This suggests a need to consider those with index shoulder fractures to be at high risk for hip re-fractures.

T0 10-6
Using national hip fracture registries and audit databases to develop an international perspective

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Introduction: Hip fracture is the commonest reason for older people to need emergency anaesthesia and surgery, and leads to prolonged dependence for many of those who survive. People with this injury are usually identified very early in their hospital care, so hip fracture is an ideal marker condition with which to audit the care offered to older people by health services around the world.

Methods: We have reviewed the published annual reports of all the established national hip fracture audit programmes, which between them cover Sweden, Denmark, Norway, Scotland, England, Wales, Northern Ireland, Ireland, Australia and New Zealand. We examine the dataset and approach used in each, and highlight the differences in case mix, management and outcomes that they profile in these different countries.

Results: The national audits provide a consistent picture of typical patients – an average age of 80 years, with 65-73% of cases being women. A third of all patients had cognitive impairment. There was surprising variation in the type of fracture, of operation and of anaesthesia and hospital length of stay in different countries. Displaced intracapsular fracture is the commonest coded fracture type, but the proportion of patients with this injury varied from 29-49% in different countries. Use of hemiarthroplasty did not entirely parallel this variation in fracture coding, but showed a very similar degree of overall variation. Rates of arthroplasty cementing ranged 70-97%. Sliding hips screws accounted for around a quarter of operations, but use of intramedullary nails varied 7-36%. Spinal anaesthesia ranges between 27-95% and general anaesthesia from 5-70% in different countries. Up to 9% of cases were classified as ‘other’. All of the audits reported over half of patients as having ‘severe systemic disease’; grade 3 using the American Society of Anaesthesiologists’ (ASA) grading. Surgery within 48 hours ranged from 74-95%, and successful mobilisation by the first post-operative day ranged 55-90%.

Conclusions: These national audits provide a unique opportunity to compare how health care systems of different countries are responding to the same clinical challenge. This review seeks to encourage the development and reporting of a standardised dataset to support future international collaboration in healthcare audit.
Abstracts

Introduction: Hemiarthroplasty for hip fracture is a common surgical procedure. A number of distinct approaches are used to access the hip joint. The most commonly used are the lateral, and the posterior approach (PA). The PA can be performed with or without repair of the joint capsule and other muscle and tendon sparing modifications. There is no consensus on which approach to use despite differences in outcomes. Choice of approach is frequently based on surgeon preference, rather than evidence. Historically, recommendations have been based on dislocation rates, however in light of technical advancements these may no longer be appropriate. Outcomes such as post-operative function and length-of-stay may be considered more important in the modern context. This is a pertinent time to explore the existing literature.

Methods: A scoping review is a framework-guided approach to reviewing research evidence. It may be used: to examine the range and nature of research activity; determine the value of undertaking a full systematic review; summarise and disseminate findings; and to identify gaps in the literature. Using systematic methods we searched for studies that reported outcomes following hip hemiarthroplasty using the PA. Studies reporting the following outcomes were considered: dislocation, mortality, pain, activities of daily living, functionality, health-related quality of life, length of stay, surgeon assessment of difficulty, adverse events. MEDLINE, EMBASE and The Cochrane Library were searched to March 2017. Relevant information was extracted and synthesis of the retrieved data followed a basic content analytical approach.

Results: A total of 33 studies were retrieved: 30 observational studies and 3 randomised trials. Three studies described an approach modified with modified PA. Three studies examined the PA in specific patient groups. The vast majority of studies were based at single sites. Larger samples using multi-site and national registry data have emerged in recent years. Reporting of technique standardisation and outcomes is inconsistent. Conclusion: This scoping review suggests that the existing evidence is heterogeneous in nature and not of a sufficient quality to appropriately inform practice recommendations. High quality experimental rather than observational designs are indicated to establish the effectiveness and adverse consequences of new surgical techniques.

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**Methods:** One hundred and one older patients scheduled to have orthopaedic surgery to correct a fractured neck of femur were recruited into this prospective study. Informed consent was obtained from the patient or their next of kin. Patients were excluded from the study if they had been transfused iron or blood preoperatively. After a pilot study evaluating the methods of bone marrow collection the surgical fixation techniques studied were limited to hemi- or total arthroplasty and proximal or trochanteric femoral nail. Preoperative blood tests, full blood count, iron studies including ferritin, soluble transferrin receptor, C reactive protein, urea and electrolytes and hepoidin levels were taken. Bone marrow samples were collected from the first reaming of the femoral canal at time of operative fixation of the neck of femur fracture. Bone marrow reamings were assessed by a haematologist blinded to the patients blood test results and clinical history and graded for iron stores using both “Gale’s” and “intensive methods”.

**Results:** Bone marrow suitable for examination was analysed in 54 of the 101 patients. Of these 54 patients, 18 (33%) were absolutely iron deficient (Gale’s > 0 or 1). When assessed by the “intensive method” all patients were at least functionally iron deficient. Mean (s.d) preoperative haemoglobin was 121(17)g/L, ferritin 255 (268)ng/mL and CRP 59 (54)mg/L. Only 5 patients had a ferritin of <30ng/mL, 4 were anaemic and 2 of these patients had their born marrow adequately assessed. 1 was and 1 wasn’t iron deficient by Gale’s method. 24 patients had ferritin 30-100ng/mL and all of these had an elevated CRP (>5mg/L), 5 of these were iron deficient by Gales method, 4 were not and the remainder could not be adequately assessed.

**Conclusions:** At least functional iron deficiency when assessed by bone marrow examination is almost ubiquitous and poorly predicted by traditional methods utilising ferritin and CRP.
Abstracts

Assessment and management of delirium in older patients admitted to orthopaedic wards
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Introduction: Delirium is a common and serious problem for hospitalised, older patients. The prevalence of delirium in patients undergoing surgery is 10-50%. Delirium is associated with adverse outcomes, such as prolonged hospitalisation, permanent cognitive impairment and death. Mortality can be as high as 37%. We aimed to assess if patients over 65 years, admitted to orthopaedic wards in a district general hospital, were at risk of delirium and managed according to NICE and trust guidelines. The aim being to improve the diagnosis and management of delirium amongst the multidisciplinary team.

Method: This was a prospective study of 50 patients over the age of 65 years admitted to orthopaedic wards between May and August 2016. Diagnoses included fractured neck of femur (46%), septic arthritis, elective total hip replacement, traumatic head injury and other fractures. Mean age was 82 years and 58% were men. A data collection tool was created based on our standards: the NICE and trust guidelines.

Results: 66% of patients underwent surgical intervention, 30% were managed conservatively and 4% were referred to a specialist centre. Mental state was not documented on admission in 50% and a baseline AMT-10 was not performed in 60%. Drug and alcohol withdrawal was not assessed for in 80%. There was no medication review in 30% and a falls risk assessment was only done in 68% of patients. In 20% of the patients, it was not documented if they required sensory aids, or they were not provided.

Conclusions: As a department, we must improve our risk assessment and methods of preventing and managing delirium. A key aspect of this is increased reporting of mental status on admission using verified tools, such as AMT-10 and CAM. To help achieve this, a delirium checklist was piloted across the orthopaedic wards, alongside introducing teaching sessions for the multidisciplinary team. Orthogeriatrician input in improving the diagnosis and managing delirium would also help in early diagnosis and management. To improve awareness, visual aids such as posters on delirium have been utilised and staff have been encouraged to give out written information to patients and relatives. The audit findings were presented during the orthopaedic clinical governance meeting and surgeons are now encouraged to discuss delirium as a complication during the consent process. We aim to re-audit later this year to assess the impact following our interventions.

Perioperative management by a critical care team improves the mortality of Japanese elderly patients with hip fractures
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Introduction: Hip fractures in elderly patients greatly influence their life. Patients with a high mortality. The 1-year mortality rate after hip fracture has been reported be 10-20%. The number of patients with hip fracture has increased with the increase in the elderly population in Japan. Therefore, treatment strategies for these patients have become essential. With our critical care team, we have performed a comprehensive perioperative treatment for patients with hip fracture since 2010. Herein, we discuss the perioperative management and findings from morning and evening rounds. We aimed to assess cooperation with the critical care team for perioperative management to improve 1-year postoperative mortality in elderly patients with hip fractures.

Method: After 2006, 142 patients aged ≥60 years underwent operation for hip fracture and were eligible for the study. We followed them up for 1 year. We separately examined 93 patients treated by the critical care team (group C) and 49 patients treated only by orthopaedic surgeons (group O). In group C, the physicians examined the patients with hip fracture twice a day, and performed additional examinations and immediate treatments as necessary. In group O, other orthopaedic surgeons treated the patients as in routine clinical practice and consulted other physicians when needed. Comorbidities on admission, and 1-year survival rate were investigated. We compared survival curves between the two groups by using the Kaplan-Meier method.

Results: The distribution of comorbidities between groups C and O was as follows, respectively: malignant tumours, 21 cases in each group; diabetes, 23 and 11 cases; cardiovascular diseases, 45 and 19 cases; and respiratory diseases, 7 and 3 cases. The 1-year survival rates were 89% in group C and 80% in group O (p=0.9). In the Kaplan-Meier method, cooperation with the critical care team for perioperative management improved the 1-year postoperative mortality in the elderly patients with hip fractures.

Conclusion: Various approaches have been undertaken to improve the mortality of patients with hip fractures, although we have few good solutions. The decreased mortality rate in group C might indicate the efficacy of perioperative management for elderly patients with hip fractures in cooperation with the critical care team. We could evaluate the patients’ conditions timely and start appropriate treatments quickly by omitting complicated consultation with other specialists.
Introduction: With an aging population, an increasing number of patients are presenting with a fractured neck of femur (NOF) and concurrent multiple co-morbidities. Two scoring systems developed to predict morbidity; mortality and long-term outcomes are the Physiological and Operative Severity Score for enUmeration of Mortality and morbidity score (POSSUM) and the Nottingham Hip Fracture Score (NHFS). Our study set out to identify the developing trends in patients presenting with a fractured NOF using the POSSUM score and NHFS.

Methods: Data was retrospective collected on all 139 patients operated on with a fractured neck of femur between two periods of study in 2011 and 2014.

Results: The results demonstrated a significant increase in both the POSSUM score and the NHFS between 2011 and 2014 (mean POSSUM score 35.39 vs. 40.19 respectively, P=0.001, 95% CI -6.94 to 2.66 and the mean NHFS 3.63 vs. 5.19 respectively, P=0.001, 95% CI -2.01 to -1.12).

Conclusion: Our study demonstrated that patients presenting with a fractured NOF are physiologically more unwell year on year. We believe that more research needs to be done to predict and prevent fractured NOF. These patients need a multidisciplinary team approach with combined active involvement from orthopaedic and sand orthogeriatrics.

Introduction: Fiona Stanley Hospital (FSH) is a tertiary hospital in Western Australia which operates on all hip fractures within the area health service. Novel oral anticoagulant medications (NOACs) are increasingly being used in WA since they were listed on the Pharmaceutical Benefits Scheme for the management of Atrial Fibrillation. There are no evidence based guidelines specifically available for managing hip fracture patients on these medications. This audit compares patient characteristics and outcomes of patients on NOACS compared to warfarin and all other patients with a hip fracture.

Methods: FSH participates in the Australian and New Zealand Hip Fracture Registry and additionally has a digital medical record which makes auditing additional information reliable. 625 consecutive patients with a hip fracture between June 1st 2015 and 1st June 2016 were audited and data collected on medications, eGFR, Haemoglobin and blood transfusion.

Results: Of the 625 patients 29 (4.6%) were on a NOAC. 35 (5.6%) were on warfarin, 213 were on an antiplatelet (34.0%) and 348 were on no antiplatelet or anticoagulants (55.7%). Detailed analysis will be presented however preliminary analysis suggests significantly more patients on warfarin had polypharmacy and reduced eGFR compared to all other groups. The median time to surgery from admission to FSH was 19.9 hours for those on no antiplatelet or anticoagulant medications, 20.4 hours for those on antiplatelet medications, 23.9 hours for those on Warfarin and 39.4 hours for those on a NOAC. Preliminary analysis has not demonstrated any difference in perioperative blood loss or transfusion rates or acute length of stay. Differences in 30 day mortality rates will be further analysed and presented.

Conclusions: The increased use of NOACS presents challenges in the management of patients with hip fracture. This audit demonstrates that these patients are delayed in time to surgical fixation. Further analysis of other outcomes including 30 day mortality will be presented and discussed.

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P E-1.19 New oral anticoagulants (NOACs) in surgery for fractured neck of femur (NOF) Sheard A., Chatterjee A., Perera S. Royal Berkshire Hospital, Reading, United Kingdom

Introduction: In recent years, several NOACs have been introduced. These are mainly used for prophylaxis against stroke in patients with atrial fibrillation (AF), and in the prophylaxis/treatment of venous thromboembolism (VTE). Patients who sustain a NOF fracture have a higher rate of NOAC use than age-matched controls. However, data on the incidence of intraoperative and perioperative bleeding in patients on NOACs is currently scarce, and this leads to difficulty in deciding on the appropriate timing for surgery, especially as only dabigatran currently has a reversible agent.

This audit was done to look at any bleeding complications, requirement for blood transfusion in relation to the timing of the surgery in patients on NOACs.

Methods: The National Hip Fracture Database and electronic discharge letters were used to select all patients admitted to the Royal Berkshire Hospital with a NOF whilst on a NOAC between 1st January and 30th June 2016.

Results: Six of the eight patients were female, with an average age of 89.3 years and AF as the most common indication for a NOAC. The most common operation was a dynamic hip screw (62.5%), and 62.5% of patients were operated on within 36 hrs of admission. 82.5% of patients sustained a drop in haemoglobin (Hb) and haematocrit, with 3 patients requiring blood transfusion of 1 unit post-operatively. 87.5% of patients had a post-op Hb of <120g/l. Interestingly, half of the patients had a pre-op INR >1.1, with 25% of patients having a pre-op platelet count of <150. Five patients were discussed with haematology. In three cases, haematology recommended holding the NOAC 48h before the procedure, but in the other two cases the advice was that the NOAC could be stopped just 24hrs or less before the procedure. No major bleeding episodes were noted in patients who had had their NOAC stopped 24hrs or less before the procedure.

Conclusion: Although this study has a small sample size, it provides a useful snapshot of the peri-operative course of this cohort of hip fracture patients during a six month period at a large

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P E-1.20 Perioperative management of oral anticoagulants in patients with hip fracture Rognone M.1, Ranalli C.1, Poldieri G.L.1, Curcio M.2, Cammilli A.2, Cartee A.2

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242 patients were enrolled from January 2012 to June 2016. Mean age was 85 years. 27 patients were treated with direct oral anticoagulants and 215 were treated with warfarin. The most frequent indication for oral anticoagulation therapy was atrial fibrillation (n=169) and the fracture of the proximal third of femur was the most common (n=192). The mean time to surgery was 4.3 days and mean duration of hospital stay 16.5 days. The hospital mortality rate was 3.3%. 148/215 in warfarin treated group received vitamin K whereas 67 did not. The incidence of postoperative complications in patients treated with vitamin K was comparable to that of patients not treated, except for deep vein thrombosis that was more frequent in the first group (12% vs 0.5%, p=0.0004). The group that received vitamin K showed a lower latency between entry into hospital and surgery (3.8 vs 5.6 days, p<0.0001) and a lower hospital mortality (2% vs 5.9%). 26 patients were suffering from atrial fibrillation in the direct oral anticoagulants treated group, only 1 from deep vein thrombosis. The mean time to surgery was 4 days and 1 patient died (3%). There was no significant difference between the warfarin treated group and direct anticoagulant group in terms of hospital stay and mortality. Bridging anticoagulation treatment was administered to 215 patients (107 received therapeutic-dose and 18 received low-dose). Enoxaparin sodium was used in 48.8% . There was no significant difference between the two group in the indication for anticoagulation therapy. We found a longer time to surgery in patients with therapeutic doses (5 vs 3.7 days, p=0.0002), but hospital mortality and length of hospital stay were not different between the two groups.

192 patients with hip fracture treated with warfarin were compared with 283 controls The mean age of the two group was similar (84 vs 83) and there were no differences with regard to comorbid, except for heart failure that was more frequent in the first group (28% vs 10%, p<0.0001). We found a longer time to surgery (4.2 vs 2.65 days, p<0.0001), a higher length of hospital stay (16.9 vs 14.6 days, p=0.0022) in the first group. The mortality rate was similar in the two groups. A higher incidence of postoperative anemia (34% vs 9%, p=0.0001) and delirium (30% vs 19%, p<0.0001) was observed in the warfarin treated group.

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District General Hospital in UK. It demonstrates that bleeding episodes, transfusion requirements and HA persist as a consequence of surgery. NOAC treated surgery were not significantly different in these patients compared with the average for NOF patients who were not on a NOAC. Further larger studies are required to gather evidence to guide clinicians regarding the optimal peri-operative management for patients on a NOAC.

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PE-2.21 Are we offering our elderly hip fracture patients enough hydration? A sprint audit assessing pre-operative fluid resuscitation Charty J., Hmun M.

Royal Devon and Exeter NHS Foundation Trust, Trauma and Orthopaedics, Exeter, United Kingdom

Introduction: During preparation for hip fracture surgery, hydration status plays a crucial role in avoiding complications. The elderly are particularly vulnerable with an estimated prevalence of 30% presenting with water loss dehydration at any one time. Pain, delirium and prolonged fasting before surgery are associated with reduced oral fluid intake increasing the risk of perioperative organ hypoperfusion and cardiovascular instability.

The aim of this project was to audit our institution’s current practice of prevention and treatment of pre-operative dehydration in hip fracture patients, identify areas for improvement and implement change.

Methods: Case notes and blood test results of all consecutive hip fracture patients admitted during a two-week period in January 2017 were retrospectively assessed. Date and time of admission, time to theatre, amount of pre-operative fluid administered orally and intravenously, calculated 24-hour fluid balance, four-hourly observations, duration of fasting time, last time of oral fluid intake before surgery and the percentual rise in serum creatinine since admission were recorded. Standards from NICE guidelines, SIGN

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PE-2.18 Current prescribing practices of antihypertensive medication in patients with hip fracture: an observational study Chong J.1, Seymour H.2

1St John of God Healthcare, Rehabilitation and Aged Care, Midland, Australia; 2Fiona Stanley Hospital, Palmyra, Australia

Introduction: Hypotension in the elderly is a known risk factor for mortality. Orthostatic hypotension in hip fracture patients, particularly in the peri-operative setting, has also been studied as a potential risk factor for complications and poorer outcomes in rehabilitation. We examined current prescribing practices of antihypertensive medications in the setting of hip fracture, as a response to observed blood pressure measurements in the peri-operative setting.

Methods: An audit was conducted of all patients admitted to the orthogeriatric unit of a tertiary hospital with a neck of femur fracture in October 2016. Medications on admission, and on discharge if admission was prolonged were examined.

Results: 49 patients were admitted with neck of femur fracture in October 2016. Complete information on medications at admission and discharge was available for 46 records. 35 patients were on antihypertensive medication on admission; 12/35 patients had their medications altered from aging could help estimating the concomitant bone alterations.

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and published guidance on reducing risks in cemented hip arthroplasty were used. Results of a pre-departmental audit on fasting times carried out in 2016 were used for comparison.

Results: 18 patients were identified in the study period. Pre-operative intravenous fluid prescription was confirmed in all patients with at least 1 litre of crystalloid solution. However, 10 patients were starved for more than 6 hours, 6 of whom being fasted from midnight but only being taken to theatre in the afternoon.

Patients were not being offered oral fluids up to 2 hours before the operation as they were being starved from midnight. We implemented change by introducing a new placard by the patients’ beds specifying the planned date for surgery, last time allowed for food and milk (6 hours before surgery), stating peri-operative intravenous fluids as per the instructions and asked the on-call team to agree on the estimated time of surgery for each patient.

Conclusion: Although being a first step towards improving pre-operative strategies, this audit may help minimise the risks associated with dehydration in a hip fracture admission.

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Proximal femur morphology in Japanese elderly patients was studied.

Methods: The hundred hips were measured anatomical variables using of full limb CT. The average neck-shaft angle was 128° and the distance from the sub capula line to the subchondral bone on a line parallel to the femoral neck axis (FNA) was approximately 25mm at the superior and inferior borders of the femoral neck. The cross section of the femoral neck forms a reverse right triangle. A new device has three sliding screw with triangle barrel locking type dynamic hip screw, named TresLock (Kasco, Co. Japan). From August 2016 to March 2017, ten consecutive patients with hip fracture were treated with this new device.

The mean age of the patients was 71.1, and one man and nine women. The average of operation time was 76 minute, and bleeding was 48.8ml.

Results: All patients have decreased a pain after operation immediately. All fractures healed within 12 weeks. Radiographic analysis at healing revealed no loss of reduction, no uncontrolled collapse of the neck, no nonunion and no important failures. There was no virus malposition seen in the remaining ten fractures.

Discussion: The appropriate selection of surgical treatment for femoral neck fractures remains controversial. Although the Swedish registry data demonstrates that the use of hemiarthroplasty has increased whereas internal fixation decreased over the last two decades, internal fixation is still a valid option for displaced fracture treatment.

Conclusion: A new device appears to be a reliable treatment for the femoral neck fractures of Japanese elderly patients. Its design provides for stability against rotation and angle stability to the shaft. This device will become the standard treatment for all femoral neck fractures of Japan.

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Quality improvement project – Why are outcomes for fractured neck of femurs (NOFs) sustained as inpatients worse than those that present via the emergency services?

Malik A., Paling E., Malik R., Simons A.
Heart Of England Foundation Trust, Birmingham, United Kingdom

Introduction: We developed a new device for the femoral neck fractures. A design of this device was appropriate positions and spacing of hip screws for multiple-screw femoral neck fracture fixation, which outlines quality standards. The National Hip Fracture Database (NHFD) have 8 criteria that must be met to achieve Best Practice Tariff (BPT). There is no pathway for patients who sustain these fractures as an inpatient.

Goal: To identify patients who sustain a NOF as an inpatient and compare their pathway to those presenting to A&E with a suspected NOF. NICE Guidelines state that all patients with a fractured NOF should have; surgery within 36 hours, Ortho-geriatric input within 72 hours and pre/post-operative cognitive assessment. Suspected fractured NOF's should receive analgesia within 30 minutes and clinical examination and x-ray within 60 minutes.

Methods: We included all NOFs in the trust (Heart of England Foundation Trust) sustained as an inpatient in 2016 (1st January–31st December). We reviewed the time taken for doctor to review, time to analgesia, time to x-ray, time to theatre, time to Ortho-geriatric review and 30 day mortality. Data was collected from electronic records and case notes.

Results: 13 patients sustained a NOF fracture as an inpatient in the past 12 months, this is 1.5% of all NOF's. NOFs in our trust were reviewed within 1 hour of the fall, 75% had been reviewed within 4 hours of the fall. For the remaining 25%, we were unable to determine the time taken for a doctor to review due to inadequate documentation. No patients received analgesia within 30 minutes, and no patients had an x-ray within 1 hour. Two patients were managed conservatively due to severe medical problems, both died within 30 days of the fall. 11/13 patients were managed surgically. 4/11 patients were operated within 36 hours of fracture diagnosis. The rest waited longer than 36 hours for surgery, the longest wait was 41 days as the patient was not medically fit for theatre. Mortality at 30 days was 30% compared with 7% for those sustaining a NOF as an outpatient.

Conclusion: A separate pathway for patients who sustain NOFs as inpatients is required, to identify those with serious injury, ensure prompt analgesia, x-ray and a quicker transit to theatre. Mortality rates for inpatient NOF’s are higher as the patients have more medical problems and are often unwell at the time of falling. This contributes to delays in time to theatre and worse outcomes.
PE 2-3
Percutaneous osteoplasty for the treatment of painful osteochondral lesions of the ankle in ischmic conditions
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Introduction: After treatment for talar allograft, it is uncommon to find osteochondral lesions (OCLs) of the ankle in ischemic conditions, such as complex regional pain syndrome (CRPS) or thromboangiitis obliterans (TAO, Beurger’s disease). Chart review was performed to evaluate the results of percutaneous osteoplasty (POP) for the treatment of the OCLs in the ankle.

Methods: The candidates were selected from patients with constant and aggravated pain after weight bearing, such as walking or standing for a while, following treatment for talar allograft. POPs were performed under fluoroscopic and endoscopic guidance after confirmation of the OCLs of the ankle by plain film, computed tomography or magnetic resonance imaging, or bone scans.

Results: Nine patients received POPs with hydroxyapatite at the talus (7) and distal tibia (2). The underlying diseases were CRPS (7) and TAO (2). Immediately after the POPs, the ankle pain after weight bearing positions was significantly reduced (median visual analogue scale score; from 7.5±1.8 to 2.7±1.5). There were no complications related to the procedure.

Conclusions: It is important to recognize the hidden OCLs in chronic ischemic conditions combined with talar allograft. POPs allowed ambulation after immediate pain relief.

PE 2-4
Symptomatic thrombo-embolism risk for immobilised lower leg injuries: to treat or not to treat?
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Background: Thromboembolism prophylaxis strategies for patients immobilised for lower leg injuries vary greatly across Europe. Recently attention has been paid to risk stratification with increasing use of prophylaxis. Symptomatic DVT/PE rates have been reported as high as 2.99% in some studies.

Methods: We performed a retrospective analysis of any patients who were rigidly immobilised for a minimum of 6 weeks. Every NHS provider within a 50 mile radius was accessed to capture any patients who may have suffered a symptomatic event.

Results: Results covered 1000 patients over an 18 month period with M:F ratio (12:13) and ages between 18 and 88 (mean: 49). Of the patients studied, 6 suffered a symptomatic DVT during their treatment (0.6%) whilst 1 suffered a fatal PE (0.1%).

Conclusions: This study has shown a significantly lower rate of symptomatic DVT and PE than previous studies. Implications: Limitations of this study include analysis of symptomatic events only as well variable thresholds in local departments to image suspected DVTs/PEs. Nevertheless from our results, the low rates of symptomatic thromboembolism raise questions over the drive to offer prophylaxis.

PE 2-5
The difference between short and long intramedullary nailing for unstable intertrochanteric femoral fracture in elderly patients
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Introduction: The purpose of this study was to analyze the radiological and clinical outcomes in elderly patients with unstable intertrochanteric femur fractures in accordance with the length of intramedullary nailing.

Methods: Between August 209 and December 2014, a total of 139 patients – older than 65 years of age with AO/OTA classification of 31-A2 unstable intertrochanteric femur fracture – who has been followed-up for at least 1 year after the treatment with internal by using an intramedullary nail were enrolled for this retrospective control study. The subjects were classified into two groups according to the length of intramedullary nail: 106 patients in the short group (group I) and 33 patients in the long group (group II). For radiological assessments, the reduction state, time to union, and implant related complications were examined. The clinical outcomes were assessed by preoperative hemoglobin, operating time, intraoperative bleeding amount, blood transfusion rate, hospitalization period, and Charney hip pain scoring system at the final follow-up.

Results: The postoperative radiographs showed good or acceptable reduction in all cases. The mean time of radiologic bone union was 4.8 months, and there was no difference between the two groups. With respect to surgical time, the group II was found to take longer (57.87 minutes) than the group I (45.65 minutes) (p=0.003). The bleeding amount during surgery of the group II was greater (288.78ml) than that of the group I (29.90ml) (p=0.046). The clinical results at the final follow-up were found to be satisfactory in both groups.

Conclusion: In cases of good reduction of the fracture from the treatment of unstable intertrochanteric femur fracture accompanying the posterosmedial fragment in elderly patients, both groups – long and short intramedullary nails – showed satisfactory radiological and clinical outcomes.

PE 2-6
Compliance with time to surgery in femoral neck fracture patients qualified for total hip replacements
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Introduction: In 2011, NICE guideline recommended that elderly patients presenting with a displaced intracapsular fracture neck of femur (NOF) should be offered total hip arthroplasty (THA). If they were able to walk independently out of doors without no more than the use of a stick, not cognitively impaired and medically fit for anaesthesia and the procedure. We evaluated the percentage of these patients with displaced intracapsular fracture suitable for THA, have met the standard for time to surgery set by Best Practice Tariff (BPT) or NICE guideline in our institution. We then assessed whether admissions at weekends, or under a non-hip arthroplasty surgeon has a significant impact on surgical waiting time.

Methods: This is a single centre, retrospective study over a two-year period. The percentages of patients with displaced intracapsular fracture NOF qualified for a THA who had surgery within 36 hours (BPT) or 48 hours (NICE) were calculated. The length of surgical waiting time from weekday admission was compared with weekend admission. We then repeated this comparison with admission under a hip or a non-hip arthroplasty on-call consultant.

Results: 61 patients (13 Male, 48 Female) who were eligible for THA were operated at our institution. Within 48 hours and 72 hours, this represented 7% of all fracture NOF cases (n=890). Overall, 70.5% of these patients were operated within 48 hours and 54% within 36 hours. The average surgical waiting time was 34 hours. At weekends, these numbers dropped dramatically to only 48% within 48 hours and 76% within 36 hours. Statistically, admission at weekends had significantly longer surgical waiting time (33 vs 50 hours, p value <0.001). Patients admitted under a non-hip arthroplasty on-call consultant also had to wait significantly longer for their operation. This was wholly due to longer surgical waiting time at weekends (21.8 vs 56.5, p value=0.002). 46% of these operations were transferred to elective lists to achieve an acceptable time to surgery. The rate of complications was 5.5%.

Conclusion: Proportion of THA compared to hemiarthroplasty within the time frame is challenging, and could only be achieved on weekdays by displacing elective surgery patients. We raise the questions as to whether extending the BPT time frame to NICE guideline would result a greater proportion of these eligible, to be offered THA, without adversely impacting elective services or affecting their outcome.

PE 2-7
Mismatch between the design of conventional femoral stems in hip arthroplasty and the hip morphology in the elderly Asian hip fracture population
Siow J., Kwek E.
Tan Tock Seng Hospital, Orthopaedic Surgery, Singapore, Singapore

Introduction: The morphology of the proximal femur is known to differ in various population groups. Based on our clinical experience, conventional femoral stems used in hip arthroplasty have measurements that do not fit the Asian population. Hence, this study aims to evaluate the suitability of conventional femoral stems in the elderly Asian hip

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Fracture population requiring hip arthroplasty. Our secondary aim is to evaluate for gender and age related differences within the study population.

Materials and methods: We analysed, retrospectively, radiographic data of 300 patients from a local restructured hospital's geriatric hip fracture database who underwent either hip hemi-arthroplasties or total hip arthroplasties. Proximal femoral morphological measurements were recorded using our institution's radiographic software. These results were analysed and compared to that of commonly used femoral stem implants in our hospital. Subgroup analysis was performed to compare age and gender related morphological differences of our patients.

Results: The range of values of medial femoral offsets for femoral stem prostheses are generally larger than the range of that for our population as a whole and when compared to different gender and age groups. 18.3% of the study population have medial femoral offsets less than 30mm, which is the smallest available offset for the implants that were studied. In terms of gender, 22.6% of female and 3% of male subjects have medial femoral offsets that were smaller than 30mm. In our subgroup analysis, male subjects had significantly larger femoral head diameters (p<0.0001), medial femoral offset (p<0.0001) and vertical femoral offset (p<0.0001) when compared to female subjects. Older subjects from 75 to 90 years old have significantly smaller femoral head diameters (P<0.03), vertical femoral offsets (P<0.002) and neck shaft angles (P<0.03) compared to younger subjects from 60 to 70 years old.

Conclusion: Commonly used conventional femoral stem implants in our local setting have measurements that do not suit our Asian hip fracture population, in particular patients with small medial femoral offsets. In addition, there are significant differences in morphology based on age and gender.

PE 2.9 Treatment of subtrochanteric femoral fracture with long proximal femoral nail antirotation Kim K.S., Won Y.Y.2

1Hanyang University, Orthopaedic Surgery, Daejeon, Korea, Republic of; 2Ayu University, Orthopedic Surgery, Suwon, Korea, Republic of

Purpose: Good results of the cephalomedullary nails have been reported in proximal femoral fractures recently. Based on length of nails and shape of screws fixed in a femoral head for proximal fragment fixation, Various designs of implant were used. The purpose of this study was to evaluate the clinical and radiological results of a long proximal femoral nail ant rotation II (Long-PFNA II) for the treatment of comminuted subtrochanteric femoral fractures.

Methods: Twenty-one consecutive patients with severe subtrochanteric femoral fractures who had undergone intramedullary fixation using long-PFNA II between March 2010 and March 2013 were followed-up for over 12 months. Their mean age was 64.8 years old. According to Seinsheimer’s classification, 5 cases were type IV and 16 cases were type V. For radiological assessment, time to union, change of neck-shaft angle, sliding length, tip apex distance (TAD) and leg length discrepancy (LLD) were measured. For clinical evaluation, a modified Koval index was investigated.

Results: All the 21 subtrochanteric fractures healed uneventfully on an average of 24.2 (18-30) weeks. An average decrease of neck-shaft angle was 4.5°. The average sliding length of the helical blade was 4.2mm. Average LLD was 3.0mm, and TAD was 22.0mm. Mean modified Koval index score at final follow-up was 4.6 points. Mean operation time was 96 minutes. The range of motion in hip and knee remained intact in all of our patients. Malunion happened in 3 patients, 10-degree internal rotation in 1 patient and 1 centimeter limb shortening in 2 patients.

Conclusion: According to the result of this study, it can be drawn that MIPO is a simple and effective method of fixation for comminuted fractures of long bones. It has a high rate of union with minimal complications. Infection is rare, and malunion or any deformity is incredibly infrequent. MIPO appears to be a promising and safe treatment alternative for comminuted fractures.

PE 2.10 Fixed volar angle plate: A useful tool to achieve better functional and radiological outcomes in extraarticular fractures of lower end of radius as compare to K wire fixation Jagdev S.S.

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Introduction: Fractures of distal radius are the most common fractures of upper extremity with no clear guidelines for intervention. Few trials have compared the benefit of volar plate fixation with other stabilisation techniques like percutaneous K wire fixation. Purpose of present study was to compare open reduction internal fixation with use of volar plate with percutaneous fixation for the treatment of extra-articular distal radius fractures, laying emphasis on better functional and radiological outcome.

Methods: A prospective study was performed at our institution. 45 consecutive patients with extra-articular radius fracture treated with either K wire (n=21) or volar plating (n=24) were analysed. Clinical and radiographic assessments were conducted at end of six months after surgery. Outcome was analysed on the basis of range of motion, DASH scores and radiological parameters.

Results: Patients in the plate group showed faster union, and lower DASH scores at six months. At six months the mean DASH score was 2.35 in plate group as compared with 5.20 in K wire group (p=0.0431). Patients in plate group had greater range of motion than patients in K wiring group. K wire group had 6 complications (3 had pin tract infection, 2 had radial collapse, 1 had DRUJ subluxation) with respect to plate fixation group in which one patient had tenosynovitis.

Discussion: On statistical analysis, we found that fixed angle volar locking plate fixation used in extra-articular fractures of lower end radius gives better functional outcomes as compared to K wire fixation. The plate provides a stable construct upto remodelling phase of fractures as compared to K wire which are removed at 4-6 weeks and have potential to distort the fracture fixation.

Abstracts

Poster Presentations

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Abstracts

Introduction: To evaluate outcome after cementless bipolar hemiarthroplasties using a standard(tapered, rectangular) stem for the treatment of Type A2 or above intertrochanteric fractures in elderly patients.

Methods: We reviewed the records of 37 patients who underwent bipolar hemiarthroplasty between February 2006 and February 2010 in our hospital who were followed for more than two years after surgery. The mean patient age was 73.5 years old (range 65~88 years old), 16 patients were men, and 21 patients were women. We evaluated the results by analyzing operation time, amount of bleeding, recovery of walking ability, complications and radiographic findings.

Result: The mean operation time was 75.3 minutes. The average total amount of bleeding was of 755.5cc. At the last follow-up, 27 patients (72.9%) had recovered more than 80% of their pre-injury Barthel Index values. Complications included a deep infection in one case, 1 cases of acetabular erosion, 3 cases of greater trochanter non-union. There were no revisions due to prosthesis loosening or another reason.

Conclusion: Cementless bipolar hemiarthroplasty using a tapered, rectangular stem can be an alternative treatment for type A2 intertrochanteric fractures in elderly patients so as to achieve earlier mobilization.

Olecranon fractures: A new fragility fracture?

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Abstracts

Fixation of greater trochanter using an AO Trochanteric Reattachment Device (AO TRD) in arthroplasty for intertrochanteric femur fracture of elderly patients

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Introduction: The purpose of this study is to evaluate the efficacy of the trochanter reattachment device (TRD) as a firm internal fixation method for bipolar hemiarthroplasty in unstable intertrochanteric femur fracture for elderly patients over 65 years old.

Materials and methods: From September 2014 to April 2015, 19 patients (M/F: 1/18) over 65 years old were treated with bipolar hemiarthroplasty using the TRD and a bone fixation method for intertrochanteric femur fracture with above Evans-Jensen classification 2nd (above AO/OTA A1.3). They were followed up for more than 12 months (12-29 months).

Results: Out of 19 patients, only one had loosening of the TRD plate and reoperation was performed. There was no dislocation after surgery. Complete fracture union was observed in 19 patients with follow up of more than 12 months.

Conclusion: In bipolar hemiarthroplasty for intertrochanteric femur fracture, TRD produced easy and firm fixation. Additional fixation with TRD restoring abduction force by union of greater trochanter can be a good choice of surgery for avoidance of dislocation and chronic pain due to trochanteric non-union after arthroplasty.

Keywords: Femur, Intertrochanteric fracture, Trochanteric reattachment device, Hip dislocation, Hemiarthroplasty

Proximal femoral nail anti-rotation and gamma proximal femoral nail in intertrochanteric fractures

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Introduction: The purpose of this study was to compare the curative effect of Proximal Femoral Nail Antitrotation (PFNA) with a Gamma
Proximal Femoral Nailing (GFN) for the treatment of intertrochanteric fracture of the femur.

**Materials and methods:** This study compared 58 cases of 57 patients who were treated by PFNA from June 2013 to February 2015 with 60 cases of 58 patients who were treated by GFN from July 2011 to May 2013. The mean duration of follow-up was 17.2 months (range: 12-31 months). All the fractures were classified according to the AO/ASIF systems. The operative time, the average number of days of hospitalization, the amount of bleeding, the incidence of complications, the union time as assessed on radiologic examinations, the tip apex distance (TAD), the outcome according to the Cleveland index, the change of the neck shaft angle and the amount of sliding at the end of follow-up were compared between the two groups.

The clinical outcomes were compared according to the mobility score of Parker, Palmer, Jensen. The results were analyzed using the Student T-test and chi-square tests.

**Results:** There was no significant difference in blood loss during surgery, the number of hospitalization days, radiographic bone union in blood loss during surgery, the number of nail.

**Conclusion:** Fragment fractures of the pelvis (FFP) are increasing frequency and some cases are requiring an operative management. But now there were not correct methods for fragility fractures of the pelvis. We used classification by Rommens, and treated by operative four cases of fragility fractures of the pelvis. We used spinal system.

**Methods:** Between January 2014, and April 2016, five patients with FFP were treated with iliac screw and connected rod. The mean age of the patients was 84.0 (range of 81 to 86). Fracture patterns were three cases of FFPs IVa, and two of Ila. The patient is placed in the prone position with only small bilateral longitudinal skin incisions to the pelvis. The iliac screws of spinal system were inserted from the posterior superior iliac spine to the anterior inferior iliac spine. Each two iliac screws were connected two rod parallels. All of cases were used teriparatide after operation.

**Results:** Surgery was performed 5 to 22 days after injury. Surgical time was averaged 85 minutes, and blood loss averaged 135.6ml. All patients were started sitting immediately after operation. Fractures healed within 12 weeks. Two cases were delayed surgical wound, but there were not major complications.

**Conclusion:** Fragility fractures of the pelvis were difficult to treatment. Our method for FFP was minimally invasive and able to fix. Patients were able to decreasing pain and walk quickly after operation.

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Abstracts

PE 2-22
Thoracic vertebral fractures causing cardiopulmonary resuscitation in two cases of severe kyphosis patients
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Complications of cardiopulmonary resuscitation have been reported in several studies and rib fractures were reported most frequently. Sternal fractures were the second. However, there were only a few reports about thoracic vertebral fractures. In our country, a number of elderly patients are increasing and also of patients who have severe kyphosis. We experienced two cases of thoracic vertebral fractures causing by CPR recently.

Case 1: 84 years old female. She fell unconscious while walking and surroundings called for ambulance. There was no evidence of trauma in her spine. CPR was performed during transportation and she was resuscitated before arriving. On the next day she died and AI showed severe hemotherox on the right side. In this case, she had a severe kyphosis and Th9 fracture was severe.

Case 2: 92 years old female. She fell unconscious and surroundings called ambulance and they started CPR. She was resuscitated once before arriving our hospital, but she became CPA again. AI showed thoracic vertebral fractures which was DISH type deformity and severe kyphosis was severe. There were also multiple rib fractures and hemotherox on the left side. The mechanism of this type of fracture is that chest compressions cause extension force for thoracic spine with kyphosis and result in vertebral extension fracture. In these cases, if we succeed to resuscitate patients, severe spinal cord injury will be remained. In order to prevent this injury, we should pay attention to patients who have severe kyphosis and improve the position when we undergo CPR.

Conclusion: Our study demonstrated that over two-thirds of older adults reported fracture-related pain and/or limitations at, or beyond, six months post-fracture. We suggest that health care providers ask questions about post-fracture pain and/or limitations when assessing fracture status beyond six months.

PE 2-23
A comparison of hip fracture patients with concurrent upper limb injuries and those with an isolated hip fracture
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Introduction: Concurrent upper limb injuries can occur with hip fractures but little is known about how often this occurs or the effect it has on patient outcomes. A retrospective study was performed, looking at 820 patients with a hip fracture and reviewing the number and types of upper limb injuries sustained. The acute and rehabilitation hospital length of stay and patient outcomes were then compared in patients with concurrent upper limb injuries and those with an isolated hip fracture.

Methods: All patients over the age of 55 years admitted to Fiona Stanley Hospital between February 2015 and June 2016 with a minimal trauma hip fracture are prospectively identified and have a baseline dataset recorded. The electronic x-ray system was searched for all of these patients and any upper limb injuries identified. These included - wrist, shoulder, elbow, clavicular and acromial fractures and shoulder dislocations sustained which would affect weight bearing status and ability to participate in rehabilitation. Comparisons were made in acute length of stay and length of stay in inpatient rehabilitation. Outcomes recorded at discharge from acute care and at 30 days included death and place of residence.

Results: Of the 820 patients admitted with a hip fracture between February 2015 and June 2016 34 patients (4.3%) had concurrent upper limb injuries (CULI). Preliminary analysis demonstrates that patients with a CULI had a lower mean ASA 2.67 (SD 0.59) compared to 2.88 (SD 0.6). Dementia rates were also noted to be lower in CULI patients – 29% vs 38%. The proportion of nursing home residents were lower in CULI patients 21% vs 47%. The two groups had a similar acute length of stay noted in Fiona Stanley Hospital. Rehabilitation time almost doubled in CULI patients 34.5 vs 17.8 days. The crude mortality rate was lower in CULI population at time of discharge 3% vs 6% and at 30 days 9% vs 11%. On discharge from the acute ward, the proportion of patients requiring in hospital rehabilitation was higher in CULI patients 81% vs 56%. 30 days after discharge, there was a higher proportion of CULI patients still requiring rehabilitation – 38% vs 5%.

Conclusions: A concurrent upper limb injury is infrequent in hip fracture patients. Overall patients who experience a concurrent upper limb injury were previously higher functioning than the average hip fracture patient and required longer stays in inpatient rehabilitation than patients with an isolated hip fracture.

PE 2-24
Specially designed brace for the treatment of osteoporotic vertebral fractures
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Introduction: The treatment of osteoporotic vertebral fractures is still controversial. What kind of brace should we choose? How long does it put on? When can we allow patients to walk? Which is better, a doctor’s visit or hospital stay? Aged people are unwilling to wear braces because of its inconvenience and discomfort. We made some refinement to our conventional hard brace. Patients were successfully treated with the brace.

Methods: 69 patients with OVs were treated in our hospital from Aug. 2014 to Jul. 2015. 62 patients were hospitalized, immobilized with hard brace within one week and began to walk after braking. Physiotherapy was started as soon as possible at bedside. Hard brace was specially designed. It was made by soft plastic with quick-drying inner material. Patients can take shower with the brace. Therefore, they can wear it almost all day for initial 2 months. We reviewed hospitalized 62 patients. Compression ratio, kyphotic angle andVAS were also evaluated.

Results: 61 patients were treated successfully. One patient had to take BKP because of pseudoarthrosis. Compression ratio and kyphotic angle were deteriorated 18.4% and 7.6 degrees respectively at one year after injury. The final VAS was 2.1. 92% of all patients answered for our questionnaire that they were satisfied with this treatment.

Conclusion: Hard brace specially designed for all day use were comfortable for patients. Clinical
results were good enough for this injury. We strongly recommend at least 2 months complete immobilization. 1 week bed-rest after injury was enough for pain control. Hospitalization with early started physiotherapy were also helpful in avoidance of disuse atrophy and joint contracture.

PE 2.25
Mini-invasive retrograde tibiotalocalcaneal nailing for treatment of distal tibia malunion and nonunion in elderly patients with compromised soft tissues and severe comorbidities: case report and literature review

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Introduction: The treatment of fragility fracture of the distal tibia is challenging and osteosynthesis is associated with high rate of complications such as nonunion and malunion. Optimal management of this complications occurring in elderly patients is unclear. We report a case of an eighty-year-old women with nonunion of a distal tibia fracture treated with percutaneous tibiotalocalcaneal nailing and propose a literature review of surgical alternatives.

Methods: An eighty-year-old woman was treated for a distal tibia malunion and nonunion with ankle arthritis. Due to oblitative arteriopathy and compromised soft tissues, one stage percutaneous hindfoot arthrodesis and nonunion management was performed using T2 Ankle Arthrodesis Nail. Full weight bearing in a walking cast was authorized at 6 weeks post op. Systematic review was conducted on Medline, Embase and the Cochrane Library to identify salvage procedures proposed for distal tibia malunion nonunion in elderly patients with severe comorbidities.

Results: Painless full weight bearing was obtained 12 weeks after surgery and the patient returned to previous autonomy at 4 months post-op. Bone fusion was observed at 6 months post-op. No articles focused on tibial non-union in elderly patients were found and only 3 articles reporting tibiotalocalcaneal arthrodesis for salvage of tibia nonunion malunion were identified. No article describing mini-invasive procedure was found. All procedures were open arthrodesis and open nonunion takedown. Fusion was obtained in all cases, with VAS and functional score improvement at last follow-up.

Conclusion: This is the first report of a full percutaneous tibiotalocalcaneal arthrodesis for salvage of tibia nonunion malunion in elderly patient. It is an effective alternative when compromised soft tissues and severe comorbidities prevent from open arthrodesis or staged procedures. Results appear to be comparable with open procedures but need to be confirmed on larger sample of patients.

PE 2.26
Considering prophylactic fixation in contralateral femur of patients with atypical femoral fracture after six months of biphosphonate suspension and positive scintigraphy, a case presentation

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Introduction: Due to the increase in life expectancy, diseases such as osteoporosis have become a public health problem. Among drugs for treating this disorder, bisphosphonates, continue to be the gold standard. Its suspension without proper controls has triggered complications such as atypical femoral fractures. Despite the proper treatment in affected femur, controversy still remains about the adequate management in contralateral femur, specially, if radiographic signs, functional symptoms and risk factors are present.

Case Presentation: We present two patients with chronic biphosphonate consumption. In both females of 51 and 81 years old, alendronate was prescribed during 8 and 12 years, respectively. They presented a minor trauma as the cause of the fracture. X-rays were performed in both patients, finding besides fracture, cortical thickening and medial spike. MRI was performed as well, presenting bone edema and the same findings as radiographs. Uninjured side in both cases present with lateral cortical thickening without fracture. Surgical technique consisted in reaming the intramedullary canal with the purpose of removing the biphosphonate storage before fixation with intramedullary nail. Parathyroid hormone analogue was prescribed at discharge. Scintigraphy labelled with biphosphonate was performed after discontinuing medication for about 6 months, paying special attention to uninjured side. Radionucleide storage was present on lateral cortical of the uninjured side, suggesting biphosphonate deposit was still present. This findings should be considered if prophylactic fixation is planned, doing a proper patient selection and taking into account risk factors for a new fracture.

Conclusions: Chronic biphosphonate use, increases the risk of atypical femoral fractures. Although this medication improves bone mineral density and prevents the risk of fragility fractures in patients with osteoporosis, consumption of this drug should be closely monitored. We must be alert in this group of patients, to evaluate the time of consumption and the characteristic findings at image studies, to be able to take preventive measures. Information should be given about which patients are elective for drug holidays. In terms of prophylactic fixation, controversy exists. In this case we obtained a positive scintigraphy labelled with biphosphonate, after 6 months without the medication, but, although they do not have symptoms, would be candidates for prophylactic fixation.

PE 2.27
Surgical treatment of dementia patients following undisplaced femur neck fractures using PFNA
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Introduction: People with dementia have reported to have poor mobility and discharge outcomes following hip fracture. The purpose of this study was to evaluate the clinical and radiological outcomes of internal fixation by proximal femur antitration (PFNA) to dementia patients following minimally displaced femur neck fracture (MDFNF).

Methods: We studied retrospectively 19 MDFNF patients over 70 years of age who walked independently with a cane or crutches and who suffered moderate-to-severe dementia, treated by proximal femur antitration (PFNA) and followed up for more than two years. Revision, loss of fixation, complication, and walking-ability outcomes were measured.

Results: In walking-ability evaluation, patients showed an average decrease of just 0.2 levels at the final follow-up. Walking ability was evaluated from before injury to 4 weeks after surgery showed decreases of less than 0.5 levels. Radiological bone union was achieved in 17 cases; the average time duration to bone union was 4.14 months (2.5–7 months). As complications, nonunion occurred in two cases; among these, there was one case of femoral head avascular necrosis.

Conclusions: It was found that for patients with osteoporotic bone tissues in their femoral head or patients (e.g. those suffering dementia) for whom cooperating with medical workers for postoperative walking-control or rehabilitation exercises is difficult, implanting a mechanically stable spiral blade for fixation of femoral neck fractures could facilitate walking after surgery.
impossible with internal fixation and therefore it necessarily entails the adoption of double mobility or partial arthroplasty. Moreover, compared to elective arthroplasty group, the application of FT in FFNF involves some important adjustments due to the kind of surgery and the clinical-functional status of patients. These “geriatric” adjustments are fascia iliaca block, rapid recausulation, preoperative counselling to the patient/caregiver about the rehabilitation program, location, and aids after discharge. In particular, the opioid therapy is totally excluded and replaced by multimodal analgesic therapy and the rehabilitation program is adjusted according to the pre-event functional status of patient. The expected in-hospital outcomes of FT method are a rapid functional recovery and less frequent red-cell transfusion, urine catheter application, post-surgery pain, delirium, and caregiver distress. The FT method represents a new and global approach to the patients with FFNF. The transplant care of FFNF patients must be compared with other international experiences, especially in terms of efficiency.

PE 2.29 Proactive nursing intervention in perioperative management of medical complications associated with hip fractures

Jones C.1, Gupta A.2

Introduction: Hip fractures occur in elderly and have high incidence of associated comorbidities and perioperative complications which may affect their outcomes such as length of stay and mortality if not promptly identified and treated adequately. Setting: The study was conducted in a District general hospital in United Kingdom. This Unit has Orthogeriatrician led ‘medical’ approach towards proactive management of hip fracture patients perioperatively. The nursing staff attended Orthogeriatrician led ward rounds, educational meetings and developed medical and nursing care plans for various preventative and management issues for admitted hip fracture patients. Major risk categories included anaemia, infection, dehydration, delirium, depression, anemia, hypotension, severe pain, pressure sore and nutrition. Proactive approaches by senior nursing staff included checking patient’s change in mental state, rise in WC, CRP, fall in Haemoglobin, vital signs (irregular heart rate, change in oxygen saturation, falling standing blood pressure difference) which was used to prompt the doctor for early intervention.

Results: Over 4 month period amongst 50 patients studied- 10 patients required Intraavenous antibiotic, 3 required blood transfusion, 5 had medication reviewed, 4 referred to pain specialist/ other specialists, 4 referred to psychogeriatrician, 5 started on antidepressants and 8 to dietician.

Conclusion: Orthogeriatrician led Hip unit dealing with mainly hip fracture patients enables Nursing staff to predict, prevent and help doctors in early management of many reversible complications. This study suggests that a ‘medical model’ of Orthogeriatrician led hip ward has the added advantage of more focussed approach as compared from a ‘surgical’ based general trauma ward for management of all hip fracture patients. This has the potential for earlier recovery and discharge from the hospital besides reducing mortality from conditions many of which could be reversible.

PE 3.1 Falls efficacy and its relationship with early functional outcomes after hip fracture rehabilitation in a community hospital

Goh K.S.1, Chandran T.1

Introduction: It is common for the elderly to develop fear of falling (FoF) following hip fracture. FoF is known to be related to adverse outcomes including impaired functional recovery and recurrent falls. This study aims to examine self-efficacy related to falls and its association with rehabilitation efficiency following hip fracture in a community hospital in Singapore.

Methods: This is a prospective cohort study on 116 community-dwelling elderly aged ≥65 years consecutively admitted to a Singapore community hospital after surgery for fragility hip fracture. Falls Efficacy Scale (FES; range 0-100) was measured on discharge, along with functional and mobility outcomes. The relationship between continuous variables and FES was studied using Spearman’s correlation. Backward stepwise multiple linear regression was used to examine the association between the de Morton Mobility Index efficiency (DEMMI-E) and FES in Model 1, as well as Modified Barthel Index efficiency (MBI-E) and FES in Model 2; adjusting for age, pre-morbid Parker Mobility Score (PMS), Mini Mental State Examination (MMSE) score and depression.

Results: Median FES score was 26.0 (Interquartile range 13.5-47.5). The proportion of patients with FES score ≥70 was 13%. There was moderate correlation between DEMMI-E and MBI-E with FES with correlation coefficients -0.34 and -0.38 respectively (p<0.001). Multiple linear regression showed that DEMMI-E and MBI-E were significantly associated with lower log-transformed FES score with corresponding coefficients -0.39 (95%CI: -0.69 to -0.10, p=0.08) and -0.37 (95%CI: -0.63 to -0.10, p=0.007). Other factors associated with lower log-transformed FES score were pre-morbid PMS (coefficient -0.06, 95%CI -0.12 to -0.01, p=0.019 in Model 1; and coefficient -0.06, 95%CI -0.11 to -0.00, p=0.039 in Model 2), and MMSE (coefficient -0.04, 95%CI -0.07 to -0.02, p=0.001 in Model 1; and coefficient -0.05, 95%CI -0.07 to -0.03, p=0.001 in Model 2).

Conclusion: FoF is associated with adverse functional outcomes in early hip fracture rehabilitation. This warrants a need to address falls self-efficacy as a major component of assessment and intervention. It is also essential to explore the local validity and applicability of various instruments measuring FoF. Further research is necessary to examine the evolving patterns of FoF over time and its effect on long-term functional and psycho-social outcomes following hip fracture.

Abstracts

Interventions for the management of people with dementia who fracture their hip. A qualitative study

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Background: It is estimated that people with dementia are approximately three times more likely to fracture their hip than sex and age matched controls. A report by the Chartered Society of Physiotherapy found that people with dementia have poor access to rehabilitation in the community. A recent scoping review found a paucity of research in this area, indeed there has been no qualitative research undertaken with physiotherapists. In order to address this evidence gap, the aim of this current study was to determine the experiences of physiotherapists treating this population.

Methods: Semi-structured interviews with physiotherapists were undertaken in order to gain an in-depth understanding of how they manage this population. Physiotherapists were recruited from all over the UK and a purposive sampling strategy was employed. Thematic analysis was utilised.

Results: A total of twelve physiotherapists were interviewed, at which stage theoretical data saturation was reached. The participants had a broad range of experience both in physical and mental health settings. Analysis identified three separate themes: challenges, “thinking outside the box” and realising potential. Physiotherapists felt significant pressures and challenges regarding many aspects of the management of this population. Mainly this was the result of pressures placed on them by guidelines and targets that may not be achievable or appropriate for those with dementia. The challenges and importance of risk taking was also highlighted for this population with current approaches that standard treatment techniques may need adapting. “Rehabilitation potential” was highlighted as an important consideration, but challenging to determine.

Conclusion: Interventions for the management of people with dementia and hip fracture need to reflect the fact that a traditional biomedical physiotherapy approach may not be achievable.
with this population. However, physiotherapists feel pressurised to conform to this biomedical approach.

PE 3-3
Vertebral fragility fractures: co-designing solutions to promote independence and quality of life based on the needs of service users
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Introduction: Vertebral fragility fractures (VFF) affect one in six women and one in twelve men during their lifetime, costing the UK NHS more than £133 million each year (without considering medication). Pain as a result of VFF can last up to 2 years, with up to 20% having another VFF within a year. They impact on ability to do everyday activities, such as getting washed and dressed as well as stopping people going to work, often because people are afraid to move.

The aim of this study was to utilise a co-design approach with people living with VFF to identify areas of unmet need and establish whether proof of prototype devices could be co-created that addressed those needs.

Methods: A participatory and iterative approach was utilised involving ten people with osteoporosis or VFF, plus carers, physiotherapists, industrial designers, design engineers and researchers in a series of workshops.

Results: In workshop one, we immersed ourselves in the lived experiences of people with VFF, carers and physiotherapists. A series of creative activities captured these experiences visually, physically and emotionally and statements of need were defined. In the second workshop, creative activities were undertaken to generate ideas and concepts, moving from two dimensional to three dimensional visualisations. We are currently in the process of converting these visualisations into concept artefacts. The final workshop (May 2017) will develop the initial creative material for each artefact that will be promoted to a ‘Dragon’s Den’ panel of key stakeholders.

Conclusion: People with VFF report that services and support (including equipment) do not particularly meet their needs. As a diverse group of patients, carers, designers, engineers and researchers, we were able to develop prototype solutions with supporting materials that could be further developed and tested. We plan to use this work to underpin the development of a future grant application in 2017.

PE 3-8
Functional exercise for the rehabilitation of community dwelling people with dementia who fracture their hip – a feasibility study (protocol)
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Introduction: Hip fracture is a common injury, especially among older people, resulting in the estimated occupation of over 4000 inpatient beds at any time in the UK. People who fracture their hip often have multiple co-morbidities, of which it is estimated that dementia is the most prevalent. Despite hip fracture resulting in a significant decrease in mobility, there is currently insufficient evidence to either support or negate the use of physiotherapy and any evidence that is available lacks detail about the actual intervention.

The aim of this study is to determine whether it is feasible and acceptable to deliver a dementia specific, progressive, home-based functional physiotherapy programme for community-dwelling people with dementia who fracture their hip.

Methods: A multi-site, single arm, mixed and multiple methods feasibility study will be undertaken following the methodological framework stipulated in the Medical Research Council guidelines for development and evaluation of complex interventions. The study will recruit twelve to fifteen participants in order to determine the acceptability and feasibility of the intervention. Four delivery sites across the South West of England will deliver the intervention which, informed by the results of two qualitative studies, involves a dementia-specific, personalised, progressive, functional, home-based physiotherapy intervention delivered over twelve weeks with a mixture of face to face and telephone contacts. Semi-structured interviews will aim to determine the experiences of people receiving the intervention and a focus group with physiotherapists will aim to determine the acceptability of delivering the intervention. A mixed methods analysis will seek to combine qualitative and quantitative data to help answer the question of “why” the intervention is (or is not) acceptable and feasible. The study is currently under ethical review and is planned to start recruitment in June 2017.

Conclusion: This exploratory research will aim to determine whether this intervention is feasible to deliver to people with dementia following hip fracture and whether it is acceptable to those delivering and receiving it. It will also inform the design of a potential future randomised controlled trial exploring the effectiveness of this home based functional exercise for the rehabilitation of people with dementia after hip fracture.

PE 3-9
Survival after hip fracture – 5 years results of a prospective observational study
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Introduction: Hip fracture incidence is increasing due to demographic transition. Until now they are associated with poor results and high mortality rates. Data on long-term survival and the influencing factors are few. Therefore a prospective observational study was conducted.

Methods: Patients ≥60 years with hip fracture were included in this prospective study between 2009 and 2011. Apart from demographic parameter the ASA-Score, the pre-fracture Barthel Index (BI) and EQ-5D, the Mini-Mental-State-Examination (MMSE), the fracture type and type of surgical treatment were registered. Outcome parameter was survival during a five-year follow-up period.

Results: 402 patients were included. 142 (35%) survived the study period. The mortality was more than 25% in the first year after fracture. Subsequently it was between 5% and 10% per year. Risk factors for dying were male gender (p=0.004), higher age, living in a nursing home before fracture, higher ASA score, lower BI, EQ-5D and MMSE (p<0.001 each). Type of hip fracture and kind surgical treatment had no influence on survival.

Conclusion: Our results confirm poor results of geriatric patients after hip fracture. While early results might be influenced by optimal fracture care, long-term results seem to be determined by not changeable patient factors. However the fact that more than 1/3 of patients survived the 5 years justifies the elaborate treatment algorithms for these fragile patients.

PE 3-10
@ctiveHip: A home-based tele-rehabilitation program for patients with hip fracture
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Introduction: It has proven difficult to establish consensus on evidence based recommendations for rehabilitation protocols and optimal delivery of rehabilitation programs for patients with hip fracture. Home-based tele-rehabilitation programs are under development and may be a future option for some patients.

Objective: To design a tele-rehabilitation system based on a multidisciplinary rehabilitation protocol designed to improve the level of physical function in patients after acute hip fracture surgery.

Methods: This methodological study is part of a larger clinical trial conducted at the University Hospital of Granada from September 2016 to September 2017. Patients surgically treated for an acute hip fracture, with a high pre-fracture functional level (Functional Independence Measure (FIM) score ≥90), without severe cognitive impairment, absence of terminal disease, discharged to their own home or a relative’s home postoperatively, and with a signed informed consent are included in this study. Inclusion criterion for the intervention group is to have a caregiver with the ability to operate the internet and time to perform exercises and activities with the patient at home. Patients are evaluated at 4 and 12 weeks after surgery. The main variables are the functional level (FIM), quality of life (Euro-Qol), physical function (Timed Up and Go) and other descriptive data.

Results: The @ctiveHip tele-rehabilitation platform (www.activeship.es) has been developed and is currently being tested with 62 out of 70 anticipated participants enrolled. The platform is designed with a private area available for the patient to visualize videos with home exercises and activities. The training program consists of five weekly sessions (three of physical exercises and two of occupational therapy) during 12 weeks. The level
of difficulty in the exercises is determined by the time spent performing the Timed Up and Go test on the day of hospital discharge. Results slower than 25 seconds it will assign the participant to level 1, between 20 and 25 seconds to level 2 and less than 20 seconds to level 3 exercises.

Conclusion: A tele-rehabilitation system was successfully developed based on a multidisciplinary rehabilitation protocol designed to improve the postoperative functional level for patients in rehabilitation after acute hip fracture surgery. Final results are needed to determine the feasibility and utility of the @tivehip as a rehabilitation method for these patients.

PE 3-11
Risk factors of falls in Brazilian older adults with fall-related hip fracture: a cross-sectional study
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Introduction: The incidence of hip fractures due to falls increases substantially with aging. Among the survivors, less than half regain the functionality abilities previous the fracture. The physical condition post hip fracture increases the hazard of recurrent falls and fractures. The overall aim of this study was to investigate physiological risk factors of falls in post hip fracture older adults in Brazil.

Methods: This is a cross-sectional study derived from a Randomized Controlled Trial (REATIVE Study). Older adults aged 60 years or over who have suffer a hip fracture due to fall were included in this study. The physiological risk of fall was assessed using the Physiological Profile Assessment (PPA) that includes tests of vision, peripheral sensation, proprioception, muscle strength, reaction time and balance. The results of each test were computed in a specifically software developed for this assessment, generating a falls risk score. According to the score, participants were classified in two groups of risk: low to moderate and high. Also were evaluated the functionality of lower limbs (using the Short Physical Performance Battery) and falls efficacy (using the Falls Efficacy Scale, FES-I).

Participants were asked regarding the referral and rehabilitation period. A descriptive analysis and a t-test to compare means was conducted using the software SPSS. Results: The sample was composed by 49 older adults with a mean age of 77.3 (7.8 SD) and 85.7% of women. High risks of falls were identified in 73.5% of the participants and low to moderate risk were identified in 26.5%. Participants had a high-perceived fall risk (87.3%) and low lower limbs functionality (81.6%). There were no differences in physical risks of falls between groups of risk and falls efficacy (p=0.69) or for lower limb functionality (p=0.19). Approximately 86% of the participants with high physiological risk of falls were referred to rehabilitation services, but only 16.7% adhered to the treatment for more than 6 months.

Conclusion: The physiological risk of falls is high among community-dwelling older adults that sustained a hip fracture and these patients remain with poor functionality even though the later stage of fracture. Different interventions strategies should be purpose for this population, aiming increase adherence and consequently decrease the risk of future falls and fractures.

PE 3-12
Proximity and after hip fracture – first year results of a German geriatric trauma centre
Wiedemann J.

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Poster Presentations

Introduction: In Germany there are over 700,000 fragility fractures per year, which represents over 50% of patients in a trauma department. Hip fracture is included in a list of the ten most frequent diagnoses. A hip fracture tends to result in a decline of general condition and mobility. There is no comparison data pre and after hip fracture.

Methods: Patients >65 years, who incurred a hip fracture and were treated in a specialised geriatric trauma department were included. Apart from age, ASA Score, type of fracture, mobility pre and 120 days after fracture, time of admission in hospital to operation and allowed full weight bearing were registered. The figures of the first year of the German geriatric trauma regist will be added in August until the start of the congress.

Results: 120 patients were included. 7 days after surgery only 21% reached their previous mobility. Risk factors for worse mobility were higher age, living in a nursing home before fracture, ASA Score ≥3 and time to surgery more than 48 hours.

Conclusion: Our results confirm an aggravation of the mobility of geriatric patients after hip fracture. However the fact that more than 21% reach an independent agility reassure the complex orthogeriatric therapy.

PE 3-13
The influence of preoperative physical function on functional status 1 month after total knee arthroplasty
Lee S.Y., Kim B.R., Suh M.J.

Introduction: To identify preoperative physical performance factors predictive of self-reported physical function and quality of life for people 1 month following total knee arthroplasty.

Methods: In this prospective cohort study, we assessed a total of 60 patients (7 males and 53 females) who underwent a primary total knee arthroplasty (TKA). Before and 1 month after TKA, patients completed self-reported disease-specific physiologic function that was measured using the Western Ontario McMaster Universities Osteoarthritis Index (WOMAC) and self-reported quality of life measured by using EuroQOL five dimensions (EQ-5D) questionnaire.

Physical performance tests included 6-minute walk test (6MW), timed up and go (TUG) test, timed Stair Climbing Test (SCT), instrumental gait analysis for spatio-temporal parameters, and isometric knee flexor and extensor strength of the surgical and nonsurgical knees.

Results: In the bivariate analyses, the postoperative WOMAC function score had a significant positive correlation with the preoperative WOMAC function score (r=0.28, p=0.04), WOMAC pain score (r=0.30, p=0.03), WOMAC stiffness score (r=0.34, p=0.02), SCT-ascent (r=0.39, p=0.01), SCT-descent (r=0.38, p=0.01), and a significant negative correlation with preoperative peak torque (PT) extensor (r=-0.32, p=0.02) of the surgical knee, PT flexor (r=-0.42, p=0.01) of the nonsurgical knee. The postoperative EQ-5D score had a significant positive correlation with the preoperative EQ-5D score (r=0.40, p=0.01), gait speed (r=-0.31, p=0.03), and a significant negative correlation with the postoperative SCT-ascent (r=-0.34, p=0.03), SCT-descent (r=-0.37, p=0.001). In the linear regression analyses, the postoperative SCT-ascent (β=0.39, p=0.01) was a factor predictive of the postoperative WOMAC function score, and the preoperative EQ-5D score (β=0.36, p=0.04) and gait speed (β=0.34, p=0.04) were factors predictive of the postoperative EQ-5D score.

Conclusion: This study demonstrated that preoperative stair climbing ability and gait speed significantly influenced on postoperative self-reported physical function and quality of life 1 month after TKA. Using variables easily measured before surgery, it may be possible to predict with good accuracy for postoperative functional ability and quality of life after surgery, these results could be of importance in determining variable preoperative rehabilitation strategies, especially focusing on resistance exercise.

PE 4-1
Improving follow-up of fragility fracture patients within the Fracture Liaison Service
Hernbry G.1, Solanki T.2

Introduction: The Fracture Liaison Service (FLS) was formed to provide a pathway that actively identifies patients over the age of 50 years with a fragility fracture, diagnose, treat and follow-up. The vision of the National Osteoporosis Society (NOS) and Clinical Commissioning Group (CCG) was that follow-up should be completed at 16 and 52 weeks, with the view to ensure medication was commenced and adhered to, falls prevention started and if any new fractures or new secondary risk factors were present. This study reflects the systems trialled to assess the best follow-up strategy to gain this information.

Methods: Follow-up of patients was reviewed and recorded as successful, unsuccessful or declined. Every patient due for follow-up at 16 weeks was contacted, data recorded and results grouped monthly. We analysed data from April to August 2016 in cycle 1 and September to January 2016 in cycle 2. Our dataset included: bone sparing treatment, falls prevention, further fractures and advice/strategies to help improve compliance. In cycle 1 this data was collected via telephone and cycle 2 by a postal questionnaire which included a
range of response options (postal, internal mail via GP, email, telephone).

Results: 262 patients were followed-up between April and August 2016 in cycle 1, the months of April, May and July just achieved the follow up criteria of 50% set by the CCG with June reaching only a 41% success rate and August a 37% success rate. On average 50% of our patients were falling into the uncontactable list. Out of the 262 patients 105 were uncontactable, 16 declined and 14 patients were dead. In cycle 2 there were 421 patients followed up with only 87 patients uncontactable, 29 declined, 1 was not yet completed and 17 were dead. This showed an average monthly increase of around 10% of completed follow-ups, September 57%, October 64%, November 73% and December showed an 88% success rate of completed follow-ups.

Conclusion: The change of follow-up method gave a greater scope to capture patients who we could not previously reach by telephone. This showed a significant and progressive improvement in response rates and gave us a clearer understanding of the uptake and continuation of bone sparing medication, falls prevention and any future fracture risks. There is still room for improvement and we will look to see if there is an identifiable trend or patient group of those patients who are continually uncontactable.

PE 4-2
The canal bone ratio as a predictor for intraoperative femoral fractures in total hip replacement
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Introduction: The intraoperative femoral periprosthetic fractures are a complication with an incidence that goes up to 3-8% of the non-cemented primary hip prosthesis. Several risk factors have been studied in order to predict and prevent such fractures from occurring. One of them is the canal bone ratio. .49 or greater, now related to osteoporosis.

Materials and methods: In a case-control retrospective study, we retrospectively analysed all the primary non-cemented hip arthroplasties during the last 2 years, searching for all the intraoperative femoral fractures, using the lateral direct approach and the related risk factors. We collected the variables: age, gender, comorbidities, morphological-cortical index (IMC), canal bone ratio (CBR) and type of fracture using the Unified Classification System. We analysed the odds ratio, central tendency measurements and made an association analysis.

Results: In the 406 analysed cases, 25 patients presented an intraoperative femoral fracture and 381 were control cases. By the odds ratio analysis, the female gender was related (OR:2.36, RR:1.3 p= .44), age was not a related factor, the IMC less than 2.6 was not related (OR .31, RR .32 p= .01), and the CBR greater than .49 was directly related to the risk to suffer an intraoperative fracture (OR: 3.8 RR: 2.8 p=.03).

Conclusion: The CBR of .49 or greater can be a good preoperative predictor of an increased risk of intraoperative proximal femoral periprosthetic fractures in primary non-cemented hip arthroplasty. Other factors can also determinate a greater risk of intraoperative femoral fractures.

Methods: Since 2011 various methods of implementation strategies have been hosted by the ACI Musculoskeletal Network in efforts to move from the original four industry funded services to government funded services across the state. Methods include conducting a formative evaluation to understand if the model of care works in various settings, hosting of implementation efforts across primary and secondary care settings, setting up a community of practice with peer mentoring workshops, and development of data specifications for system-wide change-management.

Results: The formative evaluation revealed an overall re-fracture rate in NSW of 46.5% within two years of the first fracture. Data has shown that with full NSW system implementation of the model of care and after two full years of service provision, 242,000 fractures could be prevented over the next 10 years with as little as 10% reduction in re-fractures. With the evaluation determining the model of care can be applied to a variety of care settings in NSW, over 14 sites across the state have implemented the model of care, all with government funding. Service sites consistently report their patient cohort have a 4-5% re-fracture rate.

Conclusion: Based on the outcomes of the evaluation and implementation efforts in NSW since 2011, the NSW Government has now committed to roll-out of the model of care across all Local Health Districts in NSW in the 2017/18 financial year. Further evaluation of this strategy will be undertaken in 2018.
Rising treatment numbers of osteoporosis patients, and a new way of working together across disciplines – a result of implementing a Fracture Liaison Service programme in Region Gavleborg

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Introduction: Sweden has one of the highest incidences of fragility fractures in the world. Despite this, the number of fragility fracture patients treated with osteoporosis medication is low. Region Gavleborg has 284,586 inhabitants spread over an area of 18,199 km². Health care services are provided by 43 primary care units, 3 hospitals and 10 municipal out care units.

In November 2014 a fracture liaison service programme (FLS) was introduced, aiming to increase the awareness of osteoporosis and associated fractures, as well as to increase the number of patients receiving osteoporosis medication.

The FLS programme includes two fracture coordinators (FC) at orthopedic clinics in two hospitals and five osteoporosis nurses (ON) in five primary care districts, collaborating with 43 primary care units. The programme has successfully brought together a handful of professions from different organisations and disciplines.

Results: During two years of the FLS programme, 2,352 in- and outpatients have been screened by FC. Of these, 1,354 patients have been classified as risk patients. Radiologists have reported 196 patients with vertebral fractures as incidental findings on X-ray. 85 of these patients were included in the FLS. ON in primary care have during this period assessed and, together with general practitioners (GPs), treated a total of 2,013 patients. Of these, about half were referred from FC, the other half from GPs, physiotherapists or the patients themselves.

At baseline osteoporosis medication prescribed in Region Gavleborg was: Aclasta/Zoledronic 171 packages, Denosumab 106.012 DDD and Alendronate 576. 422 DDD. After two years of the FLS programme, the prescriptions increased by: Aclasta/Zoledronic 186% (packages), Denosumab 77% (DDD), and Alendronate 5%,6% (DDD).

Conclusion: The results show that it is possible to create a successful multidisciplinary team spanning different organisations, professions and disciplines, including hospital, primary and municipal care. The numbers of prescribed osteoporosis medications have steadily increased, in particular the parenteral treatment options. This in turn means that compliance is high, especially coupled with active follow-up measures by ON in collaboration with GPs in primary care.

Abstracts

4.6 What fragility fracture patients have told us about osteoporosis medication

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Introduction: Approximately 50% of patients adhere to their medication, regardless of disease, treatment or age. These adherence rates are similar for patients with osteoporosis. A fragility fracture could be considered a “teachable moment” or “cue to action” because it provides individuals with a direct and vivid experience that illustrates risk relevance and may promote risk-reducing behaviours, such as taking medication.

Purpose: To examine patients’ experiences with and perceptions of osteoporosis medication, including the challenges related to taking this medication.

Methods: We conducted a secondary analysis of eight unique qualitative datasets collected by our team between 2008 and 2017 from patients who had a fragility fracture. In total, transcripts of 180 participants (31 men, 149 women) aged 45-89 were analyzed guided by a phenomenological perspective. The sample included 31 hip fracture and 149 non-hip fracture patients. We explored patients’ experiences with taking antiresorptive medication, their decisions to take or not take the medication, and their perceptions of health care providers in prescribing that medication.

Results: Our analysis identified several factors that do not convince patients to take antiresorptive medication. For a significant proportion of patients, non-adherence did not appear to be explained by patient knowledge, the use of non-pharmacological strategies, perception of bone health (including perception of fracture risk), reports of long-term pain, the type of the fracture, experiences of fracturing while taking medication, or being an effective consumer.

Conclusion: In a significant proportion of patients, we appear to lack an explanation for non-adherence. Our results have implications for focusing the educational content of post-fracture secondary prevention programs as well as the training of health care providers in the community. They also have implications for capitalizing on the fracture event as a “teachable moment” for patients.

4.7 Finding out the patients who had vertebral fracture as screening for osteoporosis using routine thoracic and abdominal CT scans of inpatients obtained for other purposes

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Introduction: There are 135,000 inpatients of our hospital every year. We think that there are also many inpatients of all departments except orthopaedics who need treatment for osteoporosis. We analyzed routine thoracic or abdominal CT scans of inpatients obtained for other purposes and found out patients who had vertebral fracture which was suggested having osteoporosis.

Methods: We analyzed retrospectively 459 inpatients’ routine thoracic or abdominal CT scans obtained for other purposes that included the fracture event as a “teachable moment” for osteoporosis. We also have implications for capitalizing on the fracture event as a “teachable moment” for patients.

Conclusions: Our method is one of the way to prevent the secondary fracture.
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Methods and Measures: 182 participants (mean age 63.45±6.5) of the UCD Better Bones programme between 2013-2016 were evaluated. Semi-structured interviews with pre determined questions were carried out with a sample of 12 participants at long term follow up. Results were recorded verbatim by 2 researchers and read back to participants to ensure agreement and triangulation.

- Physical Outcome measures of Timed Up and Go from 6.1s (±1.33) down to 5.6s (±1.24), increased grip strength from 24.8KG (±7.24) to 25.8KG (±7.4) and improved balance both eyes closed 6.29s (±5.5) to 9.4s (±8.75) were observed.

Descriptive statistics and paired sample t tests for comparison of mean scores were used.

Results: Improved performance in Timed Up and Go from 6.1s (±1.33) down to 5.6s (±1.24), increased grip strength from 24.8KG (±7.24) to 25.8KG (±7.4) and improved balance both eyes open 28.1s (±15.1) to 31.96s (±16.6) and eyes closed 6.29s (±5.5) to 9.4s (±8.75) were observed. All were statistically significant (P<0.05). Increased means were noted for the Osteoporosis Self Efficacy Scale. (Exercise 73.7% to 75.8%, Diet 75.6% to 77.1%, Combined 74.5% to 76.9%).

Interviews were coded with common themes of barriers and facilitators identified.

Conclusion: The UCD Better Bones Programme is effective in improving physical performance in terms of function, strength and falls risk. The programme demonstrates a positive influence on bone building behaviours.

PE 4-9 A knowledge based application screening radiology reports for fracture. A pilot study

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Introduction: Preventing a second fracture is challenging when patients present to numerous clinical services via different referral pathways. Management usually requires radiology confirmation of fracture. The digital image or the radiology report are resources that can be mined for secondary fracture prevention. Ripspeed is an incremental knowledge software (KBS) application that can use natural language recognition to identify fractures in radiology reports.

Method: 426 hip and pelvis radiology reports were entered into KBS. KBS was instructed to screen for fractures identified in the report. We compared this to a manual review of the clinical note included with the request and the radiology report to assign fractures identified or excluded.

Results: 147 (34.5%) cases had clinical notes provided with the request. 32 (7.5%) included fracture as a definite diagnosis (10) or a possibility (22). The 10 with the highest clinical certainty had radiology reports confirming 9 with fracture and 1 without fracture at the site examined (femur) yet a previous fracture at an adjacent site (pelvis). Where fracture was a diagnostic possibility 8 had a definite fracture and 14 excluded fracture at the site examined but 2 where a previous or adjacent fracture had been identified. 394 reports did not have clinical notes or notes that did not include the word fracture. KBS identified fracture in 221 reports (56%). 166 were over the age of 70.

Conclusion: KBS can screen radiology reports for the presence or absence of fracture. Coupled with data included in the report (age and gender) a stratified list of patients at possible risk of a second osteoporotic fracture can be generated. KBS may be a useful tool for fracture liaison services that currently rely on case finding or direct patient referral.

PE 4-10 Repeated osteoporosis screening in rheumatoid arthritis: Are we complying with guidelines?

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Introduction: Osteoporosis rates are higher in patients with rheumatoid arthritis (RA). Patients with RA diagnosed with osteoporosis have a 30% increased risk of major fracture. 1 Monitoring response to osteoporosis treatment is recommended however there is no consensus on how frequently this should be performed. The International Society for Clinical Densitometry (ISCD), National Osteoporosis Foundation (NOF) and the American Association of Clinical Endocrinologists (AACE) all recommend repeat Bone Mineral Density (BMD) assessment within two years after initiating osteoporosis treatment to assess response to treatment.1,2,3 Furthermore, the NOF and AACE recommend repeat screening every two years after diagnosis.1 The aim of this study was to identify if international guidelines are being achieved for reassessment of BMD within two years of treatment commencement in keeping with international guidelines in patients with rheumatoid arthritis.

Methods: A database of patients with a diagnosis of RA and osteoporosis who attend the Rheumatology department of the Midlands Regional Hospital, Tullamore since January 2013 was reviewed. Outpatient summaries, date of diagnosis, radiology investigations (DEXA scanning), pharmacological treatment and follow up investigations and treatment were documented.

Results: As of August 2016, 770 patients were identified as having RA. 90% of patients had attended the department since 2013. 117 (16.7%) patients were identified as having osteoporosis. Of these, 52.14% of patients were prescribed bisphosphonate therapy, 31.62% denosumab, 9.4% calcitriol/vitamin D alone, 0.85% other treatment (teriparatide/strontium) and 5.1% were on no treatment. Only 11.9% of these patients had a repeat DEXA scan within two years of starting or changing treatment. 11.1% of patients had repeat DEXA scans booked. The average length of time since a patient’s most recent DEXA is 35 months.

Conclusions: Repeat DEXA scanning to assess the response to osteoporosis treatment in people with RA within the timeframe recommended by international guidelines has not been achieved. Patients who fail to respond to osteoporotic treatment are not being identified in a timely manner and therefore are at an increased risk of fractures. The results of this audit will make us more vigilant to identify those patients who are treated for osteoporosis that need repeat DEXA scanning to ensure that treatment is efficacious.

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Self-efficacy and exercise motivation in promoting bone health

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Introduction: The Better Bones (BB) programme is a 7 week exercise and education intervention, designed to promote self-management of bone health, through improved knowledge, self-efficacy and adoption of positive bone health behaviours. This study explored (i) effectiveness of Better Bones in improving participants self-efficacy and knowledge with regards to osteoporosis and (ii) the relationship between exercise motivation and exercise self-efficacy.

Methods: Thirty seven participants (84% female, mean age 65±8.2 years), consented to follow-up postal questionnaires. All completed the programme at least 6 months previously (mean 13.5±7.5 months). Scores in the Osteoporosis Knowledge Assessment Tool (OKAT) and Osteoporosis Self-Efficacy Scale (OSES) were recorded at baseline (T0), after completion of the BB programme (T1) and at follow-up (T2). Short-term effectiveness of the programme was assessed by comparing T0 to T1 (Paired t test) and longer-term by comparing T0 to T2, controlling for variable length follow-up (Repeated Measures ANCOVA). The Behaviour Regulation in Exercise Questionnaire (BREQ-2) was also collected at T2. Relationships between exercise motivation subscales and exercise self-efficacy were explored with correlation analysis.

Results: Participants overall self-efficacy (OSES Total) increased significantly after the BB programme (T0-T1, mean 4.1, p=0.044). Non-significant but positive increases were seen in OSES-Exercise (mean 4.3, p=0.06) and OSES-Diet (mean 3.9, p=0.20) subscales. Knowledge of osteoporosis (OKAT) also increased (mean 1.4, p=0.066). Controlling for varying length follow-up, significant gains in OSES-Total (mean 2.1, p=0.022) and OSES-Diet (mean 6.5, p=0.017) were noted from T0 to T2. OSES-Exercise and OKAT scores were not significantly different from baseline. Positive correlation between OSES-Exercise and the Identified (r=0.73, p<0.001) and
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Intrinsic (r=0.38, p=0.027) subscales of BREQ-2 were found at follow-up. Consensus-based BB programme was effective in improving overall and dietary osteoporosis self-efficacy in the short and longer term, but initial gains in exercise self-efficacy were not sustained. Participants with strong intrinsic exercise motivation had greater confidence in their ability to engage in exercise. Understanding motivation for exercise and tailoring interventions appropriately may enhance exercise self-efficacy and adherence for bone health.

**Poster Presentations**

**Methods**
A new MDT BH education class was developed by staff from the departments of PT, nutrition & dietetics. FF outpatients >50 years attending PT, OT and osteoporosis nurse are invited to attend. Patients with cognitive impairment are excluded. The interactive monthly one-hour class provides information regarding fracture prevention, diet, exercise, falls prevention, balance and local/online BH resources. Outcomes collected included osteoporosis knowledge questionnaire pre-class (n=93) and service-user experience questionnaire 6 weeks post class (n=26). Data was analysed using SPSS.

**Results**
102 patients attended between April 2016 and Feb 2017. Initial analysis indicates incorrect answers for calcium intake (86.3% (n=79)), physical activity (41.7% (n=37)) and menopause (16% (n=13)). Satisfaction rates were excellent or very good (81%, n=21). Eighty-eight percent (n=23) reported receiving sufficient BH information. High confidence was reported regarding lifestyle changes for diet (77%, n=20), physical activity (73%, n=19) and falls prevention (65%, n=17).

**Conclusion**
The MDT BH information class improves FF patients’ ability to access secondary prevention information. Results indicate low levels of BH knowledge in this FF outpatient population. This new initiative is a positive patient experience resulting in high confidence making positive lifestyle changes to prevent further FFs. This model of BH education may be expanded, targeting patient sub-groups at risk of FF e.g. COPD, renal disease.

**Abstracts**

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**Poster Presentations**

**Methods**
A new MDT BH education class was developed by staff from the departments of PT, nutrition & dietetics. FF outpatients >50 years attending PT, OT and osteoporosis nurse are invited to attend. Patients with cognitive impairment are excluded. The interactive monthly one-hour class provides information regarding fracture prevention, diet, exercise, falls prevention, balance and local/online BH resources. Outcomes collected included osteoporosis knowledge questionnaire pre-class (n=93) and service-user experience questionnaire 6 weeks post class (n=26). Data was analysed using SPSS.

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102 patients attended between April 2016 and Feb 2017. Initial analysis indicates incorrect answers for calcium intake (86.3% (n=79)), physical activity (41.7% (n=37)) and menopause (16% (n=13)). Satisfaction rates were excellent or very good (81%, n=21). Eighty-eight percent (n=23) reported receiving sufficient BH information. High confidence was reported regarding lifestyle changes for diet (77%, n=20), physical activity (73%, n=19) and falls prevention (65%, n=17).

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Background: Screening programs for osteoporosis are supported by municipalities throughout Japan. However, the actual screening rate is low, and prevention and management of osteoporosis are far from adequate. Early detection of osteoporosis is cost-effective. Family history of hip fracture and postmenopausal status are strong risk factors. Accordingly, daughters of hip fracture patients may be suitable candidates for osteoporosis screening.

Methods: Thirty-six daughters with a parent who received inpatient treatment for a fragility hip fracture between December 2015 and March 2017 were included. Exclusion criteria were previous treatment and/or diagnosis of osteoporosis. The daughters of hip fracture patients who were hospitalized, we educated the daughters on the epidemiology and risk factors for osteoporosis by using an original brochure, and then recommended screening tests for osteoporosis. Those who agreed to screening underwent bone mineral density testing with dual energy X-ray absorptiometry (DXA).

Results: Of 27 daughters (75.0%) who expressed interest in DXA, 21 were actually screened; 12 (57.1%) met the Japanese diagnostic criteria for osteoporosis, and began treatment. In Japan, DXA is recommended every 5 years for women between 40 and 70 years old under the Health Promotion Law, regardless of clinical risk factors. However, the screening rate is only 5%. In this study, 75.0% of subjects expressed interest in DXA screening after receiving information about risk factors, and 57.1% of screened women were diagnosed with osteoporosis.

Conclusion: The daughters of hip fracture patients should undergo screening for osteoporosis.
Abstracts

The application of FRAX to assessment for those aged more than 75 years old. Elevated measurements in areas with similar sun exposure.

Elevated PTH has been found for 44 patients (30.6%) and only 23 patients (53.5%) had low vitamin D levels (<20ng/ml) measured (mean PTH=76.39pg/ml, SD=44.69).

Patients with a clinical risk factor (CRF), lower BMI, female gender, higher age, and decreased BMD T score. A parental history of major osteoporotic fracture was associated with the highest risk in men and women (8.1 and 14.0% accordingly at 90 years). The great increase of fracture probabilities in men and women was associated with a history of prior fracture (4.8 and 11.0% respectively at 80 years). Intermediate increments in probability were associated with rheumatoid arthritis and long-term use of glucocorticoids (4.5 and 4.2 in men and 10.0 and 10.0% in women accordingly) at the age of 80 years. Alcohol use was concerning weak risk factor as it increased the probability for a major fracture from 2.6 to only 3.9% in men and from 3.7 to 8.9% in women at the age of 80 years respectively. Smoking has also been weak risk factor for fractures. Probability of major osteoporotic fracture slightly increased but probability of hip fractures did not change in men aged 50-70 years. Both indices weakly increased in the age of 80 years and older. In women, smoking also has little effect on the risk of osteoporotic in age over 50 years.

Conclusions: The Ukrainian FRAX tool is the first country-specific fracture prediction model. It is based on the original FRAX methodology, which has been externally validated in several independent cohorts. Despite some limitations, the strengths make the Ukrainian FRAX tool a good candidate for implementation into clinical practice.

Introduction: The introduction of a fracture liaison service (FLS) aims to increase the identification and evaluation of patients with manifest osteoporosis and thus lower the incidence of secondary fragility fractures.

Patients and methods: All consecutive low-energy hip fracture patients (n=34, >50y) during 6 months in our regional hospital obtained routine care. After establishing an FLS in the department of orthopedic surgery, coordinated by a specialist nurse and two part-time physicians, all consecutive patients (n=55) during the following 6 months were compared to the preceding group. The median age of all patients was 83 years (range 62-100), 71% were women (n=63) and 87% of the hip fractures were caused by a low-energy fall indoors. One of four patients (26%) had a suspected or diagnosed dementia, and almost every other patient (44%) suffered one or several fragility fractures before the hip fracture. From the FLS start, the coordinator nurse identified all hip fracture patients, at daily X-ray rounds, and records of all skull and radiographs performed in our region (island of Gotland), allowing 98% of the hip fracture patients to be identified by the coordinator. About 3 months after the hip fracture, patients younger than 90 years, were contacted by the coordinator and asked if they were motivated for evaluation of osteoporosis including FRAX, bone densitometry (DXA) and, if motivated, laboratory tests, clinical evaluation and therapy.

Results: Before the start of FLS 3 patients (9%) were evaluated (FRAX and/or DXA) and diagnosed with manifest osteoporosis, 2 of them got treatment. During the FLS 33 patients (60%) (60 patients (60%) accepted evaluation (FRAX and DXA). Four patients (7%) refrained evaluation, and 14 patients (25%) were not contacted due to advanced age and/or dementia. In the evaluated group (n=33), 79% were diagnosed with osteoporosis and 61% were prescribed bone specific medication.

Conclusion: FLS markedly increased the number of patients evaluated (FRAX and DXA) and diagnosed with osteoporosis. The rate dramatically. Preventive measures to avoid a contralateral hip fracture remain frequently ineffective and several authors suggested to perform a preventive surgery on the contralateral hip once the first fracture occurred. In that case, bone mineral density has been suggested to select the patients eligible.

Objective: We hypothesized that BMD was not suitable to detect the patients with a higher mechanical risk of contralateral hip fracture.

Methods: We included 49 human femoral heads extracted from 49 consecutive elderly who sustained a femoral neck fracture. From each femoral head, we harvested standard cores on which we assessed BMD and micro architecture by high-resolution micro-computed tomography. Then, we performed finite-element simulations to estimate the mechanical properties. Finally, we performed finite-element simulations from the samples’ micro-architecture in order to estimate the mechanical properties and the failure mode. Then, we correlated the micro architecture and the mechanical properties with BMD.

Results: We found that BMD was weakly correlated with the macroscopic and microscopic mechanical properties but with the micro architecture. Hence, BMD is not sufficient to estimate the mechanical risk of fracture.

Conclusion: We found experimental evidence that BMD alone cannot predict the mechanical risk of fracture of the hip in an elderly. This finding supports the use of alternative measures to estimate the mechanical risk of contralateral hip fracture in the elderly.
were new diagnoses. The mean T-score was -1.8. The mean T-score was -3.0. 37% of patients were found to have osteopenia. 92% of these cases were female, 37% were male. 69% were between 65-75 years of age.

The range of T-scores was -0.2 to -4.5. The mean T-score was -2.3. 54% of patients were found to have osteoporosis or osteopenia by Dual Energy X-ray Absorptiometry (DEXA scan) is an investigation that measures bone mineral density, and thus can be used to make a diagnosis of osteoporosis or osteopenia. Osteoporosis has no clinical symptoms or signs, and the first presentation may be at the time of sustaining a fragility fracture. Treatment with bisphosphonates and/or calcium and vitamin D supplements is then to be considered, to try to prevent future fragility fractures. In the Royal Berkshire Hospital, Reading, UK, all patients aged 75 and under who were admitted with a hip fracture are considered for DEXA scanning.

Methods: All patients aged 75 or younger, who were admitted to the Royal Berkshire Hospital, Reading, UK, in the year 2016, with a hip fracture, were included in the survey. If a DEXA scan was indicated, the discharge letters were examined and to ascertain if patients had been referred for a DEXA scan upon discharge. If there was a contra-indication to DEXA scan, the patient was excluded. For those who underwent a DEXA scan, the T-scores were recorded. A T-score -2.5 or lower implies osteoporosis, while a T-score between -2.5 and -1 implies osteopenia. A management plan was then recommended at Rheumatology clinic.

Results: 53 patients were included in the survey. Of those, 35 attended for DEXA scan, 63% were female, 37% were male. 69% were between 65-75 years of age, and 31% were under 65 years of age. The range of T-scores was -0.2 to -4.5. The mean T-score was -2.3. 54% of patients were found to have osteoporosis. Of these, 84% were new diagnoses. The mean T-score was -3.0. 37% of patients were found to have osteoporosis. 92% of these cases were new diagnoses. The mean T-score was -2.3. 54% of patients were found to have osteoporosis.

Conclusion: Osteoporosis is quite prevalent in the younger age group of patients who sustain a hip fracture, and is often a new diagnosis made after hip fracture is sustained. These patients require treatment in order to prevent further fractures. Treatment should be guided by T-scores obtained by DEXA scan. Patients should be encouraged to attend their DEXA scan in order to ensure they receive a correct diagnosis and the optimum treatment. Medical co-morbidities and risk factors predisposing for osteoporosis should be explored.
medications were started in re-audit compared to 5 in original audit. 1 medication dose was reduced in re-audit in comparison to 0 in first audit. 1 dose was increased in re-audit in comparison to 2 in first audit. In the initial audit the total number of psychotropic medications on admission was 38 vs 44 on discharge. This is an increase of 16% (excluding buprenorphine patches, which we almost universally prescribe for 2 to 4 weeks in hip fracture patients). In the re-audit the total number of psychotropic medications on admission was 41 and on discharge was reduced to 31. This is a decrease of 24%. Dose was increased in 3 patients in first audit, and none in re-audit. In both audits, benzodiazepines were increased by 25%.

**Analysis and recommendations:** Our data suggests that introduction of a formal medication guide at eye level in the doctor’s room on the ward, of large, coloured posters of Falls and Medication suggests that introduction of a formal medication program “Osteoporosis School” – a successful patient education program that could be managed by primary care centers were invited to a four hour course where the program was presented and discussed.

**Results:** 41 physiotherapists, representing 19 of the 37 primary care centers invited, attended the course. The participants received an USB stick with the material (power-point presentations, exercise manual etc) needed to start up. Five months after introducing the standardized patient education program on osteoporosis, 11 primary care centers have started their own patient education and more centers are preparing to get started.

**Conclusion:** Offering primary care centers a physiotherapist lead standardized patient education program on osteoporosis facilitated start-up. The concept will be evaluated and the aim is for it to be introduced in the entire health care region.

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**Results:** Amongst thoracic spine x-ray reports (N=50), meanage (72), No of fractures noted (14)-ambiguous terms used (4). Appropriate Grading of fracture used (9/14) amongst Lumbar spine films- (N=50)-Mean age (72), No of fractures noted (14), ambiguous terms used (0), grading of fracture used (9/14).

**Conclusions:** Our study confirms that radiology reporting is using ambiguous term such as wedging without mentioning fracture in some reports. Grading of vertebral fracture was used only in 64% of fracture reports by radiologists. Accurate, clear, unambiguous reporting is essential for accurate identification of vertebral fractures. The results of our study were disseminated to radiologists and regular educational updates to doctors, radiologists and radiographers is ongoing. Early and accurate diagnosis of vertebral fractures is an important step in optimizing the clinical management of patients with osteoporosis.

**Method:** The target group for initiating the program was physiotherapists. The rational for targeting physiotherapists were a) non-pharmacological interventions are essential in a patient-centered approach and b) primary care physicians and nurses focus on many other health issues.

**Results:** The patient education program consists of patient-adapted power-point presentations about osteoporosis and an exercise manual. The suggested setup of the program; five visits beginning with a session on theory for about 45 minutes including time for questions and discussion, followed by individualized group training for 45 minutes. The physiotherapists in charge of the education program can for the theory sessions include other professionals (doctor, nurse, dietitian, occupational therapist) at their centers as needed. Physiotherapist from 37 primary care centers were invited to a four hour course where the program was presented and discussed.

**Conclusion:** The physiotherapists, representing 19 of the 37 primary care centers invited, attended the course. The participants received an USB stick with the material (power-point presentations, exercise manual etc) needed to start up. Five months after introducing the standardized patient education program on osteoporosis, 11 primary care centers have started their own patient education and more centers are preparing to get started.

**Objective:** International Osteoporosis Foundation (IOF) recommends the use of clear, unambiguous terminology using the word “fracture”, and grading the fracture from mild to severe in reporting, and terms such as collapse, wedging to be avoided. We aimed to assess vertebral fracture reporting of spinal plain films at our teaching hospital in United Kingdom.

**Method:** This was a retrospective observational study, 100 plain lumbar X-rays (50 thoracic and 50 lumbar) from hospital PACS system for patients aged above 50 years were analysed over a period of 4 months. We studied the concordance of reports done by local Radiologists comparing with the IOF guidelines which required use of the word “fracture” and avoidance of ambiguous words.

**Introduction:** Knowledge on osteoporosis needs to be raised in general population as well as among health care providers. Compliance with pharmacological treatment is low in patients with osteoporosis for various reasons such as problems with side effects or fear for side effects or lack of motivation for treatment. In addition to pharmacological treatment, lifestyle changes can also be challenging. Most patients with osteoporosis are followed in the primary care setting where the availability to organized patient education about osteoporosis is limited.

To facilitate primary care centers to easily being able to offer patient education for patients with osteoporosis, “Osteoporosis School”. Center of Osteoporosis and Fracture prevention at Skåne University Hospital designed a standardized patient education program that could be managed by primary care centers.

**Results:** The reach test (FRT) and falls in community dwelling elderly (more than 65) women in Greece.

**Conclusion:** The Functional Reach Test in 35 community dwelling older women aged more than 65 years. 22 of them had a positive history of falls, meaning 1 fall in the past 12 months or more than 1 in previous years, and 13 had no falls. The FRT was performed to assess a patient’s stability by measuring the maximum distance an individual can reach forward while standing in a fixed position. The patient was instructed to stands close to, but not touching, a wall and position the arm that is closer to the wall at 90 degrees of shoulder flexion with a closed fist. The assessor records the starting position at the 3rd metacarpal head on the yardstick and instruct the patient to reach as far as he can forward without taking a step, the location of the 3rd metacarpal is recorded the difference between the start and end position is the reach distance in cm. We used to demonstration trials and two test trials, we recorded the best.

**Results:** Out of the 22 women that had a positive history of falls only 6 (27,27%) had an FRT less than 25,4cm, which is the cut-off point for identifying an individual at risk for a fall. Only 1 out of 13 (7,69%) of the non-fallers at the other hand had a low FRT.

**Conclusions:** Although the sample size is small we think that the FRT is not a good tool for the assessment of risk falls in community dwelling elderly women, it seems it can predict better the non-fallers than the fallers. Further research is needed to assess the relation between risk prediction of falls in community dwelling older women and FRT.
Falling. Two widely accepted physical performance tests have been used, hand grip strength and gait velocity test. We took three consecutive measurements of hand grip strength with a Java dynamometer taking under consideration the best performance. We measured gait velocity on a level indoor surface of four meters; two different measurements were recorded and the best was kept. Falls were recorded based on the anamnestic data. We labelled faller a woman who had more than 1 fall in the last or multiple falls in previous years.

Results: Twenty-seven (27) women had hand grip strength over 20N (Newton) and twenty-six (26) below 20N that is a widely accepted lowest threshold of normal hand grip strength. Of the 27 women with hand grip strength more than 20N, 18 (66.6%) had gait velocity more than 1 m/s and totally 20 (74.07%) had gait velocity more than 0.8 m/s. From the 26 elder females that had hand grip lower than 20N, 20 of them (79.92%) had a gait velocity less than 0.8 m/s and 12 (60%) had gat velocity more than 1 m/s and 16 gait velocity less than 0.8 m/sec (61.53%). 20 (79,92%) had a gait velocity less than 1 m/s and that had hand grip lower than 20N, 20 of them (79.92%) had a gait velocity less than 0.8m/s and 16 gait velocity less than 0.8m/sec (61.53%). When the distinction was between fallers and not fallers, a total of 33 fallers were identified. From the 26 elder females that had hand grip lower than 20N, 20 of them (79.92%) had a gait velocity less than 0.8 m/s and 16 gait velocity less than 0.8m/sec (61.53%).

Conclusion: Our results display a strong correlation between hand grip strength and gait velocity in community-dwelling elderly women and between the two-performance test and falls. However, the correlation seems more significant in the worst performing group.

Methods: FLS team for secondary prevention of hip fracture was established on October 2013 in Niigata Rehabilitation Hospital. An osteoporosis manager coordinated multidisciplinary approach for hip fracture patients with the original FLS notebook. DXA bone scans and osteoporosis treatments were done in all cases with the exceptions of serious conditions. Fall prevention program were provided by physical therapist and occupational therapist.

Results: Of the 187 hip fracture patients admitted to our hospital, 23 patients were not received our FLS program, 164 of 187 patients (87.7%) were included in this study. FLS were performed at all patients with osteoporotic medications and fall prevention education at the end of hospitalization. At 1 year from discharge, 12 of 164 patients (7.3%) were died and 3 of 164 patients (1.8%) were suffered from another hip fracture within one year. 124 of 164 patients (75.6%) continued to take osteoporotic medications.

Conclusion: We developed FLS approach for hip fracture care coordinated by osteoporosis manager in Niigata Rehabilitation Hospital. Our FLS improved the persistency rate of hip fracture patients admitted to our hospital. 23 patients were not received our FLS program, 164 of 187 patients (87.7%) were included in this study. FLS were performed at all patients with osteoporotic medications and fall prevention education at the end of hospitalization. At 1 year from discharge, 12 of 164 patients (7.3%) were died and 3 of 164 patients (1.8%) were suffered from another hip fracture within one year. 124 of 164 patients (75.6%) continued to take osteoporotic medications.

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term subsequent Fx. Recognition of risk factors for near-term subsequent Fx is important and allows PM women to be identified as a priority to receive immediate intervention.

Acknowledgements: Funded by UCB Pharma.

Results:

We demonstrated that the callus volume in the TL+Z groups was significantly increased to 78.78%, compared with 54.63% and 62.57% in the C and TH+Z groups, respectively (p<0.01). In the RUST including the extent of callus formation, the TL+Z and TH+Z groups were 9.0 and 8.8 points, respectively, compared with 5.4 and 6.2 points for the C and TL groups, respectively, indicating a significant progression of bone union (P<0.01).

Conclusion: It is suggested that administration of low dose TP and ZA in combination may lead to the treatment of delayed union of fracture. We hope this treatment may become one of new therapeutic strategy.

Abstracts

Introduction: It has been reported that intermittent administration of Teriparatide (TP) in rats fracture model promotes callus formation and markedly increases mechanical strength, however, a high dose of 60μg/kg or 200μg/kg is often reportedly used, causing many pharmacologically problems. In this study, we investigated the effects of combined low dose TP and Zoledronate (ZA) treatment on fracture healing in rats fracture model.

Methods: After transection osteotomy of the right femur of 40 male SD rats aged 12 weeks old with detaching the peristeum, intramedullary nail osteosynthesis was performed. From 1 week postoperation, TP (5 times a week administration) with TP (5 times a week administration) and ZA (0.1 mg/kg single administration) were administrated by dividing the rats into the following 4 groups: low dose TP group (TL: TP 1μg/kg), low dose TP+ZA group (TL+Z: TP 1μg/kg+2A), high dose TP+ZA group (TH+Z: TP 10 μg/kg+2A), and control group (C: administered saline). If femurs were excised 7 weeks after the surgery, bone fusions were evaluated with soft X-ray images on a 4-point scale. And the histopathological examination was performed in demineralized and non-demineralized specimens. Furthermore, the Radiographic Union Scale for Tibial fractures (RUST: Kooistra, 2010) was conducted in all specimen.

Results: About the bone fusions, C, TL, TL+Z and TH+Z groups demonstrated 0.80, 1.56, 2.60 and 3.00 points, respectively. Histopathologically, cartilage tissue and immature callus formation were observed at the bone junction in the C group, and the osseous bridge formation of mature callus tissue was observed in the TL+Z and TL+Z groups.

Conclusion: In this study, we investigated the effects of combined low dose TP and ZA treatment on fracture healing in rats fracture model. This was a cross-sectional analysis of patients aged 50 years and over and hospitalised with a VFF from the 1st Feb 2016 to the 31st Jan 2017 using electronic and radiological records to identify hospitalised VFF. Patients sustaining vertebral fractures due to either major trauma or malignancy were excluded. Data was collected on patient demographics, hospitalisation details and health outcomes.

Results: 28 patients with a mean(SD) age of 80.5(11) years, of which 68% were female, were hospitalised over a 12 month period with VFF. 94% presented to the Emergency Department (ED) as their first point of contact of which 70% were subsequently hospitalised. VFF in 81% of the patients was the main presenting diagnosis. 67% presented with a single level VFF predominantly around the thoracolumbar region. The overall median number of vertebral fractures was 1 (IQR 1-3). 72% had no known previous VFF. 45% were managed by Geriatric Medicine, followed by 37% by other general physicians and 14% by the spinal surgeons. The majority of the VFF (87%) were treated non-operatively. The median length of stay was 12 (IQR 6-20) days and in-patient mortality was 3%. 84% had 25-OHD levels measured, of whom 39% were deficient (25-OHD<30nmol/L). Only 52% of patients went on to have a bone health assessment (DEXA scan requested, osteoporosis treatment initiated or referral to a bone health clinic). There were no significant differences between those hospitalised and those discharged from the ED (gender, age, number of deformity, previous vertebral fractures; and where available vitamin D and calcium levels).

Conclusion: We have reported on the prevalence of VFF hospitalisation. Most were treated non-operatively over almost two weeks in hospital. Bone health assessment and fracture secondary prevention in this group of patients was poor. Much still needs to be done to improve the care of hospitalised VFF.

Conclusion: Short PFNA II for atypical insufficiency subtrochanter fracture was efficient as Long PFNA and had a merit with short operation time.

Abstracts

Conclusion: Radiologically, there were no significant difference between short nail group and long nail group in union period, change of neck-shaft angle, sliding of length of helical blade screw, tip apex distance (TAD), and leg length discrepancy (LLD). In clinical evaluation, modified Koval index, operation time and total blood loss until postoperative 24 hours were investigated.

Results: Radiologically, there were no significant difference between short nail group and long nail group in union period, change of neck-shaft angle, sliding of length of helical blade screw, tip apex distance (TAD), and leg length discrepancy (LLD). In clinical evaluation, modified Koval index, operation time and total blood loss until postoperative 24 hours were investigated.

Abstracts

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fractures were classified to 55 neck fractures (average 80.1 years old) and 68 trochanteric fractures. Semi-quantitative method (Genant, 1993) was used for the assessment of vertebral fracture on spinal lateral view.XP.

Results: 24.4% of whole hip fracture patients had any previous fragility fracture history, while 20% of neck fracture and 27.9% of trochanteric fracture had the fracture history. 78.9% of hip fracture had no osteoporotic drug treatment history before injury, while 81.8% of neck fracture and 76.5% of trochanteric fracture had no drug treatment. In spinal Xp examination, 70% of whole hip fracture had any prevalent vertebral fracture, while 27.6% patients had one and 43.4% had more than 2 fractures. In neck fracture 63.6% had any prevalent vertebral fracture, while 36.3% patients had one and 27.3% had more than 2 fractures. In trochanteric fracture 76.5% had prevalent vertebral fracture, while 20.6% patients had one and 55.9% had more than 2 fractures. The rate of the patients with prevalent vertebral fracture was higher in trochanteric fracture than in neck fracture. The incidence of vertebral fracture was highest at T11, T12, L1 levels.

Discussion: It has been reported that hip fracture incidence has already started to decline in western countries, while it keeps increasing in Japan. Our results indicate that osteoporotic drug treatment following diagnosis may not be fully performed, which may partially cause high hip fracture incidence in Japan.

PE 5-6
Hospital mortality after hip fracture surgery in relation to length of stay by care delivery factors
Sheehan K.J.1, Sobolev B.2, Guy P.3, The Canadian Collaborative Study on Hip Fractures

Materials and methods: 35 healthy Lebanese women aged 65 to 75 years were assessed. They had a low intensity physical activity. Their cognitive level evaluated by the Mini mental state evaluation was higher than 26, and their psychological condition evaluated by the geriatric depression scale was less than 8. Maximum strength in bench press and horizontal press of the lower limbs were evaluated. The best value of the grip strength of the hands and forearms on 3 tests was also noted. Bone mineral content (BMC) and BMD were determined for each individual by DXA at whole body (WB), Lumbar spine (L1-L4), total hip (TH), and femoral neck (FN) (GE Healthcare, Madison, WI). Body composition and trabecular bone score (TBS) were also evaluated. Geometric indices of bone resistance of the femoral neck such as the cross section area (CSA), the cross-sectional area moment of inertia (CSMI) and buckling ratio (BR) were calculated by the hip structure analysis (HSA) software.

Results: In the whole population, the maximum strength in bench press was positively correlated to the BMC WB (r=0.49; p<0.05), the BMD L1-L4 (r=0.41; p<0.05), the BMD TH (r=0.55; p<0.001), the CSA (r=0.38; p<0.05), and the CSMI (r=0.39; p<0.05). The maximum strength in horizontal press was positively correlated to the BMC WB (r=0.38; p<0.05), the BMD WB (r=0.38; p<0.05), the BMD TH (r=0.50; p<0.01), the BMD FN (r=0.35; p<0.05), the CSA (r=0.38; p<0.05) and the TBS (r=0.37; p<0.05). Grip strength was positively correlated only to the CSMI (r=0.43; p<0.01).

Discussion: In this population of healthy postmenopausal women, the maximum strength indices are accessible measures and are significantly correlated with the measured bone parameters.

Conclusion: This study suggests that the increase in maximum strength can help promote bone health and prevent osteoporotic fractures in this population.

Methods: We analyzed acute hospital discharge abstracts for subgroups defined by hospital type, bed-capacity, hospital volume, and admission time from a total of 153,917 patients 65 years or older surgically-treated for first hip fracture. Main outcome measure was risk of hospital death.

Results: We found a decrease in the 30-day risk of hospital death from 7.0% (95%CI: 6.6-7.5) in 2004 to 5.4% (95%CI: 5.0-5.7) in 2012. After adjustment for characteristics of patients, their fracture, treatment, and care delivery, the risk of death was 27% lower in 2012 than in 2004 (OR=0.73, 95% CI 0.65 to 0.82), with a significant trend in reduction of the adjusted ORs ordered by calendar year (p<0.001). In subgroup analysis, only large community hospitals showed the reduction of ORs by calendar year. No trend was observed in teaching and medium community hospitals. By 2012, the adjusted risk of death in large higher-volume community hospitals was 35% lower for weekend admissions, OR=0.65 (95%CI: 0.45-0.4) and 39% lower for weekday admissions, OR=0.61 (95%CI: 0.41-0.92), compared to 2004. In large lower-volume community hospitals, the 2012 risk was 56% lower for weekend admissions, OR=0.44 (95%CI: 0.26-0.74) compared to 2004.

Conclusions: Despite universal shortening of hospital stays in Canadian hospitals between 2004 and 2012, the risk of hospital death after hip fracture surgery decreased only in large community hospitals, but not in teaching and medium-size community hospitals. This supports the concern of worsening the quality of hip fracture care resulting from shorter stays in some care settings.

PE 5-7
Relationship between maximum strength indices and bone parameters in healthy postmenopausal women
Alwan A1, Nasr R1, Rizkallah M2, El Hage R1, Amer S2, Bachour F2, Berro A.E.J.2, Maalouf G2

Materials and methods: 35 healthy Lebanese women aged 65 to 75 years were assessed. They had a low intensity physical activity. Their cognitive level evaluated by the Mini mental state evaluation was higher than 26, and their psychological condition evaluated by the geriatric depression scale was less than 8. Maximum strength in bench press and horizontal press of the lower limbs were evaluated. The best value of the grip strength of the hands and forearms on 3 tests was also noted. Bone mineral content (BMC) and BMD were determined for each individual by DXA at whole body (WB), Lumbar spine (L1-L4), total hip (TH), and femoral neck (FN) (GE Healthcare, Madison, WI). Body composition and trabecular bone score (TBS) were also evaluated. Geometric indices of bone resistance of the femoral neck such as the cross section area (CSA), the cross-sectional area moment of inertia (CSMI) and buckling ratio (BR) were calculated by the hip structure analysis (HSA) software.

Results: In the whole population, the maximum strength in bench press was positively correlated to the BMC WB (r=0.49; p<0.05), the BMD L1-L4 (r=0.41; p<0.05), the BMD TH (r=0.55; p<0.001), the BMD FN (r=0.35; p<0.05), the CSA (r=0.38; p<0.05) and the TBS (r=0.37; p<0.05). Grip strength was positively correlated only to the CSMI (r=0.43; p<0.01).

Discussion: In this population of healthy postmenopausal women, the maximum strength indices are accessible measures and are significantly correlated with the measured bone parameters.

Conclusion: This study suggests that the increase in maximum strength can help promote bone health and prevent osteoporotic fractures in this population.
Abstracts

Conclusion: Pain improvement was significant, especially in the 3- and 6-month reevaluations. Most of the patients’ record values from 0 to 3. After 6 months pain levels do not show further improvements. Osteoporotic VF is a common condition, especially among elderly population. In the US, ~40% of women at the age group of 80 years old suffer from VF. The incidence of osteoporotic VF is expected to increase with the growing age of population.

PE 5-9

Gender and age distributions in geriatric hip fractures: a six year retrospective study at the University Hospital of Crete

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Introduction: Hip fractures are considered a principal cause of morbidity and mortality among patients over the age of 65. The main cause of this injury is low energy ground level falls. In the present study we aim to investigate the differences in distribution of intracapsular and extracapsular hip fractures among genders and age groups operatively treated at the University hospital of Crete.

Methods: The present is a six year retrospective cohort study (2008-2013). All patients over 65 years of age surgically treated at the Orthopaedic department of the University hospital of Crete, Greece were included in this study. The type and sub-type of fracture in correlation to gender and age were investigated.

Results: A total of 1,129 patients were included. Women suffered hip fractures 2.61 times more often than men. The majority of patients hospitalized with hip fracture were above 75 years of age (83.8% for women and 83.3% for men). The proportion of extracapsular and intracapsular fractures in men were 59.6% and 40.4% and in women 62.7% and 37.2% respectively. Extracapsular-intertracapsular fractures were found to increase dramatically with age in women (from 41% in patients younger than 75 to 61% in those older than 75), while in men they slightly decreased with age (54.2% in patients older than 75, compared to 55.7% in those less than 75).

Conclusion: The pattern of hip fractures was found to differ between genders and age groups in the present patients’ population. Most likely these findings reflect differences in nature and rate of bone loss, and frequency of falling events between males and females. It has become evident that the two main hip fracture types (extracapsular and intracapsular) are distinct clinical entities. Hence, they should be addressed independently in terms of underlying causes and prevention strategies.

PE 5-10

Incidence, timing and impact of comorbidity on second fall-related hip fracture in Australia

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Introduction: In Australia, there are 22,000 hospitalisations for fall-related hip fractures in older people each year. Multiple comorbidity is common in older people, with 80% of older Australians having two or more, chronic conditions. Comorbidity increases both the risk of hip fracture and death. The aim of this population-based study was to quantify the incidence and timing of second hip fracture (SHF), and to evaluate the relative impact of comorbidities on the risk of SHF accounting for the competing risk of death.

Methods: Hospital and mortality records for all individuals aged ≥65 years, admitted to a NSW hospital for a fall-related hip fracture from 1 January 2005 to 31 December 2009 were linked. Comorbidities identified in the literature as increasing the risk of hip fracture were assessed. SHFs occurring within the same hospitalisation were excluded.

Results: A total of 24,500 individuals (17,911 female, 6,589 male) sustained at least one hip fracture. The median time to SHF was 1.8 years (IQR=0.7-3.2); with 2.9% of individuals experiencing a SHF within a year, 6.1% within 3 years, 8.1% within 5 years, and 9.4% within 8 years. In the multivariate hazards regression, malnutrition/cachexia (HR 2.47; 99.9%CI 1.87-3.26), dementia (HR 2.15; 99.9%CI 1.80-2.57), congestive heart failure (HR 1.62; 99.9%CI 1.30-2.04), Parkinson’s disease (HR 1.51; 99.9%CI 1.8-2.10), cerebrovascular disease (HR 1.41; 99.9%CI 1.06-1.89) and osteoporosis (HR 1.36; 99.9%CI 1.11-1.67) were associated with increased risk of SHF within 3 years. Mortality was high in this population. Median time to death was 11 years (IQR=0.2-2.9); with 26% of individuals dying within a year, 44% within 3 years, 59% within 5 years and 70.2% within 8 years. Both the median time to death (0.9 vs 1.6 years, p=0.0001) and SHF (1.6 vs 1.8 years, p=0.0128) were shorter for males than females.

Conclusion: SHFs are potentially preventable. Implementation of targeted falls and fracture prevention may help reduce the incidence of SHF. A number of comorbid conditions contribute to this increased risk but at this point it is uncertain if intervention can alter the level of risk.

PE 5-11

Most useful and predictive indicator for mortality and quality of life in patients with osteoporotic fractures

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Purpose: Osteoporotic fractures (OF) are characterized by high mortality(M) & significantly affect the quality of life (QOL) & health of these patients. But all patients do not have the same progression & rehabilitation after surgery. Can ordinary used clinical biomarkers have predictive value for postoperative evolution of patients, in order to identify these in increased risk in order to be offered more intensive monitoring & rehabilitation? The purpose of this study is to demonstrate the predictive value of vitamin D, PTH & albumin in postoperative M & QOL in patients with OF.

Materials and methods: 60 patients men & women from 56 to 94 years old who were hospitalized in the orthopaedics clinic for OF during 2016 were selected for the study. Blood biomarkers were calculated during hospitalization as follows:25OHHt,D3, PTH & Albumin. At least 3 months & until 1 year after discharge from the clinic, patients were called to complete a questionnaire about their state of health and quality of life (EQ-5D-5L). 26 of the 60 patients responded. From the 26 patients we were informed that 3 had died. Statistical analysis was performed by the T-test method.

Results: postoperative M was around 11.54% & is not affected by vitaminD3 (P=0.107, 95% CI -9.99191/18.15762 sign. at the 0.05 level), PTH (P=0.518, 95% CI -31.34507/24.42126, sign. at the 0.05 level) & Albumin (P=0.301, 95% CI -0.4234/0.96628, sign. at the 0.05 level). PTH & Albumin are not related with the QOL neither with each one of the parameters of the EQ5D-5L nor with the self-perception of health.25OHHt,D3 (Mean 14.8325ng/ml, Std. Deviation ±1.84212) is positively related to the self-perception of health (P=0.047, sign. at the 0.05 level), self-care (P=0.04, sign. at the 0.05) & pain/discomfort (P=0.028, sign. at the 0.05) of the EQ 5D-5L parameters, and the self-perception of health (P=0.022, sign. at the 0.05).

Conclusions: None of the biomarkers tested in this study was associated with an increased M. However, the influence of 25-OH-Vitamin-D3 seems to be important for the postoperative evolution and the QOL of these patients, emphasizing once again on the multiparametric effect and function of this vitamin-hormone, attributing to the prognostic value. In this study however, the very small sample does not allow definitive conclusions, considering this additional studies on larger samples are necessary.

Key words: predictive factors, osteoporotic fractures, vitamin D, PTH, quality of life, postoperative mortality
Low mineral bone density is the main contributor to falls-related health burden in the elderly
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Objective: Falls are the leading injury type in population 70 years and above and a major health burden and cause of death globally. Most of such burden is due to bone fractures. In the Global Burden of Diseases (GBD) initiative, the worldwide attributable burden of falls due to low bone mineral density (BMD) was analysed through its relationship with fractures.

Methods: The data followed the Counterfactual Risk Assessment Methodology used in the GBD study (1). Systematic review was performed seeking population-based studies with femoral neck (FNBM) measured by Dual-X-Ray-Absorptiometry in people 50 years and over. Age- and sex-specific levels of mean+/-SD FNBM (g/cm²) were extracted from eligible studies, and this was used as the exposure variable. The age and sex-specific 99th percentile from non-Hispanic whites in the National Health and Nutrition Examination Survey (NHANES) 2009-2010 was used as the theoretical minimum risk factor exposure distribution, to estimate the potential impact fraction (PIF) of FNBM for fractures. Relative risks of FNBM for fractures were obtained from a previous meta-analysis (2). Coded hospital data was used to calculate the fraction of falls-related deaths due fractures. Disability levels were established by applying disability weights to each type of fracture. Then, PIFs were applied to obtain attributable deaths and disability due to low BMD.

Results: The absolute global health burden for falls in the population 70 years and above almost doubled between 1990 and 2015. More than 50% of such burden was attributable to low BMD. Low BMD could explain more than three quarters of all deaths due to falls and two fifths of all falls-related disability in this age group. Mortality and disability due to low BMD doubled during the 25-year period. Low BMD ranked 9th for contributions to worldwide disability among 79 preventable risks factors.

Conclusions: In those aged 70 and over the importance of low BMD as a preventable risk factor for falls health burden is a growing concern, given the global population trajectories, and requires urgent attention.

References:
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Mortality and complications rates of geriatric hip fractures with hemodiagnosis
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While mortality and morbidity rates in geriatric general population after hip fracture at one year post fracture were 20% and 11% in geriatric patients with end – stage renal disease corresponding percentages are reached 37.2% and 14%. The purpose of this study is to analyze the outcomes of morbidity and complications in geriatric hip fractures with hemodiagnosis.

Material and method: Between 2013-2016, 27 geriatric hip fractures with hemodiagnosis were identified, of which 14 were male, 13 were female with an average age 78 years. 10 patients had cancellous fractures, 3 transcervical and 14 had trochanteric fractures. In all patients the major cause was fall. Accompanied comorbidities of patients (except renal failure) were retrieved at the time of hospitalization and included hypertension, diabetes, chronic heart disease, chronic pulmonary disease. 15 patients received internal fixations (Richards nail or short Intramedullary nail) and 12 patients receive hemiartroplasty. The mean time to operation were 3,7 days (2-6 days). The day before and the first postoperative day all patients were haemodialyzed.

Conclusions: Falls and associated fragility fractures are a major cause of morbidity and mortality in geriatric persons. The fall rate is much greater in Dialysis patients than in the general population. Hip fractures in persons on dialysis occur three to four times more commonly than in the general population because of increased bone loss. One-year mortality and complications rate in dialysis patients with hip fracture is two to three time of that in other geriatric patients who have hip fractures.

Undisturbed local bone formation capacity in patients with incomplete atypical femoral fractures
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Introduction: Incomplete atypical femoral fractures heal slowly or not at all, and often progress to a complete fracture with minimal trauma. The impaired healing has been attributed to an impaired biologic healing capacity related to bisphosphonate use, or the mechanical environment within the fracture crack. This study aimed to investigate the capacity for bone formation after resection of the fracture site.

Methods: Between 2008 and 2014 we recruited 8 patients with incomplete atypical femoral fractures. All used oral bisphosphonates before the fracture for on average 8 years (range 4 to 15) and complained of thigh pain. The fractures were stabilized withreamed cephalomedullary nails. During surgery, the fracture site in the lateral cortex was resected with a cylindrical drill (diam: 11.5mm). The cylindrical cortical defect allowed radiographic evaluation of new bone formation, and the patients were followed clinically and radiologically for 24 months (range 15 to 92).

Results: After 3 months, newly formed bone could be seen in the cortical defects in all. After 13-26 months, the previous defects showed continuous cortical bone. At final follow up, all patients reported full recovery of pre-surgical complaints. No complications occurred and no reoperations were performed.

Conclusions: New bone formation occurred within a time frame that appears normal for healing of cortical bone defects. This suggests that the capacity to form new bone is intact.
in Niqata Prefecture. The number of hip fractures in men decreased from 2010 to 2015, which is in contrast to that in women.

**PE 5-16**

**Free vitamin D is a stronger determinant of bone parameters and hip bone strength indices than total vitamin D in a group of young male adults**

Alwan A.1, Rizkallah M.2, Nasr R.1, Berro A.E.J.1, Bachour F.2, El Hage R.1, Amer S.2, Barakat A.2, Maalouf G.2

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**Introduction:** Optimizing bone mass in adulthood is of great importance to prevent the occurrence of osteoporosis in the later age. Low serum vitamin D is associated with low bone mineral density (BMD), which is an important predictor of fracture risk. However, most cells apart from the renal tubular cells, are exposed to free rather than to total 25(OH)D. Whether free vitamin D would be a better marker than total vitamin D is still under debate. The aim of the present study is to explore the relationships between serum, total vitamin D, vitamin D binding protein, free vitamin D and bone parameters in a group of young Lebanese adult.**Methods:** This study included 40 young male adults aged between 18 and 35 years. Body composition and vitamin D were assessed by dual-energy X-ray absorptiometry (DXA) and lumbar spine trabecular bone score (TBS) was derived. Bone mineral content (BMC) and BMD were measured at whole body (WB), lumbar spine (L1-L4), total hip (TH) and femoral neck (FN). To evaluate hip bone geometry, DXA scans were analyzed at the femoral neck (FN), the intertrochanteric region (IT), and the femoral shaft (FS) by the Hip Structure Analysis (HSA) program. Cross sectional area (CSA), index of axial compression strength and section modulus (Z), as well as index of bending strength were measured from bone mass profile composite index of FN strength (CSI, BSI, and ISI) were calculated as previously described. Direct measurement of free 25(OH)D concentrations was performed by immunoassay which detects free vitamin D by ELISA on a microtiter plate.

**Poster Presentations**

**Results:** Free vitamin D was positively correlated with the WB BMC (r=0.392, p=0.02), WB BMD (r=0.351, p=0.045), TH BMD (r=0.479, p=0.003), FN BMD (r=0.455, p=0.006), Lumbar spine TBS (r=0.432, p=0.01), CSI (r=0.415, p=0.013), CSA (r=0.450, p=0.006) and CSMI (r=0.416, p=0.012). Vitamin binding protein was positively correlated with lumbar spine TBS (r=0.442, p=0.08), CSI (r=0.510, p=0.001) and negatively correlated with the body weight (r=0.501, p=0.002) and body fat percentage (r=0.429, p=0.021). No correlation was detected between the total vitamin D serum level and the previously cited parameters.

**Conclusion:** The free vitamin D serum level is a stronger positive determinant of bone parameters and hip bone strength indices than total serum vitamin D in the Lebanese male adults.

**PE 5-17**

**Free vitamin D is a stronger determinant of bone parameters and hip bone strength indices than total vitamin D in a group of young female adults**

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**Introduction:** Optimizing bone mass in adulthood is of great importance to prevent the occurrence of osteoporosis in the later age. Vitamin D is an essential component of bone health. Low serum vitamin D is associated with low bone mineral density (BMD), which is an important predictor of fracture risk. However, most cells apart from the renal tubular cells, are exposed to free rather than to total 25(OH)D. Whether free vitamin D would be a better marker than total vitamin D is still under debate. The aim of the present study is to explore the relationships between serum, total vitamin D, vitamin D binding protein, free vitamin D and bone parameters in a group of young Lebanese female adults aged between 18 and 35 years. Body composition and BMD were assessed by dual-energy X-ray absorptiometry (DXA) and lumbar spine trabecular bone score (TBS) was derived. Bone mineral content (BMC) and BMD were measured at whole body (WB), lumbar spine (L1-L4), total hip (TH) and femoral neck (FN). To evaluate hip bone geometry, DXA scans were analyzed at the femoral neck (FN), the intertrochanteric region (IT), and the femoral shaft (FS) by the Hip Structure Analysis (HSA) program. Cross sectional area (CSA), index of axial compression strength and section modulus (Z), as well as index of bending strength were measured from bone mass profile composite index of FN strength (CSI, BSI, and ISI) were calculated as previously described. Direct measurement of free 25(OH)D concentrations was performed by immunoassay which detects free vitamin D by ELISA on a microtiter plate.

**Results:** Free vitamin D was positively correlated with the WB BMC (r=0.263, p=0.023), WB BMD (r=0.298, p=0.01), TH BMD (r=0.340, p=0.003), FN BMD (r=0.295, p=0.01), Lumbar spine BMD (r=0.280, p=0.014), CSI (r=0.289, p=0.014), and CSI (r=0.243, p=0.03). No positive correlation was detected between the total vitamin D serum level, the Vitamin D binding proteins and the previously cited parameters.

**Conclusion:** The free vitamin D serum level is a stronger positive determinant of bone parameters and hip bone strength indices in female young adults than total serum vitamin D.

**PE 5-18**

**Vitamin D metabolites and bone parameters in elderly women: is a better marker of vitamin D deficiency?**

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**Introduction:** Many studies analyzing the effects of vitamin D in the bone status and risk of fracture, suggested that vitamin D might have a strong role in bone health. However, evidence concerning the relation between Vitamin D, its serum metabolites and bone indices is still inconsistent. The aim of this study was to investigate the influence of vitamin D level on bone parameters in a group of elderly men and women.

**Material and methods:** This study included 35 elderly women aged between 65 and 74 years (69.0±3.13) and 17 elderly men between 66 and 75 years (68.1±3.98). They were living autonomously and they were physically active with low intensity physical activity level (women: 9.4±3.65 hours/week and men: 7.3±2.45 hours/week). Weight and height were measured, and body mass index (BMI) was calculated. Whole body bone mineral content (WB BMC), whole body bone mineral density (WB BMD), whole body T-score, total hip BMC (TH BMC), femoral neck BMD (FN BMD), lumbar spine BMC (L1-L4 BMD) and trabecular bone score (TBS) were measured using dual-energy X-ray absorptiometry (DXA). Blood samples were also taken from each participant to measure the vitamin D components levels (total vitamin D, free 25 OH vitamin D ELISA and human vitamin D binding protein(BP)).

**Results:** In the females group, 7 of the participants were osteoporotic, 13 osteopenic and 15 were with normal bone status. In the males group: 5 of the participants were osteoporotic, 8 osteopenic and 4 were with normal bone status. In the female population, there were no significant correlation between vitamin D components and bone indices. In the male population, only total serum Vitamin D was positively correlated to WB BMC (r=0.49, p<0.05).

**Conclusion:** Our study didn’t find overwhelming evidence considering the influence of vitamin D and its composites on the bone status of elderly population.

**PE 5-19**

**Influence of vitamin D level on executive function in elderly men and women**

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**Introduction:** Although the effect of vitamin D on mental health was indefinite, it has been recently reviewed. Lower serum vitamin D is associated with poorer cognitive function. The executive function is considered a higher order ability of the cognitive function that may be primarily affected in cognitive impairment. Its deterioration is associated with...
increase the risk of falling, and therefore fragility fracture occurrence in adults. The aim of this study is to investigate the influence of vitamin D and its metabolites on executive function in a group of elderly men and women.

**Methods:** 17 healthy elderly men aged between 66 and 75 years and 35 healthy elderly women aged between 65 and 74.6 years are included. They were autonomous, with low intensity physical activity level. There global cognitive status, assessed by the Mini mental state evaluation of Folstein, was higher than 26. Executive function was evaluated by the Trail making task (A, B and A-B) for mental flexibility, the Stroop color test (congruent (C), non-congruent (NC) and NC-C) for mental inhibition, and the 2-back task (% of wright answers, and time reaction (TR)) for working memory. Blood samples were taken from each participant to measure the vitamin D components levels (total vitamin D and free 25OH vitamin D by ELISA).

**Results:** In the male group, free 25 OH vitamin D was negatively correlated to TMT B (-0.51; p<0.05), TMT B A (-0.52; p<0.05), Stroop NC (-0.47; p<0.05) and 2-back TR (-0.58; p<0.05). No correlation was found between Total serum vitamin D and vitamin D binding protein with executive function indices. In the female group, total vitamin D was negatively correlated to TMT B (-0.33; p<0.05), Stroop NC (-0.32; p<0.05) and Stroop NC-C (-0.4; p<0.05). No correlation was found between free serum vitamin D and vitamin D binding protein with executive function indices.

**Discussion:** Negative correlation between free vitamin D and cognitive function in elderly men underlines for the first time in the medical literature a positive impact of free vitamin D on executive function of elderly men, which is associated with less fall risk and therefore less fracture risk. Similarly, negative correlation between total serum vitamin D and executive function in elderly women implies a positive impact of serum vitamin D on these functions in elderly men.

**Conclusion:** Vitamin D and its metabolites positively affect cognitive executive function in elderly men.

### PE 5-20

**Vitamin D and trabecular bone score in young Lebanese adults**

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The Trabecular Bone Score (TBS) is a non-invasive method for assessing bone microarchitecture, a key determinant of bone strength. It predicts fragility fractures and when combined with Bone Mineral Density (BMD), this improves the predictive ability. Beyond the established role of Vitamin D in bone health, its correlation to the TBS was never analyzed. This study aims to explore the relation between serum vitamin D and TBS in a group of young Lebanese adults.

**Methods:** 54 young Lebanese men and 61 young Lebanese women whose ages range from 18 to 35 years participated in this study. Bone mineral content (BMC) and BMD were determined for each individual by DXA at whole body (WB), lumbar spine (L1-L4), total hip (TH), and femoral neck (FN) (GE Healthcare, Madison, WI). Bone strength and trabecular bone score (TBS) were also evaluated by DXA. Serum vitamin D insufficiency is defined as a 25(OH)D concentration of<30ng/ml.

**Results:** In men (n=54), weight, BMI and fat mass were negatively correlated to TBS (r=-0.38; p<0.01, r=0.30; p<0.05 and r=-0.31; p<0.05 respectively) while serum vitamin D level was positively correlated to TBS (r=0.36; p<0.01). The positive association between TBS and serum vitamin D remained significant after adjustment for BMI. Vitamin D-sufficient men (n=22) had a significantly higher TBS (1.423±0.81 vs. 1.347±0.82; p<0.01) compared to vitamin D insufficient men (n=32). In women (n=61), weight, BMI and fat mass were not significantly correlated to TBS while serum vitamin D level was positively correlated to TBS (r=0.47; p<0.001). The positive association between TBS and serum vitamin D remained significant after adjustment for BMI. Vitamin D-sufficient women (n=18) had a significantly higher TBS (1.417±0.113 vs. 1.364±0.079; p<0.05) compared to vitamin D insufficient women (n=43).

**Discussion:** Our study suggests that serum vitamin D is a positive determinant of TBS in young Lebanese adults. To our knowledge, this is the first study to find positive correlations between serum vitamin D and TBS in young adults. Optimizing serum vitamin D levels in the youth may be associated with higher TBS values in young adults, and therefore with stronger bone and less predisposition to fragility fractures later on.

**Conclusion:** Our study provides an additional evidence of vitamin D effect on bone health in youth, promoting an early primary senile osteoporosis prevention.

### PE 5-21

**Relationship between maximal half squat strength and bone variables in a group of young Lebanese men**

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**Aim:** The purpose of this study is to explore the relationships between maximal half squat strength and bone variables (BMC, BMD, hip geometric indices and TBS) in a group of young Lebanese men.

**Materials and methods:** 76 young Lebanese men whose ages range from 18 to 32 years participated in this study. Body composition and bone variables were measured by DXA. Maximal half squat strength was measured by a classical fitness machine (Smith machine) respecting the instructions of the national association of fitness machine. The relationship between maximal half squat strength and bone variables in young men was assessed.

**Results:** Maximal half squat strength is positively correlated to whole body BMC (r=0.37; p=0.001), whole body BMD (r=0.29; p=0.01), L1-L4 BMD (r=0.42; p<0.001), total hip BMD (r=0.26; p=0.02), femoral neck BMD (r=0.32; p=0.004), femoral neck cross-sectional area (r=0.44; p<0.001), femoral neck cross-sectional moment of inertia (r=0.27; p=0.03) and femoral neck section modulus (r=0.37; p=0.001). Using multiple linear regressions, positive correlations between maximal half squat strength and several bone variables measured (whole body BMC, whole body BMD, L1-L4 BMD, femoral neck BMD, femoral neck cross-sectional area and femoral neck section modulus) persisted after adjustment for lean mass.

**Discussion:** This study highlights the positive influence of maximal strength of the lower limbs on bone variables in young men. Maximal half squat strength is an independent determinant of bone mass, bone mineral density, and geometric indices of femoral neck in young men.

**Conclusion:** This study suggests that promoting physical training in youth might have practical implications in the field of the prevention of osteoporosis in men.
a program provide the most benefit for delirium prevention or management yet this systematic review reveals that hip fracture patients who received multimodal interventions had a 35% lower risk of developing delirium as compared to those who did not.

**PE 5-23**
Geriatric orthopaedic trauma at the University hospital of Crete Greece: A 5-year surveillance study
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**Introduction:** Geriatric orthopaedic trauma is a major cause of disability, loss of independence, as well as financial burden for the society. In the present study we investigated the incidence, the gender and age differences of elderly patients suffered from a fracture, treated surgically in a five year period.

**Methods:** The present is a retrospective epidemiological cohort study. The study period was from January 2011 to December 2015. We included patients older than 65 years of age, with low energy-trauma, treated surgically due to a fracture at the Orthopaedic Department of the University Hospital of Heraklion, Crete, Greece. The following parameters were studied from the patients’ medical records: age, gender, type of fracture.

**Results:** Our sample consisted of 1676 patients. The majority of the patients were female (1143 or 68.2%), while the rest 553 (31.8%) were male. The mean age of the female group was 81.6 (± 7.8) and 78.9 (± 8.2) for the male group. The vast majority of fracture documented was that of the hip (1123 or 68.2%), while the rest 553 (31.8%) were male. The vast majority of patients were female (1143 or 68.2%). In all type of fractures the female group predominated (78.9%) for the male group. The vast majority of the patients were female (1143 or 68.2%).

**Conclusion:** There is an increasing fiscal need to provide trauma and orthopaedic care in a cost-effective manner. This study evaluated the quantity and quality of economic analyses performed in trauma and orthopaedics amongst elderly patients.

**Materials and methods:** Electronic databases were systematically searched without restrictions in line with PRISMA guidelines. Inclusion criteria were patient age 65 years or over and any disease or injury requiring orthopaedic treatment. Relevant data was extracted and the Consensus on Health Economic Criteria (CHEC) checklist was used to assess the methodological quality of the economic analyses. A descriptive analysis and a subgroup analysis were conducted.

**Results:** There were 62 eligible studies identified. 10 incorporated full economic analyses and the remaining conducted partial economic analyses. The mean CHEC checklist quality score was 10.7 out of 19. Subgroup analysis suggested a deficiency of economic analyses on anatomical sites besides the hip and knee. High quality economic analyses utilise the societal perspective, indirect costs, discounting, incremental analyses and sensitivity analyses and few clinical studies incorporated these factors.

**Conclusion:** This systematic review demonstrates the need for improved cost-effectiveness data to aid resource allocation decisions in trauma and orthopaedics, including for fragility fractures.

**Abstracts**

**Poster Presentations**

**PE 5-25**
Bone mineral density and trabecular bone score in men with vertebral fractures

**Aim:** To evaluate the trabecular bone score (TBS) and bone mineral density (BMD) in men with osteoporotic vertebral fractures.

**Materials and methods:** We’ve examined 197 men aged 45-89 years, divided according to the gerontological classification: 45-59 yrs (n=83), 60-74 yrs (n=88), 75-89 yrs (n=28). Group A – consists of 44 men with vertebral fractures (mean age – 63.7±10.8yrs; mean height – 1.73±0.07m; mean weight – 79.4±14.9 kg) and group B – 153 men without fractures (mean age – 62.3±10.2 yrs; mean height – 1.73±0.29 m; mean weight – 76.3±8.9 kg). The BMD of lumbar spine L1-L4, femoral neck and total body were measured by DXA (Prodigy, GEHC Lunar, Madison, WI, USA). The TBS L1-L4 was assessed by the TBS iN多余的™ software package installed on our DXA machine (Med-Imaps, Pessac, France).

**Results:** In group we found that men with osteoporotic vertebral fractures have significantly lower TBS L1-L4 (A – 1.02±0.210, B – 1.185±0.170; P=25.54; p<0.001) and BMD of lumbar spine (A – 1.09±0.172 g/cm², B – 1.150±0.130 g/cm²; F=33.74; p<0.001), femoral neck (A – 0.821±0.143 g/cm², B – 0.981±0.135 g/cm²; F=13.62; p<0.001), total body (A – 1.110±0.117 g/cm², B – 1.183±0.094 g/cm²; F=17.80; p<0.001) to compared with men without fractures. When we analyzed BMD depending on age, we found the significantly differences in group A: TBS L1-L4 – 45-59 yrs – 1.025±0.248 vs 1.226±0.156 (p<0.001), 60-74 yrs – 1.830±0.170 vs 1.150±0.257 (p=0.195), 75-89 yrs – 0.951±0.170 vs 1.183±0.174 (p=0.002) and BMD of lumbar spine – 45-59 yrs – 1.027±0.18 vs 1.154±0.13 (p=0.001), 60-74 yrs – 1.014±0.16 vs 1.154±0.13 (p=0.001), 75-89 yrs – 0.951±0.17 vs 1.182±0.17 (p=0.003); total body – 45-59 yrs – 1.141±0.11 vs 1.203±0.09 (p=0.02), 60-74 yrs – 1.121±0.11 vs 1.179±0.09 (p=0.04), 75-89 yrs - 1.040±0.11 vs 1.128±0.8 (p=0.02).

**Conclusion:** Subjects with vertebral fractures have significantly lower TBS and BMD parameters than the healthy men.

**Poster Presentations**

**PE 5-26**
Low bone mineral density is a major contributor in the global health burden due to road traffic accidents in people aged 50 years and above

**Aim:** To measure the proportion of the worldwide health burden of road traffic accidents (RTA) in people aged 50 years and above attributable to low bone mineral density (BMD), as part of the Global Burden of Diseases (GBD) study.

**Methods:** The estimates followed the Counterfactual Risk Assessment Methodology used in the GBD study (1). Systematic review was performed seeking population-based studies with femoral neck BMD (FNBM) measured by Dual-X-Ray-Absorptiometry in people 50 years and over. Age- and sex-specific levels of mean FNBM<5SD (g/cm²) were extracted from eligible studies, and this was used as the exposure variable. The age and sex-specific 99th percentile from non-Hispanic whites in National Health and Nutrition Examination Survey (NHANES) 2009-2010 was used as theoretical minimum risk factor exposure distribution, to estimate the potential impact fraction (PIF) of FNBM for fractures. Relative risks of FNBM for fractures were obtained from a previous meta-analysis (2). Attributable deaths due to RTA-related fractures were obtained through coded hospital data. Disability levels were established by applying disability weights to each type of fracture. Then, PIFs were applied to obtain attributable fraction and disability due to low BMD.

**Results:** Globally, in 2015, 12.0% (95% CI: 10.5-13.3%) and 29.2% (29.0-30.3%) of deaths caused by RTA were attributable to low BMD in the population aged 50-69 and 70 years and above, respectively. This represents a 64% and 97% increase in absolute deaths from 1990 data, respectively. The percentage of global
health burden caused by RTAs attributable to low BMD in the population aged 50-69 was 13.6% (11.6-15.6) for 70 and over 26.2% (24.9-27.5%). This represents a 64% and 80% increase, respectively, from 1990 data. For disability, in the population aged 50-69 was 22.3% (19.2-25.2%) and for 70 and over 28.2% (26.3-29.8%). This represents 64% and 84% increase, respectively, from 1990.

Conclusions: This data shows the non-previously reported important role of low BMD as a preventable risk factor for RTAs’ health burden in population 50 years and over, and its growing trends, which requires urgent attention.

PE 5-27
Investigation of factors affecting postoperative sliding of lag screw in femoral trochanteric fractures
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Background: It is known that the excessive sliding of the lag screw after the internal fixation for femoral trochanteric fractures can lead to poor surgical outcomes. In this study we retrospectively review the factors associated with the length of sliding which are shown in previous literatures. Material and method: 134 patients who had received internal fixation with IF and followed up for more than 3 months. The mean age was 82.5 years (range, 49 to 99 years). 11 cases were Jansen type I, 34 cases were type II, 46 cases were type III, 17 cases were type IV. 26 cases were younger men and 10 patients who had more than 10mm (more than 10mm) were classified as group A, while 124 cases who had less amount of sliding were classified as group C. Fracture type, Tip-apex distance (TAD), the position of lag screw based on postoperative radiographs (anterior, P=0.70; lateral, P=0.153). Multivariable linear regression analysis showed age (standardized beta: -0.7, P=0.023), Jensen classification III/IV/V (standardized beta: 0.288, P<0.001), and subtype P based on postoperative radiographs with lateral view (standardized beta: 5.077, P=0.002) but not TAD nor the position of the lag screw based on postoperative radiographs were independent predictor of the length of sliding.

Discussion: In previous reports, unstable fracture, TAD more than 25mm, malposition of the lag screw and sub-type P in ML view were considered as the prognostic factors that lead to postoperative excessive sliding. In this study, the amount of sliding is not associated with TAD and the position of lag screw meanwhile sub-type P is correlated with the amount of sliding. Therefore for unstable fractures in particular, optimal reduction position is important, and careful postoperative check-up for less of reduction after ambulation is mandatory for patients with sub-type P.

Conclusion: Optimal reduction position is essential for the prevention of the postoperative excessive sliding for unstable femoral trochanteric fractures.

PE 5-28
Synthesis of international guidelines on fracture risk
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Introduction: There is a significant knowledge gap about the concept of moderate risk in Canada making it difficult for clinicians to manage patients assigned to this risk category. This risk category applies to approximately 61% of fragility fracture patients. Our team was interested in how other countries classify fracture risk in their guidelines and what actions they recommend, such as pharmacologic treatment, based on these classifications.

Purpose: We conducted a synthesis of international osteoporosis guidelines to determine how individual countries: 1) Identify patients at risk for future fracture; 2) Classify the categories of fracture risk status, if applicable; and 3) Recommend actions (pharmacologic and non-pharmacologic) based on fracture risk status. We were specifically interested in the category of “moderate” risk or an equivalent classification.

Methods: We retrieved osteoporosis guidelines from the International Osteoporosis Foundation website as of March 2017. We focused on the guidelines written in English only. Two reviewers independently reviewed each document and the following data were extracted: 1) how are patients classified at risk for future fracture, if at all (e.g. fracture risk tool used); 2) the categories used to describe fracture risk status (e.g., low, moderate, high), if risk categories exist; and 3) actions recommended based on risk status (e.g. further testing, pharmacological treatment). A third reviewer resolved differences where a consensus could not be reached by the two primary reviewers.

Results: In total, there were links to guidelines and supporting documents from 46 countries and 5 regions. Of the 51 countries or regions, 30 had guidelines written in English or with an English summary. The guidelines demonstrated that ten countries/regions classify individuals as “moderate”, “medium”, “intermediate”, or “orange” fracture risk with management patients in this risk category varying greatly across jurisdictions: no formal recommendations, BMD testing to reassess fracture probability, lifestyle changes only, pharmacotherapy (if other clinical factors are present).

Conclusion: International guidelines for management of patients at risk for future fracture are not consistent. In guidelines that acknowledge moderate risk patients, recommendations vary making international comparisons of treatment difficult. We recommend that a simple and clear message about patients at moderate risk be developed.

PE 5-29
Distal radius fracture in men: outcome in the young and elderly over the first year
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Introduction: A fracture of the distal radius is one of the most commonly seen fractures in men, across a spectrum of ages. Functional outcome after such a fracture may affect quality of life and working ability; although the extent to which outcome is influenced by treatment strategy and similarly, the extent to which age is a contributing factor, is unclear. The aim of this prospective observational cohort study was to determine whether self-reported outcome differs between young and elderly men and if outcome is related to radiographic fracture properties and bone mineral density.

Methods: N=133 adult men (21-88y; mean 54y) presenting with a distal radius fracture were followed for the first 12 months post fracture. All men were treated according to standard protocols for distal radius fracture. Outcome measure was DASH (Disability of the Arm, Shoulder and Hand) at 12 months. DASH scores range 0-100 (i.e. low- high disability); a poor result being defined as DASH>15. Bone mineral density was available in 117 patients. Men were classified as young (<65y) and old (65+). Malunion was defined as dorsal tilt >10° and/or ulnar variance >2mm.

Results: In the older men, median DASH was 10 (IQR: 1-26; mean 20) compared to 2 (IQR: 0-8; mean 7) in the younger men, p=0.002. A clinically meaningful difference between age groups (DASH 10 (95% CI: 2-19) p=0.017) was apparent after adjustment (malunion, fracture type, treatment method). Older men had a worse outcome, with almost half having a poor result (48% (13/27) compared to 14% (11/78) in younger men, p<0.001. In the group ≥65 years, there were no significant difference in DASH between those who healed with malunion compared to those who had no malunion, p=0.466. Bone mineral density was not an independent predictor of outcome in either old or younger men when adjusting for age, treatment method and radiographic parameters.
**Conclusion:** Men over age 65 report an overall worse functional outcome 12 months after distal radius fracture; malunion does not affect the outcome in this age group. Bone mineral density was not a predictor of disability in either old or younger men.

**PE 5.30**
The timed loaded standing test in Osteoporotic Vertebral Fracture (OVF): evidence of characteristic patterns of erector spine muscle fatigue during endurance testing

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**Introduction:** The key role of the back extensor muscles in conditions such as vertebral osteoporosis, OVF and hyperkyphosis has focussed attention on the importance of measuring erector spine (ES) muscle endurance in this population. Traditional trunk holding tests times correlate highly with ES muscle fatigue measured objectively using surface electromyography (sEMG) but these tests are not feasible in this patient group. The Timed Loaded Standing (TLS) test records how long someone can stand holding a 1Kg dumbbell with arms extended and shoulders flexed. Previous work suggests TLS is reliable and correlates with relevant impairments. This study investigates evidence for thoracic ES muscle fatigue during the TLS.

**Method:** A cross-sectional observational study of adults with vertebral osteoporosis, OVF and back pain. Information was collected about bone health, spinal curvature (Flexi-curve) and back pain (0–10 scale). Endurance time on TLS was recorded in seconds (s). Surface electromyography (sEMG) was used to measure thoracic ES muscle activity bilaterally at the level of T3 and T12 during TLS. Fatigability of the ES muscles was evaluated by considering change in the median frequency (MF) of the sEMG signal.

**Results:** There were 36 participants: 3 men, 33 women, age a mean 71.3 (S.D.: 9.4) years. Most were hyperkyphotic (mean 44.8°, S.D.: 12.9° kyphosis), had multiple, previous OVF (mean 4, S.D.: 2.6) and back pain (mean 4.5, S.D.: 2.6 severity). The TLS lasted a mean 55.8 (S.D.: 48.3) seconds. Over the test MF declined at a mean -24.2% per minute (95% CI: -26.5% to -21.9%). Overall MF slope and test time were strongly correlated (r=0.70). Initial MF slope showed minimal fatigue at an average -7.9% per minute (95% CI: -11.4% to -4.5%) compared to increasing fatigability at test end. MF slope of the final 30s mean -42.6% per minute (95% CI: -38.0% to -47.0%), final 10s -48.3% per minute (95% CI: -52.9 to -43.1%), final10s -98.6% per minute (CI: -105.7% to -87.7%). At the point at which each participant stopped TLS, MF had decreased significantly (p=0.04) and was a mean 89% (S.D.: 11.6%) of initial MF values.

**Conclusions:** This data relates TLS test time strongly to ES muscle fatigue observed objectively using sEMG. It suggests the TLS test can be used with people with symptomatic vertebral osteoporosis to evaluate thoracic ES muscle endurance. Further work should assess the lumbar ES during TLS and consider the responsiveness of the test.

**PE 5.31**
Fragility hip fractures in young patients: are we missing the point?


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**Introduction:** Hip fractures are uncommon in patients under 65 years of age, and can be caused by high-energy trauma as well as fragility in patients with comorbidities causing secondary osteoporosis. The goal of this study was to analyze the predisposing factors and prognosis of these fragility hip fractures in patients under 65 years of age.

**Methods:** We performed a retrospective study of fragility hip fractures in patients between 18 and 65 years of age with a minimum 1-year follow-up; only low-energy fractures (fractures falling from standing height) were included, and pathologic fractures and high-energy injuries were excluded. 490 patients between 18 and 65 years of age were treated for hip fractures between 2004 and 2014, and 241 fit the inclusion criteria. Median follow-up was 89 months. Risk factors for osteoporosis were assessed, as well as postoperative complications, new fractures, and mortality.

**Results:** Median age was 66 years (20–65), and 55.5% were male. The most common comorbidities were: history of alcohol and/or drug abuse (24.9%), neuromuscular disorders (17.8%), mental retardation (12.5%), endocrine disease (12%), chronic viral hepatitis (6.6%), epilepsy (4.6%), and HIV (3.7%). 52.3% of the fractures were intracapsular, and 58.7% of these were treated with cannulated screws. 55 patients were lost to follow-up, and 42 (22.5%) died during follow-up. 15 (9.8%) in the first year after the fracture. Of the patients followed up, only 14.7% were studied for osteoporosis, and 27.7% presented postoperative complications. Avascular necrosis occurred in 13% of cases. 15.2% suffered subsequent fragility fractures, and nearly half of these were fractures of the contralateral hip.

**Conclusions:** Low-energy fragility fractures are also an important entity among younger patients treated at our centre. Though most patients had a medical history compatible with secondary osteoporosis, few were formally diagnosed and treated. Subsequent fractures were common in this group, and the complication and mortality rates were high. We believe the severity of a low-energy hip fracture should never be underestimated, even in younger patients.

**PE 6.1**
“Cancer survivors” as the target of treatment for osteoporosis

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**Introduction:** “Cancer survivor (CS)” is the concept advocated by the National Coalition for Cancer Survivorship, an individual is considered a CS from the time of diagnosis, through the balance of his or her life. In Japan, half of the population has cancer in their lifetime, and one third die of cancer. Therefore, we should take QOL of CSs into account, and discuss the medication of osteoporosis (Tx) for them. Experience of Tx for CSs by a rehabilitation doctor in a regional central hospital is described here.

**Methods:** The author considered Tx for 52 CSs in these 5 years, according to the treatment criteria for primary osteoporosis by Japan osteoporosis society. When vertebral fracture(s) was found on CT taken before, Tx was recommened to the patient. And in cases with more than 3 cm loss in height, the bone mineral density (BMD) was measured and Tx was considered. They are classified in 2 groups: group (R): radical cancer therapy patients, and group (M): maintenance therapy patients.

**Results:** Group(R) includes 30 patients (28 females, 2 males) aged 58-85 years old. Organs got cancer were lung (20), stomach or intestine (4), tongue (2), and others (4). Tx beban with Bisphosphonates (15), SERM (1), PTH (2), Denosumab (2). 4 patients had no fracture and BMDs were osteopenia level. 3 patients were already medicated by family doctors. The author failed to begin Tx for 3 patients by error in scheduling. 16 patients continued Tx and keep their activity. There is no information about Tx for 2 patients and Tx for a male patient stopped soon after hospital transfer. A patient died of brain tumor. Group(M) includes 21 patients (16 females, 5 males) aged 62-84 years old, whose cancer was cancer in liver or gallbladder (6), uterus or ovarian (4), blood (5), lung (3), and others (3). Bisphosphonates (11), Denosumab (3), PTH (2), and Eldedcalcit (1) were used. For renal dysfunction or problem on the character, Tx was avoided in 2 patients. Tx for a patient was postponed for dental treatment. 8 patients died of cancer, and a patient refused treatment 2 months later. 8 patients are continuing medication and keeping activity.

**Conclusion:** Most CSs have interest in own health, and come to hospital regularly, so adherence of Tx is very good. And CSs continuing Tx kept their performance status. On one hand, remarks to Tx from doctors in charge became favorable. We should suggest Tx to CSs actively with the support of co-working staffs.
Introduction: Over 70,000 operations are performed annually for fractured neck of femurs (NOFs). Hip fracture patients remain at high risk of complications as they tend to be elderly with multi-system co-morbidities. Our study looks at previous fractured NOF admissions, identifying indications for intensive care transfers and overall outcomes in these patients. No clear guidelines currently exist to guide this. Methods: All patients presenting to a London teaching hospital with fractured NOFs were identified from a retrospective database. Hospital records were used to collect data on patient demographics, high dependency (HDU) or intensive care (ICU) unit admissions and overall outcomes. Results: Overall 216 patients presented to our hospital with fractured NOFs in 2016. 12 patients were admitted to HDU/ICU in the post-operative period (5.6%) of which one patient was excluded from this study as no clinical data was available. Of the remaining 11 patients, all had an ASA grade of 3 or more. 4 admissions were planned pre-operatively as a result of high risk premorbid states (1.9% of all fractured NOFs), 7 HDU/ICU admissions were due to post-operative organ failure, predominantly cardiorespiratory complications. The average length of stay for these planned admissions was 1.75 days (compared to 4.5 days for the post-operative complications). 9 of 11 patients survived to discharge (82%). Conclusion: There is currently no consensus nationwide as to which fractured NOF patients require post-operative HDU/ICU monitoring. Only a small percentage of these patients are admitted to HDU/ICU during their hospital stay (5.6%). However, intensive care support can lead to excellent outcomes in the most high risk patients (82% survival) despite their precarious premorbid state. Additionally, planned intensive care monitoring post-operatively is associated with shorter ITU/HDU stays than emergency admissions due to organ failure. We are therefore developing a local multidisciplinary pathway whereby high risk patients will be identified in the pre-operative period and transferred electively to intensive care post-operatively. This should improve patient outcomes significantly in a cost-effective manner (shorter stays and reduced requirements for multi-organ support). This will be trialled and presented at our Fragility Fracture Network Meeting.

TP 9-2 Is there an increased risk of prosthetic dislocation after insertion of a hemiarthroplasty for a hip fracture in patients with neuromuscular conditions? Parker M., Dasaraju P. Peterborough City Hospital, Peterborough, United Kingdom

Introduction: Is the risk of dislocation of hemiarthroplasty higher in patients with neuromuscular conditions? Parker M., Dasaraju P.

Methods: Is there an increased risk of prosthetic dislocation after insertion of a hemiarthroplasty for a hip fracture in patients with neuromuscular conditions? 3151 consecutive patients with an intracapsular hip fracture treated with a hemiarthroplasty followed up to one year from injury. Dislocation of the prosthesis occurred in 1.9% of the 676 patients with dementia, 1.2% of the 80 patients with a previous limb weakness on the fracture side from a previous stroke and 2.2% of the 181 patients with Parkinson’s disease. The dislocation rate for a patient with none of the above conditions was 1.2%. None of these differences were statistically significant. In conclusion the presence of neurological disorder or weakness does not significantly increase the risk of prosthetic dislocation.

TP 9-3 Hip fractures: “What I wish you had told me” McCluskey L.1, Patel V.1, Yeung J.1, Simons A.1

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Introduction: In the UK there are currently 75,000 hip fractures annually and this number is rising. Hip fractures are associated with significant distress, morbidity and mortality, with 10% of patients dying within 30 days. Patients approach surgery with expectations about their outcomes. Evidence shows that pre-operative expectations predict important post-operative outcomes, including factors such as healing time, functional improvement and re-hospitalization rates. The purpose of this study was to examine patients’ expectations and address any concerns that they may have. This information will help the clinic to develop a booklet to give to patients at their pre-operative outpatient visit.

Conclusions: This service evaluation highlights a need for the implicit of a hip fracture booklet into our practice to improve patient satisfaction and care. The topics addressed, whilst similar to the NHFD recommendations, did include local variations, such as physiotherapy times and aftercare. The booklet about treatment and aftercare following a hip fracture could be prevented with identification and treatment. Fracture prevention is therefore both clinically and cost-effective. This analysis showed that the risk of dislocation of hemiarthroplasty higher in patients with neuromuscular conditions? Parker M., Dasaraju P.
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TP 9-5
The treatment gap after fracture in osteoporosis patients in Sweden
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1Linköping University Hospital, Linköping, Sweden, 2Lund University, Skåne University Hospital, Malmö, Sweden, 3Uppsala University Hospital, Uppsala, Sweden, 4Quantify Research, Stockholm, Sweden, 5UCB Pharma, Brussels, Belgium, 6Karolinska Institutet, Department of Learning, Informatics, Management, and Ethics, Stockholm, Sweden

Introduction: In Sweden, ~50% of women and ~25% of men are expected to suffer an osteoporosis (OP)-related fracture (Fx) and hip Fx incidence in Sweden is one of the highest worldwide. However, nationally only 12% of patients are prescribed an OP treatment following Fx. Understanding the reasons for the under-treatment of patients with Fx may provide insights into how to improve deficiencies in OP management.

Methods: Patients ≥50 yrs with any type of Fx were identified from Swedish national registers (2006-2012) and followed from time of first Fx. Patients who were treatment-naïve at first Fx were included. Here, we report OP treatment initiation <1yr after Fx in different baseline subgroups (gender, age, Fx type, steroid use and comorbidities).

Results: 258,827 patients (68% female; mean age 72.7 yrs) were included. Overall, 6.6% of patients initiated OP treatment<1yr; this was higher in females (8.5%) vs males (2.3%), and highest in patients aged 70-80 yrs (10.7%) vs other ten-year age groups (mean 5.5%). Patients with a diagnosed vertebral Fx were more likely to start treatment (21.2%) vs non-vertebral Fx (5.6%). OP treatment initiation was higher in patients receiving (17%) vs not receiving (6.1%) glucocorticoid (GC) treatment. Comorbidities were not generally associated with treatment initiation, except for those indirectly connected to Fx risk factors, i.e. chronic pulmonary disease (GC use) and rheumatoid arthritis (FRAX-algorithm risk factor) (both associated with increased initiation). Although dementia and dependency are associated with increased Fx risk, treatment initiation was lower in patients with these conditions vs those without (1.5% vs 6.9% and 2.3% vs 7.4%, respectively).

Conclusions: This study confirms the large gap in OP treatment initiation following first Fx in Sweden; the post-Fx OP treatment initiation rate was below the goal of 30% and lower than the 12% published national indicator for treatment exposure (2015). The proportion initiating OP treatment appears to be somewhat influenced by gender, age, Fx type, GC use, rheumatic disease, dependency and dementia; however, initiation rates were low. These data highlight the need for significant efforts to improve OP management post Fx in Sweden.

Reference:

Acknowledgements: Funded by UCB Pharma.

TP 9-6
Reducing 30 days mortality and 30 days readmissions for patients with hip fracture discharged to nursing care
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The 30 days mortality of patients with hip fracture, at Kolding Hospital in 2015 was 14%. This is more than the national average and goal of 10%. A 30 days mortality audit was done by Orthopedic geriatrician, anesthesiologist, head nurse and the chief doctor. The purpose was to explain the rate and to set proposals to optimize the patient care. In 2015 there were 377 patients with hip fracture. The average age was 82 years and 22% with Charlestone score 3 or more. 57 patients came from nursing care. 49 Patients had died within 30 days – 16 patients were from nursing care. The 30 days mortality of patients with hip fracture, at Kolding Hospital in 2015 was 14%. This is more than the national average and goal of 10%. A 30 days mortality audit was done by Orthopedic geriatrician, anesthesiologist, head nurse and the chief doctor. The purpose was to explain the rate and to set proposals to optimize the patient care. In 2015 there were 377 patients with hip fracture. The average age was 82 years and 22% with Charlestone score 3 or more. 57 patients came from nursing care. 49 Patients had died within 30 days – 16 patients were from nursing care.

The audit team found that a few deaths was potentially preventable with focus on:
- Reducing analgesic and using block preoperatively
- Prevent pneumonia by swallowing assessment
- Prevent constipation
- Early mobilization
- Focus on kidney function
- Treat delirium in transition to nursing care.

The 30 days mortality were high among patients from nursing care and they are often readmitted with preventable causes as infections, fall and dehydration. A meeting with the leaders from the nursing Homes and the emergency team were planned and a protocol was made containing systematic observations 14 days after discharge. The observations are: Early warning scores twice a day, pain assessment twice a day, mobilization at every meals, liquid scheme and nutrition drinks twice a day. The emergency team will do planned visits and acute visits and cooperate with the doctors from Orthogeriatric Unit. The hospital will be responsible for the treatment 14 days after discharge. The emergency team is able to treat the patient with iv fluid, iv antibiotics and they can measure bloodsamples in the nursing home. We expect through this project, that the patient care will be with a higher quality. We hope to reduce the 30 days mortality, reduce the 30 days readmissions and reduce infections and dehydration.
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Notes
Be part of our highly interactive, illuminating discussion exploring:

How do we rapidly identify patients with fragility fractures?

How can we share practical solutions to ensure no patient with a fragility fracture is left behind?

What actions should we take in our own hospital settings?
Rapid Recovery Programme

Our Rapid Recovery Programme supports hospitals with improving their Fragility Hip Fracture Care Pathway.

Through in-depth pathway analyses we provide detailed insights into the organisational and medical processes, identifying opportunities for improvement.

Lunch Symposium

Embrace Complexity! Advancing Fragility Fracture Care

Faculty: Prof. S. Nijs / Prof. M. Blauth

When: Thursday 24 August, 12:30 - 13:30

Where: Ballroom CD