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Floorplan

- Capital Foyer
- Scandinavian Foyer
- Stairs to lobby, restaurants & bars
- Capital Ballroom
- Casino Ballroom
- Scandinavian Ballroom
- Reykjavik
- Stockholm
- Copenhagen
- Helsinki
- Oslo
- Denmark
- Iceland
- Sweden
- Finland
# Udstillere

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Dagsprogram

Onsdag d. 21. oktober 2015

09:00 – 10:30 **Session 1** *(Hip/knee)*

09:00 – 10:30 **Session 2** *(Trauma I)*

09:00 – 10:30 **Session 3** *(Hands/wrist)*

09:00 – 10:30 **DOS Symposium: (videnskab) “PROMs – hvad skal vi med det?”**  *Casino Ballroom*

10:30 – 11:00 **Kaffe i udstillingen**

11:00 – 12:00 **Session 14** *(Poster med foredrag A)*  *Reykjavik*

**Session 15** *(Poster med foredrag B)*  *Stockholm/Copenhagen*

**Session 16** *(Poster med foredrag C)*  *Helsinki/Oslo*

12:00 – 13:00 **Frokost i udstillingen**

12:15 – 12:45 **Frokostsymposium: Ortotech**

Dr. med. Clemens Köster, FEBS

*”The Challenge of Treating Periprosthetic Femoral Fractures”*
13:00 - 14:30 **Møde i fagområderne**  
**Fagområde:**  
DSHK  
Dansk Selskab for Håndkirurgi  
Dansk Ortopædisk Traumeselskab  
Dansk selskab for skalder – og albuekirurgi  
SAKS  
Fod/ankelselskabet  
Børneortopædisk Selskab  
Ledende overlæger  
Ortopædisk Onkologi/knogle- og bløddelstumorer  

**Lokale:**  
Casino Ballroom  
Lillebror  
Stockholm  
Copenhagen  
Reykjavik  
Helsinki  
Directors  
2620 (26.etage)  
“Top of Town” (25. etage)

14:30 - 15:00 **Kaffe i udstillingen**

15:00 - 17.30 **Møde i fagområderne (fortsat) samt:**  
Ryginteressegruppen

16:00 - 17:30 **Dansk Selskab for Ortopædisk Infektionskirurgi (DSOI)**

17:30 - 18.30 **Velkomst og Posterwalk**

18.00 - ? **Danske Ortopæders Organisation**

18.30 - 20:00 **YODA**
Dagsprogram

Torsdag 22. oktober 2015

09:00 - 10:30  **Session 4** *(Knee)*  Reykjavik

**Session 5** *(Pediatric/foot)*  Stockholm/
Copenhagen

**Session 6** *(Spine)*  Helsinki/Oslo

**DOS Symposium (uddannelse):**  Casino Ballroom
“**Introduktionsstilling i ortopædkirurgi** ”

10:30 - 11:00  **Kaffe i udstillingen**

11:00 - 12:00  **DOS Honorary Lecture**  
*Thomas Bjarnsholt,*  
*Civiling. professor, DMSc.*  
Stockholm/  
Copenhagen

**“Biofilm og deres rolle i kroniske infektioner og andre inflammatoriske tilstande”.**

12:00 - 13:00  **Frokost i udstillingen**

13:00 - 14:30  **Session 7** *(Hip)*  Reykjavik

**Session 8** *(Sportstraumatology)*  Stockholm/
Copenhagen

**Session 9** *(Exsperimental)*  Helsinki/Oslo
Dagsprogram

Torsdag 22. oktober 2015

09:00 - 10:30  **Session 4 (Knee)**  Reykjavik

**Session 5 (Pediatric/foot)**  Stockholm/
Stockholm/Copenhagen

**Session 6 (Spine)**  Helsinki/Oslo

**DOS Symposium (uddannelse):**  Casino Ballroom
"Introduktionsstilling i ortopædkirurgi"

10:30 - 11:00  **Kaffe i udstillingen**

11:00 - 12:00  **DOS Honorary Lecture**  Stockholm/
v/Thomas Bjarnsholt,  Copenhagen
Civiling. professor, DMSc.  Helsinki/Oslo

"Biofilm og deres rolle i kroniske
infektioner og andre
inflammatoriske tilstande".

12:00 - 13:00  **Frokost i udstillingen**

13:00 - 14:30  **Session 7 (Hip)**  Reykjavik

**Session 8 (Sportstrauamatology)**  Stockholm/
Stockholm/Copenhagen

**Session 9 (Exsperimental)**  Helsinki/Oslo
13:00 - 14:30  **DOS Symposium (kvalitet) “Patientinvolvering”**  
Casino Ballroom

14:30 - 15.00  **Kaffe i udstillingen**

15:00 - 17:00  **Generalforsamling i DOS**  
Stokholm/  
Copenhagen/  
Helsinki/Oslo

18.30 - ?  **Kongresfest**  
Casino Ballroom/  
Stockholm/  
Copenhagen/  
Helsinki/Oslo
Dagsprogram

Fredag 23. oktober 2015

09:00 – 10:00  Session 10 (Tumor)  
Lokale:  Reykjavik

Session 11 (Shoulder/elbow)  
Stockholm /Copenhagen/

Session 12 (Trauma II)  
Helsinki/Oslo

10:00 – 10:30  Kaffe i udstillingen

10:30 - 11:30  Professor lectures:

10:30 – 10:45  Professor Michael Ulrich Jensen, MD. PhD DMSc  
Stockholm/ Copenhagen/

"From Gene to Registry“  
Helsinki/Oslo

10:45 – 11:00  Professor Bjarne Møller-Madsen, MD, DMS, Consultant  
Stockholm/ Copenhagen/

“Childrens Orthopaedics-
Guided Growth“  
Helsinki/Oslo

11:00 - 11:15  Professor Ming Ding, MD, PhD, DMSc  
Stockholm/ Copenhagen/

“Imaging bases of bone tissues and biomaterials in bone regeneration“  
Helsinki/Oslo

11:15 - 11:30  Professor Per Hölmich, MD, DMSc  
Stockholm / Copenhagen/

“Sports orthopaedics in arthroscopic surgery“  
Helsinki/Oslo
11:30 - 12:30  **Guildal lecture:**
Wayne G. Paprosky,
MD FACS, Professor
“Current Status of Acetabular
and Femoral Revisions:
Is There Anything New?”

12:30 - 13:30  *Frokost i udstillingen*

13:30 - 15:00  **Session 13 (Best paper)**

15:00 - 16:30  **Uddelinger:**
• DOS Fonden
• Guildal Fonden
• Vindere af foredrag og posterkonkurrence

16:30 - 17:00  *Kaffe*
Session 1: Hip / Knee

Onsdag d. 21. oktober
09:00-10:30
Lokale: Reykjavik

Chairmen: Per Kjærsgaard / Thomas Jakobsen

1. Risk factors for early periprosthetic fractures following primary cementless THA
Ann Buhl Bersang, Anders Troelsen, Kalemose Thomas, Husted Henrik, Gromov Kirill

2. Is patient-reported outcome after total hip arthroplasty influenced by type of bearings?
Claus Varnum, Alma B. Pedersen, Per Kjærsgaard-Andersen, Søren Overgaard

3. Promising migration Pattern in a 2 year RSA follow-up of the short Primoris Femoral Stem
Janus Duus Christiansen, Michael Ulrich Jensen, Ashir Ejaz, Poul Torben Nielsen, Mogens Berg Laursen

4. Surgical Selection Bias may influence results presented in current literature after two-stage revision of chronic peri-prosthetic hip joint infection.
Jeppe Lange, Alma B. Pedersen, Anders Troelsen, Kjeld Søballe

5. The association between gender and the familial prevalence of hip dysplasia in Danish patients with hip dysplasia
Rima El Jashi, Maria Biehl Gustafson, Mette Bjørn Nielsen, Jens Michael Hertz, Kjeld Søballe, Inger Mechlenburg

6. Validation of the prosthetic joint infection diagnosis in the danish hip arthroplasty register
Per Hviid Gundtoft, Alma Becic Pedersen, Henrik Carl Schønheyder, Søren Overgaard
7. The suitability of dynamic RSA for evaluation of dual-mobility liner motion
Peter Bo Jørgensen, Bart L. Kaptein, Maiken Stilling

8. Improved diagnostic accuracy of prosthetic joint infection (PJI) by combining culture of sonication fluid and tissue samples from revision total hip (THA) and knee arthroplasty (TKA)
Christen Ravn, Michael Kemp, Per Kjærgaard-Andersen, Søren Overgaard

9. Laminar airflow reduces microbial air contamination in comparison to turbulent airflow during simulated total hip arthroplasty (THA)
Christen Ravn, Anders Overgaard, Niels B. Knudsen, Jørn Toftum, Lars Henrik Frich, Søren Overgaard

10. How accurate are common biochemical and microbiological tests towards a multi-criteria definition of prosthetic joint infection (PJI) for revision total hip (THA) and knee arthroplasty (TKA)?
Christen Ravn, Michael Kemp, Per Kjærgaard-Andersen, Søren Overgaard

11. Serious renal and urological complications in fast-track primary total hip and knee arthroplasty
Lars Bjerregaard, Christoffer Jørgensen, Henrik Kehlet

12. When to catheterise after fast-track total hip (THA) and knee arthroplasty (TKA) – a RCT on bladder volumes of 500 vs. 800 ml
Lars Stryhn Bjerregaard, Ulla Hornum, Charlotte Troldborg, Bogø Stina, Per Bagi, Henrik Kehlet
Session 2: Traume I

Onsdag d. 21. oktober
09:00-10:30
Lokale: Stockholm / Copenhagen

Chairmen: Ilija Ban / Bjarke Viberg

Ciea Grønlund, Thomas Sandholdt Andreasen, Line Hernæs Husby, Morten Schultz Larsen, Michael Brix

14. Results of tibial nailing with angular stable locking screws (ASLS)
David Lunde Hatfield, Mohammed Sherif, Peter Kraglund, Morten Schultz Larsen, Michael Brix

15. Interrater reliability, agreement and internal consistency of Constant score in patients with clavicle fractures
Ban Ilija, Troelsen Anders, Kristensen Morten Tange

16. Reproducibility of malleolar classification systems
Jesper Stork-Hansen, Tamim Ahmad Haidari, Roland Knudsen, Rune Dueholm Bech, Bjarke Viberg

17. Does intermittent pneumatic compression affect time to surgery for malleolar fracture patients?
Kristine Bollerup Arndt, Anders Jordy, Bjarke Viberg

18. Surgical blood loss and mortality after hip fracture surgery
Lisa Lethan, Henrik Palm, Nicolai Bang Foss, Thomas Kallemose, Anders Troelsen, Peter Tengberg
19. Reliability of posterior tilt in Garden I–II femoral neck fractures by eye-estimation, trabecular-angulation and a new cortex-surface method
Lotte Gerholt, Haider Karim Abd-El-Redda, Anna Gaki Lindestrand, Kasper Gosvig, Ilija Ban, Henrik Palm

20. Should we bury K-wires after metacarpal and phalangeal fracture osteosynthesis?
Mads Terndrup, Thomas Giver Jensen, Søren Kring, Martin Lindberg-Larsen

21. The basic mobility status at the time of acute hospital discharge is an independent risk factor for long-term mortality after hip fracture
Morten Tange Kristensen, Henrik Kehlet

22. Performance measures and 30 day mortality after hip fracture in the elderly: a nationwide cohort study
Pia Kjær Kristensen, Theis Muncholm Thillemann, Kjeld Søballe, Søren Paaske Johnsen

23. Performance measures, length of stay and readmission 30 days after discharge among hip fracture patients: a nationwide study
Pia Kjær Kristensen, Theis Muncholm Thillemann, Kjeld Søballe, Søren Paaske Johnsen

24. Bone transport of the femur with a motorized intramedullary lengthening nail.
Søren Kold, Knud Christensen
Session 3: Hand / Wrist

Onsdag d. 21. oktober
09:00–10:30
Lokale: Helsinki / Oslo

Chairmen: Bo Munk / Maiken Stilling

25. Short term results of Total Wrist revision arthroplasties
Allan Ibsen Sørensen, Peter Axelsson, Christer Sollerman

26. THE ELEKTRA PROSTHESIS FOR TOTAL REPLACEMENT OF THE FIRST CMC-JOINT
Allan Ibsen Sørensen, Peter Axelsson

27. Complication rates of volar plating of distal radius fractures – a retrospective analysis of 595 consecutive cases
Daniel Wæver, Mette Normann Lund, Rikke Thorninger, Jan Duedal Rølfing

Johannes Heindl, Per Hølmer, Per Rasmussen, Anders Klahn

29. Does Xiapex have a roll in the treatment of flexion deformities of the proximal interphalangeal joint of the little finger caused by Dupuytrens disease – Experiences after 1 year follow up of 85 treatments.
Karina Liv Hansen, Jens Christian Werlinrud, Sören Larsen, Jens Lauritzen

30. Disability and return to work after trapeziometacarpal total joint arthroplasty: influence of occupational mechanical exposures
Lone Kirkeby, Poul Frost, Susanne Wulff Svendsen, Torben Bæk Hansen

31. Disability and return to work after early MRI on suspicion of scaphoid fracture: influence of MRI pathology and occupational mechanical exposures
Lone Kirkeby, Poul Frost, Torben Bæk Hansen, Susanne Wulff Svendsen
32. Do high occupational mechanical exposures influence the risk of failure of trapeziometacarpal total joint arthroplasty?
   Lone Kirkeby, Poul Frost, Susanne Wulff Svendsen, Torben Bæk Hansen

33. Fixation of cemented and cementless cups in total joint trapeziometacarpal prostheses. A randomized clinical RSA study with 5 years follow-up
   Maiken Stilling, Torben Bæk-Hansen

34. Surgery versus ultrasound-guided steroid injection for trigger finger: A randomised controlled trial with one year follow-up
   Rehne Lessmann Hansen, Morten Søndergaard, Jeppe Lange

35. Accuracy of cone-beam versus multi-detector computed tomography bone models in analysis of wrist kinematics using dynamic radiostereometric analysis
   Sepp De Raedt, Peter Bo Jørgensen, Paolo M. Cattaneo, Maiken Stilling

36. Xiapex® (collagenase clostridium histolyticum) – treatment of patients with primary Dupuytren’s contracture – 3 years follow-up
   Søren Larsen, Karina Liv Hansen, Jens Christian Werlinrud, Tune Ipsen, Jens Lauritsen
Session 4: Knee

Torsdag 22. oktober
09:00–10:30
Lokale: Reykjavik

Chairmen: Henrik Husted / Mogens Berg Laursen

37. Medial Overhang of Tibia Component is associated with higher risk of inferior KOOS pain score after Knee Replacement
Christian Skovgaard Nielsen, Audrey Nebergall, James Huddleston, Christopher Barr, Henrik Malchau, Anders Troelsen

38. Are there Regional Differences in Osteoarthritis and KOOS scores for Patients undergoing Total Knee Replacement?
Christian Skovgaard Nielsen, Audrey Nebergall, James Huddleston, Christopher Barr, Henrik Malchau, Anders Troelsen

39. Patient and department related outcomes after fast-track total hip and knee arthroplasty in patients ≥85 years
Christoffer C Jørgensen, Frederik Pitter, Martin Lindberg-Larsen, Henrik Kehlet

40. Promising results of the Sigma unicompartmental knee arthroplasty
Daan Koppens, Maiken Stilling, Stig Munk, Jesper Dalsgaard, Søren Rytter, Torben Bæk Hansen

41. Patient Specific Instrumentation (PSI): early results in a Danish orthopaedic department
Katrine Borum, Thomas Houe, Olsen Claus, Henrik Schrøder

42. Dynamic RSA for evaluation of fixation of Oxford Unicompartmental Knee prostheses during Step-up and Step-down motion
Kristian Horsager, Maiken Stilling, Peter Bo Jørgensen, Bart L. Kaptein
Madeline Therese Kudibal, Thomas Kallemose, Anders Troelsen, Henrik Husted, Kirill Gromov

44. Validity and reliability of the Forgotten Joint Score (FJS) in evaluating the outcome of TKA.
Morten Grove Thomsen, Roshan Latifi, Thomas Kallemose, Kristoffer Barfoed, Henrik Husted, Anders Troelsen

45. Iodine impregnated incision drape and bacterial recolonization in simulated total knee arthroplasty. A controlled randomized experimental trial
Nikolaj Milandt, Tine Nymark, Hans Jørn Kolmos, Claus Emmeluth, Søren Overgaard

46. Comparison of a novel porous titanium construct (Regenerex®) to a well proven porous coated tibial surface in cementless total knee arthroplasty. A Prospective Randomized RSA Study.
Nikolaj Winther, Claus L Jensen, Thomas Lind, Claus Munk Jensen, Henrik Schrøder, Michael Mørk Petersen

47. The impact of knee alignment and component positioning on patient reported outcomes 1 year after total knee arthroplasty
Roshan Latifi, Kirill Gromov, Madeline Frederiksen, Thomas Kallemose, Henrik Husted, Anders Troelsen

48. Bone remodelling of the femur after total knee arthroplasty with uncemented implants.
Mikkel Rathsach Andersen, Nikolaj Winther, Thomas Lind, Henrik Schrøder,

Michael Mørk Petersen
Session 5: Pediatric / Foot

Torsdag 22. oktober
09:00–10:30
Lokale: Stockholm / Copenhagen

Chairmen: Vilhelm Engell / Jeannette Ø. Penny

49. The effect of early vs. late weightbearing in conservatively treated acute Achilles tendon rupture: A meta-analysis
Ali Imad Akkawi, Cand.med, Rajzan Joanroy, Cand.med, Kristoffer Weisskirchner Barfod, MD, PhD, Thomas Kallemose, statistician, Søren Skydt Kristensen, MD, Prof, Dr.med, Bjarke Viberg, MD, PhD

50. The effect of 15 minutes postoperative daily arm bicycling on oxygenation of the soft tissue after total ankle replacement
Claus Sundstrup, Niels Christian Jensen, Kristian Kibak Nielsen, Frank Linde

Lotte Dalsgaard Petersen, Merete Frick Jeopsen, Henrik Lopdrup, Frank Linde

52. Achilles Tendon Total Rupture Score at 3 months can predict patient’s ability to return to sport at 12 months. A registry study on 366 patients from the Danish Achilles Tendon Database.
Maria Swennergren Hansen, Marianne Christensen, Thomas Budolfson, Thomas Kallemose, Anders Troelsen, Kristoffer Weisskirchner Barfod

53. 10-year survival analysis of 217 primary Hintegra total ankle arthroplasties from an independent center
Mina Zafar, Lars Ebskov, Jeannette Østergaard Penny

54. Fracture dislocation of the midfoot (Lisfrancs injury): Early results of ORIF at Koege Hospital
Zaid Issa, Anna Kathrine Pramming, Jens Kurt Johansen
55. Subtalar arthroereisis by minimal invasive surgery
Frantz Nørregaard, Gert Rahbek Andersen

56. Obesity increases risk of deep infection in ankle fracture surgery
Lasse Lykkebo Olsen, Rune Sort, Ann Merete Møller, Stig Brorson

57. Seating performance in children with cerebral palsy in relation to hip reconstructive surgery
Line Kjeldgaard Pedersen, Ole Rahbek, Bjarne Møller-Madsen

58. Intra-variability of outcome measures for seating performance and pelvic tilt in 65 healthy children
Line Kjeldgaard Pedersen, Polina Martinkevich, Søren Quist Ege, Sofie Gjessing, Ole Rahbek, Bjarne Møller-Madsen

Martine Solheim, Jens Martin Lauritsen, Christian Færgemann

60. Congenital Clubfoot treated by the Ponseti method. Evaluated by the CAP at age 4.
Vilhelm Engell, Niels Wisbech Pedersen, Bjarne Lundgaard, Søren Overgaard
Session 6: Spine

Torsdag 22. oktober
09:00-10:30
Lokale: Helsinki / Oslo

Chairmen: Ebbe Stender Hansen / Stig Mindedahl Jespersen

61. Cobb angel measurement without X-ray, a novel method.
Ane Simony, Karen Hoejmark Hansen, Hanne Thomsen, Mikkel Meyer Andersen, Morten Vuust

Ane Simony, Leah Y Carreon, Karl Erik Jensen, Steen Bach Christensen, Mikkel Ø Andersen

63. Health-related Quality-of-life in Adolescent idiopathic scoliosis patients 25 years after treatment
Ane Simony, Leah Y Carreon, Steen Bach Christensen, Mikkel Ø Andersen

64. The association between severity of scoliosis and lung clearance index (LCI) in patients with adolescent idiopathic scoliosis (AIS)
Anne Katrine Blyme, Birgitte Hanel, Martin Gehrchen, Benny Dahl

65. The Effect of Lumbar Disc Degeneration and Low Back Pain on the Lumbar Lordosis in Supine and Standing: A Cross-Sectional MRI Study
Bjarke Brandt Hansen, Tom Bendix, Jacob Grindsted, Robert GC Riis, Philip Hansen, Mikael Boesen

66. Return to work after lumbar disc surgery is related to the duration of symptoms.
Carsten Ernst, Mikkel Andersen, Jesper Rasmussen, Søren Dahl
67. A Novel Cobalt Chromium Four-Rod Surgical Technique Reduces Motion and Rod Strain Compared to Standard Constructs Following Spinal Deformity Correction: an in vitro Biomechanical Study
Dennis Hallager Nielsen, Martin Gehrchen, Benny Dahl, Jonathan Harris, Manasa Gudipally, Brandon Bucklen

68. No effect of TLIF over standard posterior instrumented fusion. Results from a RCT 5–10 years follow up.
Kristian Høy, Kamilla Truong, Thomas Andersen, Cody Bünger

69. Is it worthwhile operating geriatric patients with herniated lumbar disc?
Marie Nørgaard Petersen, Christian Støttrup, Mikkel Østerheden Andersen

70. Comparison of synthetic bone graft ABM/P-15 and allograft on uninstrumented posterior lumbar spine fusion in sheep
Martin Glasdam Axelsen, Stig Mindedahl Jespersen, Søren Overgaard, Ming Ding

71. Pharmacokinetics of Single Dose Cefuroxime in Porcine Intervertebral Disc and Vertebra Determined by Microdialysis
Pelle Hanberg

72. Can supine lateral bending radiographs predict the initial in-brace correction of the Providence orthosis in patients treated for adolescent idiopathic scoliosis?
Søren Ohrt-Nissen
Session 7: Hip

Torsdag 22. oktober
13:00-14:30
Lokale: Reykjavik

Chairmen: Ole Ovesen / Claus Varnum

73. Radiographic cup position following posterior and modified direct lateral approach in total hip arthroplasty. An explorative randomized controlled trial with 80 patients.
Christine Kruse, Signe Rosenlund, Leif Broeng, Søren Overgaard

74. Association between hospital procedure volume and risk of revision after total hip arthroplasty: A population-based study within the Nordic Arthroplasty Register Association Database
Eva Natalia Glassou, Torben Bæk Hansen, Keijo Mäkelä, Leif Ivar Have-lin, Johan Kärrholm, Alma Becic Pedersen

Inger Mechlenburg, Peter Bo Jørgensen, Kasper Stentz-Olesen, Mari-anne Tjur, Bernd Grimm, Kjeld Søballe

76. Hip arthroplasty with the Primoris® stem – Bone remodelling around a short femoral neck stem
Janus Duus Christiansen, Michael Ulrich Jensen, Ashir Ejaz, Mogens Berg Laursen, Poul Torben Nielsen

77. Bone Mineral Density (BMD) around Large Diameter Head, Standard and Resurfacing THA. 5 Year Results
Jeannette Penny, Ole Oversen, Søren Overgaard
78. Establishing Thresholds For Outcomes After Total Joint Replacement: Patients In Need Of Post-Operative Evaluation Based On Oxford Scores And Pain Levels
Nicolai Kjærgaard, Christian Lund Petersen, Jonas Bruun Kjærsgaard

79. Stable Fixation of Trilogy Acetabular Cup at 1-year Follow-up.
Martin Lamm, Stig Storgaard Jakobsen, Dovydas Vainorius, Kjeld Søballe, Maiken Stilling

80. Telemedicine support in total hip replacement. The Remote Rehabilitation and Support Project
Martin Vesterby, Preben Ulrich Pedersen, Lene Bastrup Jørgensen

81. Revision risks of dual mobility cups in primary total hip arthroplasty due to osteoarthritis.
Rasmus Kreipke, Alma Becic Pedersen, Cecilia Rogmark, Johan Kärrholm, Leif Ivar Havelin, Søren Overgaard

82. Effectiveness of technology assisted exercise compared to usual care in total hip arthroplasty
Carsten Juhl

83. Patient reported outcome after primary total hip arthroplasty performed through either posterior approach or modified direct lateral approach. A randomized controlled trial
Signe Rosenlund, Leif Broeng, Carsten Jensen, Anders Holsgaard-Larsen, Søren Overgaard

84. High frequency of labral pathology in dysplastic hips with a CE angle between 20-25.
Stig Storgaard Jakobsen, Charlotte Hartig-Andreasen, Lone Rømer, Kjeld Søballe
Session 8: Sportstrama

Torsdag 22. oktober
13:00-14:30
Lokale: Stockholm / Copenhagen

Chairmen: Morten Boesen / Kristoffer Barfod

85. Self-reported shoulder function, strength, range of motion and pain in patients with subacromial impingement: A direct comparison of patients being candidates versus patients not being candidates for subacromial decompression
Adam Witten, Mikkel Bek Clausen, Mikkel Attrup, Kristian Thorborg, Per Hölmich

Andreas Chatterton, Ole Gade Sørensen, Torsten Nielsen, Martin Lind

Charlotte Hartig-Andreasen, Bent Lund, Grønbeck Nielsen Torsten, Kjeld Søballe, Martin Lind

88. Arthroscopic treatment of degenerative meniscal tears: importance of age and osteoarthritis
Jens Jørgsholm, Claus Hjorth Jensen, Anders Odgaard

89. Minimal Important Change for the Knee injury and Osteoarthritis Outcome Score in patients undergoing anterior cruciate ligament reconstruction
Lina Holm Ingelsrud, Caroline Terwee, Lars-Petter Granan, Lars Engebretsen, Ewa Roos
90. Translation, cross-cultural adaptation, reliability and discriminative validity of the Danish version of the short questionnaire to assess health-enhancing physical activity (SQUASH)
Lotte Sørensen, Lone Ramer Mikkelsen, Julie Sandell Jacobsen, Inger Mechlenburg

91. Incidence and outcome after PCL reconstruction. Results from the danish registry for knee ligament reconstructions
Martin Lind, Lene Rahr-Wagner, Kristian Behrndtz

92. The injured exerciser - in risk of depression?
Mia B. Lichtenstein, Uffe Jørgensen

93. Distribution of muscle fibres with centralized nuclei close to the myotendinous junction in humans
Niels Jakobsen, Abigail Mackey, Jens Jakobsen, Michael Krogsgaard

94. Large improvements in patient-reported outcome occur after hip arthroscopy within the first year – but HAGOS finds continued markedly reductions in patient’s ability to perform desired physical activity and in their quality of life.
Otto Kraemer, Anne-Dorthe Madsen, Per Hölmich, Kristian Thorborg

95. Muscle strength symmetry of the hip flexors and extensors in patients with femoroacetabular impingement included in the HAFAI-cohort – preliminary data
Signe Kierkegaard, Ulrik Dalgas, Bent Lund, Kjeld Søballe, Inger Mechlenburg

96. 2 year FU after hip arthroscopy with labral repair in children and adolescents
Søren Winge, Christian Dippmann, Kristian Thorborg, Otto Kraemer, Per Hølmich
Session 9: Experimental

Torsdag 22. oktober
13:00–14:30
Lokale: Helsinki/Oslo

Chairmen: Jan Duedal Rolfing / Ming Ding

97. Autologous cartilage chips transplantation for chondral defects: Improved repair tissue compared with microfracture
   Bjørn Borsøe Christensen, Morten Lykke Olesen, Martin Lind, Casper Bindzus Foldager

98. Effects of substitute coated with hyaluronic acid or poly-lactic acid on implant fixation in glucocorticoid-treated ovariectomised sheep
   Christina M. Andreasen, Ming Ding, Thomas L. Andersen, Søren Overgaard

99. The efficacy of bone substitutes on implant fixation in sheep
   Christina M. Andreasen, Susan S. Henriksen, Ming Ding, Naseem Theilgaard, Thomas L. Andersen, Søren Overgaard

100. On route to in-house production of tissue engineered implants
    Dang Le, Cody Bünger, Ming Sun, Chi-Chih Chang

101. Educational offer – Status on the average Danish orthopedic department
    Eske Brand, Marie Fridberg, Ulrik Kragegaard Knudsen, Kristoffer Weisskirchner Barfod

102. Determining the tissue concentration of dicloxacillin using Microdialysis
    Kristian Kraft Hansen, Lasse Enkebølle Rasmussen, Ole Skov, Flemming Nielsen, Tore Bjerregård Stage, Uffe Jørgensen
103. *Staphylococcus aureus* Infection on Knee Implants, with Focus on Biofilm
Kristine Marie Jakobsen, Niels H. Søe, Britt Mejer, Janne Koch, Claus Sternberg, Helle Krogh Johansen

104. 3D Printed Polycaprolactone Scaffolds Result in Foreign Body Reaction in an Articular Cartilage Repair Model in Minipigs
Morten Lykke Olesen, Casper Bindzus Foldager, Bjørn Borsøe Christensen, Jens Vinge Nygaard, Helle Lysdahl, Martin Lind

105. Substrate stiffness affects proliferation of human chondrocytes
Natasja Leth Jørgensen

106. Are Young Orthopedics self-satisfied Delusionists?
Per Hviid Gundtoft, Eske Brand, Kristoffer Barfod

107. Effects of BMP-2 on Implant integration with Bisphosphonate Background – a Dose Response Study
Rasmus Cleemann, Mette Sørensen, Jørgen Baas, Joan Bechtold, Kjeld Søballe

108. The significance of graft size for graft tunnel healing
Yeliz Jakobsen, Ines Willerslev Jørgensen, Ming Ding, Uffe Jørgensen
Session 10: Tumor

Fredag 23. oktober
09:00 – 10:00
Lokale: Reykjavik

Chairmen: Johnny Keller / Claus Lindkær Jensen

109. Use of pneumatic tourniquet does not reduce the total postoperative blood loss after transtibial amputation. A prospective case-control study of 76 non-traumatic transtibial amputations.
Christian Wied, Morten Tange Kristensen, Peter Toft Tengberg, Gitte Holm, Nicolai Bang Foss, Anders Troelsen

10. Is there a correlation between Skin Perfusion Pressure and healing after amputation below the knee?
Kate Smidt, Niels Krarup, Jan Abrahamsen, Thomas Jakobsen

111. Can inflammatory markers be included into models predicting survival after treatment for metastatic lesions in the extremities?
Michala S. Sørensen, Jonathan A. Forsberg, Klaus Hindsø, Michael M. Petersen

112. Implant and patient survival following limb-sparing surgery with reconstruction using the Global Modular Replacement System (GMRS) due to primary or secondary bone cancer. A retrospective study of 52 patients
Müjgan Yilmaz, Michala S. Sørensen, Michael M. Petersen

113. In-vivo gentamicin concentrations in plasma and drain fluid after bone defect reconstruction using a gentamicin-eluting bone graft substitute
Peter Frederik Horstmann, Werner Hettwer, Zhijun Song, Michael Mørk Petersen
114. Risk Factors for Local Recurrence after Intralesional Curettage for Giant Cell Tumors of Bone
*Peter Frederik Horstmann, Peter Holmberg Jørgensen, Mathias Rædkjær, Bjarne Hauge Hansen, Michala Skovlund Sørensen, Werner Hettwer, Tine Nymark, Michael Mørk Petersen*

115. Migration pattern of the osseointegrated implant system for transfemoral fixation evaluated with radiostereometry
*Rehne Lessmann Hansen, Peter Holmberg Jørgensen, Klaus Kjær Petersen, Kjeld Søballe, Maiken Stilling*

116. Reconstruction of metastatic bone defects with a bisphosphonate eluting bone graft substitute
*Werner Hettwer, Peter Horstmann, Michael Mørk Petersen*
Session 11: Shoulder/Elbow

Fredag 23. oktober
09:00 – 10:00
Lokale: Stockholm / Copenhagen

Chairmen: Bo S. Olsen / Jeppe V. Rasmussen

117. Thirty-day, ninety-day and one-year mortality after shoulder replacement: 5,853 primary operations reported to the Danish Shoulder Arthroplasty Registry
Alexander Amundsen, Jeppe V. Rasmussen, Stig Brorson, Bo Sanderhoff Olsen

118. Evaluation of the clinical practice of shoulder examination among ten experienced shoulder surgeons
Ann Ganestam, Mikkel Attrup, Per Hölmich, Kristoffer W Barfod

119. Shoulder function, pain and health related quality of life in adults with Joint Hypermobility Syndrome/Ehlers-Danlos Syndrome, Hypermobility Type
Birgit Juul-Kristensen, Elise Johannessen, Helle Reiten, Silje Maeland, Helene Løvaas

120. Patient-reported outcome following revision of resurfacing hemiarthroplasty in patients with glenohumeral osteoarthritis.
Jeppe Rasmussen, Stig Brorson, Ali Al-Hamdani, Bo S Olsen

121. The Nordic Arthroplasty Register Association experience: 19,857 primary shoulder replacement reported from 2004-2013.
Jeppe Rasmussen, Steen Lund Jensen, Stig Brorson

122. Unscheduled contacts after outpatient shoulder arthroscopy - Preliminary results from an observational follow-up study
Lone Dragnes Brix, Theis Muncholm Thiellemann, Karen Toftdahl Bjørnholdt, Lone Nikolajsen
123. Outcome after shoulder replacement for failed osteosynthesis in proximal humerus fractures. A registry-based study of 293 cases.
Marc Randall Kristensen, Jeppe Vejlgaard Rasmussen, Bo Sanderhoff Olsen, Stig Brorson

124. Rasch analysis of The Western Ontario Osteoarthritis of the Shoulder (WOOS) index – the Danish version
Sahar Moeini, Stig Brorson, Tobias Wirenfel dt Klausen, Jeppe V. Rasmussen
Session 12: Traume II

Fredag 23. oktober
09:00 – 10:00
Lokale: Helsinki / Oslo

Chairmen: Hans Gottlieb / Peter Toft Tengberg

125. Time-to-surgery in hip fracture patients: 36 hours is feasible, but why and where do patients wait?
Haidar Karim Abd-El-Redda, Henrik Palm

126. Diagnostic accuracy of ultrasound screening on suspicion of extremity fractures in adults.
Helle Østergaard, Inger Mechlenburg, Lars Bolvig Hansen, Kjeld Søballe, Kaj Døssing

127. A systemic review of treatment guidelines for hip fracture surgery
Henrik Palm, Jordi Teixidor

128. Displaced midshaft clavicle fractures: Survey of treatment across centres in Sweden, Denmark and Finland
Ban Ilija, Troelsen Anders

129. Clavicle fractures: characteristics of patients with failure of primary treatment.
Ban Ilija, Troelsen Anders

130. Risk factors predicting complications after ankle fracture surgery
Kolja Weber, Amandus Gustafsson, Anders Troelsen, Ilija Ban

131. Exposed implant in below knee osteosynthesis – can hardware be preserved until fracture healing?
Malene Ringholm Bæk Larsen, Jesper Fabrin, Anna Kathrine Pramming
132. The case for continuing Clopidogrel® therapy during hip-fracture surgery. Results of a retrospective study and systematic review with meta-analysis.

Peter Toft Tengberg, Lisa Lethan, Ann Ganestam, Henrik Palm, Nicolai Bang Foss, Thomas Kallemose, Anders Troelsen
Session 13: Foredragskonkurrence

Fredag 23. oktober
13:30 – 15:00
Lokale: Stockholm / Copenhagen / Helsinki / Oslo

Chairmen: Anders Troelsen / Martin Lind

133. Double-Blinded Randomized Controlled Trial of Patellofemoral vs. Total Knee Arthroplasty for Isolated Patellofemoral Osteoarthritis
Anders Odgaard, Frank Madsen, Per Wagner Kristensen, Andreas Kappel, Jesper Fabrin

134. Plate fixation compared with nonoperative treatment of displaced midshaft clavicular fractures. A randomized controlled trial.
Andreas Qvist, Carsten Moss, Michael Toft Væsel, Steen Lund Jensen

135. Autologous cartilage chip implantation improves cartilage repair tissue quality in osteochondral defects
Bjørn Borsøe Christensen, Casper Bindzus Foldager, Morten Lykke Olesen, Hede Kris Chadwick, Martin Lind

136. Combined Intra-articular and Intravenous Tranexamic Acid Significantly reduce Blood Loss in Knee Arthroplasty
Christian Skovgaard Nielsen, Oejvind Jans, Nicolai Bang Foss, Tue Ørsnes, Anders Troelsen, Henrik Husted

137. Splinting versus Extension Block Pinning Technique in the Treatment of Mallet Finger Fracture. - A Randomized Controlled Trial.
Janni Kjærgaard Thillemann, Theis Muncholm Thillemann, Anders Ditlev Foldager-Jensen, Bo Munk
138. Migration and bone remodeling after uncemented TKA. A randomized RSA and DEXA study comparing monoblock and modular tibial component designs. 
Mikkel Rathsach Andersen, Nikolaj Winther, Thomas Lind, Henrik Schrøder, Gunnar Flivik, Michael Mørk Petersen

139. Analgesic and sedative effects of perioperative gabapentin in total knee arthroplasty: A randomized, double-blind, placebo-controlled, dose-finding study
Troels Haxholdt Lunn, Henrik Husted, Mogens Berg Laursen, Lars Tambour Hansen, Henrik Kehlet
Session 14: Poster med foredrag A

Onsdag 21. oktober
11:00 – 12:00
Lokale: Reykjavik

Chairmen: Micheal Bentsen / Theis Thillemann

140. Preoperative treatment of Giant-Cell Tumors of Bone with Denosumab
Anna Lynge Sørensen, Rehne Lessmann Hansen, Inger Krog-Mikkelsen, Peter Holmberg Jørgensen

141. Danish Hip Arthroscopy Registry: The first outcome description of patients with femoroacetabular impingement (FAI).
Bent Lund, Bjarne Mygind-Klavsen, Torsten Grønbech Nielsen, Per Hölmich, Otto Kraemer, Martin Lind

142. Danish Hip Arthroscopy Registry: An epidemiologic and perioperative description of the first two thousand patients.
Bjarne Mygind-Klavsen, Torsten Grønbech Nielsen, Otto Kraemer, Per Hölmich, Bent Lund, Martin Lind

143. Healthy patients with colonized implants - a ticking bomb for the future of orthopedics?
Charlotte Stenqvist, Steffen Eickhardt, Thomas Bjarnsholt, Jesper Hvolris

144. Patient reported effect of arthroscopic subacromial decompression after failure of conservative treatment.
Jón Rói Jacobsen, Søren Rasmussen Deutch, Carsten Moss Jensen

145. Does an accelerated hip fracture pathway in a non-orthogeriatric unit reduce hospitalization without changes in 30 day mortality?
Martin Peter Nielsen, Jon Jacobsen, Peter Revald
146. Comparison of Clinical Results with Bone Allograft or PMMA after Intralesional Curettage for Giant Cell Tumors of Bone
Peter Frederik Horstmann, Peter Holmberg Jørgensen, Werner Hettwer, Bjarne Hauge Hansen, Michael Mørk Petersen

147. Clinical Results after Intralesional Curettage in Benign and Borderline Bone Tumors
Peter Frederik Horstmann, Werner Hettwer, Michael Mørk Petersen

148. Reoperation factors in malleolus fracture surgery
Peter Sass Jensen

149. Bone shortening of clavicular fractures: comparison of measurement methods.
Anders Thorsmark Høj, Peter Udby, Ilija Ban, Lars Henrik Frich

150. Positiv cultures in primary cuff surgery
Thomas Falstie-Jensen, Theis Thillemann, Brian Elmengaard, Hans Viggo S. Johannesen, Janne Ovesen
Session 15: Poster med foredrag B

Onsdag 21. oktober
11:00 – 12:00
Lokale: Stockholm / Copenhagen

Chairmen: Søren Overgaard / Casper Foldager

151. No effect on tissue oxygenation at the ankle level after sciatic and saphenous nerve block
Ane Linde, Thomas Fichtner Bendtsen, Niels Christian Jensen, Kristian Kibak Nielsen, Frank Linde

152. Can MRI predict the tissue quality of a meniscus tear?
Ahmad Siar Barat, Trine Torfing, Uffe Christiansen Jørgensen

153. Preoperative Oral Anticoagulants in Fast-track Hip and Knee Arthroplasty, Practice and Outcomes
Christoffer C Jørgensen, Kehlet Henrik

154. The influence of infecting microorganisms on outcome after infectious revision knee arthroplasty. A two year nationwide study
Martin Lindberg-Larsen, Frederik Taylor Pitter, Marianne Voldstedlund, Henrik Schrøder, Jens Bagger

155. Safety of Metal-on-Metal Articulation
Kim Pagh Sperling

156. Mononucleated Bone Marrow Cells do not Survive During Long-Term in vitro Culture
Kris Chadwick Hede, Helle Lysdahl, Bjørn Borsøe Christensen, Martin Lind, Casper Bindzus Foldager
157. Recurrent patellar dislocation in 37 adolescent knees treated with a modified Roux-Goldthwait procedure; a follow-up study with inferior results.
Lars Lykke Hermansen, Knud Gade Freund

158. Success rates and failures after infectious revision knee arthroplasty in Denmark. A two year nationwide study.
Martin Lindberg-Larsen, Christoffer Calov Jørgensen, Jens Bagger, Henrik Schrøder, Henrik Kehlet

159. Chemical neutralization of carry-over contaminants in the evaluation of topical antimicrobial effectiveness
Nikolaj Milandt, Tine Nymark, Søren Overgaard, Hans Jørn Kolmos

160. Changes in Bone Mineral Density of the Proximal Tibia After Uncemented Total Knee Arthroplasty. A Prospective Randomized Study Comparing a Novel Porous Titanium Construct (Regenerex) surface to a Well-Proven Porous-Coated Implant surface
Winther Nikolaj, Claus L Jensen, Thomas Lind, Morten Boye Petersen, Henrik Schrøder, Michael Mørk Petersen

161. Rising incidence of Bacteremia in a Danish Orthopedic Department
René Gren Hansen Voldby, Rolf Magnus Arpi, Jonas Bredtoft Boel
Session 16:
Poster med foredrag C

Onsdag 21. oktober
11:00 – 12:00
Lokale: Helsinki / Oslo

Chairmen: Søren Eiskjær / Ole Rahbek

162. Conventional Supine MRI with a Lumbar Pillow an alternative to Weight-Bearing MRI for diagnosing functional spinal stenosis? A Cross-Sectional Study
Bjarke Brandt Hansen, Philip Hansen, Mikael Boesen

163. Rate of unsuspected malignancy in patients with vertebral compression fracture undergoing percutaneous vertebroplasty
Emil Jesper Hansen, Ane Simony, Mikkel Østerheden Andersen, Leah Carreon

164. Selective motor branch block of the rectus femoris as diagnostic tool before surgical rectus transfer
Stig Sonne-Holm, Derek Curtis, Hanne Bloch Lauridsen, Billy Kristensen, Jesper Bencke

165. TheStaRT Back Sreening can predict pain problems after spine surgery.
Lisbeth Storm, Rikke Rousing, Leah Carreon, Mikkel Østerheden Andersen

166. Arthroscopic evaluation of degenerative changes in the trapeziometacarpal joint
Lone Kirkeby, Lene Dremstrup, Hansen Torben Bæk

167. Revision procedures do not affect survival after surgical treatment of acute metastatic spinal cord compression (MSCC).
Maria Ferm Eisenhardt, Søren Schmidt Morgen, Martin Gehrchen, Sidsel Fruergaard, Benny Dahl
168. Evaluation of cell binding peptide (P15) in silk fibre enhanced hydroxyapatite bone substitute for posterolateral spinal fusion in sheep
Martin Glasdam Axelsen, Stig Mindedahl Jespersen, Søren Overgaard, Ming Ding

169. Revision of total wrist arthroplasty
Michel E. H. Boeckstyns, Guillaume Herzberg

170. 3D Correction by CB Growth Rod Concept in Severe Deformities of the Immature Spine (EOS)
Simon Toftgaard Skov, Barbara Jensen, Haisheng Li, Ebbe Stender Hansen, Kristian Høy, Cody E. Bünger

171. Risk factors for recurrent lumbar disc herniation
Stina Brogård Andersen, Elisabeth Corydon Smith, Christian Støttrup, Mikkel Andersen

172. Treatment of Pathologic Acetabular Fractures with Tri-flange Reconstruction Cage
Elinborg S. Mortensen, Peter Horstmann, Michala S. Sørensen, Werner Hettwer, Michael M. Petersen
Posterudstilling

Fra onsdag 21. oktober
Lokale: Capital Foyer

Postere med foredrag er listet under Session 14-16.

Andreas Saine Granlund, Ilija Ban, Anders Troelsen

174. Eighty-seven patients operated due to Herniated Disc. No correlation between the presence of Modic changes and Propionibacterium Acnes.  
Anne Hansen, Laura Mathiesen, Thomas Bender, Peter Lemcke, Søren Fruensgaard, Malene Laursen

175. The use of Quantitative Sensory Testing as predictive measure of surgical outcome in Lumbar Disc Herniation  
Christian Stømstrup, Søren O’Neill, Mikkel Andersen

176. Noises from total hip arthroplasty and patient-reported outcome (PRO)  
Claus Varnum, Alma B. Pedersen, Per Kjærgaard-Andersen, Søren Overgaard

177. Malformation is a risk factor for osteoarthritis in young THA patients – a prospective multicenter cohort study  
Dennis Karimi, Anders Troelsen, Jakob Klit

178. The association between preoperative symptoms of obesity in knee and hip joints and the change in quality of life after laparoscopic Roux-en-Y gastric bypass  
Ida Birn, M.Sc, Inger Mechlenburg, M.Sc, PhD, Anette Liljensøe, M.Sc, PhD, Kjeld Soballe, MD, DMSc, Professor, Jens Fromholt Larsen, M.D, PhD
Isabel Maria Nyring, Philip Hansen, Mikael Boesen, Peter Lavard, Anette Holm Kourakis, Michael Rindom Krogsgaard

180. MCL as a pulley in MPFL reconstruction
Jens-Christian Beuke, Jens Christian Pörneki, Kristine Bollerup Arndt, Bjarke Viberg

181. Two case reports on the use of negative pressure wound therapy with instillation (NPWTi) as adjuvant treatment of infected total hip replacements.
Jörg Dominik Adam, Jens Jørgen Elmer Christensen, Renee Kirchhoff-Jensen, Xiaohui Chen Nielsen

182. Persistent pain following surgically treated distal radius and malleolar fractures
Kristian Christensen, Kirill Gromov, Lone Knudsen, Michael Brix, Anders Troelsen, Lone Nikolajsen

183. Evidence for performance of implants used for proximal femoral fractures in Denmark.
Anne Marie Nyholm, Henrik Palm, Henrik Malchau, Anders Troelsen, Kirill Gromov

184. Patient-reported quality of life and hip function after revision of total hip arthroplasty due to chronic periprosthetic infection: An analysis of one-stage revision and a comparison of one-stage and two-stage revision
Ninna Rysholt Poulsen, Kjeld Søballe, Inger Mechlenburg, Jeppe Lange

185. Metacarpophalangeal Joint Silicone Arthroplasty – A Review Of Sugery Performed At Aarhus University Hospital In The Period 2007-2012
Peter Birk
186. Clinical outcome of posterior tibial support brace treatment of isolated or combined posterior cruciate ligament rupture with the PTS Jack bandage
Torsten Grønbech Nielsen, Birgitte Blaabjerg, Randi Gram Rasmussen, Martin Lind

187. Ulnar Head Arthroplasty – short term results
Robert Gvozdenovic, Michel Boeckstyns

188. The odds of receiving a knee arthroplasty is higher in patients with a high Pain Catastrophizing score
Sara Birch, Inger Mechlenburg, Stilling Maiken, Bæk Hansen Torben

189. DVR® Anatomic volar plating system vs. VA2 Variable Angle LCP Two Column Volar Distal Radius Plate. A comparison of two volar locking plates for treatment of distal radius fractures.
Tord Salomonsen, Bjarke Viberg

190. The induced membrane technique for healing of bone defects. A review of 9 cases.
Ulrik Kähler Olesen, Anders Wallin Paulsen, Per Bosemark, Henrik Eckardt

191. Analysis of drain fluid particle content after implantation of an antibiotic eluting bone graft substitute close to a partial pelvic replacement
Hettwer Werner

Hettwer Werner

193. Surgical treatment of severe scoliosis in young children using magnetically controlled growing rods – initial experience in a prospective cohort
Benny Dahl, Thomas Borbjerg Andersen, Martin Gehrchen

194. Early Clinical Experience with Local Bisphosphonate Delivery for Bone Defect Reconstruction in Aggressive Benign Bone Tumors
Werner Hettwer, Peter Horstmann, Michael Mørk Petersen
195. Complications following distal radius fracture osteosynthesis using two different volar locking plates.

Julie Ladeby Erichsen, Roland Knudsen, Zafar Bahadirov, Frank Damborg
Abstracts
Risk factors for early periprosthetic fractures following primary cementless THA

Ann Buhl Bersang, Anders Troelsen, Kalemose Thomas, Husted Henrik, Gromov Kirill

Orthopaedic department, Hvidovre Hospital

**Background:** The use of cementless fixation for primary THA has increased worldwide, which can be considered paradoxical as registry data suggest inferior survival of cementless THA. Periprosthetic fracture is one of the main complications following cementless THA.

**Purpose / Aim of Study:** In this retrospective cohort study we 1) investigate risk and 2) identify pre- and intraoperative risk factors for early periprosthetic fracture following primary cementless THA.

**Materials and Methods:** 1,255 unselected and consecutive patients undergoing primary THA between July 2010 and May 2014 were identified. Patients with missing data or patients operated with other implants than a standard cementless THA were excluded, leaving 1,183 patients for analysis. Patient demographics were recorded. Level of preoperative arthritis, Dorr type and cortical index were recorded on preoperative x-rays. Varus/Valgus placement of the stem and canal fill were recorded postoperatively. Early periprosthetic fractures (< 1 year) were identified. Regression analysis was performed to identify risk factors for early periprosthetic fracture.

**Findings / Results:** 37 (3.1%) early periprosthetic fractures were identified. 28 (76%) occurred in females. Mean age was 72.7 years. Median time until fracture was 16 days (1-102). 10 (37%) of all fractures occurred in patients >80 years old. 8 fractures occurred in Dorr type C femurs (21.6%). Patients with Dorr type C femurs had a 7.5 OR (95%CI (1.6-35.0)) for early periprosthetic fractures. Varus/Valgus placement of the stem (1.1 OR (95%CI (0.9-1.2))) and canal fill (1.1 OR (95%CI (1.0-1.2))) were not identified as predictors of early periprosthetic fracture.

**Conclusions:** Dorr type C is an independent risk factor for early periprosthetic fracture. Surgeons should be aware of this and considerer cemented arthroplasty in those patients.
Is patient-reported outcome after total hip arthroplasty influenced by type of bearings?

Claus Varnum, Alma B. Pedersen, Per Kjærgaard-Andersen, Søren Overgaard

Department of orthopaedic surgery, Vejle Hospital; Department of clinical epidemiology, Aarhus University Hospital; Department of orthopedic surgery and traumatology, Odense University Hospital

Background: The outcome of total hip arthroplasty (THA) has traditionally been assessed in prosthetic survivorship and complications. Patient-reported outcome (PRO) is recognized as a very important tool for evaluating the outcome after THA.

Purpose / Aim of Study: We aimed to compare PRO scores from patients having ceramic-on-ceramic (CoC) and metal-on-metal (MoM) to scores from patients with metal-on-polyethylene (MoP) THA.

Materials and Methods: We identified 4,212 patients matched on sex, age, and year of surgery operated during 2002 to 2009 from the Danish Hip Arthroplasty Registry with no revision. 450 patients were excluded due to death, protection against inquiry from researchers, unknown address, hip resurfacing arthroplasty, and dual mobility cup. In total, 3,762 patients received the following PROs: The hip disability and osteoarthritis outcome score (HOOS), EQ-5D, and UCLA activity score. Of these, further 145 patients were excluded due to confirmed revision surgery. 3,082 patients responded (response rate 85%). Univariate linear regression was used to compare mean age between the bearings groups. Multivariate linear regression was used to compare mean values of PRO subscale scores within the three groups.

Findings / Results: Among responders, 1,393 (45%) had CoC, 512 (17%) MoM, and 1,177 (38%) MoP THA. There was a similar distribution of sex within the three bearing groups. Patients with CoC and MoM bearings were significantly younger (mean age 65.7 and 65.5 years, respectively) than patients with MoP bearings (mean age 67.4 years). No significant difference in mean scores was found in the 5 HOOS subscales, EQ-5D index, EQ VAS, or UCLA activity score between patients with CoC, MoM, and MoP THA.

Conclusions: We found no association of CoC, MoM, and MoP bearings on PRO after THA.
Background: In order to save proximal bone stock in primary total hip arthroplasty (THA), short femoral stems are introduced.

Purpose / Aim of Study: Designed for perfect fit within the femoral neck, the Primoris® femoral stem has been released for clinical studies in coherence with stepwise introduction of new implants. This is the preliminary report of the Radio Stereometric Analysis (RSA) results after 2 year follow-up (FU).

Materials and Methods: We carried out a prospective cohort study of 52 patients scheduled for surgery with the femoral neck-preserving Primoris® stem. Migration was analyzed by RSA, and clinical results recorded using the Harris hip score, UCLA activity score, WOMAC, EQ5D health questionnaire and Oxford Hip scores.

Findings / Results: 2 patients were excluded intra-operatively and 1 patient was revised due to aseptic loosening 3 months postoperatively. 4 patients were excluded from the RSA analysis due to technical issues, leaving 44 patients for analysis. RSA showed minor micro motions of the stem: Mean subsidence was 0.35 mm (precision: 0.10) and mean rotation around the longitudinal axis was 0.10º (precision: 0.64) after 2 years.

Conclusions: The stems showed migrations characteristic for stable uncemented implants. Long term follow up will be performed in future years.
Surgical Selection Bias may influence results presented in current literature after two-stage revision of chronic peri-prosthetic hip joint infection

Jeppe Lange, Alma B. Pedersen, Anders Troelsen, Kjeld Søballe

Orthopaedic Surgery, Regional Hospital Silkeborg; Clinical Epidemiology, Aarhus University Hospital

Background: Currently, the gold-standard treatment for hip periprosthetic joint infection (PJI) is two-stage revision. However, advocates for the one-stage revision strategy argue that current literature is biased in the selection of two-stage revision.

Purpose / Aim of Study: We wanted to investigate the potential presence of surgical selection bias in patients undergoing two-stage revision in chronic hip PJI.

Materials and Methods: We identified patients in the National Patient Register from 2003–2008 at 11 orthopaedic departments. A manual review of the medical records verified 130 patients with a treatment performed for a chronic hip PJI. We divided the patients, into two groups based on the revision strategy chosen. 82 patients constituted one group and was characterized by having a re-implantation performed in a two-stage revision. The remaining 48 were not treated using a two-stage revision.

Findings / Results: Patients in the two-stage group were younger (mean age 68, 95% CI: 66–71 vs. 76, 95% CI: 72–80; p-value <0.001) and had better overall health as indicated by the surrogate health markers ASA score (median score 2, IQR: 0 vs. median 2, IQR: 1; p-value <0.001) and CCS Score (median score 0, IQR 1 vs. median 1, IQR 1; p-value 0.005). Patients not re-implanted had a crude 68% higher risk of dying in the follow-up period compared to patients undergoing two-stage revision. After adjusting for selected confounding variables the risk of dying remained 25% higher, although not found to be statistically significant.

Conclusions: When discussing the optimal treatment strategy, surgeons must keep in mind that 1-in-3 of all chronic hip PJI are not treated with a two-stage revision. We also found a significant difference between our established groups indicating that patients undergoing re-implantation are a selected group of patients.
The association between gender and the familial prevalence of hip dysplasia in Danish patients with hip dysplasia

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Background: The development of hip dysplasia is associated with several risk factors. One of the risk factors is gender and 80% of patients with symptomatic hip dysplasia are females. Another risk factor is familial prevalence of hip dysplasia. Studies indicate that the risk of hip dysplasia is increased with familial prevalence of hip dysplasia. However, little is known about the association between the familial prevalence and gender and development of hip dysplasia.

Purpose / Aim of Study: The aim of the study was to estimate the prevalence and genealogy degree of family history in Danish patients with hip dysplasia operated with periacetabular osteotomy (PAO) and furthermore, to assess the association of gender and family history in the same group of patients.

Materials and Methods: A cross-sectional study of 676 patients drawn from a clinical database of patients operated with a PAO at Aarhus University hospital from 1998 to 2014. Information on gender operated hip side and age was collected from the clinical PAO database, and information on familial prevalence was collected through questionnaires. The association between gender and familial prevalence of hip dysplasia was presented as the prevalence proportions ratio (PPR), tested by χ² test. Stratification was conducted for the variables age and operated hip side, and tested for statistical significance.

Findings / Results: Familial prevalence of hip dysplasia was 30% (95% CI 27; 34), with 73% reporting 1st degree relatives. Females had 32% increased risk of familial prevalence of hip dysplasia compared to men, but this difference in risk was not statistically significant (p=0.10).

Conclusions: Females had increased familial prevalence of hip dysplasia compared to men, but the increased prevalence was not statistically significant probably due to the low power of the study.
Validation of the prosthetic joint infection diagnosis in the danish hip arthroplasty register

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Background: The Danish Hip Arthroplasty Register (DHR) is a national database on total hip arthroplasties (THAs) with a high completeness and validity of registration for primary procedures.

Purpose / Aim of Study: The aim was to validate the registration in DHR for revisions due to Prosthetic Joint Infection (PJI).

Materials and Methods: We identified a cohort of patients in the DHR who underwent primary THA from January 1, 2005 to December 31, 2012 and followed these patients until first-time revision, death, emigration or December 31, 2012. The PJI-diagnosis registered was tested against a gold standard encompassing information from microbiology, prescription, clinical biochemistry registries and clinical findings retrieved from medical records. We estimated the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) with 95% confidence interval for PJI in DHR alone and in combination with microbiology registries.

Findings / Results: Out of 37,828 primary THAs, 1,382 were registered with any revision, 232 of which were due to PJI. For PJI revisions in DHR, the sensitivity was 67.0% (CI: 61.0 – 72.6), specificity 95.2% (CI: 93.8 – 96.4), PPV 77.2% (CI: 71.2 – 82.4), and NPV 92.3% (CI: 90.7 – 93.8). Combining DHR with microbiology registries led to a notable increase in the sensitivity for PJI revision to 90.3% (CI: 86.1 – 93.5) and likewise for specificity 99.6% (CI: 99.1 – 99.9), PPV 98.4% (CI: 95.9 – 99.6) and NPV 98.5% (CI: 97.6 – 99.1).

Conclusions: Only two thirds of PJI revisions were captured in DHR and the PPV was moderate (77%). However, combining DHR with microbiology registries improved the accuracy remarkably.
The suitability of dynamic RSA for evaluation of dual-mobility liner motion

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Background: Dual-mobility hip prostheses have potential benefits in terms of increased hip joint mobility, decreased dislocation risk, and less polyethylene wear. The shape, material and surroundings of the polyethylene component, complicates recording of the essential in-vivo liner motion.

Purpose / Aim of Study: To assess the feasibility of in-vivo liner motion recording using dynamic RSA in a phantom set-up.

Materials and Methods: The phantom set-up consisted of a Sawbones® pelvis and extremity, and was prepared with a Restoration ADM® cup (Stryker Inc.) size 56. A matching liner was prepared with 12 1-mm tantalum beads in four unique groups and a 28 mm ceramic femoral head (Biolox) and a CoCr femoral stem. The phantom was positioned supine with 45 degrees flexion in the hip for dynamic stereometric recordings at 5 fps through a 10 cm acrylic layer, with a set-up (tubes and calibration box) tilted in a 45 degree cranial/caudal angle during external and internal rotation in the hip joint. A marker-model of the polyethylene tantalum-beads was combined from multiple RSA-recordings using visual validation and computed clustering. A CAD model of the ADM cup and stem was registered to the contour of the implant in the stereoradiographs and relative angles of the liner and femoral component were evaluated with respect to the ADM cup.

Findings / Results: Of 12 polyethylene bead-markers we obtained a model of 10 markers (83%). The relative angle varied between polyethylene liner and cup (>8 deg.) and between polyethylene liner and the femoral component (>20 deg.) during internal-external rotation.

Conclusions: Liner- and stem motion in a dual-mobility hip implant was quantified in a phantom set-up by use of dynamic RSA. In-vivo measurement of polyethylene motions in the dual-mobility implant is expected to work well.
Improved diagnostic accuracy of prosthetic joint infection (PJI) by combining culture of sonication fluid and tissue samples from revision total hip (THA) and knee arthroplasty (TKA)

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Background: Culture-negative PJI is challenging and occurs in 60–80 % of THA and TKA revisions suspected for deep infection. Culture of dislodged biofilm bacteria in sonication fluid (cSF) from explanted implant materials has been reported to increase the diagnostic sensitivity in comparison to conventional culture of periprosthetic tissue samples (cPT) (Trampuz, 2007. NEJM).

Purpose / Aim of Study: To compare the diagnostic accuracy of cPT alone with a combination of cPT and cSF in revision of THA and TKA.

Materials and Methods: We prospectively analyzed explanted prosthetic materials from consecutive THA and TKA revision surgery performed at Odense University Hospital and Vejle Hospital during one year. The prostheses were sonicated for one minute due to the Trampuz-protocol (NEJM, 2007). cSF was considered positive with >20 colonies/ml. Conventional cPT was performed due to best practice and considered positive with identical bacterial findings in 3/5 tissue samples. We defined PJI by different criteria incl. microbiology, and/or a combination of biochemistry and clinical findings.

Findings / Results: Revision of 214 THA (131) and TKA (83) were indicated by aseptic loosening (73), deep infection (57) and ‘other indications’ (84). PJI was defined in 56 cases and microbial diagnosis was achieved in 41 and 48 cases by either cPT or cSF. Bacterial findings were similar in all concordant cases. Sensitivity and specificity of cPT alone was 0.73 and 1.00 respectively. The combination of cPT and cSF gave a microbial diagnosis in 53 PJI-cases; sensitivity 0.93 and specificity 0.95 (p<0.05).

Conclusions: The combination of cPT and cSF significantly increased the sensitivity of culture-based methods for PJI-diagnosis leaving only 3/56 PJI-cases culture-negative. Sonication is useful for detecting surface-attached bacteria living as biofilm on prosthetic implants.
Laminar airflow reduces microbial air contamination in comparison to turbulent airflow during simulated total hip arthroplasty (THA)

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Background: It has been debated whether type of ventilation system LAF versus TAP can influence the risk of deep infection following THA and TKA. Moreover, choice of ventilation system is of debate in construction of hospitals

Purpose / Aim of Study: To compare the number of airborne bacteria and particles under laminar airflow (LAF) vs turbulent airflow (TAF) with 100% or 50% reduced fresh air exchange in simulated THA

Materials and Methods: We conducted 32 simulated operations under 4 conditions: LAF or TAF with either full (n=8+8) or 50% reduced (n=8+8) air exchange. Microbial contamination was determined by Microbiological Active Sampler (MAS-100), and colony-forming units (CFU) per m3 air were counted after 2 days incubation. Airborne particulate (0.5-10 µm) was sampled with light scattering particle analyzer (MET-1). Large particle sizes (>5 µm) must not exceed a 2.900/m3-threshold for cleanroom operations

Findings / Results: Microbial air concentration (mean CFU/m3 ±SD) with LAF under full and 50% reduced air exchange were 0.4±0.8 and 0.4±0.4 respectively, whereas airflow contamination under TAF conditions had significantly higher values of 7.6±2.0 and 10.3±8.1, respectively (p<0.05) Large (>5 µm) airborne particulate (mean no./m3 ±SD) with LAF under full and 50% reduced air exchange were 1.581±2.841 and 1.018±1.084 respectively, whereas particulate under TAF conditions were 7.923±5.151 and 6.157±2.439 (p>0.05). The number of particles measured under TAF conditions exceeded the threshold for cleanroom operations in 12/16 simulated operations

Conclusions: Microbial air contamination was significantly lower under LAF ventilation compared to TAF during simulated THA under both full and 50% reduced air exchange in modern operating theatres. These findings indicate that LAF may reduce the airborne microbial risk factor of surgical site infection in comparison to TAF
How accurate are common biochemical and microbiological tests towards a multi-criteria definition of prosthetic joint infection (PJI) for revision total hip (THA) and knee arthroplasty (TKA)?

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Background: A certain diagnosis of PJI is sometimes difficult to achieve when clinical, biochemical and microbiological findings are ambiguous. Seemingly there is no Danish consensus for a PJI definition as proposed by the International Consensus Meeting (Parvizi, 2013. BJJ)

Purpose / Aim of Study: We suggest a PJI definition incl. pre-operative C-reactive protein (CRP) as well as culture of intra-operative joint fluid (JF) and periprosthetic tissue samples (PT) from patients undergoing revision surgery in order to determine the diagnostic accuracy of each parameter

Materials and Methods: Revision of 214 THA (131) and TKA (83) were indicated by aseptic loosening (73), deep infection (57) and other (84). We analyzed CRP, JF- and PT-culture and defined PJI by either 1-4: 1. Presence of a sinus tract 2. Culture of identical microorganisms in ≥3/5 PT 3. Culture of identical or microorganisms in 2/5 PT in combination with either -a JF cultured with an identical organism OR -b Elevated CRP (threshold >100mg/l at 0-90 postoperative days; >10mg/l after 90 days) 4. Minor criteria (required 3/4): -a Culture-positive PT (≥1/5) -b Culture-positive JF -c Purulence of JF -d Elevated CRP

Results are presented as number of test-positive PJI-cases (sensitivity / specificity)

Findings / Results: PJI was found in 56 cases according to our definition criteria 1-4. CRP was elevated in 32 cases (0.60 / 0.85). JF-aspiration was dry in 35 and culture- negative in 136 cases. JF-culture gave a microbial diagnosis in 37 PJI-cases (0.70 / 0.96). PT-culture with a diagnostic threshold at 3/5 positive samples gave a microbial diagnosis in 41 PJI-cases (0.73 / 1.00)

Conclusions: Diagnostic accuracy of each parameter showed no tests exceed 0.75 leaving every fourth PJI-cases without a bacterial diagnosis. Thus in order to increase sensitivity we suggest introducing new validated diagnostic tools.
Serious renal and urological complications in fast-track primary total hip and knee arthroplasty

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Background: The fast-track methodology has reduced overall medical complications after total hip (THA) and knee arthroplasty (TKA). However, limited data exists on renal and urological (RU) complications.

Purpose / Aim of Study: To study the incidence and consequences of serious RU complications in otherwise uncomplicated elective fast-track THA and TKA, resulting in length of stay (LOS) > 4 days or a 30-day readmission.

Materials and Methods: A detailed, observational study of prospectively collected pre-operative data with complete 30-day follow-up based on the Danish National Patient Registry and review of medical charts in a large cohort of 8,804 fast-track THA and TKA from 7 Danish high-volume orthopaedic departments, with similar standardised fast-track protocols.

Findings / Results: Of 8,804 procedures, 0.6 % developed serious RU complications resulting in 38 LOS >4 days and 17 readmissions. Acute kidney injury (AKI), defined as an increase in serum creatinine by ≥ 0.3 mg/dl or ≥ 1.5 times baseline, accounted for 43 cases (0.5 %), and was most frequently explained by dehydration. Of the 43 patients with AKI, 25 (58 %) had a preoperative estimated glomerular filtration rate < 60 mmol/ml. and 16 of these (64 %) had received a NSAID as postoperative pain treatment. 7 cases (0.1 %) were due to urological complications, mainly haematuria after bladder catheterisation, and 5 patients (0.1 %) developed postoperative urosepsis or pyelonephritis.

Conclusions: The overall incidence of serious RU complications after fast-track THA and TKA was low (0.6 %). Of these, 78 % were AKI, most often due to dehydration, pre-existing kidney disease and NSAID treatment, calling for an increased focus on perioperative fluid management and optimisation of the perioperative care of patients with pre-existing kidney disease.
When to catheterise after fast-track total hip (THA) and knee arthroplasty (TKA) – a RCT on bladder volumes of 500 vs. 800 ml

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Background: A bladder volume of 500 ml is a commonly used catheterisation threshold for treating POUR after THA and TKA, but this threshold is without evidential support.(1,2)

Purpose / Aim of Study: The purpose was, in a RCT to compare two bladder volumes (500 vs. 800 ml) as catheterisation threshold.

Materials and Methods: We included 800 adult patients (2x400), planned for fast track THA or TKA and who had given their informed written consent. 721 patients completed the study. Bladder scans were performed at 2 hours intervals until the first voluntary micturition. All patients completed a preoperative questionnaire on voiding difficulties, which were repeated at 30 days follow-up. Main outcome was the proportion of patients needing postoperative catheterisation. Secondary outcomes included the incidences of UTI and voiding difficulties within the 30 days follow-up period.

Findings / Results: 114 of 355 patients (32.1 %) were catheterised in the 500 mL group compared to 49 of 366 patients (13.4 %) in the 800 mL group (p < 0.0001). The need for repeated catheterisation was 4.5 % vs. 0.8 % respectively. Follow-up data on the incidences of UTI and PO voiding difficulties will be presented at the conference.

Treatment Of Displaced Femoral Neck Fractures With An Uncemented Hemiarthroplasty (Corail, DePuy).
A Series Of 318 Consecutive Fractures, With Focus On Major Complications

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Background: Hemiarthroplasty is the preferred treatment for displaced femoral neck fractures (DFNF) in elderly patients (>70 years). The use of uncemented stems remains controversial. Few studies report data about the setting in which the results is achieved.

Purpose / Aim of Study: Our outcome is overall reoperation rate and the rate of major complications; deep infections, periprosthetic fractures, dislocations, hip pain or loosening of the implant. We describe the setting in which the results have been achieved, and whether surgical treatment was according to the standard treatment algorithm for the department.

Materials and Methods: A retrospective study including all consecutive patients who had sustained DFNF and had been operated with an uncemented hydroxyapatite coated hemiarthroplasty (Corail, Depuy) from 2009-1-1 to 2012-31-12 at OUH. Patients were identified using the nationwide patient record system. Data was extracted from patient records. X-rays were examined by a younger doctor and a senior consultant.

Findings / Results: 318 patients, median age 83 years. Standard treatment algorithm was followed in all cases. A minor fracture occurred during surgery in 6 cases. 1 patient died within 48 hours after surgery. The rate of complications leading to reoperation was: Dislocation; 3,1%, deep infection; 2,2%, periprosthetic fracture; 5,0%, hip pain; 0,9%, stem loosening; 0%. Reoperation rate didn't differed even though more than 90 surgeons performed the surgeries, 213 by younger doctors, 105 by an attendant or above.

Conclusions: We find reoperation rates acceptable and comparable to other studies. Stem loosening seems to be non-existing. It seems safe that the surgeries are performed by younger doctors under supervision. Forward focus should not only be on cemented vs. uncemented stems, but also on the setting in which the surgeries are being performed.
Results of tibial nailing with angular stable locking screws (ASLS)

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Background: Current standard treatment of tibia fractures involves a high rate of unwanted complications and non-unions. Therapy with ASLS is introduced later and is now widely used in Denmark. At present time there is little published clinical clinical data in the relevant literature. Several biomechanical studies have been carried out showing positive results and capacities of the ASLS.

Purpose / Aim of Study: The aim of the study was to present early and mid-term clinical results of intramedullary nailing combined with angular stable locking system (ASLS) in distal and diaphyseal tibial fractures. The study was done with these following core parameters: Time to healing, union rate, secondary loss of reduction as well as rate and causes of reoperation.

Materials and Methods: A consecutive series of 107 patients with distal tibial fractures were treated with Synthes Expert Tibial Nail combined with ASLS between September 2009 and June 2014. All fracture types AO42 and AO43 were included except AO43 B2,B3 and C3. One patient was lost to follow up. The patients were followed up postoperatively with radiographs and clinical control every 6 weeks until healing.

Findings / Results: We found a union rate of 100% with an average of 5,1 months to healing and a low rate of complications. In particular, a low rate of infection (one patient) was found. No patients had non-union. 37 patients were re-operated; 34 patients because of hardware removal and three patients because of major complications.

Conclusions: Intramedullary nailing combined with ASLS in distal tibial fracture provides a high rate of union and low rate of major complications. This suggests that the treatment is safe and capable of achieving favourable clinical results.
Interrater reliability, agreement and internal consistency of Constant score in patients with clavicle fractures

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Background: Despite being a frequent injury, the optimal treatment of clavicle fractures is still debatable. Constant score (CS, 0–100 points) has been the primary endpoint in all recent randomized studies concerning clavicle fractures. However, CS was not developed to assess patients with clavicle fractures and the psychometric properties (reliability, validity and responsiveness) have not been evaluated on these patients.

Purpose / Aim of Study: To examine the interrater reliability, agreement and internal consistency of the Danish version of CS on patients with a clavicle fracture.

Materials and Methods: Based on sample size, 34 patients (29 males, mean age 41.3 years) with clavicle fractures (2 medial, 21 midshaft and 11 lateral) had standardized CS assessment done by two independent and experienced raters, 5–8 weeks following injury. Interrater reliability and agreement of the overall CS was determined. The interclass correlation coefficient (ICC2.1), standard error of measurement (SEM), minimal detectable change (MDC) and Cronbach’s Alpha coefficient were used to evaluate data.

Findings / Results: The interrater reliability of the total CS in patients with clavicle fractures was excellent (ICC=0.94; 95%CI 0.88–0.97) and with no systematic difference between the two raters (p=0.75). The SEM, representing the measurement error on group level, was 4.94, while the MDC; the smallest change needed to indicate a real change for an individual patient was 13.69. Internal consistency of the 10 CS items was good as Cronbach’s Alpha was 0.85.

Conclusions: The CS is a reliable tool when assessing patients with clavicle fractures and with a small measurement error at a group level. The responsiveness and whether the CS results reflect the functional deficit of patients with clavicle fractures when evaluated with other outcome measures is still unknown.
Reproducibility of malleolar classification systems

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**Background:** Classification of malleolar fracture is important when deciding for surgical or conservatively treatment, and the literature have provided several classification systems concerning the stability of the fracture.

**Purpose / Aim of Study:** To assess the reproducibility of malleolar fracture in Lauge-Hansen (LH), AO/Weber (AO), ankle stability assessment (SA) and operative decision (OD) in adult patients with primary malleolar fractures.

**Materials and Methods:** A historical cohort was retrieved from the county database using ICD10 diagnoses for malleolar fractures (DS824-DS828). The study period was 01/01/2010 to 01/08/2011 in order to reach the calculated sample size (489). 692 patients x-ray images were reviewed for inclusion and the final cohort consisted of 496 malleolar fractures. The included x-ray images were reviewed 2 times with minimum 14 days interval by 2 medical students, 2 residents and 1 consultant in orthopaedic traumatology. All x-ray images were measured independently and any patient identifiers were removed. The raters were blinded to each other and own results. Unweighted kappa statistics were used to assess reproducibility.

**Findings / Results:** Overall mean (95 % confidence interval – CI) interrater kappa results for the classifications systems were 0.65 (0.64;0.68) for LH, 0.62 (0.60;0.63) for AO, 0.61 (0.57;0.62) for SA, and 0.70 (0.68;0.72) for OD. The intrarater results ranged from a mean kappa of 0.64-0.80 for the medical students, 0.65-0.81 for the residents, and 0.82-0.84 for the consultant.

**Conclusions:** There do not seem to be any difference in the reproducibility of any of the classification systems, stability assessment or operative decision.
Does intermittent pneumatic compression affect time to surgery for malleolar fracture patients?

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**Background:** Surgery of malleolar fractures are often delayed due to oedema of the ankle. The use of intermittent pneumatic compression (IPC) is thought to reduce oedema of the fracture site and thereby time to surgery in patients with internal fixated malleolar fractures.

**Purpose / Aim of Study:** To investigate the influence of IPC on time from admission to surgery in adult patients with acute primary malleolar fractures treated with open reduction and internal fixation.

**Materials and Methods:** February 1st 2013 IPC was introduced as a standard procedure for all patients admitted with a malleolar fracture. Data was retrieved from the county database 2 years prior and after the introduction date. The search was based on a combination of ICD10 diagnoses and procedure codes (DS826–8 and NHJ60–61). The groups were statistically compared using Wilcoxon signed rank test.

**Findings / Results:** 195 patients were included, 82 with IPC and 113 without IPC treatment. There were 104 female and 91 male with a median age (interquartile range – IQR) of 53.5 (39.7–64.5). Time to surgery was median (IQR) 20.5 hours (7.5–41.6) with IPC treatment and 24.6 hours (10.8–46.9) without IPC treatment. There were no statistically difference between the two groups (p<0.117).

**Conclusions:** There does not seem to be any benefit from IPC on time to surgery in patients with acute primary malleolar fracture.
Surgical blood loss and mortality after hip fracture surgery

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Background: Hip fractures and the surgery that follows is known to cause a large blood loss that in turn causes anaemia and the need for transfusions. To our knowledge it has not been established whether surgical blood loss within the normal range has any impact on mortality after hip fracture surgery.

Purpose / Aim of Study: To investigate whether surgical blood loss, total blood loss and red blood cell transfusion has an impact on mortality.

Materials and Methods: Retrospectively review of all patients who were admitted and subsequent operated at our institution for an extra-capsular fracture of the hip using a short intramedullary nail between 1st of January 2011 to 31st of December 2013. Primary endpoint was mortality related to Surgical Blood Loss (SBL). Secondary outcomes were mortality related to Total Blood Loss (TBL), Red Blood Cell (RBC) transfusions and Massive transfusions (MT).

Findings / Results: We identified 320 patients operated using an IMN. The mean SBL for all patients was 235 mL (20-2200 mL) and the mean TBL was 2006 mL (213-7615 mL). A logistic regression analysis was performed on 30-day and 90-day mortality in relation to SBL, TBL and units of RBC transfusions. All associations were insignificant except for the association between units of RBC transfusions and increased 90-day mortality. It showed that there was significant increased risk of death within 90 days of 15% per transfused unit (OR 1.152, CI = 1.002:1.325, p = 0.048).

Conclusions: Our study has proven no significant relationship between greater SBL or TBL and mortality within a normal range of blood losses. We did find a 15 % elevation in 90-day mortality risk for every RBC transfusion. The study design did not allow us to make any conclusions whether this was a result of the transfusion itself or from the patient being in the physiological state of needing a transfusion (PANT).
Reliability of posterior tilt in Garden I-II femoral neck fractures by eye-estimation, trabecular-angulation and a new cortex-surface method

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Background: Posterior tilt in Garden I-II femoral neck fractures is debated as a predictor of reoperations following osteosynthesis. We hypothesized that a new method first published in 2009, based on angulation measurement between the outer cortex-surfaces of the femoral head sphere and neck cylinder, would be more reliable than the eye-estimation or trabecular-angulation previously used in literature.

Purpose / Aim of Study: To examine the reliability of these three different methods.

Materials and Methods: All 51 consecutive patients with a Garden I-II femoral neck fracture admitted to our institution in 2013 were retrospectively included. Preoperative axial radiographs were used to assess posterior tilt by the three different methods. Assessments were performed twice minimum 8 weeks apart, by 5 doctors with varying charge, given 5 radiographs of training. Radiographs were randomly shuffled and type of operation blinded. SPSS statistical software was used to calculate Pearson correlation coefficient (PCC) between methods and inter- and intraclass correlation coefficients (ICC) between observers.

Findings / Results: The 51 assessments took mean 17 minutes (range 9–30) by use of eye-estimation, 28 min (12–50) by trabecular-angulation and 120 (57–183) min by the new cortex-surface method. The mean PCC for same observer using the new cortex-surface method versus the eye-estimation and trabecular-angulation was 0.77 (range 0.67–0.87) and 0.76 (0.72–0.85) respectively, compared to 0.86 (0.71–0.93) between the latter two. The mean inter- and intra-observer ICC’s were 0.77 (range 0.66–0.85) and 0.90 (0.78–0.95) for eye-estimation, 0.77 (0.63–0.88) and 0.91 (0.84–0.96) for trabecular-angulation and 0.88 (0.78–0.95) and 0.92 (0.89–0.97) for the new cortex-surface method.

Conclusions: This new cortex-surface method is time-consuming, but appears to be more reliable.
Should we bury K-wires after metacarpal and phalangeal fracture osteosynthesis?

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**Background:** Burying of K-wires after metacarpal and phalangeal fracture osteosynthesis may reduce risk of infection, but it might also complicate later removal.

**Purpose / Aim of Study:** To examine infection and reoperation rates after metacarpal and phalangeal fracture osteosynthesis with buried versus exposed K-wires.

**Materials and Methods:** 597 metacarpal and phalangeal fractures treated with K-wire osteosynthesis at Bispebjerg Hospital from 1st of January 2009 to 1st of February 2015 were identified retrospectively. Excluded were cases requiring simultaneous osteosynthesis of other fractures, Ishiguro procedures, cases with K-wire removal in other hospitals and cases where it could not be identified whether K-wires were buried or not. The final study population included 444 procedures in 331 metacarpal, 109 phalangeal and 4 mixed fractures. In all cases surgical and patient records ≥90 days postoperatively were examined.

**Findings / Results:** The K-wires were buried in 337 (75.9%) cases and exposed in 107 (24.1%). A total of 14 (4.0%) cases with buried K-wires presented with later superficial infection versus 7 (6.5%) in cases with exposed K-wires (p=0.311). Overall, none of these infections caused re-operation. In 58 cases (17.2%) buried K-wire removal was not possible in the outpatient clinic and required readmission for removal in the operation theatre. All exposed K-wires could be removed without re-operation.

**Conclusions:** There was no significant difference in postoperative infection rate between metacarpal and phalangeal osteosynthesis with buried versus exposed k-wires. However, burying lead to unplanned re-operations for K-wire removal in 17.2% calling for reconsideration of surgical strategies.
The basic mobility status at the time of acute hospital discharge is an independent risk factor for long-term mortality after hip fracture

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**Background:** One might ask; does it really matter if patients with hip fracture (HF) regain an independent ambulatory status in the acute hospital towards reducing odds of the ultimate fatal event after trauma, death?

**Purpose / Aim of Study:** To evaluate the importance of the basic mobility status at the time of acute hospital discharge to 1- and 5-year deaths after HF.

**Materials and Methods:** 491 patients who followed a multimodal fast-track HF program until discharged from an acute orthopedic ward. The median (IQR) age was 81 (74-87) years; 133 men and 358 women; 250 cervical and 241 with a trochanteric fracture. The national hip fracture register Cumulated Ambulation Score (CAS 0–6 points) was used to evaluate the basic mobility status. A CAS=6 point equals an independent basic mobility status.

**Findings / Results:** 107 (22%) patients with a CAS<6 at time of hospital discharge stayed in the acute ward a median of 22 (15-32) days post-surgery as compared to a median of 11 (8-16) days for those 384 patients who achieved a CAS=6. Overall 1-year mortality was 15%, while it was 11% for those with a CAS=6 and 29% for those with a CAS<6. Corresponding data for 5-year deaths was 38% and 67%. Cox regression analysis demonstrated that the likelihood of not surviving the first year after HF was 2 times higher for those with; a CAS<6, a low prefracture functional level, for men, and for those with an American Society of Anesthesiologists rating of 3–4 points, when adjusted for age and cognitive status.

**Conclusions:** The regain of basic mobility independency (CAS=6) within the primary acute hospitalization seems highly relevant towards reducing long-term deaths following HF. Enhanced efforts should therefore be instigated to improve the basic mobility status of patients with HF before discharge from the acute hospital.
Performance measures and 30 day mortality after hip fracture in the elderly: a nationwide cohort study

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Background: High mortality rates after hip fracture among elderly patients is of concern. Unfortunately, studies concerning the association between performance measures and 30 day mortality are lacking.

Purpose / Aim of Study: We therefore examined the association between seven evidence-based performance measures including: systematic pain assessment, mobilization before 24 hours postoperatively, basis mobility assessment at admission and at discharge, receiving a post discharge rehabilitation program, anti-osteoporotic medication, fall prevention and 30 day mortality among elderly patients with hip fracture.

Materials and Methods: Using prospectively collected data from the Danish Multidisciplinary Hip Fracture Registry, we identified 25,354 patients ≥65 years who were admitted with a hip fracture between March 2010 and November 2013. Each performance measure was analyzed separately. Furthermore, we included all performance measures in the same regression model for their mutual adjustment. The outcome was 30-day mortality. For the analysis, we only included patients found eligible for the interventions. Data was analyzed using regression techniques while controlling for potential confounders.

Findings / Results: Overall, the 30-day mortality was 11.2%. All seven interventions were associated with lower 30 day mortality. The adjusted mortality odds ratios (ORs) ranged from 0.41 (95% CI: 0.33-0.51) for post discharge rehabilitation program to 0.61 (95% CI: 0.55-0.68) for prevention of future fall accidents. In the mutual adjustment, only mobilization within 24 hours postoperatively and receiving a post discharge rehabilitation program were associated with lower 30 day mortality.

Conclusions: Mobilization within 24 hours postoperatively and discharging patients with a rehabilitation program seems to lower the 30 day mortality among patients with hip fracture.
Performance measures, length of stay and readmission 30 days after discharge among hip fracture patients: a nationwide study

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Background: Data on the association between performance measures of hip fracture care, length of stay (LOS) and risk of readmission within 30 days of discharge, are lacking.

Purpose / Aim of Study: To examine the association between seven evidence based performance measures; systematic pain assessment, mobilization before 24 hours postoperatively, basis mobility assessment at admission and at discharge, receiving a post discharge rehabilitation program, anti-osteoporotic medication, fall prevention and LOS and readmission within 30 days of discharge among elderly patients with hip fracture.

Materials and Methods: From the Danish Multidisciplinary Hip Fracture Registry, we identified 25,354 patients ≥65 years who were admitted with a hip fracture between March 2010 and November 2013. The association with LOS and readmission within 30 days of discharge was analyzed for the individual performance measures using multivariable regression techniques while controlling for potential confounders.

Findings / Results: Patients who were mobilized within 24 hours postoperatively had a median LOS of 8.1 days compared to 9.8 days for patients mobilized after 24 hours (adjusted relative time = 0.87 (95% CI: 0.86–0.89)). For the remaining six performance measures, the differences in LOS were less than 1 day. Furthermore systematic pain assessment (adjusted odds ratio (OR) = 0.80 (95% CI: 0.72–0.89)), mobilization within 24 hours postoperatively (OR=0.84, 95% CI: 0.78–0.92) and antiosteoporotic medication (OR=0.79, 95%CI: 0.70–0.88) were all independently associated with a lower readmission risk.

Conclusions: Receiving mobilization within 24 hours postoperatively was associated with shorter LOS. Receiving systematic pain assessment, mobilization within 24 hours and anti-osteoporotic medication was also associated with a lower risk of readmission among patients with hip fracture.
Bone transport of the femur with a motorized intramedullary lengthening nail.

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**Background:** Femoral bone defects might be treated with a bone transport nail.

**Purpose / Aim of Study:** A retrospective study of the first six consecutive femoral atrophic non-unions.

**Materials and Methods:** The atrophic non-union site was resected and an osteotomy was performed. A motorized femoral nail capable of combined bone transport and lengthening was inserted.

**Findings / Results:** Treatment failed in a 51-year-old woman as the sliding screw cut out. Union of the docking site and distraction callus was achieved in three women and two men with a mean age of 49 (23 – 70 years). Mean defect size was 3 (2 – 5 cm), and mean limb length discrepancy was 3 (1 – 6 cm). Mean distraction at the osteotomy site was 6 cm. Minimum distraction at the osteotomy site was 4 cm (3 cm bone transport and 1 cm bone lengthening) and maximum distraction at the osteotomy site was 8 cm (2 cm bone transport and 6 cm bone lengthening). Mean time to union at the docking site was 7 months (3 – 10 months). One patient had a persistent limb length discrepancy of 1 cm. Angular deformity in the coronal plane went from a mean preop. value of 7 (0 – 18 degrees) to a mean postop. value of 1 (0 – 5 degrees). Angular deformity in the sagittal plane went from a mean preop. value of 4 (0 – 20 degrees) to a mean postop. value of 3 (0 – 10 degrees). Angular deformity in the axial plane went from a mean preop. value of 4 (0 – 20 degrees) to a postop. value of 0 degrees in all patients. Patients had full knee extension at the latest follow-up. Knee flexion went from a mean preop. value of 100 (45 – 130 degrees) to a mean value of 120 (90 – 140 degrees) at latest follow-up.

**Conclusions:** Femoral defects in shortened femurs can be treated by a combined bone transport and lengthening nail. However, failure occurred when the sliding screw in the transport segment was inserted too close to the resection site.
Short term results of Total Wrist revision arthroplasties

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**Background:** A slowly increasing number total wrist prosthesis failes due to loosening.

**Purpose / Aim of Study:** The aim of this study is was to review our short-term results of revision of wrist-arthroplasty.

**Materials and Methods:** Maestro and Remotion total wrist prostheses are used for revision of former failed wrist prostheses. 11 cases were bone grafted and some combined with cementing. In 6 cases almost the whole carpus where gone and a new technique for reconstruction of carpus with a structural bone block was used. Patients evaluated pre- and postoperatively with ROM, grip strength, VAS of pain and satisfaction. Functional and general outcomes were evaluated using the Quick-DASH and PRWE questionnaires. Radiographs were obtained pre-operatively and at follow-up. The procedure performed in 5 men and 10 women. Their median age was 62 years (32-76). Median follow-up was 16 month (3-68). Revision arthroplasty performed with 8 Maestro implants and 7 Remotion implants.

**Findings / Results:** Wrist extension and flexion was preoperatively 30/24 degrees and at follow-up 45/22. Radial/ulnar deviation was 0/30 degrees preoperatively versus 8/30 postoperatively. Grip strength (KgF) was preoperatively 7 (range 2-20) and at follow-up 16 (4-22). VAS pain was preoperatively at rest/activity 28/43 and at follow-up 9/28. Quick DASH and PRWE scores were preoperatively 66 respectively 67 and at follow-up 43 and 34. VAS satisfaction was high at latest follow-up 75 mm (4-100). No infections or dislocations were encountered, but radio-graphically loosening of 2 Remotion prosthesis occurred and they were consequently revised to total wrist arthrodesis.

**Conclusions:** The short-term outcome of this small heterogeneous case series indicates that revision arthroplasty is a viable option in case of aseptic implant loosening even if the risk for subsequent loosening is substantial.
THE ELEKTRA PROSTHESIS FOR TOTAL REPLACEMENT OF THE FIRST CMC-JOINT

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**Background:** Earlier designs of the Elektra cup had revision rates up to 40 percent. A new Electra cup design was developed for the first carpo-metacarpal joint.

**Purpose / Aim of Study:** The aim of this study was to evaluate the preliminary results after joint replacement with the Elektra prosthesis, a non-cemented, HAP-coated 3-component titanium-implant. The cup is the third generation Elektra cup with a metal to metal CR-CO articulation.

**Materials and Methods:** 28 patients were operated and followed prospectively. Diagnosis was idiopathic osteoarthritis in all cases. 23 were women and five men. The operated hand was dominant in 10 cases and non-dominant in 18 cases. Median age 60 years (48–78). Medium values are used.

**Findings / Results:** The follow-up is 26 month (3–60). Pain on VAS in rest/activity decreased from 44/78 mm preoperatively to 2/2 mm at last follow-up. Abduction/volar adduction were 36/35 degrees preoperatively and 40/40 degrees at last follow-up. Grip-strength increased from 19 KgF preoperatively to 24 KgF at last follow-up. Pinch-strength increased from 3.5 KgF preoperatively to 5.5 KgF at last follow-up. Quick-DASH was preoperatively 49 and at last follow-up 18. VAS satisfaction at last follow-up was 97 mm (3–100). Revision of the total prosthesis to interposition arthroplasty occurred in one case. Revision of the cups to cemented polyethylene cups done in four cases. One neck of the prosthesis changed to a longer neck due to instability. Total rate of revision was 18% and revision due to loosening 14%. No infections occurred.

**Conclusions:** Electra prosthesis with third generation cup had at last follow-up still improved ROM, pain score, strength, Quick-DASH and a high degree of patient’s satisfaction of the prosthesis. Complication rate were unacceptable high concerning loosening of the cup.
Complication rates of volar plating of distal radius fractures – a retrospective analysis of 595 consecutive cases

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Background: The current trend in treatment of displaced distal radius fractures favours volar plating. However, recent studies question both the clinical advantage and the cost effectiveness of this treatment modality. An alarming number of complications ranging from 5 to 30% have been reported in the literature.

Purpose / Aim of Study: To estimate the complication rate of volar plating of distal radius fractures in correlation to surgeon experience, type of plate (VariAx® and Acu-Loc®) and AO- fracture type.

Materials and Methods: We reviewed all cases operated with a volar locking plate at Aarhus University Hospital between February 2009 and June 2013. Surgeon experience was categorized as orthopaedic consultant, 2nd-5th-year resident, or 1st-year resident. Correlation coefficients between complications, surgeon’s experience, type of volar plate and type of fracture (AO classification) were estimated.

Findings / Results: 595 patients (mean age 60, 78% females) presenting with distal radius fractures were operated with a volar plate by 21 consultants, 27 2nd-5th-year residents and 16 1st-year residents. Within the mean observation time of 3.2 years (min=1.0; max 5.4) 69 reoperations were performed including 44 plate removals. We observed 30 nerve complications, 2 flexor tendon ruptures, 13 extensor tendon ruptures, 3 cases of complex regional pain syndrome, 5 disturbances of the distal radius ulna joint or scapholunar dislocations and 2 deep infections. No correlation was found between complication rates and type of plate or surgeon experience. Correlation analysis between complications and the type of fracture (AO) are pending.

Conclusions: We observed a reoperation rate of 12%. Neither surgeon experience, nor type of volar plate were related to the complication rate.
CT-scanning of nondisplaced scaphoid fractures diagnosed on primary plain radiographs: Consequences for decision of treatment. A cross sectional study

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Background: Displacement is an important factor associated with failure of a scaphoid fracture to heal. Treatment decisions and the need for further imaging are often made according to the findings on plain radiographs.

Purpose / Aim of Study: The purpose of the study was to investigate how CT scans of nondisplaced scaphoid fractures affect the treatment decisions.

Materials and Methods: We retrospectively searched the medical records for patients registered for suspected scaphoid fractures from 01/2009 – 05/2014 at the Orthopedic department at Nordsjaellands Hospital, Hillerød. 70 patients with a scaphoid fracture and a complete set of radiographs and CT-scan available could be included. All images were evaluated by 2 senior hand surgeons for displacement, stability, fracture localization and treatment was recommended. CT scans served as reference standard in our study.

Findings / Results: Of the 140 cases reviewed (2x70) 111 fractures were found to be nondisplaced at the radiographs. 10% of these were found to be displaced on CT resulting in an agreement on nondisplacement of 90%. Agreement on stability and treatment recommendation was 78% and agreement on localization 80%. Sensitivity and specificity for stability and treatment were 29% and 89% with a positive and negative predictive value of 28% and 93%. We found a change in treatment recommendation after the evaluation of CT scans in 24 out of 111 cases (21,6%). In 10 cases review of CT scans changed the recommended treatment from conservative to operative and in 14 cases the recommendation changed from operative to conservative.

Conclusions: Our study shows that in scaphoid fractures found to be nondisplaced on radiographs, CT scans lead to a significant change of treatment recommendation. According to our findings we will continue to make CT scans of all scaphoid fractures diagnosed on plain radiographs.
Does Xiapex have a roll in the treatment of flexion deformities of the proximal interphalangeal joint of the little finger caused by Dupuytrens disease – Experiences after 1 year follow up of 85 treatments

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Background: Dupuytren’s contracture (DC) is a fibroliferative disorder effecting the palmar fascia causing flexion contractures and impairing hand function. Since July 2011 Collagenase has been a treatment option for patients with Dupuytrens contracture. The efficacy of Collagenase and its place in treatment of DC is still debated.

Purpose / Aim of Study: The aim of this study is to evaluate the efficacy of Xiapex® in the treatment of DC effecting the PIP joints of the little finger at least 12 month after injection. Primary endpoint is reduction in contracture.

Materials and Methods: The study is an ongoing prospective study on a consecutive series of patients with primary and recurrent DC and flexion deformities of the proximal interphalangeal joint of >20 degrees of the little finger.

Findings / Results: 85 treatments have been enrolled, 65 men and 20 women, mean age 67 years [22-83]. 44 treatments of primary DC and 41 treatments of recurrent DC. 41% had skin rupture, no infections were seen. Mean pre-injection-contracture 65 degrees. Mean qDASH pre-injection was 12 [0-52]. Excellent results defined as 0-10 degree extension lack was achieved in 47% of the treatments. Mean follow up 16 months [12- 22] Improvement in contracture 40 degrees. Mean qDASH at 12 month follow-up was 10 [0-57]. In 7 cases (8%) there had been a need for further treatment of the Xiapex® treated finger joint at 12 months (=unacceptable recurrence) At 12 months 56% of the patients were satisfied or very satisfied. Adverse events were mild in all cases. Recurrence defined as > 20 degree los of extension was seen in 47% of the cases.

Conclusions: The treatment does improve hand function but excellent results can be difficult to achive. Choosing Xiapex for treatment for contractures of the 5th PIP joint may not be the best solution for the patient.
Disability and return to work after trapeziometacarpal total joint arthroplasty: influence of occupational mechanical exposures

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**Background:** There are no studies concerning disability and return to work after trapeziometacarpal total joint arthroplasty in younger and active patients.

**Purpose / Aim of Study:** To determine the prognosis after trapeziometacarpal total joint arthroplasty with respect to disability and return to work. We examined the hypothesis that occupational mechanical exposures are negative prognostic factors.

**Materials and Methods:** We conducted a register-based follow-up study in 133 patients aged 39–65 years, who in the period 2003–2013 had a total of 164 trapeziometacarpal total joint arthroplasty operations. Prospectively collected clinical data concerning DASH, VAS, and grip strength before the operation and 3 and 12 months postoperatively was combined with information about occupation and labour market attachment from the Danish National Register on Public Transfer Payments. Job title was linked with a job exposure matrix to obtain estimates of occupational mechanical hand-arm exposures. Uni- and multivariable Cox regression models were used.

**Findings / Results:** A high preoperative DASH score was a positive predictor of a high DASH score after 12 months. 73 patients were listed as active on the labour market at the time of surgery. Half of these patients returned to work within 3 months after surgery, and only 2 patients did not return to work. Preoperative sick leave and forceful work were predictors of prolonged sick leave before return to work.

**Conclusions:** The prognosis with respect to disability and return to work after trapeziometacarpal total joint arthroplasty is generally excellent. However, high occupational mechanical exposures and preoperative sick leave may lead to prolonged sick leave.
Disability and return to work after early MRI on suspicion of scaphoid fracture: influence of MRI pathology and occupational mechanical exposures

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Background: There are no studies concerning disability and return to work after wrist injury in relation to forceful work, including the prognosis for patients with wrist injury without MRI features of any acute carpal pathology.

Purpose / Aim of Study: To determine the prognosis after early MRI on suspicion of scaphoid fracture with respect to disability and return to work. The hypotheses of MRI pathology and high occupational mechanical exposures as negative prognostic factors were examined.

Materials and Methods: A follow-up study based on register and questionnaire information on 469 patients, aged 18–89 years, who in the period 2006–2010 had early MRI on clinical suspicion of scaphoid fracture. Questionnaires included DASH, PRWE, job title, and lifestyle factors. Information on time until return to work was obtained from the Danish National Register on Public Transfer Payments. Job title was linked with a job exposure matrix to obtain estimates of occupational mechanical hand–arm exposures. Uni- and multivariable Cox regression models were used.

Findings / Results: 249 patients (53%) responded to the questionnaire after a mean of 4.8 years after the trauma. Mean age was 43.5 years (SD 19.7), there were 43% males. 46% of respondents had pathological findings on MRI. Predictors of DASH-score >20 and PRWE-score >20 were higher age, female sex, tobacco smoking, and increasing body mass index. Predictors of prolonged time until return to work were MRI pathology, forceful work, and habitual sickness absence.

Conclusions: MRI pathology and high occupational mechanical exposures were negative prognostic factors regarding return to work after wrist trauma, while tobacco smoking and high BMI were negative prognostic factors regarding disability.
Do high occupational mechanical exposures influence the risk of failure of trapeziometacarpal total joint arthroplasty?

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**Background:** There are no studies concerning the influence of occupational mechanical exposures on the risk of implant failure and revision in trapeziometacarpal (TMC) total joint arthroplasty in younger and active patients.

**Purpose / Aim of Study:** To determine the prognosis with respect to risk of revision after TMC total joint arthroplasty, evaluating the hypothesis that occupational mechanical exposures are negative prognostic factors for implant survival.

**Materials and Methods:** A register based follow-up study in 133 patients aged 39–65 years (mean age 56 years), who in the period 2003–2013 had a total of 164 TMC total joint arthroplasty operations. Prospectively collected clinical data concerning DASH, VAS, and grip strength before the operation and after 3 and 12 months plus data concerning revision were combined with self-reported job title and information about labour market attachment from the Danish National Register on Public Transfer Payments. Job title was linked with a job exposure matrix to obtain estimates of occupational mechanical hand-arm exposures. Uni- and multivariable Cox regression models were used.

**Findings / Results:** 45 of the 164 implants had been revised due to failure with high revision rates linked to the early part of the inclusion period. Implant type with a cup with collar predicted a high DASH score after 12 months and implant revision during the observation period. Implant fixation (cementless vs cemented) was not a predictor. Forceful work increased the risk of implant revision, however not significant (p=0.17) in a multivariate analysis.

**Conclusions:** The prognosis for implant survival after TMC total joint arthroplasty in younger and active patients is relatively poor and highly influenced by implant design. High occupational mechanical exposures may be important and studies with a larger number of patients are needed.
Fixation of cemented and cementless cups in total joint trapeziometacarpal prostheses. A randomized clinical RSA study with 5 years follow-up

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Background: Cup failure is a recognized problem in total trapeziometacarpal (TM) joint prosthesis and may be related to poor fixation, which can be measured by radiostereometry (RSA).

Purpose / Aim of Study: To compare implant migration of cemented polyethylene TM cups with cementless screw TM cups.

Materials and Methods: In a prospective, parallel-group, randomized patient-blinded clinical trial, we included 32 hands in 28 patients (5 males) at a mean age of 58 years (40-77) with Eaton stage 2 and 3 osteoarthritis of the TM joint. Patients were randomised to surgery with A) a cemented DLC all-polyethylene cup (PC) (n=16) or B) a cementless hydroxyapatite-coated chrome-cobalt Elektra screw cup (SC) (n=16) that was inserted without threading of the bone. Stereoradiographs for evaluation of cup migration (primary effect size), and alongside DASH and pain scores were obtained at 5 years follow-up. 4 patients entered the study with both hands, and secondarily had the last operated hand excluded from final analysis.

Findings / Results: The 5 year total translation (TT) was similar (p=0.09) with 0.90mm (SD 1.04) for the PC (n=7) and 0.26mm (SD 0.20) for the SC (n=9). Subsidence was also similar (p=0.22). 4 cups (2 PC and 2 SC) were revised and the 2 SC implants both had TT>1mm. 2 other PC cups migrated above 1mm TT to 5 years follow-up. Additionally 1 SC cup was radiographically loose between 1 year and 5 years, but had not been revised, and could not be measured with RSA because of loose markers. Grip strength, pain, and DASH scores were similar between the two groups at all measure points.

Conclusions: Midterm implant fixation and clinical outcome was similar with both cup designs. Although RSA has natural limitations in anatomical small regions, the method is feasible for measurement of TM joint translational stability.
Surgery versus ultrasound-guided steroid injection for trigger finger: A randomised controlled trial with one year follow-up

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Background: Trigger finger (TF) is a common disorder, which affects more than two in a hundred persons during a lifetime. Open surgery (OP) is the gold standard and cures near 100%, steroid- injections (SI) are reported to cure between 60-90%. Comparative trials on this disorder are limited.

Purpose / Aim of Study: To investigate the long term follow-up of patients treated for TF with ultrasound-guided SI compared to OP.

Materials and Methods: 51 males and 102 females, mean age 60 (range 19-87) was randomised to open surgery (n=76) or ultrasound-guided SI (n=77). Follow-up was conducted at 12 weeks and one year. The affected finger was graded using a trigger finger score (TFS); I)normal movement, IIa)normal movement with pain at the A1-pulley, IIb)history of uneven movement, III)uneven movement, IV)locked, actively correctable and V)locked, passive correctable, static. If the finger was graded above IIa at follow-up, it was considered a failure. Pain was assessed with a numeric rating scale (NRS) from 1 to 10, 10 being the worst imaginable pain.

Findings / Results: No difference was found in baseline data between the groups (p>0.1). At 3 months 98.5% (OP) and 85.5% (SI) patients were successfully treated for TF (chi2 p=0.003). At one year the number of successfully treated patients were reduced to 97.5% (OP) and 48.5% (SI) (chi2 p<0.001). The mean TFS and NRS was reduced in both groups at three months and one year follow-up (p<0.001). Willingness-to-repeat after one year were positive in 84% (OP) and 67% (SI) patients (chi2 p=0.016). When evaluating the failures of SI (n=39), the mean time until recurrence was 7 months (range 0-12).

Conclusions: Open surgery is superior to steroid injection. Our findings indicated that the curative effect of a single SI is overestimated in the literature and the effect declines rapidly between 3 and 12 months after injection.
Accuracy of cone-beam versus multi-detector computed tomography bone models in analysis of wrist kinematics using dynamic radiostereometric analysis

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Background: With the introduction of dynamic radiostereometric analysis (RSA) it is possible to study the kinematics of the wrist and diagnose injuries. Using patient specific bone models, it is possible to use Model- based RSA. To reduce the radiation dose, cone-beam CT (CBCT) can be used instead of multi-detector CT (MDCT). The reduction in dose is associated with a decrease in image quality. However, it is unclear if the difference results in a difference in model fitting and subsequent accuracy of model- based RSA.

Purpose / Aim of Study: To investigate the use of bone models of the wrist created from CBCT and MDCT in a cadaver study.

Materials and Methods: A single arm was scanned with CBCT (NewTom 5G, Verona, Italy) and with MDCT (Brilliance 64, Best, The Netherlands). The wrist bones were automatically segmented and bone models were created. Tantalum beads were inserted in the radius and ulna and dynamic RSA images were acquired during radioulnar deviation. Paired migration analysis with respect to bone markers were performed with MBRSA (MBRSA, Medis specials bv, Leiden, NL). We report mean difference and standard deviation.

Findings / Results: CBCT images were noisier than MDCT. Dose length product was 10 times lower for CBCT. The radius and the ulna were analyzed in five frames. No differences were found between the radius and ulna. Combined mean model fitting error was 0.10±0.01 for both CBCT and MDCT based models (P-value: 1.0, 95% CI: -0.01:0.01). No differences for translations and rotations were found between CBCT and MDCT compared to marker-based RSA.

Conclusions: We found no difference between model fitting error or migration analysis for CBCT and MDCT based bone models. With further investigation, we believe that CBCT based bone models may be a good alternative for MDCT due to a ten fold reduction in dose without a difference in accuracy.
Xiapex® (collagenase clostridium histolyticum) – treatment of patients with primary Dupuytren’s contracture – 3 years follow-up

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**Background:** Dupuytren’s contracture (DC) is a disorder that affect the palmar fascia where a pretendinous cord with time causes the finger to flex resulting in impaired hand function.

**Purpose / Aim of Study:** The aim of this study was to evaluate the efficacy of Xiapex® in the treatment of Dupuytren’s contracture at least 3 years after injection.

**Materials and Methods:** The study is a prospective study on consecutive series of patients with DC and flexion deformities of the metacarpophalangeal and/or proximal interphalangeal joint of >20 degree. Primary end point was reduction in contracture. Secondary end points was improving hand function and recurrence rate. All patients gave informed consent.

**Findings / Results:** 422 treatments of patients with primary DC were enrolled of which 40 treatments had reached 3 years follow-up. 36 men and 4 women, mean age 67 years [22-85]. 95 % of the treated fingers are the 4. and 5. finger. Mean pre-injection contracture MP/PIP-joint 50 degree/62 degree [20-90]. Mean pre-injection qDASH was 15 [0-52] 40 treatments, MP/PIP-joint 29/11, were seen for follow-up after a mean of 38 months [36-41] At follow-up: Improvement in contracture MP/PIP-joint 33 degree/11 degree corresponding to a corrections degree of 66% /18% Mean qDASH was 7 [0-34]. 82 % of the patient were satisfied or very satisfied. In 2 cases (5%) there had been a need for further treatment (=unacceptable recurrence)

**Conclusions:** Our results are still promising at 3 years and we find Xiapex® a good treatment option for DC-patients with a palpable cord. The treatment is effective although declining for PIP joints and with acceptable recurrence.
Medial Overhang of Tibia Component is associated with higher risk of inferior KOOS pain score after Knee Replacement

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Background: Consequences of tibial overhang and component malalignment in knee replacement (TKA) have been investigated, however, there is no consensus in relation to patient reported outcome measures (PROMs). KOOS (Knee Injury and Osteoarthritis Outcome Score), specifically the subscale KOOS pain, is used to monitor pain.

Purpose / Aim of Study: The aim of this prospective multicenter study was to investigate the associations between 1) tibial overhang and KOOS pain and 2) malalignment of TKA components including overall malalignment and KOOS pain, both 1 year after surgery.

Materials and Methods: 323 patients from 10 centers in Europe, US, Asia and Australia were enrolled between October 2011 and Feb 2014. Demographic data, postoperative X-ray, and 1 year KOOS pain were collected. Overhang was defined as any portion of the tibial tray that exceeds tibial bone. There were 4 categories of malalignment: overall (≤2.5° or >7.5° valgus); femoral (≤2° or >7° valgus); tibial (≤3° varus or >3°); and combined (defined as both tibial and femoral malalignments). Any 1 Y KOOS pain score of < 70 was used to represent unsatisfactory pain based earlier on follow-up knee studies. Multiple logistic regression was used to assess associations.

Findings / Results: 68.4% were females, mean BMI was 30.7 (SD ± 8.2) and mean age was 66.0 (SD ±8.2). Significant association was observed between medial overhang and 1Y KOOS pain of < 70 (p =0.04). 18.5% of patients had medial overhang. For overall, tibial, femoral, and combined malalignment as for anterior and lateral overhang no significant associations were found in relation to 1 year KOOS pain of < 70.

Conclusions: A significant association was shown between medial overhang and a 1 year KOOS pain less than 70, which demonstrates a significantly reduced chance for entering a satisfactory pain category 1 year after TKA.
Are there Regional Differences in Osteoarthritis and KOOS scores for Patients undergoing Total Knee Replacement?

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Background: Patient Reported Outcome Measures (PROMs) are a reliable means of assessing preoperative pain and function as well as clinical improvement after Knee Replacement (TKA). There may be differences in preoperative characteristic and improvement of patients undergoing TKA between countries.

Purpose / Aim of Study: The aim of this prospective multicenter study was to investigate differences between USA, Europe, Asia, and Australia (4 regions) in preoperative Osteoarthritis (OA) and KOOS (Knee Injury and Osteoarthritis Outcome Score) as well as the improvement in KOOS 1 year after TKA.

Materials and Methods: In 10 centers 435 patients were enrolled from Europe (4), USA (2), Asia (2) and Australia (1). Demographics, preoperative X-rays, and KOOS were collected. KOOS consist of 5 individual subscales: pain, symptoms, function in daily living, function in sport, and quality of life (QoL). Delta KOOS was defined as the improvement in each subscale KOOS from preoperative score to 1 year after TKA. Preoperative OA was graded according to the Kellgren-Lawrence (KL) scoring system. Parametric tests were used for statistics.

Findings / Results: There were significant differences in gender, age, and BMI between the 4 regions (p < 0.001, for all). For OA-severity, no significant difference was observed between the 4 regions (p = 0.25). Regarding preoperative pain (p = 0.13) no significant difference was found between the regions. For Delta KOOS significant differences were shown for all subscales between the 4 regions (p < 0.01).

Conclusions: Significant demographics differences were shown between the 4 regions. For OA severity and preoperative pain, no significant differences were observed, indicating similar radiological criteria and pain thresholds prior to TKA in the 4 regions. There were significant differences in improvement after TKA between the regions.
Patient and department related outcomes after fast-track total hip and knee arthroplasty in patients ≥85 years

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Background: Elderly total hip (THA) and knee arthroplasty (TKA) patients have increased length of hospital stay (LOS), readmissions and non-home discharge. However, the role of patient and department-specific characteristics within a fast-track protocol is uncertain. Furthermore, differences between “medical” and “surgical” complications are rarely mentioned.

Purpose / Aim of Study: To investigate LOS>4 days, 90-days readmissions and discharge destinations in patients ≥85 years in relation to patient-characteristics and department of surgery.

Materials and Methods: Observational prospective study in 8 fast-track departments. 90-days follow-up from the Danish Patient Registry and patient records.

Findings / Results: 549 (4% of 13775) procedures were in patients ≥85 years, of which 12% had ≥4 conventional surgical risk-factors. In dep2 more patients had preoperative anemia (42%) and in dep7 more patients used walking aids (86%) or had psychotropic treatment (29%) (p<0.05). Median LOS was 3 days and 27% had LOS>4 days. Of these, 83% were “medical”, mainly anemia requiring transfusion and mobilization issues. Preoperative anemia and use of walking aids were associated with LOS >4 days (OR:1.54 (95%CI:1.03–2.31) and 1.84 (95%CI:1.18–2.86)). Dep1 had more (43%), and dep7 had fewer (13%) patients with LOS>4 (p<0.05). 38 patients (6.9%) were not discharged to home, more in dep1 (24%) and fewer in dep3–5 (0–1%)(p<0.05). 90-day readmission rate was 18%, more in dep2 (26%) and less in dep7 (10%)(p<0.05). Of readmissions 80% were “medical”, mainly falls and disproved thromboembolic events. Mortality was 2%.

Conclusions: Patients >85 years can successfully undergo a fast-track regime, but patient and department-related factors influence LOS, readmissions and discharge destination. Attention to pre- and postoperative anemia and prevention of “medical” complications is needed.
Promising results of the Sigma unicompartmental knee arthroplasty

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Background: The Sigma unicompartmental knee arthroplasty (UKA) is a relatively new implant offering a low 5–year revision rate of 5.5% (2.9–10.1) in the Australian arthroplasty register. Early implant migration can be assessed by radiostereometric analysis (RSA). Migration is a predictor of implant loosening/revision.

Purpose / Aim of Study: We evaluate migration of the Sigma UKA using RSA.

Materials and Methods: During December 2012 to December 2013, 45 cemented, uncoated, fixed-bearing medial Sigma UKA were implanted in 45 patients (21 male; mean age 63 years; SD 9.7). Stereoradiographs were obtained postoperatively, at 4 months (4M) (N=37), 1 year (1Y) (N=40), and 2 years (2Y) (N=17) after surgery. Model-based RSA was used to analyse migration of the femoral and tibial components with respect to their rigid bone-marker model. At the time of the conference, 2Y follow-up data will be nearly completed.

Findings / Results: Median maximal total point motion (MTPM) (95%CI) for the femoral component was 0.54mm (0.44 0.66) at 1Y and 0.50mm (0.35 0.73) at 2Y (t-test p=0.64), and for the tibial component 0.45mm (0.35 0.56) at 1Y and 0.52mm (0.32 0.86) at 2Y (t-test p=0.54). Continuous migration (MTPM>0.2mm at any follow-up after 1Y) of the tibial component was seen in 6 knees. One patient was revised 19 months after primary surgery.

Conclusions: Pijls suggests a threshold for MTPM for the tibial component of TKA at 1Y of 0.54 as acceptable. This level is associated with a low revision rate in the arthroplasty registries. Our data are comparable with an MTPM for the tibial component at 1Y of 0.45. Continuous migration is observed in 6 knees at 2Y follow-up. These knees have a 20% chance of loosening.2 Our study shows low migration of the Sigma UKA at 2Y follow-up, 6 knees are at risk for loosening.
Patient Specific Instrumentation (PSI): early results in a Danish orthopaedic department

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Background: A new way of improving quality and logistics in TKA surgery might be Patient Specific Instrumentation (PSI), providing cuttingblocks and predetermining component sizes from a MR or CT.

Purpose / Aim of Study: To report early results with PSI in a Danish orthopaedic department.

Materials and Methods: A retrospective review of 38 patients operated at Næstved Sygehus with insertion of a Zimmer® NexGen TKA with the use of PSI. All knees had been operated by two experienced knee surgeons between October 2014 and June 2015. We searched the medical records, The Danish knee arthroplasty register and the files from the Zimmer® PSI- online management system.

Findings / Results: 42 patients were selected for PSI. 2 patients had to drop out due to change of surgeon. Another 2 patients dropped out, because their scans were dismissed for technical reasons by Zimmer®. Thus 38 patients were reviewed: 16 men and 22 women, mean age 66,1 years (50–82), BMI 29 (21–44), all suffering from osteoarthritis. It took 70,8 days from time of indication until the operation. 12 out of the 38 (31,6%) patients were per-operatively converted to conventional operating technique, because the predetermined size didn’t fit. Four femurs and 8 tibias were converted. 9/12 of the converted patients got larger sizes that pre-planned, equally divided between femoral and tibial components. The converted operations had an operating time of 57,9 min compared to 54,4 min when the PSI system was used successfully. In the Danish Knee Arthroplasty Register (2013) the operating time was on average 68 minutes.

Conclusions: With an average time from indication to operation of almost 71 days, and a conversion rate of 31,6% (12/38), our early results with PSI were not good. However, given proper education of surgeons, the potential logistic advantages warrants further research.
Dynamic RSA for evaluation of fixation of Oxford Unicompartmental Knee prostheses during Step-up and Step-down motion

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Background: Traditionally, RSA is used for static recordings of joint implants at fixed time intervals to follow fixation over time. Dynamic RSA allows for assessment of implant fixation during loaded functions.

Purpose / Aim of Study: To assess inducible micromotions (IMM) of the Oxford UKA tibial component and evaluate IMM for fixation methods (cemented vs. cementless), tibial radiolucent lines (RLL), component alignment and clinical outcome scores.

Materials and Methods: 15 patients (12 males and 3 females, mean age: 69 years, n = 7 cemented/n = 8 cementless) with a well-fixed Oxford UKA (mean in-situ: 4.4 years) were invited. Five of these had tibial RLL. Each patient was recorded with dynamic RSA (10 fr/sec) during a continuous step-up / step-down motion on a 30 cm. box. IMM was calculated for the tibial component with respect to the tibia bone. Postoperative component alignment (posterior slope and varus slope) was measured with Model-based RSA, RLL was measured on screened X-rays, and clinical outcome was evaluated as OKS, AKSS and VAS.

Findings / Results: All tibial components had IMM which followed the highest loadings during the step-cycle (p<0.001) with subsidence up to -0.06 mm (95%CI: -0.10 ; -0.03). Tibial component IMM was similar for cemented and cementless fixation (p>0.19). Patients with tibial RLL had 0.4° (95%CI: 0.06 ; 0.72) larger medio-lateral tilt (p=0.03). Postoperative posterior slope of the tibial plateau correlated with posterior tilt at mean 4 years follow-up (p=0.008). No correlation was found between IMM and clinical outcome scores (p>0.07). Further analysis are ongoing.

Conclusions: All Oxford UKA had IMM of the tibial component during a step-up cycle. RLLs and component alignment influenced the magnitude of IMM. Dynamic RSA is a promising clinical tool for the evaluation of functional implant fixation and implant kinematics.
Does ethnicity and level of education influence preoperative disability in patients undergoing primary TKA? A cohort study

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Background: Background: Patient- and surgery related parameters as well as preoperative disability may influence postoperative outcome following primary TKA. The role that ethnicity and level of education plays in preoperative disability in patients scheduled to undergo primary TKA surgery is unknown.

Purpose / Aim of Study: Aim: In this prospective cohort study we investigate the role that ethnicity and level of education plays in preoperative disability in patients undergoing primary TKA.

Materials and Methods: Methods: We identified 651 patients receiving primary TKA between Oct. 2013 and Dec. 2014, at our institution. Patient demographics, including ethnicity (place of birth) and level of education as well as preoperative disability, including Oxford Knee Score (OKS) and pain on a Visual Analogue Scale (VAS) were registered preoperatively. Regression analysis was performed to identify independent factors affecting preoperative OKS and VAS pain scores.

Findings / Results: Results: 46 (7%) of patients were born outside DK. 182 (28%) and 317 (49%) of patients had <9 years and 9-12 years of education respectively. Adjusted for potential confounders (age, gender and BMI), patients born outside DK had higher VAS pain (1.0; 95%CI (0.4-1.6)) and lower OKS scores (3.6; 95%CI (1.7-5.5)) preoperatively. Patients with >12 years of education had higher VAS pain (0.7; 95%CI (0.2-1.1)) and lower OKS scores (1.9; 95%CI (0.6-3.3)) preoperatively.

Conclusions: Conclusion: Ethnicity and level of education plays a role in preoperative disability in patients undergoing primary TKA. Further investigations on what effect ethnicity and education plays in utilization of medical services and outcome following TKA are warranted.
Validity and reliability of the Forgotten Joint Score (FJS) in evaluating the outcome of TKA

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**Background:** When evaluating the outcome after TKA increasing emphasis has been put on patient perceived outcome, such as patient satisfaction and ability to perform activities of daily living. To accommodate this, a new scoring system, the Forgotten Joint Score (FJS), has been developed.

**Purpose / Aim of Study:** The purpose of this study was to develop and validate a Danish version of the FJS.

**Materials and Methods:** A danish version of the FJS questionnaire was created according to internationally adopted standards. 360 patients previously treated with primary TKA were invited to participate in the study (follow-up 1–4 years). Of these, 315 patients were included in the validity study and 150 patients in the reliability study. Correlation between the Oxford Knee Score (OKS) and FJS was calculated and test-retest evaluation was performed. Ceiling effect was defined as patients reaching a score within 10% of the maximal achievable score.

**Findings / Results:** The reliability study revieled a strong correlation between the FJS- and OKS scoring systems with a correlation coefficient of 0.81[0.77;0.85] (p < 0.001). The test-retest showed almost perfect reliability for the FJS total score (ICC = 0.91 [0.88;0.94]) and at least substantial reliability for the individual FJS sub scores (ICC > 0.79). We found a high level of internal consistency amongst the 12 individual FJS sub scores (cronbach’s $\bar{\Omega} = 0.96$). The ceiling effect for the FJS was 12% compared to 26% for the OKS.

**Conclusions:** The danish version af the FJS demonstrated high test–retest reliability and validity. The FJS did not carry the same degree of ceiling effect as found in the OKS. The FJS is a usefull and reliable tool when evaluating potential small differences in knee performance of patients with good clinical results after TKA.
Iodine impregnated incision drape and bacterial recolonization in simulated total knee arthroplasty. A controlled randomized experimental trial

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Background: Iodine impregnated incision drape (IIID) was deemed ineffective in preventing surgical site infection (SSI) in a recent systematic review. Some evidence suggests a potential increase in SSI risk as a result of IIID use, possibly from promotion of skin recolonization. IIID is sparsely investigated in orthopaedics. An increase in the number of viable bacteria in the surgical field of an arthroplasty has a potential to increase operative infection risk

Purpose / Aim of Study: To investigate if IIID increase bacterial recolonization rates compared to no drape use under conditions of simulated total knee arthroplasty (TKA)

Materials and Methods: 20 patients scheduled for TKA were recruited. Each patient had one knee randomized for draping with IIID, while the contralateral knee was left bare, thus the patients served as their own control. Operating theatre conditions and perioperative procedures of a TKA were simulated. Cup-scrub samples were collected from the skin of each knee prior to disinfection and on 2 occasions after skin-preparation, 75 minutes apart. Bacterial quantities were estimated by spread plating under aerobic conditions. Outcome was measured as colony forming units per cm2 of skin (CFU)

Findings / Results: Following skin-disinfection we found no significant difference in bacterial quantities between the intervention and the control knee (p = 0.823). Neither did we see any difference after 75 minutes of simulated surgery (median 0.00 vs. 0.26 log10 CFU, p = 0.601). Bacterial quantities had not increased at the end of surgery when compared to baseline in either groups, thus no recolonization was detected (p = 0.852 and 0.304, respectively)

Conclusions: IIID did not increase bacterial recolonization rates in simulated TKA. This study does not support the hypothesis that IIID promotes bacterial recolonization and postoperative infection risk.
Comparison of a novel porous titanium construct (Regenerex®) to a well proven porous coated tibial surface in cementless total knee arthroplasty. A Prospective Randomized RSA Study.

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**Background:** Regenerex is a novel porous titanium construct with a 3-dimensional porous structure and biomechanical characteristics close to that of normal trabecular bone. It is believed that these characteristics will facilitate bone ingrowth and secure a better fixation to the host bone, thus increasing the implant survival.

**Purpose / Aim of Study:** The aim of this study was to compare this novel construct to a well-proven porous plasma sprayed tibial (PPS) implant after total knee arthroplasty.

**Materials and Methods:** Sixty-one patients scheduled for a TKA were randomized to receive either the novel titanium construct or the PPS tibial component. Radiostereometric analysis of the tibial components was performed postoperatively at 3, 6, 12 and 24 months. Maximum total point motion (MTPM) and segment motion of the implant were analyzed.

**Findings / Results:** Knee and function scores improved significantly from preoperatively to 2-year follow-up in both groups. The Regenerex and the PPS both had the majority of migration appearing during the first 3 months and then stabilized. MTPM in the Regenerex group between 12 and 24 months were 0.06 mm with a total migration of 1.7 mm. In the PPS group MTPM between 12 and 24 months was 0.15 mm and total migration 1.35 mm. The Regenerex had significant lower migration rates between 12 and 24 month compared with the PPS implant (p=0.03).

**Conclusions:** The migration pattern expressed by rotation and translation about X-, Y-and, Z-axes were similar and considered stable in both groups. If we excluded a group of high migrators (n=12) the MTPM in both groups could be reduced to approximately 1 mm, close to that of cemented implants. The results of the novel titanium construct look promising in terms of migration and with a significant improvement in KSS score and WOMAC score at all follow-up and comparable with other uncemented implants.
The impact of knee alignment and component positioning on patient reported outcomes 1 year after total knee arthroplasty

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Background: The definitions of an ideal alignment in total knee arthroplasty (TKA) are much debated. The pre- and postoperative alignment of the knee and its components are hypothesized to play a significant role in patient outcomes after TKA

Purpose / Aim of Study: The aim of this prospective cohort study is to investigate pre- and postoperative overall knee alignment and component alignment and their relation to patient reported outcomes one year after TKA

Materials and Methods: Through our TKA database, we have identified 570 patients operated between May 2013 and June 2014 at our hospital. Secondary TKAs and bilateral simultaneous TKAs were excluded, leaving 334 patients for analysis. Oxford Knee score (OKS) was obtained preoperatively and at 1-year follow-up. Logistic regression was used to analyze risk factors for improvement of less than 10 OKS point. The model included the 9 radiologic parameters and was adjusted for gender, age and BMI

Findings / Results: Preoperative tibial, femoral and overall knee alignment were not significantly affecting the postoperative outcome. Isolated postoperative coronal femoral component alignment did not affect outcome whereas postoperative coronal tibial component alignment of more than 3 degrees varus (OR = 2.6, CI = 1.2-5.9, p =0.020) and overall postoperative knee alignment of more than 7.5 degrees valgus (OR = 2.5, CI = 1.0-5.6, p=0.040) were associated with poorer OKS

Conclusions: The patients with the post-operative overall knee alignment more than 7.5 degrees in valgus or the post-operative tibial component coronal alignment more than 3 degrees in varus are in a higher risk of obtaining poor results at 1 year follow-up. Therefore, according to this study, it is suggested that surgeons pay special attention to overall knee and tibial component alignment during the surgery
Bone remodelling of the femur after total knee arthroplasty with uncemented implants

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**Background:** Loss of bone stock as a response to the bone trauma, immobilisation and stress shielding related to joint replacement surgery increases the risk of fracture of the distale femur after total knee arthroplasty (TKA).

**Purpose / Aim of Study:** This study investigates the adaptive bone remodelling of the distal femur after uncemented TKA.

**Materials and Methods:** We performed a 2 year follow up of 53 patients (mean age 61.5 (38–70) years, F/M=27/26, BMI 29.5) who because of osteoarthritis received an uncemented TKA. The patients participated in a randomised study regarding the tibial component, but all received a NexGen CR-Flex Porous Femoral Component. Measurements of bone mineral density (BMD) of the distal femur using DEXA were performed postoperatively and after 3, 6, 12 and, 24 months. BMD (g/cm²) was measured in 3 regions of interest (ROI) in the periprosthetic bone of the distal femur. Statistics: Paired and unpaired t-test for normally distributed data (P< 0.05 were considered significant).

**Findings / Results:** In the distal femur significant changes in BMD were seen after 24 months of follow-up and BMD decreased by 23.6% in the anterior ROI behind the anterior flange of the prosthesis (p<0.001), 10.1.0% in the posterior ROI (p<0.01) and 5.5% in the most proksimal ROI (p<0.001).

**Conclusions:** We found highly significant BMD-changes in the distal femur after uncemented TKA, most pronounced in the anterior ROI, where a decrease in BMD of almost 25% was seen. Taking the expected age related decay in BMD in this age group in to consideration, the decrease was substantial and must be considered to predispose to periprosthetic fractures.
The effect of early vs. late weightbearing in conservatively treated acute Achilles tendon rupture: A meta-analysis

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Background: Achilles tendon ruptures can be conservatively treated with immobilization and early functional mobilization but early weight bearing is more uncertain.

Purpose / Aim of Study: To conduct a meta-analysis comparing the effect of early versus late weight bearing in conservatively treated Achilles tendon ruptures in adult patients. Primary endpoint was re-rupture and secondary endpoints were strength, ‘Quality of life during treatment’, range of motion, deep venous thrombosis, return to sport, and return to work.

Materials and Methods: A search string was constructed using the keywords “Achilles tendon” and “rupture” and applied in PubMed, EMBASE and The Cochrane library. Two reviewers independently screened the studies by title, then by abstract and finally by full text reading. 3 studies met the inclusion criteria. The reference lists of the included studies were screened and 1 further RCT study was included. Experts on this field were asked and no further studies were identified. The CASP checklist was applied for the study appraisal. Data was extracted according to the purpose of this study. For the meta-analyses the Mantel-Haenszel method was used for the effect estimates. A fixed effect model was chosen. and the results were presented in forest plots.

Findings / Results: There were no statistically significant differences between the two treatment groups concerning re-rupture: OR 0.99 (95 % CI 0.31; 3.18), p= 0.981, return to sports: OR 1.34 (0.62; 2.90), p= 0.455, and return to work: MD (Mean difference) 1.62 (-20.89; 24.13), p= 0.888. For the other endpoint it was not possible to conduct a meta-analysis.

Conclusions: There was no statistically significant difference between early and late weight bearing in conservative treatment of Achilles tendon rupture concerning the outcomes of this study.
The effect of 15 minutes postoperative daily arm bicycling on oxygenation of the soft tissue after total ankle replacement

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**Background:** Wound healing complications after total ankle replacement are reported as frequent as 30%. Although most minor, they are occasionally serious and may lead to loss of the prosthesis. Recent studies have shown that the oxygenation of the soft tissue around the ankle decreases significantly the day after total ankle replacement, and does not reached normal level until the 6th postoperative day.

**Purpose / Aim of Study:** The purpose of the present study was to study the effect of postoperative exercise by arm bicycling in the bed on the oxygenation of the soft tissue at the lower leg.

**Materials and Methods:** Eleven patients who had a total ankle replacement had a 15 minutes training session every postoperative day until the 4th postoperative day. The training intensity was individually adjusted to approximately 70% of maximal level. Transcutaneous oxygen tension (tcpO2) was measured at the operated ankle using the Radiometer TCM400 system. TcpO2 of the non-operated ankle and the upper part of both lower legs served as controls. TcpO2 was measured preoperatively and every postoperative day at rest (before exercise), during exercise, and during restitution.

**Findings / Results:** TcpO2 at the operated ankle decreased from median 58 mmHg preoperatively to median 22 mmHg the 1st postoperative day. TcpO2 at rest the following 3 days was 15 mmHg, 9 mmHg and 13 mmHg respectively. During exercise tcpO2 increased to 44 mmHg, 34 mmHg, 22 mm Hg, and 23 mmHg (p<0.05, Wilcoxon sign test). However, after exercise, tcpO2 had decreased to the pre-exercise level within 30 min.

**Conclusions:** The postoperative oxygenation of the soft tissue around the ankle after total ankle replacement increased significantly during arm exercise. However, the effect on tissue oxygenation vanished within 30 min. rest.
The flexible adult flatfoot. An evaluation of three different etiology-pathogenesis hypotheses. A case-control study

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Background: Several hypotheses have been proposed for the etiology and the pathogenesis of the flexible flatfoot.

Purpose / Aim of Study: The purpose was to test three different hypotheses. 1) a short Achilles tendon, 2) increased laxity of the 1st ray, 3) incomplete axial rotation of the medial ray in relation to the lateral ray of the foot.

Materials and Methods: 16 young adults (20–29 years) with a flexible flatfoot were selected from a group of 65 volunteers. A flatfoot was defined as a foot fulfilling two criteria: The Foot Posture Index (FPI-6, Redmond 2005) above 7 and the heel in more than 5 degrees valgus in the weight bearing position. 16 volunteers with neutral feet matched for sex, age, weight and foot length served as controls. The length of the Achilles tendon was determined as the degree of dorsiflexion of the ankle examined with the person in the prone position with the knee flexed 90 degrees and the heel in neutral position. The stability of the first ray was determined as the dorsal-plantar laxity in relation to the second ray. The axial rotation (pronation) was measured with the ankle and the heel fixed in neutral position as the maximal pronation of the forefoot.

Findings / Results: The length of the Achilles tendon in the flatfoot group was median 28 degrees compared to 24 degrees in the control group (p=0.024, Wilcoxon test). Laxity of the 1 ray was median 6 mm in the flat foot group compared to 4 mm in the control group (p=0.006). No significant difference was found regarding pronation of the foot.

Conclusions: It is a general statement that the flexible flat foot is associated with a short Achilles tendon. It could not be demonstrated in this group of young adults. In contrary the Achilles tendon was found to be longer in the flat foot group. This study support general laxity as the most probable etiology for the flexible flatfoot.
Achilles Tendon Total Rupture Score at 3 months can predict patient’s ability to return to sport at 12 months. A registry study on 366 patients from the Danish Achilles Tendon Database.

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Background: It is desirable to identify predictors of outcome after acute Achilles tendon rupture in order to individualize treatment. It is unknown if the Achilles tendon Total Rupture Score (ATRS) correlates to patients ability to return to sport and work. The Danish Achilles Tendon Database (DADB) was founded in 2012.

Purpose / Aim of Study: To investigate how ATRS 3 and 12 months after injury correlates with the patient’s ability to return to work and sport. Furthermore to investigate if sex and age influences ATRS 3 and 12 months after injury.

Materials and Methods: This is a retrospective study analyzing data from DADB including 366 patients from 5 hospitals in Denmark. Logistic regression was conducted to describe the effect of ATRS on return to work and sport after 1 year (adjusted for age and sex). The effect of age and sex on ATRS was analyzed by linear regression.

Findings / Results: Three months after injury patients had a significantly increased chance for return to sport after one year with increased ATRS score (OR = 1.06 for each point, CI = 1.02-1.09, p = 0.002), but non-significant effect for work. After one year patients had a significantly increased probability of having returned to sport (OR =1.11, CI = 1.05-1.17, p < 0.001) and returned to work (OR = 1.05, CI =1.01-1.09, p = 0.007) with increased ATRS score. Men had an average 6.6 (CI = 1.9 - 11.4, p = 0.006) point higher ATRS score at 3 months and average 22.3 (CI = 6.7 – 37.9, p = 0.006) point higher at 12 month. Age showed no significant effect on the ATRS score at 3 or 12 month.

Conclusions: ATRS is correlated to patient’s ability to return to sport and work. ATRS at 3 months can be used as a predictor of patient’s ability to return to sport one year after injury. Men obtain a noticeable higher ATRS score3 and 12 months after injury.
10-year survival analysis of 217 primary Hintegra total ankle arthroplasties from an independent center

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**Background:** Total Ankle arthroplasty (TAA) have larger revision rates than hip and knee prosthetics. Almost half of all publications concerning TAA come from the developer’s center, which often publish better survival rates than those from registries. There are currently no larger independent survival studies of the Hintegra TAA.

**Purpose / Aim of Study:** To examine the indications for and survival rates of our primary Hintegra TAAs and what different factors affect the success and/or revision-rate.

**Materials and Methods:** 487 surgeries between 2004-2014 coded as ankle implant was reviewed. 217 were operated with a primary Hintegra TAA, 109 female and 108 males, median age 61 (23 to 80). We used the 2nd generation implant (CrCo-HA coating) until 2007 and 3rd generation (Ti-HA coating) from 2008. Cause of OA, revision surgery and reason to revise was recorded. A Cox proportional hazard model evaluated gender, age, cause of OA and implant generation as risk factors.

**Findings / Results:** 62 implants were revised. The cause of revision was pain (18), loosening (18), infection (12) or mixed others (14). The 5 year survival rate (95% CI) was 72 (62-80) %, 7 year = 64 (55-75) % and 10 year = 47 (29-76) %. Fifty nine percent of the 217 primary implants had post traumatic OA, 32% idiopathic and 9% RA, which had no impact on revision risk. Nor had age or gender. Of the 34 2nd generation implants only 11 was revised, making them 5 times (1 to 18) less likely to be revised (p= 0.02).

**Conclusions:** Our revision rates are slightly above the Swedish registry and well above those of the developer. Our patients are different but that has no statistical impact on revision. The larger risk found for the 3rd generation in this study is not found in the developers results. Further studies on preoperative angles and implant position may help clarify our relative high revision rates.
Fracture dislocation of the midfoot (Lisfrancs injury): Early results of ORIF at Koege Hospital

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Background: Lisfranc injury (LI) involves ligament tear, fracture and joint disruption at the midfoot, involving 1 or more tarsometatarsal (TMT) joints. LI constitutes 0.2% of all fractures. Direct axial force is a common cause of injury generating tensile forces at the plantar ligaments of the TMT-joints. Indirect force generated through rotation or twisting on a plantarflexed foot is another cause of injury. Severity of the soft tissue injury and non-anatomic reduction are negative prognostic factors. LI are managed by foot surgeons at Koege orthopedic clinic since 2012.

Purpose / Aim of Study: To evaluate results of LI treated by ORIF over a 3 year period.

Materials and Methods: 15 consecutive patients, 9 males and 6 females, were included. Patients were identified using ICD10 diagnosecodes. Medical records and postop x-rays were reviewed. Radiologic alignment was accessed. Age ranged from 16 to 73 years, mean age 45 years. ORIF with screws, bridging plates and in some cases K-wires were used. Acute closed reduction and K-wire fixation was done in 2 cases due to soft tissue concerns, ORIF was performed secondarily. Primary arthrodesis of the 1.TMT joint was done in 1 case. A-VI Foot Pump was used in the early postoperative fase. Follow-up ranged from 6-24 weeks.

Findings / Results: 11 patients were Grade 1, 4 patients were Grade 2 on Tscherne Score. 10 patients are painfree and have returned to their pre-injury activities (work and sports). 5 patients have mild pain. 1 patient had hardware removal due to pain. 1 patient had wound breakdown but healed uneventfully. Anatomic alignment was achieved in 14 cases.

Conclusions: Outcome of current treatment of LI at Koege Hospital seems satisfactory regarding alignment and complication rate. Long term follow up and patient related outcome measure is suggested to provide more information regarding patient satisfaction.
subtalar arthroereisis by minimal invasive surgery

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Background: Calcaneus-valgus often develops in children with cerebral palsy. This can cause gait disturbance and pain. There are several surgical options to correct the valgus position. Extra articular subtalo arthrodesis or arthroereisis are among these, and they include procedure in sinus tarsi, and are thereby extensive and irreversibel procedures. The present study is minimal invasiv surgery and is reversible.

Purpose / Aim of Study: We want to present our results from charts to see if our procedure is comparable to more extensive procedures and to share the possible risk of failure in our method.

Materials and Methods: 20 feet (11 patients) operated from 2009-2014 with the present procedure was retrospectively found from charts from Rigshospitalet, Copenhagen. The operative technic was a stab wound dorsal over the neck of the talus. A K-wire was inserted through the neck and sinus tarsi, to the calcaneus, when the hindfoot is held in a correct hindfoot position. A cannulated 7 mm screw secure the correct subtalar joint position, and a low leg cast in 6 weeks allowing full weight bearing.

Findings / Results: 19/20 feet had satisfactory hindfoot position with no prolonged pain or implant failure. 1/20 feet was found with prolonged pain at the site of the screwhead, and removal was necessary. The international results are comparable with presented rates of failure in 5–10% of the feet.

Conclusions: The present procedure seems to be safe. The reversability enables the surgeon to try the internal fixation without the risk of chronic pain or otherwise unsatisfactory results.
Obesity increases risk of deep infection in ankle fracture surgery

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Background: Surgical site infections are common after open reduction and internal fixation (ORIF) of ankle fractures. Deep infections lead to re-operations, thus adding to both the risks and cost of the patient course. Smoking, obesity and alcohol overuse have been suggested as risk factors for post-operative complications after ankle fracture surgery but evidence is limited.

Purpose / Aim of Study: To examine if smoking, obesity and alcohol overuse are risk factors for developing deep infection following ORIF of ankle fractures.

Materials and Methods: We retrospectively reviewed all patients undergoing ORIF of ankle fractures at Herlev University Hospital from 01.01.2008 to 31.12.2013. Patients, who were not primarily treated with ORIF or did not attend the outpatient follow up, were excluded. We reviewed patient records and collected demographic-, surgical- and postoperative data. Deep infection was defined as being re-operated on the indication of infection. We tested for associations to current smoking (yes/no), obesity (BMI≥30) and alcohol overuse (exceeding Danish Board of Health recommendations). We analysed data using both univariate and multivariate analyses adjusting for demographic factors and diabetes.

Findings / Results: 1044 patients were included in the study. Patients with BMI≥30 were found to have an increased risk of being re-operated for an infection both in the univariate (RR=2,08 [1,21:3,59], p<0,05) and multivariate analysis (OR=2,16 [1,13:4,15], p<0,05). Alcohol overuse was also found to increase the risk but this was not statistically significant (RR=1,70 [1,03;2,78], p=0,053). We were not able to show any risk increase connected to smoking.

Conclusions: Obesity increases the risk of deep infection after primary ORIF of ankle fractures.
Seating performance in children with cerebral palsy in relation to hip reconstructive surgery

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**Background:** Excessive pelvic tilt impedes sitting function and can cause pressure ulcers, which might have an impact on quality of life in children with cerebral palsy (CP). Seated sagittal plane anterior tilt is affected by iliopsoas, hamstring and rectus contraction, weakness or spasticity. Posterior tilt with a decreased lumbar lordosis is seen in hypotonic children or after scoliosis surgery and is characterized as a more vertically placed sacrum, potentially causing painful sitting and ulcers over the sacro-coccygeal area. Seated coronal plane pelvic tilt may display either right or left pelvic obliquity and is common in children with tetraplegia, asymmetrical adductor contractures, scoliosis or hip dislocation. Seated transverse plane obliquity presents as rotation of the pelvis and is primarily seen in relation to scoliosis.

**Purpose / Aim of Study:** To assess seating performance and pelvic tilt in children with CP undergoing hip reconstructive surgery.

**Materials and Methods:** Eighteen children with CP, GMFCS III- V, scheduled for unilateral hip reconstruction were included. The Tekscan CONFORMat Seat Sensor with a resolution of 1 sensor per cm² and frequency of 66 frames/second was used for assessing seating performance with 30 seconds recordings performed pre- and postoperatively.

**Findings / Results:** Analysis of the area, force, pressure, peak force and peak pressure showed that all measures decreased on the operated side after hip reconstruction. The pressure asymmetry index decreased (diff: 11%) indicating decreased coronal plane obliquity. A decrease of peak pressures (diff: 22 mmHg and 30 mmHg) in the two columns flanking the midline was seen postoperatively indicating increased pelvic anterior tilt and elevation of the sacrum.

**Conclusions:** Changes in seated pelvic tilt after hip reconstruction can be evaluated by assessment of seating performance.
Intra-variability of outcome measures for seating performance and pelvic tilt in 65 healthy children

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Background: Normal sitting function is perceived instinctively, though many biomechanical aspects are present in the process of sitting. The three-dimensional bony base of support in sitting is formed by the ischial tuberosities and sacrum. The interface between body and support is defined by the sagittal, coronal and transverse plane pelvic tilt, which contributes to measures of pressure distribution, balance and symmetry. Balance parameters have been presented. A flexible pressure mat for measuring seating performance may be a new method for analyzing seating performance and pelvic tilt.

Purpose / Aim of Study: To define outcome measures and determine the intra-variability of measures of seating performance.

Materials and Methods: Sixty-five healthy children aged 7-14 years were included at a primary school. The Tekscan CONFORMat Seat Sensor with a resolution of 1 sensor per cm2 and frequency of 66 frames/second was used. Three recordings were done with the child seated with a relaxed back position, followed by three recordings with an up-right back position increasing the pelvic anterior tilt.

Findings / Results: The measures of area, force, pressure, peak force and peak pressure establish a normal material. Intra-Class Correlations (ICC) for these measures ranged between 0.87 and 0.99 indicating excellent intra-variability of the measures of seating performance. Asymmetry indices comparing left and right side were calculated. The lowest index was seen for contact area indicating good symmetry and the highest index was seen for peak pressure. A significant decrease of peak pressures in the two midline columns was seen when the back position was changed to up-right (p<0.05; p<0.05), reflecting an anterior pelvic tilt and elevation of the sacrum.

Conclusions: A normal material and a definition of validated measures of seating performance have been determined.
The pattern of bicycle injuries and the use of helmets among children aged 6-14 years 1980-2014

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Background: There has been an increase in bicycle helmet use since 1990. Studies have shown that the incidence of severe head injuries can be reduced by 65 % when wearing a bicycle helmet. Does the increasing use of helmets change the injury pattern from bicycle accident among children seen in an ED. Purpose / Aim of Study: The purpose of this study was to describe the injury pattern in bicycle accidents among children in relation to the use of a bicycle helmet.

Materials and Methods: We included all children aged 6-14 years with injuries from bicycle accidents treated at the ED at Odense University Hospital 1980-2014. Age, gender, helmet use, and diagnoses were analyzed. We defined head injuries as all injuries involving the head excluding injuries to the face. We defined severe head injuries as skull fractures and intracranial injuries including concussions, intracranial haemorrhages, lacerations of brain etc.

Findings / Results: We included 13661 children, 58.8 % were boys. The use of helmets at the time of injury increased from 0 to 19.6 % in girls and 16.9 % in boys. There was a gradual decrease in head injuries from 30.7 % to 14.3 % and a gradual decrease in severe head injuries from 5.9 % to 3.2 % in the study period. The proportion of head injuries and severe head injuries among children wearing helmets and children not wearing helmets were 13.9 % vs. 26.6 % and 2.8 % vs. 4.5 %. In the study period the proportion of facial injuries, bone fractures, spine/columna injuries, and deep injuries in thorax/abdomen remained unchanged. Eighteen children died from their injuries. All had severe head injuries and none of them wore a helmet.

Conclusions: The proportion of head injuries from bicycle accidents among children has been reduced by about 50 % over the last decades concurrent with increase in helmet use. None of the 18 deceased children wore a helmet.
Congenital Clubfoot treated by the Ponseti method. Evaluated by the CAP at age 4

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**Background:** Despite the advances in the treatment of clubfoot, with the advance of The Ponseti method, there is still no widely accepted method to evaluate the outcome. The Clubfoot Assessment Protocol (CAP) was developed for follow-up of children treated for congenital clubfoot. It is a comprehensive standardized measurement instrument to evaluate the clubfoot with respect to mobility, muscle function, morphology and motion.

**Purpose / Aim of Study:** The aim of this study is to report our results of the Ponseti method evaluated with CAP at age 4 years.

**Materials and Methods:** In this consecutive prospective cohort series we included all 44 children referred to the department with congenital idiopathic clubfoot from October 2006 to January 2009. A total of 44 children, with 67 clubfeet were treated. We excluded 1 patient since the clubfeet were part of Athrogryposis Multiplex Congenita, since the treatment and also the clubfoot is different from the idiopathic cases. A total of 9 patients were lost for follow-up. So, 34 children (77%) with 52 CTEV were our study population. However, only a total of 28 patients were CAP-scored. Two children were excluded because they couldn’t cooperate due to mental retardation and 4 children didn’t want to participate.

**Findings / Results:** The Clubfeet scores lower than the normal feet in all CAP subgroups. This is statistically significant in CAP1 Passive mobility, CAP2 Muscle function and CAP5 Motion quality II not so in CAP3 Morphology and CAP4 Motion quality I. We found differences with the clubfeet scoring lower in Dorsiflexion at the ankle, Muscle function of M. Peroneus and Hop on one leg.

**Conclusions:** The CAP is a comprehensive tool for follow-up of clubfeet. In this study 3 parameters shoved differences between normal and clubfeet at age 4 years (ankel dorsiflexion, peroneal function and one leg jump).
Cobb angel measurement without X-ray, a novel method

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**Background:** Cobb angel measurement is the most important tool, to determine curve progression and effect of treatment. The patients are children or adolescent and standard x-rays of the spine expose the breast area, the thyroid, and the gonads, with ionizing radiation. Increased incidence of cancer is observed among patients, treated for adolescent idiopathic scoliosis.

**Purpose / Aim of Study:** To validate the accuracy of The Manual Method, against convention radiographs.

**Materials and Methods:** 130 consecutive patients, referred to standing x-ray of the spine, were invited to participate. 78 patients fulfilled the inclusion criteria. Before x-ray, the Spinous processes where manually palpated from T1 to S1, and marked with a pen. The patient was placed for X-ray, and the photo was taken with the patient standing in exactly the same position, as the AP X-ray. Marking and photographs where taken by a Research nurse. X-rays were evaluated by 2 independent doctors, and the photographs were evaluated by the same 2 doctors, 2 weeks later. The measurements where evaluated by an independent statistician.

**Findings / Results:** For the thoracic curves, the mean difference was 6.9 (p value < 0.0001), such that on average, the angle measured with x-ray was 6.9 degrees larger than that measured with photo. The Pearson correlation between x-ray and photo angle was 0.58 (p value < 0.0001). For the thoracolumbal curves, the mean difference was 5.2 (p value < 0.0001). The Pearson correlation between x-ray and photo angle was 0.66 (p value < 0.0001). In the lumbar group, only 7 patients participated. This is not enough to evaluate the methods feasibility, and these results are not presented.

**Conclusions:** The method has been proven successful in thoracic and the thoraco- lumbar region. Further examination is needed, to evaluate if this method is useable in the lumbar region.
Incidence of cancer and infertility, in patients treated for adolescent idiopathic scoliosis 25 years prior

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Background: Adolescent females with idiopathic scoliosis are exposed to substantial amounts of radiation during treatment and follow-up for AIS.

Purpose / Aim of Study: The purpose of this study was to determine the amount radiation exposure patients received during treatment for AIS and report the incidence of infertility and cancer in adulthood.

Materials and Methods: 219 consecutive AIS patients treated at Rigshospitalet, Copenhagen between 1983-1990 were invited to participate in a follow-up study. The incidence of cancer was determined through chart review and interviews. In addition, the subjects and age-matched controls were queried regarding infertility, age at first pregnancy and spontaneous abortions. Using X-ray reports that included patient position, mAs and kV used and the number of x-rays taken, a radiation physicist calculated the total radiation dose during treatment and follow-up adjusted for BMI and sex.

Findings / Results: 159 (78 %) patients participated in the follow up study, and medical charts were available in 209 patients. 2 patients had passed away, one due to cardiac arrest and one to breast cancer. 8 patients had emigrated. Radiation information was available in 211 patients. The mean calculated total radiation exposure was 1.58 mSv (0.44–6.9). 16.3 (range, 8–34) x-rays were taken during treatment. The rate of infertility (10%) and spontaneous abortion (23%) is similar to the normal controls. 9 (4.3%) AIS patients developed cancer, mostly breast (3) and endometrial (4). The incidence of cancer in this cohort is 17 times greater than the incidence of cancer in the Danish age-matched population.

Conclusions: The infertility and spontaneous abortion rate was similar between AIS patients and an age matched cohort. The cancer rate in the AIS patients is 17 times higher than expected compared to the age-matched Danish population.
Health-related Quality-of-life in Adolescent idiopathic scoliosis patients 25 years after treatment

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**Background:** Very few long-term studies exist, focusing on the health related outcomes after scoliosis treatment.

**Purpose / Aim of Study:** The purpose of this study was to evaluate the long-term clinical outcomes using validated measures of health-related quality-of-life (HRQOL), 25 years after termination of treatment for adolescent idiopathic scoliosis.

**Materials and Methods:** 219 consecutive patients treated with Boston brace or posterior spinal fusion (PSF) using Harrington-DDT instrumentation between 1983 and 1990 at Rigshospitalet Copenhagen, were invited to participate in a long-term evaluation study. A validated Danish version of the Scoliosis Research Society 22R (SRS22R) and Short Form-36 (SF36v1) were administered to the patients two weeks before the clinical and radiological examination.

**Findings / Results:** 159 (72.6%) patients participated in the clinical follow up and questionnaires, 11 patients participated only in the questionnaires, 8 emigrated, 4 were excluded due to progressive neurological disease and 2 were deceased. The total follow up was 170 patients (83%), and the average follow up was 24.5 years (range, 22–30 years). SRS22R domain scores were within the range described as normal for the general population with no statistical difference between the groups except in the Satisfaction domain, where the PSF group had better scores than the braced group. The SF36 PCS and MCS scores in both AIS cohorts were similar to the scores for the general population.

**Conclusions:** HRQOLs, as measured by the SRS22R and SF-36, of adult AIS patients treated with Boston brace or PSF during adolescence were similar to the general population. No clinical progression of the deformity has been detected during the 25-year follow up period. The PSF group had a small but statistically significant higher score in the Satisfaction domain compared to the braced group.
The association between severity of scoliosis and lung clearance index (LCI) in patients with adolescent idiopathic scoliosis (AIS)

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Background: AIS causes thoracic distortion but the effect on ventilation inhomogeneity is scarcely reported. The lung clearance index (LCI) is an advanced pulmonary function test reflecting ventilation inhomogeneity of the lungs.

Purpose / Aim of Study: To assess the correlation between LCI and Cobb angle in AIS-patients.

Materials and Methods: A consecutive series of patients with AIS was included. Pulmonary function testing using spirometry, wholebody-plethysmography and N2 MBW was performed obtaining: forced expiratory volume in 1 s (FEV1) and capacity (FVC), total lung capacity (TLC), and LCI. An independent observer registered largest Cobb angle and apical vertebrae. Correlation analysis using Spearman’s correlation test was applied due to the index nature of the LCI. Comparison of LCI-values with reference values was done using unpaired t-test. A p-value < 0.05 was considered significant.

Findings / Results: The study population consisted of 41 patients with an average age of 14.7 (10-18) years. The average Cobb angle was 49 (11-99) degrees and 88% of the curves were thoracic. LCI was significantly increased in AIS-patients compared to the age matched reference population; 7.35 vs. 6.54 (p = 0.001). There was a significant correlation between Cobb angle and LCI (r = 0.477, p = 0.002), whereas the correlation between TLC and largest Cobb angle was small and not statistical significant (r = 0.273, p = 0.084). No significant correlation was found between Cobb angles and spirometric values.

Conclusions: Increased LCI indicates increased pulmonary ventilation inhomogeneity in AIS, reflecting a more complex affection of lung function than previously reported. Future studies will reveal if surgical treatment improves LCI or can be used as an additional variable in the assessment of curve progression.
The Effect of Lumbar Disc Degeneration and Low Back Pain on the Lumbar Lordosis in Supine and Standing: A Cross-Sectional MRI Study

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Background: The lumbar lordosis increases with a change of position from supine to standing and is known as an essential contributor to positional morphological changes. It is unclear how the lordosis is affected by disc degeneration and low back pain (LBP) in standing positional magnetic resonance imaging (pMRI).

Purpose / Aim of Study: To examine the influence of LBP and lumbar disc degeneration (LDD) on the lumbar lordosis.

Materials and Methods: Patients with LBP above 40 on a 0-100 mm visual analogue scale (VAS) both during activity and rest; and a sex and age-decade matching control group without LBP were scanned in the supine and standing position in a 0.25 T open MRI unit (G-Scan). All images were evaluated and LDD was graded using Pfirrmann’s classification. Subsequently, the L2-S1 lumbar lordosis angle was measured.

Findings / Results: Thirty-eight patients with an average VAS of 58 (±13.8) during rest and 75 (±5.0) during activities and 38 healthy controls were included. MRI changes were common in both groups, whereas, the summation of the lumbar Pfirrmann’s grades (LDD score) was significantly higher in the patients (MD:1.44, CI:0.80 to 2.10; P <0.001). The patients’ lumbar lordosis angle was lower than that of the controls for both the supine (MD:-6.4, CI:-11.4 to -1.3; P=0.014) and standing position (MD=-5.6, CI -10.7 to -0.7; P=0.027). No difference was found for supine-to-standing lordosis changes (MD:0.8, CI: -1.8 to 3.3; P=0.57) between groups. The LDD score was not correlated with the standing or supine lumbar lordosis, but with the supine-to-standing lordosis change in the controls (Pearson: r = -0.54, P< 0.001).

Conclusions: Patients with LBP have a tendency to reduce the lumbar lordosis, presumably to reduce pain. In individuals without LBP age related disc degeneration seems to lead to increased lordotic stiffness.
Return to work after lumbar disc surgery is related to the duration of symptoms

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Background: Lumbar disc herniation (LDH) is associated with great morbidity and significant socio-economic impact as the majority of the patients are in the working age.

Purpose / Aim of Study: The purpose of this study is to investigate if the return to work rate after lumbar disc herniation surgery are affected by the duration of symptoms and length of sick leave.

Materials and Methods: The present study was conducted as a single center study. All LDH patients who underwent surgery at Lillebaelt Hospital from June 1, 2009 through to December 31 were included. Data were prospectively collected in the database DaneSpine. Questions in DaneSpine include preoperative duration of leg pain, duration of preoperative sick leave and working status one year post operatively.

Findings / Results: Totally, 1329 patients were operated. Overall 62 % of the patients were back to work one year post-operatively. The rate of patients returning to work decreases significantly with the duration of leg pain. Among the patients on sick leave prior to the surgery 80 % returned to work if surgically treated within 3 months whereas 46 % returned to work with sick leave extending 3 months.

Conclusions: The present analysis suggests that the return to work rate after lumbar disc herniation surgery are affected by the duration of symptoms and length of sick leave. Detailed analysis with proper adjustment for confounding factors and a more accurate detection of disease duration after surgery is necessary in order to provide a more reliable assessment of the preoperative disease durations impact on return to work rate.
A Novel Cobalt Chromium Four-Rod Surgical Technique Reduces Motion and Rod Strain Compared to Standard Constructs Following Spinal Deformity Correction: an in vitro Biomechanical Study

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Background: Surgical treatment of adult spinal deformity is associated with a 20–30% revision rate; often caused by rod breakage at the level of the lumbar pedicle subtraction osteotomy (PSO). Only a few small clinical studies with ambiguous results have been reported regarding strategies to reduce revision rate.

Purpose / Aim of Study: To assess the biomechanical effects of cobalt chromium (CoCr) vs. Titanium (Ti), the addition of two short pre-contoured rods across the PSO (4-Rod) to the standard construct (2-Rod), and supplemental interbody spacers (S) adjacent to the PSO-level, on rod strain in a biomechanical model.

Materials and Methods: Five human specimens (T12-S1) underwent PSO at L3 with posterior pedicle screw stabilization from L1- S1. The final lordosis of all specimens was 70°. Specimens were subjected to 10 Nm in flexion-extension (FE), lateral bending (LB) and axial rotation (AR) on a custom motion simulator. Linear strain gauges measured surface rod strain during FE motion at the PSO site. Lateral interbody spacers were inserted at L2-L3 and L3-L4 following initial testing of the primary rods. Repeated measures ANOVAs assessed differences between constructs in range of motion (ROM) and strain; three-way repeated measures ANOVAs assessed effects of construct factors.

Findings / Results: CoCr 4-Rod+S constructs provided the most strain reduction compared to standard Ti 2-Rod (76%, p=0.003). Additional rods significantly reduced FE ROM (0.8%, p=0.021) and strain on the primary rods, irrespective of construct (49%, p<0.001). CoCr rods reduced strain (28%, p<0.001), but did not affect ROM in any direction (all p>0.145). Interbody spacers did not significantly reduce strain (6%, p=0.318) or ROM in any direction (all p>0.091).

Conclusions: Additional short rods and the use of CoCr rods significantly reduce primary rod strain across the PSO site.
No effect of TLIF over standard posterior instrumented fusion. Results from a RCT 5-10 years follow up

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**Background:** Inter-body fusion as an ALIF procedure has earlier been in favour to a standard procedure in long-term follow up.

**Purpose / Aim of Study:** In order to show a similar trend we made a 5-10 year follow up of your randomized trail, between TLIF and Instrumented Posterolateral fusion. (PLF)

**Materials and Methods:** During 01.11.2003–01.11.2008 100 pat."s were prospectively randomized to TLIF or PLF. TLIF’s was operated using TSRH (Medtronic) and Implex (Zimmer), allograft. PLF’s using TSRH, allograft. Inclusions: segmental instability, disc degeneration, former disc herniation, spondylolisthesis < 2. Functional-outcome was registered, prospectively, at 5-10 years, Dallas Pain questionnaire (DPQ), SF-36, Low Back pain questionnaire (LBRS), ODI. At follow up a new MRI and X-ray was done.

**Findings / Results:** Overall follow up was 93% of available, 94%, (44) in the PLF’s and 92 %, (44) in the TLIF’s no difference. Mean follow up was 8.6 years (5-10 years). Mean age at follow up was 59 years (34-76 years). Reoperation rate in a long-term perspective was 14 % in the TLIF’s and 14 % in the PLF’s. According to LBPRS: Back was pain was 3.8 (Mean), TLIF (3.65) PLF (3.97), Leg pain 2.68 (Mean) 2.90 (TLIF) and 2.48 (PLF) no difference. At follow up, no difference in functional outcome DPQ, ODI, SF-36. When asked after 8.6 years, if they would go through the operation, with now a day’s knowledge, 76% answered yes 75% (TLIF) and 77 % (PLF).

**Conclusions:** In a long-term perspective inter body fusion with TLIF does not seem to improve functional outcome in ODI, SF-36, Dallas pain Questionnaire, Low back pain rating scale compared to a standard Instrumented posterolateral Lumbar fusion (PLF).
Is it worthwhile operating geriatric patients with herniated lumbar disc?

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Background: Throughout the modern world the mean age is increasing, making the geriatric population an even greater part of our population. In many aspects, this population differs from the general population, which mandates altered approaches to many issues within the healthcare system. Disc herniation is a significant health issue in our society, which also includes the geriatric population. However limited studies have been conducted on a geriatric-only basis, for what reason we do not know whether surgical intervention have similar effects as is the case with general population.

Purpose / Aim of Study: Does geriatric patients with lumbar disc herniation (LDH) have significant effect following surgical intervention measured using patient reported outcome measures (PROM).

Materials and Methods: 118 (53 male ; 65 female) patients ranging 70-90 years were operated for LDH at Center for Spine Surgery and Research, Middelfart, from June 6th 2010 till April 1st 2014. Using pre-operative and 1-year follow-up data outcome was evaluated in terms of PROMs (ODI, VAS, EQ-5D, SF-36).

Findings / Results: Patients reported a significant improvement in all measured PROMs at 1-year follow-up. Mean ΔVAS-leg 3.1 (p <0.01), mean ΔVAS- back 2.6 (p <0.01). Mean ΔODI 29.7 (95% CI 25.2 ; 34.1) post-operative mean of 16.0 and a p-value of <0.01. SF-36 Mental Component Score mean improvement 12.0 (p <0.01) and Physical Component Score mean improvement 5.2 (p 0.0001). EQ-5D mean difference of 0.51 (p <0.01).

Conclusions: Geriatric patients have both statistically and clinically significant improvements in multiple PROMs following surgical intervention for LDH. Incidence of surgical complications was not found to be higher when compared to general population. When conservative therapy fails, surgical intervention seems to be a good alternative for geriatric patients suffering from LDH.
Comparison of synthetic bone graft ABM/P-15 and allograft on uninstrumented posterior lumbar spine fusion in sheep

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Background: Posteriolateral fusion (PLF) is a common used procedure in spinal surgery. New bone graft materials are wanted due to limitations and side effects associated with allo- and autografts. Ifactor flexTM is a commercial available synthetic bone graft material that has gained CE approval in Europe. It consists of a synthetic Anorganic bone matrix (ABM) coated with a 15 amino acid peptide sequence, identical to the binding site for β2-β1 integrin on the surface of bone forming cells. ABM/P15 bone graft has previously shown promising bone formation properties when used in closed devises or bone defects. In PLF the lack of external stability and the large graft size makes it one of the most challenging grafting procedures done in humans.

Purpose / Aim of Study: To report fusion rates when using ABM/P15 in uninstrumental posteriolateral fusion in sheep compared with allograft

Materials and Methods: Twelve sheep underwent open two level uninstrumented PLF at L2/L3 and L4/L5. Levels were randomised to allograft of ABM/P15. The sheep were sacrificed after 4.5 months. Levels were harvested and evaluated with Micro-CT 50 scanner and qualitative histology. Fusion rates were assessed with 2D sections and 3D reconstruction images and fusion was defined as intertransverse bridging.

Findings / Results: In allograft group we found 68% fusion rates. In ABM/P15 we found extensive migration of the material in all sheep and a fusion rate on 37%. These groups are significant different (P <0,01). Qualitative histology showed good osteointegration of the material and good correlation to scanning results.

Conclusions: In this preclinical study we have proved that ABM/p15 has the ability to migrate when lacking external stability as in uninstrumental PLF. This migration causes lower fusion rates. These finding are important for surgeons to make their choice of graft material for PLF.
Pharmacokinetics of Single Dose Cefuroxime in Porcine Intervertebral Disc and Vertebra Determined by Microdialysis

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Background: Pyogenic spondylodiscitis is associated with prolonged antimicrobial therapy and high relapse rates. Nevertheless, tissue pharmacokinetic studies of relevant antimicrobials are still sparse. Previous approaches based on bone biopsy and discectomy exhibit important methodological limitations.

Purpose / Aim of Study: Microdialysis (MD) was used to assess intervertebral disc (IVD), vertebral and subcutaneous tissue (SCT) pharmacokinetics of cefuroxime in a large animal model.

Materials and Methods: Ten female pigs were assigned to receive 1,500 mg of cefuroxime intravenously over 15 min. Measurements of cefuroxime were obtained from plasma, SCT, the vertebra and the IVD for 8 hours thereafter. MD was applied for sampling in solid tissues.

Findings / Results: For both the IVD and the vertebra, the area under the concentration-curve from zero to the last measured value was significantly lower than that of free plasma. Tissue penetration of cefuroxime was incomplete for the IVD, while vertebral cefuroxime penetration only just failed to be significantly incomplete. Furthermore, the penetration of cefuroxime from plasma to IVD was delayed. Additionally, a noticeable prolonged elimination rate of cefuroxime in the IVD was found. The maximal concentration and the elimination of cefuroxime were reduced in IVD compared to both SCT and vertebra. Due to this delay in elimination of cefuroxime, the time with concentrations above the minimal inhibitory concentration (T>MIC) was significantly higher in IVD than in SCT, vertebra and free plasma for MICs up to 6 µg/ml.

Conclusions: MD was successfully applied for serial assessment of the concentration of cefuroxime in the IVD and the vertebral bone. Penetration of cefuroxime from plasma to IVD was found to be incomplete and delayed, but due to a prolonged elimination, the best results regarding T>MIC was found in IVD.
Can supine lateral bending radiographs predict the initial in-brace correction of the Providence orthosis in patients treated for adolescent idiopathic scoliosis?  

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**Background:** Supine lateral bending radiographs (SLBR) are used to assess curve flexibility in patients undergoing surgical treatment of Adolescent Idiopathic Scoliosis (AIS) but to what extent SLBR can be used to predict in-brace correction (IBC) before initiating bracing treatment is unknown. The Providence orthosis is a part-time bracing system that has been shown to provide substantial curve correction.  

**Purpose / Aim of Study:** To determine the association between SLBR and initial IBC in patients treated with Providence orthosis.  

**Materials and Methods:** A retrospective cross-sectional study was conducted on all patients with AIS treated with Providence orthosis from January 1st 2006 to December 31st 2013. Only patients with a major curve of 25-45° were included. Cobb angles on SLBR before treatment and on initial standing, in-brace radiograph (IBR) were measured twice for each patient by one observer 30 days apart. Using a repeated measures mixed effect model, mean difference and 95% limits of agreement (LOA) between Cobb angles on each type of radiograph were estimated.  

**Findings / Results:** A total of 127 patients were included. Median Cobb angle on “pre-treatment” standing radiographs was 35° (IQR: 31-39°), which was reduced to 14° (IQR: 7-19°) on IBR. 52% of curves were thoracic (T), 30% were thoracolumbar/lumbar (TL/L) and 18% were double curves (DC). Overall mean difference between SLBR and IBR was 0.2° (LOA: ±10 degrees), for T curves it was 0.16° (LOA: ±8.4°), for TL/L 0.9° (LOA: ±9.8°) and for DC 0.4° (LOA: ±16°).  

**Conclusions:** Major curve measurements on SLBR and IBR are within ±10° in T and TL/L curves with a mean difference of less than one degree. These findings could indicate that SLBR are not necessary prior to brace treatment. This may reduce the number of radiographs in patients with AIS.
Radiographic cup position following posterior and modified direct lateral approach in total hip arthroplasty. An explorative randomized controlled trial with 80 patients

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Background: The two most common surgical approaches for total hip arthroplasty (THA) are the posterior and lateral approach. Differences in cup placement may contribute to differences in clinical outcomes between the two approaches. Improper placement of the cup can cause dislocation and reduced hip abductor strength.

Purpose / Aim of Study: The aim of this study was to compare cup position in the two approaches. A secondary aim was to compare changes in femoral offset (FO), cup offset (CO), total offset (TO) and abductor moment arm (AM), and to evaluate intra- and interobserver reliability of the methods used.

Materials and Methods: In a randomized controlled trial, 80 patients diagnosed with primary hip osteoarthritis scheduled for THA were assigned to operation with posterior or modified direct lateral approach. 38 patients were included in each group for the measurement cup position. FO, CO, TO and AM were measured on pre- and postoperative radiographs in 28 patients in each group. Unpaired t-tests were used to evaluate differences between the groups. An ICC value of ≥0.81 was considered excellent strength of agreement.

Findings / Results: In the posterior group, anteversion was 4.8° larger than in the lateral group (p=0.006) but inclination was 4.9° less steep (p<0.001). A larger FO of 4.3mm (p=0.006), TO of 6.3mm (p<0.001) and AM of 4.8mm (p=0.001) was found in the posterior group. There was no significant difference in CO (p=0.08). Intra- and interobserver reliability were excellent for all measurements (ICC 0.93–1.00).

Conclusions: We found a statistically significant difference in cup position between the two approaches. Femoral offset and abductor moment arm were restored after THA using the lateral approach but significantly increased when using the posterior approach.
Association between hospital procedure volume and risk of revision after total hip arthroplasty: A population-based study within the Nordic Arthroplasty Register Association Database

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Background: The outcome after total hip arthroplasty (THA) depend on factors related to the patient, the surgeon, the implant and the organization of the health care system. It has been suggested that the annual number of procedures per hospital affects the prognosis.

Purpose / Aim of Study: The aim was to examine if hospital procedure volume was associated with the risk of revision after THA in the Nordic countries from 1995 to 2011.

Materials and Methods: The Nordic Arthroplasty Register Association database provided information about primary THA, type of fixation, revisions and annual hospital volume in the Nordic countries. Hospitals were divided into 5 volume groups (1-50, 51-100, 101-200, 201-300, >300). Primary outcome was the cumulative incidence of revision from all causes 1, 2, 5, 10 and 15 years after primary procedure. Multivariable regression was used to assess the relative risk of revision (RR).

Findings / Results: 417,687 THA were included. The cumulative incidence of revision increased from 1.4% (CI 1.3 – 1.5) after 1 year to 9.2% (CI 8.9 – 9.4) after 15 years. After 1 and 2 years no differences were seen between the volume groups. After 5 years RR were reduced for group 51-100 (0.9, CI 0.8 – 1.0), group 101-200 (0.8, CI 0.7 – 0.9), group 201-300 (0.8, CI 0.7 – 1.0) and group >300 (0.8, CI 0.7 – 1.0) compared to group 1-50. Same pattern were seen after 10 and 15 years.

Conclusions: We found a consistent association between hospital volume and long term risk of revision. Hospitals operating 50 procedures or less per year had an increased risk of revision 5, 10 and 15 years after primary procedure.
Physical function and activity, pelvic movement and patient-reported outcome in patients with hip dysplasia one year after joint preserving surgery. A prospective cohort study

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Background: Good clinical and radiological outcome have been reported after periacetabular osteotomy (PAO) but little is known about objectively measured physical function.

Purpose / Aim of Study: To investigate changes in leg power, pelvic movement, physical activity and patient-reported outcome in patients with hip dysplasia one year after PAO.

Materials and Methods: Forty-one patients (7 males) with a mean age of 28.8 years scheduled for PAO were included consecutively. Patients were tested before PAO, and 4 and 12 months after. Leg power was tested in a leg extension power rig and pelvic range of motion was measured with an intertia-based measurement unit. Patient-reported outcome was assessed with the Hip and Groin Outcome Score (HAGOS). Physical activity was monitored at 4 and 12 months with tri-axial accelerometers.

Findings / Results: One year after surgery power in the operated leg had improved (p=0.004) and there was no significant difference between power in the operated leg and contralateral leg (p=0.22). In the frontal plane, pelvic range of motion decreased significant during stair-climbing and stepping down. The same pattern was seen in the sagittal plane but the changes were non-significant. All subscales on the HAGOS improved significantly over time (p<0.001). Accelerometer data showed no significant change in time spent sitting (p=0.24), standing (p=0.59), walking (p=0.57), cycling (p=0.27) and high impact (p=0.73).

Conclusions: One year after PAO, the operated leg regained power and reached the level of the contralateral leg. Pelvic range of motion in the frontal plane was decreased during stair-climbing and stepping down. Patient-reported hip function and quality of life increased substantially after PAO but there was no evidence of increased physical activity from 4 to 12 months. Unfortunately, we do not have baseline data on activity.
**Hip arthroplasty with the Primoris® stem – Bone remodelling around a short femoral neck stem**

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**Background:** Total hip arthroplasty gives immediate pain relief and restoration of mobility in patients with end stage osteoarthritis. If the patient returns for revision, the bone stock left for reimplantation may be compromised. The Primoris® stem is developed to preserve metaphysial and diaphysial bone stock.

**Purpose / Aim of Study:** In patients with the Primoris® stem, we monitored changes in bone mineral densities (BMD) in the proximal femur at 6 weeks, 6 months, 1 year and 2 years postoperatively.

**Materials and Methods:** A prospective cohort study of 52 patients scheduled for surgery with the femoral neck-preserving Primoris® stem was carried out. Patients were studied with DEXA-scans, RSA-analysis, Harris hip score, UCLA activity score, WOMAC, EQ5D health questionnaire and Oxford Hip scores. Results from DEXA-scanner were measured in 3 specific regions of interest (ROI) – the medial region of calcar and trochanter minor (ROI1), the lateral counterpart (ROI2), and a diaphysial area (ROI3). Postoperative BMD results from day one, 6 weeks, 6 months, 1 year and 2 years were analyzed.

**Findings / Results:** 3 patients were excluded, leaving 49 patients for BMD-analysis. A slightly non significant decrease was found at 6 months FU compared to day one in ROI1 and ROI2. A significant increase was found at 1 year and 2 year FU compared to day one in all regions of interest. A non significant gain of BMD was found at 2 years FU compared to 1 year FU in all regions of interest.

**Conclusions:** As to bone preservation the results are encouraging. Later follow up will be performed to evaluate if the bone stock remains. If the proximal femoral bone stock is preserved and diaphysis is not compromised then the potential for successful future revision is present.
Bone Mineral Density (BMD) around Large Diameter Head, Standard and Resurfacing THA. 5 Year Results

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Background: Resurfacing Hip Arthroplasty (RHA) transfer load and stresses to the proximal femur different from the total hip arthroplasty (THA) resulting in different patterns of bone mineral density (BMD) loss. Less is known about large diameter head MoM THA's (LDH-THA).

Purpose / Aim of Study: To compare 5 year BMD of the proximal femur and the acetabulum around LDH-THA to RHA and THA.

Materials and Methods: 54 patients, median age 57, with primary osteoarthritis were randomized in two locations to a LDH-THA (n=16), RHA (n=19) or THA (n=19). BMD was measured in 4 acetabular (W1-4), 6 neck (L&M1-3) and 7 zones in the proximal femur (G1-7) after 3 days, 8 w, and at 1, 2 and 5 years. Between data was regressed by ANCOVA and baseline to five years by t-test.

Findings / Results: Around the acetabulum the LDH-THA increased BMD in W1 at one and five years compared to the other components (p<0.01). No difference was found in the remaining 3 regions. Overall the acetabular LDH-THA BMD was 99% at 5 year compared to 97% and 93% for THA and RHA (p<0.05). On the femoral side the LDH-THA increased BMD at the tip of the stem but lost 17% at the calcar, as did the THA. The RHA preserved/increased the medial/calcar BMD substantially better than the other types (p=0.01). Around the femoral neck the RHA maintained BMD medial for the pin and increased 15-23% lateral to the pin. Only minor changes were observed between 2 and 5 years.

Conclusions: In this study, LDH-THA maintain acetabular BMD where THA and RHA declines. The RHA displays the lowest acetabular BMD, it declined further from 2 to 5 years and is the only hydroxyapatite covered cup. The between-group difference is not statistically significant, so we cannot conclude that the 3 concepts affect the acetabulum differently at five years. However the RHA has known design flaws and we’ll continue monitoring BMD.
Establishing Thresholds For Outcomes After Total Joint Replacement: Patients In Need Of Post-Operative Evaluation Based On Oxford Scores And Pain Levels

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Background: No universal method for choosing patients for post-operative evaluation of THR and TKR in Danish hospitals exists. Most methods currently used are time consuming and the number of patients in need of re-evaluation is relatively small and hence does not fully satisfy the time and resources spent. Previous studies have identified OKS and OHS thresholds to aid the clinician in presenting the expected outcome of surgery in a meaningful way to the patient. However, the thresholds may have other possible applications.

Purpose / Aim of Study: To detect thresholds to distinguish patients with or without a satisfactory outcome after TKR and THR based on PROMS (Oxford knee score, OKS, and Oxford hip score, OHS) and pain, using patient satisfaction and patient perceived function as global transition items. The thresholds are intended to be used as a tool in the process of determining which patients are in need of a post-operative out-patient evaluation.

Materials and Methods: In a prospective cohort study, TKR and THR patients who had completed a pre-operative questionnaire containing the OKS or OHS questionnaire and pain VAS scales were invited to complete the same questionnaire and supplementary questions at a mean of six (4 to 9) months after surgery. Thresholds were established by ROC analysis, using multiple anchor-based approaches. A total number of 73 knee patients and 103 hip patients were included.

Findings / Results: Significant correlations were found between outcome measures and anchors. Thresholds were determined for outcome measures coupled with satisfaction, patient perceived function and a combination thereof using a cut-off of 50 and 70.

Conclusions: We have established a set of clinically meaningful thresholds for Oxford scores and VAS pain scores that may help determine which TKR and THR patients are in need of post-operative evaluation.
Stable Fixation of Trilogy Acetabular Cup at 1-year Follow-up

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**Background:** The Trilogy acetabular cup (Zimmer) has been extensively used national as well as international. Recently, the performance of the Trilogy cup has been debated with regards to early failure. We here report early result of the Trilogy cup, with radiostereometrical (RSA), dual energy X-ray absorptiometry (DXA), and functional outcome.

**Purpose / Aim of Study:** To evaluate the early term fixation of cementless Trilogy cup with RSA, DXA, and functional outcome measures.

**Materials and Methods:** A consecutive cohort of 48 patients (20 men) with primary hip OA, age > 70 years, and T-score above -2.5 according to pre-operative DXA, was operated with THA using cementless Trilogy cup HXLPE-liner, 36mm metal head, and CPT stem (Zimmer). 1-2mm under-reaming and optional screw fixation was used. Mean age 76 years (range 71–87). Mean BMI 28 (range 21–42). Patients were followed with model-based RSA and PROMs.

**Findings / Results:** At 6 months total cup translation (TT) was 0.54mm (SD 0.3), and mean 0.15mm (SD 0.36) in TT at 1-year follow-up (p=0.009). Medial cup migration was 0.05mm (SD 0.38) at 6 months and 0.27mm (SD 0.55) at 1 year (p=0.008). Proximal cup migration at group-level was 0.14mm (SD 0.20) at 6 months and comparable (p=0.85) 0.13mm (SD 0.18) at 1 year. Proximal cup migration was higher (p=0.04) at 6 months and 1 year in patients with osteopenia. OHS and HHS improved significantly (p=0.00). There were no revisions, no infections and no dislocations at 1-year follow-up. Mean cup-size was 55 (range 50– 60) and mean T-score was -1 (range -2.4– 1). No cases required additional screw fixation.

**Conclusions:** This study proved, at 1-year follow-up that migration of the Trilogy cup was below cut-offs predictive of premature failure when inserted 1-2mm press fit. Interestingly, we also found an increased proximal cup movement in osteopenic patients that need further elucidating.
Telemedicine support in total hip replacement. The Remote Rehabilitation and Support Project

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Background: The healthcare sector faces a wide range of challenges that are all costly and demanding. Developing new ways of treating, supporting and rehabilitating patients are necessary. We found that no one had looked into the possibilities of applying telemedicine and using the significant others (SO) - spouse, other relative or friend as a resource in connection with fast track orthopedics and elective surgery

Purpose / Aim of Study: To investigate the efficacy of an intervention, including telemedicine and the SO as a resource for patients receiving total hip replacement; and to evaluate outcomes of this intervention on length of stay, adverse effects, HRQOL and the participant’s perception of cost/benefit of the procedure

Materials and Methods: The design was a randomized clinical trial. 72 couples of patients and SO were randomized to receive either the telemedicine-supported intervention or the existing intervention. Follow-up was 12 months. A cost-minimization evaluation was conducted as a piggyback study

Findings / Results: Median length of stay was halved in the group receiving the telemedicine-supported intervention; patient safety and quality were preserved. The cost-evaluation documented cost-minimization favoring the intervention. The SO perceived the workload undertaken significantly less than the people in the control group did. The perception of cost/benefit were equal for both patients and SO as was the substantial improvement in health related quality of life

Conclusions: A multimodal intervention including use of telemedicine and actively including the SO as a resource, can be used to successfully bring forward the day of the patient’s discharge after major surgery at lower cost. Patients and their SO can under the right circumstances be given more tasks and responsibility without negatively affecting their perception of benefit
Revision risks of dual mobility cups in primary total hip arthroplasty due to osteoarthritis

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**Background:** Dual Mobility acetabular cups (DMC) are designed to reduce the risk of total hip arthroplasty (THA) instability and has gained popularity in both primary and revision THA.

**Purpose / Aim of Study:** Our aim was to evaluate the survival of primary DMC implanted in patients with primary osteoarthritis (OA).

**Materials and Methods:** 2955 patients who had had primary THA with DMC were identified the Nordic Arthroplasty Registry Association (NARA) database. 2568 of these patients were matched with an equally sized control group by propensity score matching with regard to, gender, age, stem fixation and cup fixation. We used competing risk survival analyses to compare the two groups with revision or death as endpoints given as adjusted relative risk (ARR) and 95% confidence interval (CI). Surgical approach was adjusted for when appropriate.

**Findings / Results:** Mean follow-up time was 3.8 years (SD = 2.9) for the DMC group and 4.2 years (SD = 3.4) for the control group. No significant difference in overall revision risk between DMC and control group was found (p = 0.82, ARR, 95% CI = 0.97; 0.73-1.28). DMC significantly reduced risk of revision due to dislocation (p < 0.01, ARR, 95% CI = 12.15; 3.65-40.50) but had significantly higher risk of revision due to infection (p < 0.01, ARR, 95% CI = 0.31; 0.11-0.67). No significant difference in mortality between the DMC-group and control group was found. Posterior approach had no association with risk of revision.

**Conclusions:** The study showed no difference between DMC and control group in overall risk of revision but DMC reduced the risk of revision due to dislocation. DMC cups were associated with an increased risk of revision due to infection. Add. co-authors: Kaijo Mäkelä, Dep. of Ortho. and Traumatology, Turku Uni. Hosp., Finland. Geir Hallan, The Norwegian Arthroplasty Register, Dep. of Ortho. Surgery, Haukeland Uni. Hosp, Bergen, Norway.
Effectiveness of technology assisted exercise compared to usual care in total hip arthroplasty

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Background: Technology assisted exercise are increasingly used in exercise rehabilitation without appropriate clinical evaluation.

Purpose / Aim of Study: To assess the effectiveness of a technology assisted exercise intervention (ICURA) compared to usual care in total hip arthroplasty (THA).

Materials and Methods: Participants after THA admitted to rehabilitation in 4 municipalities in Copenhagen were randomized to either ICURA or usual care for 6 weeks. The ICURA group received one supervised group session every week and was instructed to perform exercise at home using a predefined exercise program in a smartphone app. Exercise performance was monitored via sensor technology. Physical therapists monitor exercise progression on a website and adjust with the patient on the weekly exercise session. The usual care group received supervised group exercise twice weekly. Primary outcome were 10 meters walk, secondary was sit-to-stand and 2.45 meters “Up and Go” and Hip disability and Osteoarthritis Outcome Score (HOOS). Difference in outcomes after 6 weeks was adjusted for baseline, municipality, sex and age. Analysis was firstly performed as completer analysis and secondly as intention-to-treat using a worst case – best case approach and a predefined equality was set to 20%

Findings / Results: 171 THA patients were included (87 to ICURA and 84 to usual care) and 148 (77 and 71 respectively) completed the intervention. No significant post intervention group differences were found for any outcomes in the completer-analysis. Differences in the worst case- best case analyses were except for the HOOS domains quality of life and sport and recreation smaller than the predefined equality point and both domains were in favour of ICURA.

Conclusions: Similar results were seen in THA receiving either ICURA or usual care and ICURA is a flexible alternative to usual care for THA.
Patient reported outcome after primary total hip arthroplasty performed through either posterior approach or modified direct lateral approach. A randomized controlled trial

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Background: The posterior approach (PA) and the lateral approach (LA) are commonly used worldwide in total hip arthroplasty (THA), but the impact on both subjective and objective outcome is widely debated. The LA may be associated with reduced patient reported outcomes whereas PA may be associated with increased risk of dislocation. However, the effect of surgical approach on patient reported outcome measures (PROM) has not been investigated with 12 month follow-up in a randomized controlled trial.

Purpose / Aim of Study: The primary aim was to investigate the effect of PA versus LA on patient reported physical function after 12 months. Secondary to investigate the effect of approach on patient reported pain and quality of life.

Materials and Methods: Eighty patients with unilateral primary hip osteoarthritis scheduled for THA surgery were randomized to operation with either PA or modified direct LA. The primary outcome was patient reported physical function measured with HOOS-physical function-Short Form (HOOS-PS) (0=extreme symptoms; 100=no symptoms). Secondary outcomes were HOOS-Pain, HOOS-QOL, EQ-5D- index and EQ5D-VAS. All outcomes were measured pre-operatively 3, 6 and 12 months after surgery.

Findings / Results: We found no difference between PA and LA after 12 months in HOOS-PS (mean difference between LA and PA: -3.3 point, 95% confidence interval: -8.73 to 2.13; p=0.23). Also; no significant differences were found in any of the secondary outcome measures.

Conclusions: The PA group did not improve more in physical function, pain or quality of life than the LA group within the first postoperative year. Both groups improved significantly from pre- to post-surgery in all PROMs. When surgical approach has no influence on PROM, other factors like risk of dislocation or risk of revision may play a role when selecting approach for the patient.
High frequency of labral pathology in dysplastic hips with a CE angle between 20–25

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Background: Hip dysplasia becomes symptomatic due to labral pathology and secondary muscular pain. A CE angle < 25 is considered pathologic and defined as dysplasia in PAO centres in Denmark. However, it is debated whether a CE angle between 20 and 25 is borderline.

Purpose / Aim of Study: We aimed to investigate the degree of labral pathology in symptomatic patients with CE between 20 and 25 compared with patients with CE < 20.

Materials and Methods: Ninety-nine patients (104 hips) with a mean age 34.1 years (range 14.5–58.9 years) consecutively scheduled for PAO due to symptomatic DDH were enrolled in the study. Five patients were excluded from the study and four patients failed to show up at follow-up, hence 90 patients were evaluated. Indication for PAO were persisting hip pain, a center-edge angle of Wiberg <25, pelvic bone maturity, internal rotation >15, hip flexion <110 and Tönnis grade of osteoarthritis 0 or 1. All patients had a magnetic resonance arthrography (MRA) performed. The MRA was assessed for labral pathology in terms of degeneration, hypertrophic changes, tears and paralabral cysts. Labral lesions were graded according to the Czerny classification.

Findings / Results: In the group with CE angle between 20 and 25 (n=41) 80% had labral pathology (Czerny 1A:2, 1B:1, 2A:7, 2B:3, 3A:15, 3B:5), whereas in the the group with CE angle < 20 (n=54) 92% had labral pathology (Czerny 1A:1, 1B:1, 2A:7, 2B:0, 3A:29, 3B:12) (P=0.12, Fisher’s exact test).

Conclusions: We present evidence that the majority of symptomatic hips with a CE angle between 20 and 25 have labral pathology, and therefore a CE angle between 20 and 25 should be considered pathological. Since the labral pathology is non-traumatic and caused by the dysplastic condition we believe that the osseous abnormality should be treated with redirection of the acetabulum (PAO) before considering hip arthroscopy.
Self-reported shoulder function, strength, range of motion and pain in patients with subacromial impingement: A direct comparison of patients being candidates versus patients not being candidates for subacromial decompression

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Background: Subacromial impingement (SIS) is associated with impairments in rotator cuff strength and range of motion (ROM), low self-reported shoulder function and pain. We hypothesized that patients being candidates for subacromial decompression (SAD) have more pronounced symptomatology and impairments than non-candidates.

Purpose / Aim of Study: To compare rotator cuff muscle strength, ROM, self-reported shoulder function and pain between candidates and non-candidates for SAD.

Materials and Methods: Self-reported shoulder function (Q-DASH and SPADI), maximum isometric muscle strength in shoulder abduction (AB-strength) and external rotation (ER-strength), active abduction ROM (AB-ROM) and passive internal rotation ROM (IR-ROM) were measured. Pain during each test and pain during the last week was reported on the Numeric Pain Rating Scale (NRS 0-10). Patients were categorized as candidates or non-candidates for SAD based on the first consultation by an orthopedic specialist, blinded to test results.

Findings / Results: From 156 SIS-patients, 25 were candidates for SAD, while 131 were not. SAD-candidates had significantly lower AB-ROM (87° vs 112°, p=0.011) and IR-ROM (114° vs 123°, p=0.026) additional to higher pain during test of AB-strength (5.3 vs 3.7, p=0.02). No differences were found between candidates and non-candidates in self-reported shoulder function, AB-strength, ER-strength, pain during test of ER-strength and pain during last week. No differences in age, gender, weight and duration of symptoms between the groups were found.

Conclusions: ROM impairments and pain during AB-strength testing is associated with being considered a candidate for SAD, while self-reported function, pain last week and actual rotator cuff strength is not. As differences seems minor, the relation between impairments and the choice of treatment needs further clarification.

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**Background:** Medial patellofemoral ligament reconstruction (MPFL-R) has in the last decade become the standard surgical treatment for patella instability. Limited knowledge exist concerning causes for failure of MPFL-R and outcome after revision MPFL-R.

**Purpose / Aim of Study:** To evaluate causes for MPFL-R failure and clinical outcome after revision MPFL-R.

**Materials and Methods:** Twenty-three patients with failed MPFL-R underwent either isolated revision MPFL-R or combined with tibial tuberosity osteotomy. There were 6 males and 17 females. Mean age was 23 (SD±8.6). Prior to surgery dysplasia of the patello-femoral joint, cartilage lesions, tibial tubercle-trochlea groove distance (TTTG) and tunnel placement were evaluated with MRI. Subjective outcome evaluation, visual analog scale (VAS) pain score and Kujala Score were performed prior to surgery and at 1 year post-operatively. Radiographic characteristics and clinical outcome was compared with a 240 patient cohort of primary MFPL-R.

**Findings / Results:** Non-anatomical fixation of the graft at the medial femoral condyle after primary MPFL-R was seen in 52% (12) of patients with anterior/proximal malplacement in most cases. Severe trochlea dysplasia Dejour Type C+D was seen in 36% of patients compared to 30% in primary MPFL patients (NS) Mean Kujala score at 1 year follow up was 60 compared to 80 in primary MPFL patients (P<0.01). Mean VAS pain score at rest was 3.0 compared to 1.7 in primary MPFL patients (P<0.01).

**Conclusions:** Non-anatomical graft position appears to be an important cause for MPFL-R failure. Subjective outcome after revision MPFL-R is poorer than after primary MPFL-R.
Outcome after arthroscopic labral surgery in patients treated with periacetabular osteotomy.
A follow-up study of 45 patients

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Background: Hip arthroscopy (HA) in the treatment of patients with persisting hip symptoms after periacetabular osteotomy (PAO) remains unclear.

Purpose / Aim of Study: The aim of this study is; 1) to identify factors predicting failure after HA with previous PAO defined as a conversion to total hip replacement (THR) and 2) to evaluate the patient reported outcome measurement scores after HA in patients with previous PAO.

Materials and Methods: Of the 55 hips treated with HA after PAO from Aug 2008 to 2012 at University Hospital of Aarhus, 45 hips were included in the study (median age: 34.1 yrs, range 13.2–61.4 yrs). Indications for HA were a positive FABER and impingement test and signs of labral damage on MR-arthrography when available. PROM questionnaires (mHHS, HOS) were completed by 37 (82.2 %) patients.

Findings / Results: Defining THR as an end point the Kaplan–Meier analysis showed a hip joint survival rate of 53.2% (95% CI, 0.1%-0.8%) at 6.5 years after HA. Using Cox regression analysis the following statistically significant predictors of conversion to THR were identified: joint space width after PAO < 3.0 mm and a Tönnis grade of >2. Twelve hips (27%) needed revision HA. Labral damage was present in 84.4% of the hips. In 42.2% of the hips an ICRS grade 3 or 4 changes were found in the acetabulum. Median mHHS and HOS scores were 63.8 and 67.1 respectively. At follow-up a NRS pain score of >3 in rest and during activity were present in 43% and 64% of the pt..

Conclusions: Patients with symptomatic hips after PAO may benefit from HA, but half of the joints underwent total hip replacement at short-term follow-up. Signs of joint degeneration after PAO are important risk factors and to be considered when offering patients arthroscopy. Pt. cannot expect to be pain free. Further studies are needed to clarify what role HA should play in this patient group.
Arthroscopic treatment of degenerative meniscal tears: importance of age and osteoarthritis

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**Background:** Arthroscopic partial meniscectomy is one of the most commonly performed orthopedic procedures; still the indication for treatment and evidence is controversial.

**Purpose / Aim of Study:** This data-based study was conducted to determine the outcome of arthroscopic partial meniscectomy. The aim was to determine whether age and knee osteoarthritis are predictive factors for the outcome of arthroscopic partial meniscectomy.

**Materials and Methods:** Prospectively collected data was retrieved from a local hospital register. The data included knee arthroscopic procedures and pre- and postoperative PROMs from June 2013 to May 2015. Patients were divided into two age groups: ≥60 years and ≤40 years. Preoperative X-rays were examined for all patients ≥ 60 years (n = 59) to determine the level of osteoarthritis using the classification of Kellgren and Lawrence (K&L). They were then divided into different groups according to the degree of osteoarthritis. The primary outcome was measured in the difference in Oxford Knee Score (OKS) and patient satisfaction at 3 months.

**Findings / Results:** At 3 months, OKS was significantly improved for both age groups, 6.6 (95% CI 4.44 to 8.69) for patients ≥60 years (n=72) and 7.4 (95% CI 4.43 to 10.65) for patients ≤40 years (n=48). The patient satisfaction was 66% for patients ≥60 years (n = 79) and 73% for patients ≤40 years (n = 78). There was no significant difference between the age groups in OKS and patient satisfaction. Patients with no osteoarthritis (K&L 0) had significantly better outcome than patients with severe osteoarthritis (K&L 3), (p = 0.044).

**Conclusions:** According to the outcome scores there was a significant postoperative improvement in both age groups. The study failed to demonstrate a significant difference between the age groups. Preoperative osteoarthritic changes correlated negatively with patient satisfaction.
Minimal Important Change for the Knee injury and Osteoarthritis Outcome Score in patients undergoing anterior cruciate ligament reconstruction

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Background: Important change in the Knee injury and Osteoarthritis Outcome Score (KOOS) in patients undergoing anterior cruciate ligament reconstruction (ACLR) is unknown.

Purpose / Aim of Study: To determine Minimal Important Change (MIC) for the KOOS in patients undergoing ACLR.

Materials and Methods: 1197 patients undergoing unilateral primary ACLR were extracted from the Norwegian Knee Ligament Register: 397 at 6 months, 400 at 12 months and 400 at 24 months postoperatively. KOOS was completed postoperatively accompanied by anchor questions with 7-point scales ranging from “better, an important improvement” to “worse, an important worsening”. Preoperative KOOS scores were extracted from the register. Two anchor-based MIC approaches were used: 1) Receiver operating curve (ROC) by using the point of least misclassification between the improved and unchanged groups, and 2) the mean change in KOOS score for patients being “somewhat better, enough to be importantly improved”.

Findings / Results: 71% (n=357) and 74% (n=385) reported an important improvement in sport and recreational activities (Sport/Rec) and quality of life (QOL), respectively. Correlations between anchor question and KOOS subscales were above 0.4 at all time-points for Sport/Rec and QOL, except Sport/Rec at 24 months (0.37). For all other subscales correlations were below 0.39, besides Symptoms at 12 months (0.49). ROC and Mean Change MIC values for Sport/Rec were at 6 months: 22.5 and 17.4, 12 months: 2.5 and 23.7 and 24 months: 10 and 24.3. MIC values for QOL were at 6 months: 21.9 and 29.7, 12 months: 15.6 and 24.3 and 24 months: 21.9 and 29.3.

Conclusions: MIC values varied based on methodology, subscale and time to follow-up. Our findings emphasize that MIC values must be interpreted with caution and that one MIC value cannot be applied across different contexts.
Translation, cross-cultural adaptation, reliability and discriminative validity of the Danish version of the short questionnaire to assess health-enhancing physical activity (SQUASH)

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**Background:** There is abundant evidence that physical activity has a fundamental role in the prevention and treatment of chronic disease. Questionnaires are simple and inexpensive to apply to measure physical activity.

**Purpose / Aim of Study:** Translate and cross-cultural adapt the short questionnaire to assess health-enhancing physical activity (SQUASH) to Danish and to investigate the reliability and discriminative validity of the Danish version.

**Materials and Methods:** The study was conducted according to the COSMIN guidelines. The reliability was evaluated in 50 healthy individuals, mean age 47.2 ± 12.6 years and mean period 37.1 ± 14.9 days between test and retest. The relative reliability was assessed with intraclass correlation coefficient (ICC) and the absolute reliability with standard error of measurement (SEM) and smallest detectable change (SDC). The discriminative validity was evaluated in 22 patients with hip dysplasia, mean age 34.8 ± 7.9 years, who were compared with 26 healthy individuals matched on age.

**Findings / Results:** For the total activity score ICC was 0.71 (95% CI: 0.54; 0.82), SEM was 2351 MET x min/week (25% of the grand mean) and the SDC was 6517 MET x min/week (70% of the grand mean). There was no significant difference between healthy adults and patients with hip dysplasia in total activity score but a significant difference in time spent on activities of high intensity.

**Conclusions:** Relative reliability was acceptable and indicates that the Danish version of SQUASH can distinguish between individuals, but the absolute reliability was poor and SQUASH is not considered suitable for measuring physical activity on an individual level. SQUASH was unable to discriminate between healthy individuals and patients with hip dysplasia with respect to total activity score, but was able to discriminate on time spent on activities of high intensity.
Incidence and outcome after PCL reconstruction. Results from the danish registry for knee ligament reconstructions

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Background: Outcome after posterior cruciate ligament (PCL) reconstruction is poorly described in the literature due to rare incidence. The Danish ACL Registry has since 2005 monitored development and outcome of PCL reconstruction.

Purpose / Aim of Study: This study presents the epidemiology and outcome after PCL reconstructions in Denmark.

Materials and Methods: A total of 585 PCL reconstructions out of a total of 23,253 knee ligament reconstructions was registered in the ACL Registry in the period 2005-2014. Type of reconstruction isolated or multiligament as well as cause of injury and concomitant meniscus and cartilage injuries were extracted. Outcome at one year follow-up was reported by KOOS score and Tegner function score. Outcome data was compared with data from primary ACL reconstructions.

Findings / Results: Isolated PCL reconstruction was performed in 32% of cases. Meniscus lesions and cartilage lesions was seen in 17 and 13% of cases respectively. The main causes for PCL injury was sports 39%, and traffic 34%. The KOOS scores at 1 year follow-up for isolated PCL reconstruction was 71 for symptoms, 77 for pain, 83 for ADL, 49 for Sports and 53 for QoL. For multiligament PCL reconstruction scores were 69 for symptoms, 78 for pain, 83 for ADL, 46 for Sports and 51 for QoL. Tegner function score for isolated and multiligament PCL reconstruction was 4.3 and 3.9 respectively. PCL reconstructions overall had poorer subjective outcome than ACL reconstructions.

Conclusions: PCL reconstructions represent only 2.5% of all knee ligament reconstructions in Denmark. Sports and traffic is the main causes for injury. Meniscus and cartilage injuries are seen frequently with PCL injury. PCL reconstructions had poorer outcome than ACL reconstructions. There was no difference in subjective outcome between isolated and multiligament PCL reconstructions.
The injured exerciser - in risk of depression?

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**Background:** Regular exercise is effective in health promotion and disease prevention. It has favorable effects on both physical and mental well-being. But injuries can lead to periods with reduced exercise levels. How do these periods affect the exercisers’ emotional condition?

**Purpose / Aim of Study:** The aim of this study was to measure emotional responses (depression and stress) associated with severe musculoskeletal injury in regular exercisers. We also wanted to identify risk factors to be able to detect the depression and stress prone patient.

**Materials and Methods:** We conducted a cross-sectional study on a orthopedic department at a local hospital. A total of 694 consecutive patients with musculoskeletal injuries at foot, knee or shoulder completed a questionnaire. It consisted of questions related to injury and exercise habits. Further we estimated depressive symptoms with the Major Depression Inventory (MDI), clinical stress with the Perceived Stress Scale (PSS) and quality of life with the EQ-5D.

**Findings / Results:** We found that 18.7% participants with symptoms of depression. Among those with depression we found that 99 participants to some extent had experienced that life was not worth living. The stress-test showed that 39.1% had symptoms of mild stress while 29.9% reported clinical stress. The participants with severe symptoms of depression or stress were significantly younger, had more days absent from work due to injury and had decreased quality of life.

**Conclusions:** Exercisers with injuries in the musculoskeletal system seem to experience symptoms of depression and stress which is associated with reduced quality of life. The MDI and the PSS are useful in the detection of depression and stress. Psychological treatment seems to be an important supplement to the medical interventions. This could prevent severe and expensive depression courses.
Distribution of muscle fibres with centralized nuclei close to the myotendinous junction in humans

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Background: Strain injuries often occur at the myotendinous junction (MTJ) and yet little is known about the constant state of remodelling of fibres close to the MTJ. During muscle fibre remodelling, nuclei can be observed centrally in contrast to the normal peripherally located nuclei. Heavy resistance exercise (HRE) significantly reduces the risk of strain injuries in the hamstrings but no studies have analysed human MTJ material to investigate this.

Purpose / Aim of Study: To investigate if muscle fibres close to the MTJ contain more central nuclei than further away from the MTJ and to see if HRE affects this pattern.

Materials and Methods: 9 patients scheduled for ACL reconstruction with hamstring grafts were randomized into a control or HRE group (5 HRE, 4 control). The MTJ samples from semitendinosus and gracilis were embedded in TissueTech and frozen in liquid Nitrogen, cut on a cryostat and stained immunohistochemically for nuclei and collagen type 12 and 22. Muscle fibres were divided into 3 groups depending on their distance to MTJ: [0 µm], [1-200 µm] and [201-400 µm]. We measured the percentage of muscle fibres with central nuclei in each group and calculated the median and range.

Findings / Results: In the HRE group, adjacent to MTJ [0 µm], the median of fibres with central nuclei was 46% (range: 11 – 88). [1 – 200 µm] from MTJ, 22% (0 – 22). [201 – 400 µm], 7% (2 – 25). In the control group, adjacent to MTJ [0 µm], the median was 31% (25 – 61). [1 – 200 µm], 26% (11 – 33). [201 – 400 µm], 13% (7 – 17).

Conclusions: It appears that a higher proportion of the fibres closest to the MTJ have centrally located nuclei. A similar analysis is being performed with collagen 22 as a specific marker for MTJ to confirm these findings and allow statistical comparisons between control and HRE groups.
Large improvements in patient-reported outcome occur after hip arthroscopy within the first year – but HAGOS finds continued markedly reductions in patient’s ability to perform desired physical activity and in their quality of life.

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Background: Improvements in modified Harris Hip Score (mHHS) following hip arthroscopy are well-known, with no additional improvements within one year. One-year results from the Copenhagen Hip And Groin Outcome Score (HAGOS) in patients undergoing hip arthroscopy are still unknown.

Purpose / Aim of Study: To evaluate and compare outcomes at 3, 6 and 12 months following hip arthroscopy for cam impingement and/or labral injury using mHHS and HAGOS.

Materials and Methods: From October 2011 to February 2014, 108 consecutive patients, 63 females, mean age 39(11) and 45 males, mean age 38(11), underwent hip arthroscopy. Standardised post-operative rehabilitation instructions were provided. Outcomes were evaluated using mHHS and HAGOS preoperatively and at 3, 6, and 12 months.

Findings / Results: Preoperative mHHS status, mean(SD), was: 62(14) and corresponding HAGOS status, mean(SD) was: Pain:54 (19); Symptoms:48(17); ADL:57(23); Sport:37(20); PA:20(23); QOL:26(16). Large improvements were seen at 3 months for all scales (p<0.001), except HAGOS, PA-subscale. Significant improvements between 3 and 6 months, and from 3 to 12 months, were only seen for HAGOS subscales Sport and PA, (p<0.05), with no improvement from 6-12 months. Status, mean(SD) at 12 months was: mHHS: 83 (17) and corresponding HAGOS status was: Pain:80(18); Symptoms:73(18); ADL:94(8); Sport:70 (25); PA:56(38); QOL:61(28).

Conclusions: Large improvements in mHHS and HAGOS subscale scores were seen at 3 months for all scales following hip arthroscopy, however, further improvements from 3 to 6 months, and from 3 to 12 months, were only seen in HAGOS subscales Sport and PA. Specific subscales of the HAGOS (PA and QOL) suggests that the ability to participate in desired physical activities and quality of life is still markedly reduced in patient undergoing hip arthroscopy at 1-year follow-up.
Muscle strength symmetry of the hip flexors and extensors in patients with femoroacetabular impingement included in the HAFAI-cohort – preliminary data

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Background: Isometric muscle strength of hip extensors and flexors is reduced in the primary affected leg of patients with femoroacetabular impingement (FAI) compared to matched healthy controls. Muscle strength asymmetry between legs has been related to decreased physical performance. Hence, it is relevant to investigate if muscle strength differences exist between the primary affected leg and the contralateral leg in patients with FAI.

Purpose / Aim of Study: To compare maximally muscle strength of the hips in patients with FAI. We hypothesised, that muscle strength of the primary affected leg would be lower than in the contralateral leg.

Materials and Methods: Sixteen patients scheduled for hip arthroscopic surgery for FAI were included. Maximum voluntary contraction (MVC) of the hip flexors and extensors were tested for both legs in a randomised order. Patients completed two submaximal familiarisation trials followed by 3–4 MVC trials performed isometrically at 45 degrees and isokinetically at 60 degrees/second. Pain levels were registered during testing, using a 100 mm Visual Analog Scale.

Findings / Results: The primary affected leg was significantly weaker than the contralateral leg for all MVC tests. Concentric, isometric and eccentric hip flexion strength of the primary affected leg was respectively median (interquartile range) 12(2-31) %, 7(5-17)% and 17(11-23)% lower than of the contralateral leg while a deficit of 11(1-29)%, 10(3-20)% and 10(2-23)% was observed for hip extension. Median (range) pain during test, affected leg: flexion 25(0-82) mm, extension 15(0-75) mm, contralateral leg: flexion 0 (0-59) mm and extension 0 (0-50) mm.

Conclusions: In patients with FAI hip extensor and flexor muscle strength of the primary affected leg is significantly lower than in the contralateral leg which could be affected by difference in pain levels.
2 year FU after hip arthroscopy with labral repair in children and adolescents  

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Background: Femoroacetabular impingement (FAI) is also being recognized in children and adolescent as a cause of hip pain. Hip arthroscopy in children and adolescents is technically demanding and although widely accepted as treatment of FAI in adults little is know about the results in this age group.

Purpose / Aim of Study: The purpose of this study was to investigate the self-reported outcome of Hip arthroscopy with labral repair in children and adolescents 2 years after surgery.

Materials and Methods: From November 2010 to February 2013 16 consecutive patients (mean age 16,2 years) 6M and 10F, underwent hip arthroscopy with labral repair at Copenhagen Private Hospital. Modified Harris Hip Score (mHHS) and a Visual Analogue Score (VAS) for pain were used as outcome measures. All patients completed both measures pre-op. and 2 years post-op. Data were collected prospectively and analyzed using non-parametric statistics.

Findings / Results: Significant statistical improvements were seen for both outcome measures (p < 0.001) at 24 months. The VAS pain score improved from mean 53 (37-80) to mean 11 after 24 months (0-55). MHHS increased from mean 57 (37-71) to mean 97 (73-100) at 2 years. The 2 worst patients had the 2 lowest CE angles (22 dg and 26 dg). These 2 patients increased mean 44 point in mHHS from 37 to 81 and decreased mean 21 point in VAS score from 79 to 58.

Conclusions: Hip arthroscopy in children and adolescents provide promising results equal to those achieved for active, non-arthritic adults. Two years after surgery we found clinically relevant improvements. CE angle close to or within the dysplasia grey zone (20-25 degrees) might lead to less optimal results. Overall the results are promising, but further investigation, including long-term results are needed.
Autologous cartilage chips transplantation for chondral defects: Improved repair tissue compared with microfracture

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Background: Repair of chondral injuries using autologous cartilage chips (ACC) have recently demonstrated clinical feasibility.

Purpose / Aim of Study: The aim of this study was to investigate in vivo cartilage repair outcome of autologous cartilage chips and compare it with that of microfracture (MFx) in full thickness cartilage defects. In addition we wanted to evaluate the viability of the implanted cartilage chips 6 months post-operative.

Materials and Methods: Six Göttingen minipigs (GMP’s) received two 6 mm chondral defects in each knee. The two treatment groups were 1) Autologous cartilage chips imbedded in fibrin glue (ACC) (n=12), and 2) MFx (n=12). The GMP’s were euthanized after six months and composition of repair tissue was quantitatively determined using histomorphometry. Evaluation of the metabolic state of the chondrocytes in the cartilage chips at follow-up (normal or degenerative) was done by immunohistochemistry measurements of collagen type IV and laminin in the pericellular matrix.

Findings / Results: Significantly more hyaline cartilage was found in the ACC (17.1%) compared with MFx (2.9%) (p<0.01). Furthermore, there was significantly less fibrous tissue in ACC (23.8%) compared with MFx (41.1%) (p<0.01). No significant difference in fibrocartilage content was found (54.7% vs. 50.8%). All cartilage chips in the ACC group had >80% positive staining for collagen type IV and laminin suggesting that the implanted cartilage chips are not undergoing degeneration six months after implantation.

Conclusions: ACC transplantation demonstrated better cartilage repair tissue than MFx. The integrity of the PCM in the cartilage chips suggested that the cartilage chips were not degenerating. Implantation of viable hyaline cartilage chips can explain the higher proportion of hyaline cartilage in the ACC group.
Effects of substitute coated with hyaluronic acid or poly-lactic acid on implant fixation in glucocorticoid-treated ovariectomised sheep

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Background: With an enhanced incidence of osteoporotic fractures among the elderly population, the need for a large animal model reflecting the situation in osteoporotic patients has increased. Recently we established that glucocorticoid (GC)–treated ovariectomised sheep replicates the bone remodeling defect and bone loss in osteoporotic patients, making it a suitable implant fixation model to investigate the performance of bone substitutes.

Purpose / Aim of Study: To investigate the performance of substitutes consisting of hydroxyapatite (HA) and beta-tricalcium phosphate (βTCP) coated with hyaluronic acid (HyA) or poly-lactic acid (PDLLA) versus allograft on implant fixation in aged sheep with OVX and GC–induced bone loss.

Materials and Methods: Ten sheep had osteoporosis induced by OVX and GC-treatment for 6.5 months, and subsequently four plasma-sprayed titanium implants were inserted into their femur condyles. The insertion created a circumferential gap of 2 mm, which were filled with one of the bone substitutes: allograft (control), HA/βTCP, HA/βTCP–HyA or HA/βTCP–PDLLA. After 12 weeks, the implant specimens were analyzed by push-out test and histomorphometry.

Findings / Results: Histology showed that the substitute groups all contained remnants of un-resorbed substitutes. However, bone formation was found in all four groups, and only the HA/βTCP group (zone 2) showed a statistically significant lower bone formation compared to the allograft group. The push-out test revealed a similar mechanical fixation comparing the groups, and likewise no statistically significance difference in ingrowth was found.

Conclusions: With HA/βTCP–granules coated with PDLLA or HyA showing an osteoconductive potential and mechanical fixation similar to allograft, the coating materials are considered valuable for composite materials – even in osteoporotic bone.
The efficacy of bone substitutes on implant fixation in sheep

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Background: The use of autograft is associated with increased donor site morbidity, whereas allograft has the risk of disease transmission, and a limited availability. To overcome these problems, synthetic bone substitutes consisting of hydroxyapatite (HA) and beta-tricalcium phosphate (β-TCP) are used. The performance of these substitutes can be enhanced by reinforcement with poly(D, L)-lactic acid (PDLLA) or infiltration with hyaluronic acid (HyA).

Purpose / Aim of Study: To investigate the efficacy of HA/βTCP granules reinforced with PDLLA or infiltrated with HyA on the implant fixation in sheep.

Materials and Methods: Plasma-sprayed titanium implants were inserted into the femur condyles of eight sheep giving a 2 mm circumferential gap. The gap was filled with one of the four materials: allograft as control, HA/βTCP, HA/βTCP-PDLLA or HA/βTCP-HyA. After 12 weeks the bone implant specimens were analyzed by µCT-scanning, push-out test and histomorphometry.

Findings / Results: Histomorphometric evaluation revealed the formation of new bone in all groups with remnants of bone substitute in the three substitute groups. The allograft group showed a larger bone volume in zone 1 and 2 compared to the HA/βTCP-PDLLA and HA/βTCP group, respectively. There was no statistically significant difference in the mechanical fixation and the bone ingrowth, comparing the four groups. The µCT scanning showed a statistically significant lower bone volume fraction in the allograft group compared to the HA/βTCP and the HA/βTCP-HyA group, which may be explained by the non-absorbed bone substitute material, which cannot be distinguished from bone by µCT.

Conclusions: HA/βTCP granules infiltrated with HyA or reinforced with PDLLA had similar bone ingrowth and mechanical fixation as those with allograft, signifying that the bone substitutes may be considered as alternatives to allograft.
On route to in-house production of tissue engineered implants

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Background: Clinical restoration of organ function using tissue engineering and personalized bioresorbable implants has been “just around the corner” for over 15 years. Although the technology readiness level is very high, the availability of clinically relevant tissue engineering solutions or individualized is virtually non-existing.

Purpose / Aim of Study: The aim of this pilot study is to chart out the processing envelope for 3D stem cell printing with regards to cell viability, printing reproducibility, and contamination risk.

Materials and Methods: Primary human mesenchymal stem cells were loaded into a hydrogel blend of hyaluronic acid, sodium alginate, and hydroxyethylcellulose at a concentration of 2 mio cells/ml. The composition of the gel represented a balance between biocompatibility, crosslinkability, and printability, respectively. The gel was printed as square constructs measuring 10x10x2 mm using a nScrypt 3dn300TE fused deposition machine in a ISO class 5 modular cleanroom. Following printing, the gels were crosslinked in 10 mM CaCl2 mixed with DMEM + 10% FBS. Antibiotics were not used. The cell-gel constructs were cultured for 7 and visualized with confocal microscopy with live-dead stain.

Findings / Results: We developed a lean workflow comprising cell loading, gel homogenization, printing, and crosslinking that ensured a short processing times, high printing printing speeds, good viability and avoidance of contamination.

Conclusions: With limited commercial interest in personalized implants, it may be the task of the public hospitals to develop this therapeutically very promising concept. We have demonstrated how this may be feasible.
Educational offer – Status on the average Danish orthopedic department

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Background: In Denmark, the education of young orthopedic surgeons is competency driven with no final examination at the end of residency. There are no national or international studies describing the educational activity among orthopedic residents.

Purpose / Aim of Study: To examine the educational offer during residency in Danish orthopedic departments.

Materials and Methods: The study was performed as a questionnaire based cross-sectional study. All residents n = 163 received a web-based questionnaire containing 15 questions within the areas of workload, surgical procedures, outpatient clinic and research. The study period was from January 1st to April 30th 2014. Residents with at least 3 active months at a department were included. Residents with less than 80% completion of the questionnaire were excluded.

Findings / Results: 152 entries were registered. 27 did not meet the inclusion criteria and 29 were excluded, leaving 96 participants, representing 22 of 26 departments, for further analysis. The average number of operative procedures as primary surgeon was 16 (range 8;35) per month. 18 out of 22 (81%) departments offered the possibility to participate in research facilitated by the department. 79 of 96 (79%) residents worked overtime (average 18 hours a month (range 5;43). 38 of 96 (40%) worked for free (average 10 hours a month (range 3;60) to increase the amount of surgical procedures.

Conclusions: A large variation in the educational offer was found among the Danish orthopedic departments. Some residents are exposed to 2-3 times as many surgical procedures as others. Danish residents operate considerable less than their US counterparts, but time spent on work is more efficient. Many work for free indicating the residents feel they lack operative experience.
Determining the tissue concentration of dicloxacillin using Microdialysis

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Background: Postoperative infections with S. aureus occur in Denmark, despite the use of perioperative dicloxacillin. Whether the tissue concentration of dicloxacillin reached is above the minimal inhibitory concentration (MIC) for S. aureus is unknown.

Purpose / Aim of Study: To measure the actual tissue concentration of dicloxacillin in human muscle and adipose tissue and compare these to the plasma concentrations.

Materials and Methods: Six healthy male volunteers were recruited. A CMA63 Microdialysis (MD) catheter (Mdialysis, Stockholm, Sweden) was placed in the subcutaneous tissue of the abdomen and in a muscle on the thigh. The volunteers were given 2 g dicloxacillin intravenously over 5 minutes. In 10 min intervals for the following 6 hours samples from blood and MD fluid were collected. Recovery was determined in vitro. Unbound dicloxacillin was isolated from plasma using filter plates. All samples were analyzed with High Performance Liquid Chromatography.

Findings / Results: Average recovery was 73.7% Maximum concentrations were reached in muscle tissue after a median of 0.5 hours and adipose tissue after 0.8 hours. The geometric mean ratio (GMR) of AUC0–6h for adipose tissue compared to plasma was 0.32 [0.15–0.71]. Concentrations were above MIC for 3.4 hours in adipose tissue and 4.1 hours in muscle tissue.

Conclusions: Dicloxacillin should be administered at least 30 minutes prior to incision to ensure maximum tissue concentrations at the onset of surgery. A second dose should be given after 3.4 hours in case of long surgery time. Since the dicloxacillin concentration reached in the adipose tissue is lower than in plasma it should be investigated whether this difference is more prominent in adipose patients or patients with impaired peripheral circulation.
Staphylococcus aureus Infection on Knee Implants, with Focus on Biofilm

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Background: Commonly used antibiotics cannot always control S. aureus-associated infections on orthopaedic implants.

Purpose / Aim of Study: The overall aim was to construct fluorescent clinical S. aureus strains that would enable in vitro and in vivo investigation of the biofilm formation in rats, which would promote the understanding of the genetic regulations involved in biofilm formation and the pathology of S. aureus.

Materials and Methods: Fluorescent clinical S. aureus MN8 isolates were constructed and subsequently used to cause infection in teen Sprague-Dawley rats that had undergone knee prosthesis replacement. The study contained three groups. Group 1 was infected with fluorescent S. aureus MN8, ica+ 10^3 CFU (N=4), group 2 was infected with fluorescent S. aureus MN8, ica− 10^3 CFU (N=4), and group 3 (control group) was given sterile NaCl i.p (N=2). The rats were injected with S. aureus or NaCl in the tibia and femur marrow before the knee prosthesis was inserted. The tissue and implants were analysed 14 days after surgery. An in vivo investigation of the biofilm formation was performed in flow-chamber biofilm systems. All biofilms were grown in AB-media for four days and subsequently analysed using a CLSM.

Findings / Results: X-ray and clinical analyses taken 7 days after surgery showed signs of commencing osteomyelitis, which had worsened 14 days after surgery especially in the ica-positive group. 14 days after surgery, the bacteria were completely eradicated from the rats.

Conclusions: The ica-positive infections showed a slightly higher occurrence of osteomyelitis and gave a higher infection score compared to the ica-negative infections. These results show that the expression of the ica-operon might increase the biofilm formation and thereby also the osteomyelitis, which is in accordance with the ica gene that is known to induce biofilm formation.
3D Printed Polycaprolactone Scaffolds Result in Foreign Body Reaction in an Articular Cartilage Repair Model in Minipigs

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Background: Microfracture (MFx) treatment is considered to be first-line treatment option for focal cartilage defects. Adjuvant therapeutic options, such as tissue engineered scaffolds, may improve formation of cartilaginous repair tissue.

Purpose / Aim of Study: To investigate the articular cartilage repair potential of a novel nanostructured polycaprolactone (PCL) scaffold in a porcine chondral defect model.

Materials and Methods: The scaffolds were produced by rapid prototyping of a PCL backbone structure. The nanostructure was created by thermal induced phase separation of a tertiary solution injected into the PCL backbone. Biocompatibility of the PCL material was tested in vitro. Ten skeletally mature Göttingen minipigs received a full thickness chondral defect (Ø=6mm) in the medial femoral trochlea in both knee joints (n=20). The defects were randomized into two groups: 1) MFx treatment, and 2) MFx+scaffold (Ø=6mm, h=0.8 mm). MRI scans were performed at baseline and at 3 and 6 months follow-up. After 6 months, repair tissue was evaluated using histological analysis, O’Driscoll score, ICRS cartilage repair assessment score and MRI MOCART score.

Findings / Results: The results of the biocompatibility study demonstrated no cytotoxic effects. Complete regeneration of the cartilage was not seen in any of the treated knees. The MFx group scored significantly higher, than the MFx+scaffold group in both the O’Driscoll score (P<0.001), and the ICRS score (p=0.03). Histologic evaluation of the repair areas revealed foreign body giant cells in the scaffold-treated groups. No significant difference was found in the MRI MOCART score at any of the time-points.

Conclusions: PCL scaffolds with a nano-porous tertiary structure resulted in foreign body reaction and significantly lower histological scores when used as adjuvant therapy to MFx treatment compared to MFx alone.
Substrate stiffness affects proliferation of human chondrocytes

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**Background:** Chondrocyte-based cartilage repair require a solid dependent expansion of chondrocytes ex vivo. Previous studies have shown that cells behave differently on different solid substrates. Therefore, substrate stiffness might be a tool to control the behavior of chondrocytes.

**Purpose / Aim of Study:** We investigated the proliferation of chondrocytes when cultured on different substrates. We hypothesized, that substrate stiffness influences proliferation of chondrocytes.

**Materials and Methods:** Human chondrocytes were enzymatically isolated from cartilage biopsies collected from patients undergoing anterior cruciate ligament reconstruction. Cells were seeded with 2,500 cells/cm² on ‘rigid’ poly styrene (control; standard culture surface) or ‘soft’ polydimethylsiloxane (PDMS; silicone surface) coated with 0.5 µg/cm² fibronectin and cultured for 1, 4, 7, & 10 days. Subsequently, cell viability and proliferation were analyzed using XTT assay and methylene blue staining, and cell cycle analysis using propidium iodide.

**Findings / Results:** The viability of chondrocytes was significantly decreased when cultured on PDMS at day 4 & 7. This effect was balanced at day 10. The proliferation was significantly increased when human chondrocytes were cultured on PDMS compared with controls. Representative images revealed diverse growth of the chondrocytes cultured on the two substrates. On the rigid substrate a colony- based outgrowth was observed compared with a single cell- based outgrowth on the soft substrate. Preliminary cell cycle data demonstrate more chondrocytes in S- & G2/M-phase in the PDMS cultured chondrocytes compared with the control.

**Conclusions:** Culturing chondrocytes on a soft substrate increased the proliferative capacity. These findings constitute further investigations aiming at elucidating the role of a softer culture substrate when expanding chondrocytes.
Are Young Orthopedics self-satisfied Delusionists?

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Background: It is a general opinion in the world of medicine that orthopedic surgeons differ from doctors of other specialties in terms of intellect, strength and self-confidence. While the former have previously been refuted, so far no studies have investigated orthopedics surgeon’s self-confidence.

Purpose / Aim of Study: To examine young orthopedics self-perceived skills and self-confidence.

Materials and Methods: Young Orthopedics in Denmark were asked to fill out a questionnaire, which consisted of the validated General Self-Efficacy Scale (GSE) and questions about their self-perceived surgical skills. The participants GSE was compared with result from a research database encompassing data from more than 17000 persons around the world. Significant difference (p<0.05) was estimated by the Wilcoxon rank-sum test.

Findings / Results: 112 young orthopedics completed the questionnaire. 5 were excluded due to incomplete answers. Young orthopedics GSE score was 3.05, average GSE score in the database was 2.94 (p=0.06). 96% of young orthopedics believed their surgical talent was average or above when compared with colleagues, and 45% believed they were “more talented” or “far more talented” than their colleagues. 99% believed their surgical skills would be rated “average” or above by their colleagues and 46% believed they would be rated “better” or “a lot better” than average. 75% believed that when assisting a senior surgeon the patient would “sometimes” (59%), “often” (14%) or “always” (2%) be better off if they were the one doing the surgery.

Conclusions: Danish patients can rest assured that they are operated by a self-confident surgeon as young orthopedics have high confidence in their surgical skills. In general young orthopedics are not significantly more self-confident than the average population.
Effects of BMP-2 on Implant integration with Bisphosphonate Background – a Dose Response Study

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Background: Poor bone stock around arthroplasties can reduce early implant fixation and threaten long-term implant survival. The trabecular bone bed for the implant is rough with craters. Allograft has been shown to augment early implant fixation, but still has an uneven bone-implant interface. A bone anabolic stimulus with BMP-2 used with catabolic control by systemic bisphosphonate (BP), could increase new bone formation and protect bone, to improving early implant fixation

Purpose / Aim of Study: We wished to investigate the dose-response relationship on implant fixation in grafted and open gap settings with three different doses of BMP-2 delivered from the implant surface, on a background of BP (to control resorption of allograft and newly formed bone)

Materials and Methods: Twelve dogs each received eight Ti-porous coated implants. Two implants in each proximal humerus and one in each distal femur condyle. Implants were coated with one of three BMP-2 doses (240 µg, 60 µg, 15 µg) or control. The humerus implants had a 2.5 mm gap filled with allograft. The femur implants had a 0.75 mm open gap. After 10 days, a single dose of Zolendronate 0.1 mg/kg was administered IV. Observation time was 4 weeks. Implants were evaluated by mechanical push-out and histomorphometrical analysis.

Findings / Results: Grafted gap: Control implants had better mechanical fixation on all parameters (strength, energy & stiffness) compared to BMP-2 coated implants (Low: 1.8 fold; Medium: 3-fold; High: 4.4–4.8; all p<0.05). Open gap: Low dose BMP-2 had best fixation on all parameters, compared to control and other BMP-2 doses (Control: 2.2–3.4; Medium: 2.2–2.2; High: 2.6–3.0; all p<0.05).

Conclusions: The mechanical data suggest that BMP-2 should be used cautiously in relation to implants. Future histomorphometric analysis will identify the tissue composition of the bone-implant interface.
The significance of graft size for graft tunnel healing

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Background: In ligament reconstruction graft tunnel healing is needed for a good outcome. Traditional mechanical thinking recommends the same size tunnel and graft in order to fill the tunnel. This sometimes makes passages of the graft difficult and potentially harms the graft. However, healing is determined by cell biology and vascularisation, which is inhibited by mechanical compression.

Purpose / Aim of Study: The purpose of this study was to investigate the significance of graft size for graft tunnel healing.

Materials and Methods: In a rat model, two tendon sizes (0.5mm and 0.9mm) was randomly inserted into two tibial tunnels in the right leg of 8 Sprague Dawley rats. Slow drilling with a conical drill (0.9mm) was performed in order to avoid necrosis. Bone healing was followed longitudinally with 3D micro-CT. After healing histological analysis were performed to study graft-ingrowth. A validated visual scoring system was used to evaluate the amount of bone formation in the tunnel.

Findings / Results: 7 of 8 rats could be followed to tunnel healing. One rat was excluded due to infection. At the 4th 3D micro-CT scan (day 11) healing was seen in all tunnels. Tendon-to-bone ingrowth was confirmed by the histological analysis in all cases. There was no difference between the healing rate of the two graft sizes.

Conclusions: In a non necrotic bone tunnel ingrowth can be obtained without stuffing the tunnel with the graft. Clinically this implicates that a graft smaller than the tunnel can heal. This should be tested further in clinical studies.
Use of pneumatic tourniquet does not reduce the total postoperative blood loss after transtibial amputation. A prospective case-control study of 76 non-traumatic transtibial amputations.

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Background: Tourniquet reduces the intraoperative blood loss when applied during transtibial amputations (TTA). However, side effects such as damage to vessels and soft tissues as well as hyperperfusion remains unilluminated. Further, the total postoperative blood loss and risk of reoperation needs evaluation to better balance the potential benefits and risks of tourniquet.

Purpose / Aim of Study: The primary aim was to determine the total calculated blood loss within the first four days after TTA’s, conducted with and without tourniquet. Secondly, to investigate the association between the use of tourniquets and re-amputations.

Materials and Methods: Primary TTA’s operated in 2013-14 at our institution were eligible for inclusion (n=86). We excluded 8 because of bilateral amputations and 2 because of traumas. The study group consisted of 76 TTA’s performed due to diabetes related complications or severe arteriosclerosis (38 with tourniquet / 38 without tourniquet). The decision to use tourniquet relied on the surgeons. The total blood loss (intraoperative until postoperative day 4) was calculated based on the hemoglobin level using a transfusion trigger of 6mmol/l and the estimated blood volume.

Findings / Results: The demographic data showed no difference between the two groups. The total calculated blood loss on day four after surgery was 930 ml ± 763 in the tourniquet group vs. 947 ml ± 717 in the non-tourniquet group (p=0.98 in a multivariate analysis). Correspondingly, no significant differences were found in transfusion requirements after four days or in the re-operation rates at one and three months follow-up.

Conclusions: Performing a TTA with the use of tourniquet does not reduce the total calculated blood loss or transfusion requirements when evaluated on postoperative day 4. The use of tourniquet does not seem to influence the re-amputation rates.
Is there a correlation between Skin Perfusion Pressure and healing after amputation below the knee?

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**Background:** When performing below knee amputation, the vascular status of the limb is of paramount significance for wound healing. Skin Perfusion Pressure (SPP) is one way to measure healing potential. A SPP of 40 mm Hg or above is believed to indicate a good or a very good probability for healing after amputation.

**Purpose / Aim of Study:** To examine the correlation between SPP and wound healing after below knee amputation.

**Materials and Methods:** One hundred and six consecutive patients underwent 113 below knee amputations from January 2009 to December 2013 at the Regional Hospital Viborg. The primary outcomes were any need for further wound management, amputation at a higher level or even death within the first 90 days. These informations were obtained from the medical records of the patients. SPP measured by photocell technique was performed less than two days prior to surgery.

**Findings / Results:** Seventy of 113 below knee amputations (62%) had a SPP performed prior to surgery. Of these seventy amputations twenty had a SPP of 40 mmHg or less. Five (25%) of the amputations with a SPP values of 40 mmHg or less had to be reamputated at a higher level. Four (20%) with a SPP values of 40 mmHg or less needed further wound management. Three of the patients with a SPP values of 40 mmHg or less died within 90 days. Thus 50 amputations (71%) had a SPP above 40 mm Hg. Of these 50 amputations three (6%) needed reamputation at a higher level, one of these patients died afterwards. Seven (7/50=14%) needed further wound management, off which two patients died. In total twenty one of the patients died within 90 days.

**Conclusions:** Several factors influence the outcome after below knee amputation. The group of patients is very fragile, and in order for a better understanding of the outcome, there is a need for a prospective study.
Can inflammatory markers be included into models predicting survival after treatment for metastatic lesions in the extremities?

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Background: Prediction of survival is considered valuable for surgeons treating metastatic bone disease in the extremities. Different models have been developed however none including inflammatory markers.

Purpose / Aim of Study: We aimed to 1) develop a model that can estimate the likelihood of survival at 3, 6 and 12 months after surgery, based on variables that are easily accessible from patient records including inflammatory markers. 2) Investigate its accuracy using the receiver operator characteristic (ROC) analysis and decision curve analysis (DCA).

Materials and Methods: A consecutive cohort of 130 patients having joint replacement surgery due to metastatic lesions at Rigshospitalet during the period 2003–2008 was included. Demographics, clinical and biochemical variables preoperatively was included into the model (age, gender, primary cancer group, ASA, hemoglobin, C-reactive protein, fracture vs. impending fracture, visceral metastasis, multiple bone metastasis). Primary cancer group was grouped as proposed by Katagiri (1,2). A Bayesian belief network (BBN) for survival status at 3, 6 and 12 months were developed and internally validated and area under the ROC curves calculated. Net benefit of the model was evaluated with DCA.

Findings / Results: BBN for survival status at 3, 6 and 12 months was developed and internal validation showed AUC of ROC curves of 0.77 (CI: 0.66;0.87), 0.83 (CI: 0.74;0.91) and 0.87 (CI: 0.81;0.94) respectively. DCA showed a clinical net benefit using these models compared to expecting all patients to outlive the period.

Conclusions: We successfully developed a BBN for predicting survival status at 3, 6 and 12 months based on various parameters including C-reactive protein. Though these results are encouraging, each of these models should be externally validated prior to being used clinically.
Implant and patient survival following limb-sparing surgery with reconstruction using the Global Modular Replacement System (GMRS) due to primary or secondary bone cancer. A retrospective study of 52 patients

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Background: Today limb-sparing tumor resection is possible in 90% of patients suffering from bone sarcomas (BS) and the preferred method of reconstruction is the use of mega-prostheses. The same surgical technique is occasionally also used in the treatment of patients suffering from metastatic bone disease (MBD).

Purpose / Aim of Study: To investigate implant and patient survival following limb-sparing surgery using the GMRS mega-prosthesis in BS or MBD patients.

Materials and Methods: A consecutive cohort of 52 patients (mean age 47 (11-78) years, F/M=21/31) treated with limb-sparing surgery due to BS (n=37) or MBD (n=15) of the lower extremities (resection type: distal femur (n=27), proximal tibia (n=5), proximal femur (n=17), total femur (n=3)) at our orthopedic oncology tertiary referral center from 2005 to 2013. Patients were followed until death or end of study (13.06.2015). Statistical analysis used was Kaplan-Meier analysis.

Findings / Results: All-cause one-year and 5 year mortality was 90.4 % and 63.0% for the complete cohort (94.6% vs 72.5% for sarcoma and 80.0% vs 40.0% for metastatic bone disease). 18 patients experienced reoperation of all causes (mean time to first surgery 694 days (range 4-3003 days). 4 patients had removal of bone anchored prosthesis components (median 925 days range 322-1855), resulting in a 5-year estimated risk of revision of 93.5%. 3 patients had amputation due to local recurrence (5 year limb survival rate of 93.6%).

Conclusions: The use of the GMRS prosthesis for reconstruction after limb-sparing bone tumor resection of the lower extremities has an acceptable risk of revision of the bone anchored parts of the implants and the risk of amputation was low. The results should be interpreted with caution due to competing risk of short life survival of especially the MBD patients in this cohort.
In-vivo gentamicin concentrations in plasma and drain fluid after bone defect reconstruction using a gentamicin-eluting bone graft substitute

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Background: Reconstruction of bone defects after bone tumor resection is associated with an increased risk of infection. A gentamicin-eluting bone graft substitute consisting of sulphate and apatite has been shown to be effective for treatment of osteomyelitis and may be a valuable addition to the therapeutic and/or prophylactic antibiotic regime for this indication.

Purpose / Aim of Study: To document early in-vivo concentrations of gentamicin in plasma and drain fluid after bone defect reconstruction using a gentamicin-eluting bone graft substitute.

Materials and Methods: We performed a prospective pilot study from December 2014 to February 2015 in 7 patients (M/F: 4/3, mean age 51 (37–79) years) who underwent bone defect reconstruction with a gentamicin-eluting bone graft substitute (CERAMENT™G – BONESUPPORT AB) containing 175 mg gentamicin per 10 mL. Indications for surgery were metastatic bone disease (n=3), giant cell tumor (n=2), aseptic prosthetic loosening (n=1) and chondroid tumor (n=1). Drain fluid and plasma was collected immediately postoperatively and each postoperative day until the drain was removed and analyzed using an antibody technique.

Findings / Results: A mean of 14 (10–20) mL gentamicin-eluting bone graft substitute was used. Mean drain fluid concentrations of gentamicin were 1200 (723–2100) mg/L immediately postoperative (0–2 hours), 1054 (300–1999) mg/L on day 1 (17–23 hours) and 509 (38–1000) mg/L on day 2 (39–45 hours). Mean plasma concentrations of gentamicin were 1.26 (1.08–1.42) mg/L immediately postoperative, 0.95 (0.25– 2.06) mg/L on day 1 and 0.56 (0.20– 0.88) mg/L on day 2.

Conclusions: Local implantation of a gentamicin-eluting bone graft substitute for bone defect reconstruction results in high concentrations of gentamicin in the drain fluid in the first postoperative days and low plasma concentrations.
Risk Factors for Local Recurrence after Intralesional Curettage for Giant Cell Tumors of Bone

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Background: Intralesional treatment of giant cell tumors of bone (GCT) increases local recurrence rates compared with wide resection. Adjuvant treatment with PMMA has been proposed to reduce local recurrence rates. However, some surgeons believe that other factors are equally important.

Purpose / Aim of Study: To determine which patient demographics, tumor characteristics, or surgical/clinical parameters are risk factors for local recurrence after intralesional treatment of GCT.

Materials and Methods: Retrospective data from a national cohort of all patients with GCT of the appendicular skeleton (n=74, M/F: 37/37, median age 29 (12–68 years), treated intralesionally between 1998 and 2013, was analyzed for association of risk factors with local recurrence using univariate, multivariate Cox regression and Kaplan–Meier survival analysis.

Findings / Results: The cumulative 4-year recurrence rate was 37%. The only significant independent risk factors associated with local recurrence rate were “preoperative diagnosis confirmed by biopsy” (HR=0.30, CI:0.10–0.90) and “treatment at an oncology center” (HR=0.29 CI:0.08–0.99). There was no independent association between local recurrence rate and other parameters such as age, gender, tumor location and Campanacci grade, pathological fracture or the use of PMMA.

Conclusions: Our results suggest that confirmation of histological diagnosis before definitive surgery and referral to an orthopedic oncology center are important to avoid local recurrence of GCT. We recommend that surgery for GCT’s is performed at a dedicated orthopedic oncology center, where biopsy typically is a part of the diagnostic routine. It seems that local adjuvant therapy with PMMA in itself is not a guarantee for a lower recurrence rate.
Migration pattern of the osseointegrated implant system for transfemoral fixation evaluated with radiostereometry

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Background: The osseointegrated (OI) implant system is a treatment for transfemoral amputees with a short residual femur and/or problems using socket prostheses.

Purpose / Aim of Study: To study fixation stability (migration) of the OI-implant up to 24 months follow-up with model-based radiostereometry (mbRSA).

Materials and Methods: 18 consecutive patients (12 males) mean age 49.5 (range 32-66) were operated through a two stage procedure (S1, S2). At S1, a titanium implant (fixture) was inserted into the distal part of femur. At S2, 6 months later, a rod (abutment) was inserted into the fixture, exiting through the skin. Weight bearing on the implant was not allowed between S1 and S2 (unloading phase) and started after S2 (loading phase). Stereoradiographs were obtained postoperatively every 6 months. X, Y, and Z translations and Total Translations \( TT = \sqrt{(X^2 + Y^2 + Z^2)} \) were evaluated using CAD-models. Precision (double examinations) was evaluated as standard deviation (SD) \times 1.96

Findings / Results: During unloading the mean TT (SD) was 1.07 (0.87) mm with Y-translation -0.16 (0.34) mm. During the loading phase TT at 6, 12, 18, and 24 months was 0.55 (0.40) mm, 0.64 (0.57) mm, 0.53 (0.39) mm, and 0.87 (0.94) mm. There was no continuous migration (TT) \( p > 0.68 \) and no continuous subsidence after S2 \( p > 0.09 \). Precision along the orthogonal axes were X: 0.62 mm, Y: 0.14 mm and Z: 0.63 mm. At 2 years, 8 OI-implants migrated above the precision limit on the Y-axis, 1 due to trauma, 4 had infections, 2 had no clinical explanation, and 1 with leg pain during loading.

Conclusions: MbRSA is feasible for measurements of fixation. Precision is less than with hip stems due to more difficult fitting of the model geometry. Overall, the OI-implant system was found to be stable after S2 on group level, but 8 patients had measureable Y-axis migrations and most had clinical conditions coherent with implant migration.
Reconstruction of metastatic bone defects with a bisphosphonate eluting bone graft substitute

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Background: Bisphosphonates inhibit the osteoclast mediated bone destruction associated with secondary malignant bone tumors. They also induce apoptosis of tumor cells and could therefore potentially contribute to prevention of local recurrence as well as restoration of bone.

Purpose / Aim of Study: To report an early clinical experience with use of local delivery of zoledronic acid in the reconstruction of metastatic bone defects.

Materials and Methods: Six patients (5f, 1m, mean age 64 (range 37-81) who had undergone reconstruction of metastatic bone defects with implantation of a gentamycin eluting sulphate-apatite bone graft substitute (Cerament™G, BONESUPPORT, Lund, Sweden) which we additionally loaded with zoledronic acid, were prospectively followed for a mean of 12 months (range 6-17). In all 5 female patients, the indication for treatment was a partially contained bone defect associated with incipient or actual pathologic fracture of the acetabulum (n=3) or proximal humerus (n=2) secondary to metastatic breast cancer. The only male patient had wide resection of a solitary lung cancer metastasis from the proximal femur.

Findings / Results: Sequential imaging (X-ray/CT) demonstrated progressive consolidation of the inserted graft material without any evidence of persistent osteolysis or local recurrence. Rapid and homogeneous remodeling typically started in well-contained areas with cancellous bone contact. Substantial bone formation was also observed in uncontained areas where graft material had been applied to the surface of metallic implants or surrounding cortical bone in some cases.

Conclusions: This small and inhomogenous case series demonstrates that successful restoration of metastatic bone defects with a bisphosphonate eluting bone graft substitute is possible in selected cases.
Background: Mortality and risk factors associated with shoulder arthroplasty has been sparsely reported compared to knee and hip arthroplasty.

Purpose / Aim of Study: The primary aim was to quantify the thirty-day, ninety-day and one-year mortality after primary shoulder arthroplasty and compare it to the general population. An assessment of the association between mortality, surgical diagnoses and causes of death was performed.

Materials and Methods: 5,853 primary operations from 2006 to 2012 were included and information about the patients was obtained from the Danish Shoulder Arthroplasty Register and the Danish Cause of Death Register. Incidences in the general population were calculated with data from Statistics Denmark and compared to the patients.

Findings / Results: The mean age was 69.3 (± 11.6) years and 69.2 % were women. Thirty-nine (0.7 %) patients died within thirty days, eighty-eight (1.5 %) within ninety days and 222 (3.8 %) within one year. Fracture patients had a higher mortality than patients with elective diagnoses. The overall incidence of death within thirty days was 666 per 100,000. Fracture patients had an over five times higher incidence of death than the general population within thirty days. Deaths occurring within thirty days were due to cardiac (20.5 %) and abdominal causes (20.5 %).

Conclusions: The mortality at thirty days (0.7 %), ninety-days (1.5 %) and one-year (3.8 %) was significantly higher than that of the general population. There was a trend that mortality rates balanced in the patients and the general population one year after shoulder arthroplasty. Fracture patients had higher mortality. Patients with osteoarthritis and rotator cuff arthropathy are relatively safe in terms of mortality when undergoing shoulder arthroplasty. Pulmonary, cardiac and abdominal causes of death were the most common in the short-term group.
Evaluation of the clinical practice of shoulder examination among ten experienced shoulder surgeons

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Background: Shoulder problems constitute a major socioeconomic problem with lifetime prevalence up to 66.7%. To aid diagnosis more than 184 tests have been described. Although a standardized guideline for a complete shoulder examination is not available, we hypothesize that experienced shoulder surgeons have clear preferences among shoulder physical examination tests.

Purpose / Aim of Study: The aims of this study was to identify the most used shoulder physical examination tests for 12 selected shoulder pathologies and evaluate the usefulness of these tests in terms of sensitivity and specificity.

Materials and Methods: In March to May 2014, ten experienced shoulder surgeons were asked to name the shoulder physical examination tests they would use for 12 pre-selected shoulder pathologies. A literature search on Pubmed.com and on the Cochrane library was conducted to assess the sensitivity and specificity of the most reported shoulder physical examination tests for each pathology to investigate specificity and sensitivity of the test.

Findings / Results: In total 49 shoulder physical examination tests were named. For eight of 12 pathologies at least 9 surgeons reported at least one common shoulder physical examination test. Eight surgeons agreed on one test for one pathology. For the remaining three pathologies six surgeons recommended one common test. The sensitivity and specificities of the 12 chosen tests were acceptable.

Conclusions: There was a high degree of agreement on which shoulder physical examination to use for which shoulder pathology and the specificity and sensitivity of the most reported shoulder physical examination tests for each pathology were both acceptable. However, there is no clear evidence to support one shoulder physical examination test over another in the literature.
Shoulder function, pain and health related quality of life in adults with Joint Hypermobility Syndrome/Ehlers–Danlos Syndrome, Hypermobility Type

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Background: The shoulder is a frequently reported pain area and associated with shoulder instability in patients with Joint Hypermobility Syndrome (JHS) and Ehlers Danlos-hypermobility type (EDS-HT). No studies have reported the nature of shoulder function in this group.

Purpose / Aim of Study: To investigate characteristics of shoulder function, pain and health related quality of life (HRQoL) in adults with JHS/EDS-HT, compared with the general population (controls).

Materials and Methods: Through postal survey 110 patients diagnosed with JHS/EDS-HT from two Norwegian hospitals, and 140 gender- and age-matched healthy controls from Statistics Norway were invited. Shoulder function from Western Ontario Shoulder Instability Index (WOSI), pain from Numerical Pain Rating Scale (NPRS) and pain drawing chart, in addition to HRQoL from the 36-item Short Form (SF-36) were registered.

Findings / Results: Totally, 81 individuals responded, with an overall response rate of 34% (JHS/EDS-HT: 53% vs. controls: 21%). JHS/EDS-HT had significantly lower shoulder function (WOSI total: 49.9 vs. 83.3; p<0.001), general physical function (SF-36, Physical Component scale: 28.1 vs 49.9; p<0.001), and higher pain intensity (NRS: 6.4 vs. 2.7; p<0.001) than controls. Further, JHS/EDS-HT more often reported generalized pain (96%). Neck and shoulder joints were most frequently rated as painful areas, with significantly higher frequency in JHS/EDS-HT than controls (90% vs 27%; 80.% vs 37%), for the neck and the shoulder, respectively.

Conclusions: Adults with JHS/EDS-HT have impaired shoulder function, increased pain intensity and more often generalized pain, as well as reduced physical HRQoL compared with the general population. Neck and shoulder joints were the most often painful areas in both groups, however, with significantly higher frequency in JHS/EDS-HT.
Patient-reported outcome following revision of resurfacing hemiarthroplasty in patients with glenohumeral osteoarthritis

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Background: Resurfacing hemiarthroplasty (RHA) has a bone preserving design facilitating revision to other arthroplasty designs. For this reason, a high revision rate may be acceptable. However, the argument is only valid as long as the RHA can be revised to a satisfactory result.

Purpose / Aim of Study: The aim of this study was to report the outcome and the need for further surgery following revision of RHA in patients with osteoarthritis.

Materials and Methods: We reviewed all patients with osteoarthritis reported to the Danish Shoulder arthroplasty registry between 2006 and 2013. There were 1,210 RHA, of which 111 (9%) required revision. WOOS was accessed at 1 year and the need for re-revision were recorded.

Findings / Results: 40 RHA were revised to stemmed hemiarthroplasty, 30 to anatomical total shoulder arthroplasty and 31 to reverse total shoulder arthroplasty. Median WOOS scores for these 3 subpopulations were 48, range 5-97; 74, range 20-97; and 68, range 22-97 respectively. The median WOOS scores for primary stemmed hemiarthroplasty, total shoulder arthroplasty and reverse shoulder arthroplasty were 74, range 0-100; 93, range 0-100; and 67, range 0-100. The differences for stemmed hemiarthroplasty (P=0.003) and total shoulder arthroplasty (P=0.003) were statistically significant and the differences exceeded the minimal clinically important difference. 11 (10%) patients were re-revised mainly because of deep infection (n=6).

Conclusions: For a revision procedure, the outcome following revision of RHA is acceptable, but the results are inferior to that of primary stemmed hemiarthroplasty and primary anatomical total shoulder arthroplasty. The revision of RHA is associated with a high risk of infection. Thus, anatomical total shoulder arthroplasty remain our preferred choice in the treatment of osteoarthritis and RHA is reserve for selected cases only.
The Nordic Arthroplasty Register Association experience: 19,857 primary shoulder replacement reported from 2004-2013

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Background: The Nordic Arthroplasty Register Association (NARA) was initiated in 2007 by hip and knee surgeons and several unique papers have been published.

Purpose / Aim of Study: We aimed to examine the feasibility of merging data from the Nordic national shoulder arthroplasty registries by defining a common minimal data set. Furthermore, we used data from the dataset to report the incidence of shoulder replacement; and finally, we compared data from the individual registries.

Materials and Methods: In 2014, a group of surgeons met to examine the feasibility of merging data from the national shoulder registries in Denmark, Norway and Sweden. Differences in definitions and variables were discussed. A common minimal dataset was defined as a set of variables containing only data that all registries could deliver and where consensus according to definition of the variables could be made.

Findings / Results: We agreed upon a dataset containing patient-related data including diagnosis, operative data including implant design and data in case of revision including reason and new implant. 19857 primary arthroplasties were reported from 2004-13. The number of replacements increased in the study period. With 13 replacements/100,000/year the incidence of shoulder replacement in Denmark was nearly twice the incidence in Norway. In Sweden, 50% of the implants used for osteoarthritis were total shoulder arthroplasties whereas in Denmark, 56% were resurfacing hemiarthroplasties and only 16% total shoulder arthroplasties. In Norway, 17% with a fracture were replaced with reverse shoulder arthroplasty compared to 4% in Denmark.

Conclusions: We were able to merge data from the national registries into one common dataset; however, the set of details was reduced. In future studies we will compare arthroplasty designs regarding revision rates and reasons for revision.
Unscheduled contacts after outpatient shoulder arthroscopy – Preliminary results from an observational follow-up study

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Background: Outpatient shoulder surgery has grown considerably over the past two decades. Good pain management after outpatient surgery is essential to make a short recovery time, early discharge and rapid return to daily living. Unfortunately, several studies have shown that pain is one of the most common complications of outpatient surgery. Severe pain remains a major problem and can lead to unscheduled contacts to healthcare professionals after discharge.

Purpose / Aim of Study: To assess the frequencies and causes of unscheduled contacts with healthcare professionals after outpatient shoulder arthroscopy within the first week after surgery with special emphasis on pain.

Materials and Methods: Outpatients scheduled for elective shoulder arthroscopy including subacromial decompression and acromioclavicular joint resection were enrolled at the Day Surgery Unit at Horsens Regional Hospital. One week after surgery patients received an electronic questionnaire containing questions about the post-discharge period.

Findings / Results: A total of 135 consecutive patients were enrolled. After discharge, 24.4% of patients contacted healthcare professionals, 10% had more than one unscheduled contact. Pain and prescription of pain medication were the leading causes for contact. Most contacts were made the day after surgery by telephone to the general practitioner. Even though 94% of all patients reported to have received sufficient information and guidance regarding pain and pain-treatment after discharge, the most frequent result of contact was information and guidance combined with prescription of pain medication.

Conclusions: Unscheduled contacts to healthcare professionals after outpatient shoulder arthroscopy are a problem. Expected future findings in present study: Unscheduled contacts after outpatient surgery differ according to surgical procedures.
Outcome after shoulder replacement for failed osteosynthesis in proximal humerus fractures. A registry-based study of 293 cases

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Background: Some patients with a failed osteosynthesis of a proximal humerus fracture are re-operated by joint replacement, but it has not been reported if previous osteosynthesis is a significant risk factor for inferior outcome after shoulder replacement.

Purpose / Aim of Study: To study if previous osteosynthesis is a risk factor for inferior outcome following shoulder replacement.

Materials and Methods: A matched case-control study based on data from the Danish Shoulder Arthroplasty Registry (DSR). All patients with shoulder arthroplasty after failed osteosynthesis of a proximal humerus fracture reported to DSR from 2006–13 were reviewed. Each case was matched with two controls based on age, gender and completeness of Western Ontario Osteoarthritis of the Shoulder index (WOOS). The controls had a primary shoulder replacement of a proximal humerus fracture. We compared WOOS and the relative risk of revision.

Findings / Results: 293 shoulder arthroplasties after failed osteosynthesis and 586 controls were included. Mean WOOS of the cases was 45.7 and of the controls 52.2. The difference of 6.5 points (95% CI 2.1–10.8; p=0.004) in favor of primary arthroplasty was statistically significant. 10.6% of the cases and 6.0% of the controls were revised, making the relative risk of revision 1.8 (95% CI 1.1–2.9; p=0.023).

Conclusions: WOOS was statistically significantly inferior in patients with shoulder replacement after failed osteosynthesis, but the difference may not be clinically relevant. However, we also found a significantly higher revision rate in patients with shoulder arthroplasty after failed osteosynthesis. Osteosynthesis should not be used as primary surgical treatment of proximal humerus fractures to delay shoulder replacement, and we advocate that peroperative conversion from osteosynthesis to shoulder arthroplasty is possible.
Rasch analysis of The Western Ontario Osteoarthritis of the Shoulder (WOOS) index – the Danish version

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Background: The Western Ontario Osteoarthritis of the Shoulder (WOOS) index is a disease-specific patient-reported 19-question survey that measures quality of life among osteoarthritis (OA) patients. WOOS is used for the evaluation of shoulder arthroplasty in patients reported to the Danish Shoulder Arthroplasty Register (DSR).

Purpose / Aim of Study: The purpose of this study was to validate the Danish version of WOOS for OA patients and secondly for other diagnoses through modern test theory.

Materials and Methods: The study included 2416 arthroplasties in 2298 patients reported to DSR between 2006 and 2011. Five diagnoses were included: 100 rheumatoid arthritis; 847 osteoarthritis; 161 rotator cuff arthropathy; 1140 fracture; and 168 revisions. We tested the fit of different diagnoses to the Rasch model. The dimensionality of WOOS was further examined with residual Principal Component Analysis (PCA). WOOS was regarded as dichotomous in the study.

Findings / Results: A dichotomous scale was the best fit for WOOS. The analysis of the OA patients had a good reliability and showed adequate targeting and a good fit to the model. The analysis of fracture (FR) patients showed an even better fit and higher reliability. The WOOS items fitted well to the OA sample except from two items, item 5 and 6. In addition, item 6 showed signs of degrading the scale. Only item 6 showed misfit for FR patients and there was no sign of scale degradation. The residual PCA confirmed unidimensionality for FR patients but not for OA patients. Six items displayed clinically significant Differential Item Functioning between OA and FR patients.

Conclusions: The Rasch analysis generally suggested that WOOS can be considered valid and representative for quality of life level of both OA and FR patients. Surprisingly, FR had the best fit to WOOS even though WOOS is originally made for OA.
Time-to-surgery in hip fracture patients: 36 hours is feasible, but why and where do patients wait?

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Background: Hip fracture patients should be operated within 36 hours from hospital admission, which due to optimized outcome is now a demand in DK and UK. Our hospital has lived up to this for years due to a high surgical priority, but increased patient number, comorbidity and use of blood-thinners is challenging.

Purpose / Aim of Study: To describe the timing of hip fracture patients from injury to surgery.

Materials and Methods: 325 consecutive patients admitted with a hip fracture from May - Dec 2014 were included. The time of injury, hospital admission and action/location steps until incision were retrospectively assessed from individual patient records, as the hospital database proved insufficient. Also use of blood-thinners and reason for delay beyond 36 hours were assessed.

Findings / Results: Mean age was 78 years (range 37-100), 65% (212/325) were female and 22% (72/325) used blood-thinners. 81% (182/226 with data) were injured 8:00-22:00, and 75% (245/325) were admitted 8:00-22:00. The mean time was 6 hours (range 15 min - 9 days) from injury to admission. From admission it took mean 47 min (range 0m-21h) to first nurse notes, 3 hours (0m-20h) to patient record, 4 hours (18m-24h) to radiographs, 6 hours (16m-25h) to surgical plan, 8 hours (17m-22h) to anesthetic plan, 7 hours (29m-20h) to hip fracture ward preoperative arrival, 21 hours (3h-4d) to theater arrival and 23 hours (4h-4d) to incision start. 94% (304/325) incisions started 8:00-18:00 and all before 22:00. 91% (297/325) of patients were operated within 36 hours, with another 8 delayed due to blood-thinners and 4 to comorbidity, also 12 were delayed due to lack of capacity and 4 due to late fracture diagnosis.

Conclusions: 91% of patients were operated within the 36 hours, with half of delays caused by blood-thinners or comorbidity. The preoperative steps however appeared time-consuming.
Diagnostic accuracy of ultrasound screening on suspicion of extremity fractures in adults

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Background: The conventional diagnostic approach on suspicion of upper and lower extremity fracture consists of a clinical and a radiographic examination. Fifty percent of the patients go through an x-ray examination having no fracture. Studies indicate that ultrasound (US) can effectively identify fractures in adults.

Purpose / Aim of Study: To determine the diagnostic accuracy of US screening to exclude extremity fractures in adults. Furthermore, to determine the inter-rater agreement of US images in this group of patients.

Materials and Methods: We consecutively enrolled 92 adults referred to x-ray at Viborg Regional Hospital, on suspicion of extremity fracture. To ensure blinding, US was consistently performed prior to x-ray. Similarly, no clinical examination was performed. X-rays were reviewed for the presence of fracture and considered to be the gold standard. Inter-rater agreement between one of the investigators and a blinded radiologist was conducted by evaluating 42 randomly selected US images.

Findings / Results: Prevalence of fractures was 27%. McNemars test found no systematic difference between the results of US and x-ray (p=0.69). The sensitivity of US in detecting fracture was 92% (95% CI: 74; 1.0) and the specificity was 94% (95% CI: 85; 1.0). The positive predictive value of US was 85% (95% CI: 66; 96) and the negative predictive value was 97% (95% CI: 0.89; 1.0). The inter-rater agreement was 100%, equal to a kappa value of 1 (95% CI: 1; 1).

Conclusions: US screening on suspicion of extremity fracture has a high accuracy and reliability. No systematic differences were found between the results of the two modalities. Due to the small study population, more studies are required before US can be recommended as a screening modality.
A systemic review of treatment guidelines for hip fracture surgery

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Background: In hip fracture surgery, the exact choice of implant often remains somewhat unclear for the individual surgeon, but the growing literature consensus has enabled publication of evidence-based surgical treatment guidelines.

Purpose / Aim of Study: The aim of this study was to review author guidelines and national guidelines for hip fracture surgery and discuss a method for future guideline implementation and evaluation.

Materials and Methods: In a systemic review (PubMed search in March 2015) six studies of surgical treatment guidelines covering all types of hip fractures with publication after 1995 were identified. Also we searched the homepages of the national heath authorities and national orthopedic societies in West Europe and found 11 national or regional (in case of no national) guidelines including any type of hip fracture surgery.

Findings / Results: Guideline consensus is outspread (Internal Fixation for undisplaced femoral neck fractures and Prosthesis for displaced among the elderly; and Sliding Hip Screw for stabile- and Intramedullary Nails for unstable- and sub-trochanteric fractures) but they are based on a variety of criteria and definitions – and often leave wide space for the individual surgeons’ subjective judgment. Appearing neither exhaustive nor exclusive, most of the guidelines seem difficult to evaluate scientifically, which might explain why only very few have been evaluated for compliance, reliability and complications after implementation in an actual clinical setting. We therefore introduce a model for step-wise guideline implementation including proper scientific evaluation.

Conclusions: Treatment guidelines for hip fracture surgery are available in literature and nationally with somewhat evidence based treatment consensus, but the scientific evaluation of the guidelines them selves needs to be optimized.
Displaced midshaft clavicle fractures: Survey of treatment across centres in Sweden, Denmark and Finland

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Background: The best treatment for displaced clavicle fractures has been subject for an on-going debate throughout decades. Traditionally a non-operative approach of treating all types of clavicle fractures has been gold standard. Though several randomized trials have been performed comparing non-operative and operative treatment the evidence in favor of operative treatment is not compelling and therefore routine operative treatment is not recommended though it seems a trend.

Purpose / Aim of Study: To identify the primary treatment modality used to treat patients with displaced midshaft clavicle fractures at public hospital across several counties in Scandinavia.

Materials and Methods: A purpose made multiple-choice questionnaires in English was addressed to all public hospital across Denmark, Sweden and Finland. The orthopaedic surgeon responsible for clavicle fracture treatment was addressed and the questionnaires were collected from 88 of 118 hospitals. 3 responding hospitals did not treat acute clavicle fractures and were excluded leaving 85 for analysis.

Findings / Results: Across the 3 countries, 81% (69/85) of all hospitals would treat displaced clavicle fractures operatively. Clear criteria for treatment allocation were used at 68% (58/85) of the hospitals with the remaining 32% (27/85) using individual assessment in collaboration with the patient. Precontured locking plates, placed either superiorly 64/85 or anteriorly 10/85, are most used. At 82% (70/85) of all hospitals displaced midshaft clavicle fractures are treated surgically by an orthopaedic specialist.

Conclusions: Displaced midshaft clavicle fractures are predominantly treated surgical in Sweden, Denmark and Finland. Though surgical intervention is a reliable method with few complications, overtreatment seems to take place in these counties as the strategy is not supported by compelling evidence.
Clavicle fractures: characteristics of patients with failure of primary treatment

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Background: Identification of patients at high risk of nonunion, extensive pain or symptomatic malunion following a clavicle fracture is desirable at time on initial treatment. However, little is known about predictive factors associated with these complications and the magnitude of the problem seems unknown as reports on these complication rates vary from below 1% to 40%.

Purpose / Aim of Study: To characterise clavicle fracture patients in whom primary treatment (surgical or non-surgical) fail and surgical treatment is needed.

Materials and Methods: Retrospective assessment of all patients, that based on a complication (non-union, extensive pain or symptomatic malunion), were treated surgical at our institute from 2008 to 2015. Inquiry of electronic patient files and radiographs was done, collecting following: patient demographics, smoking status, fracture type and surgical indication.

Findings / Results: 59 patients (42 males, mean age 49 years (range 20–73)) were included. 53 of the patients had a midshaft fracture (2 fractures were undisplaced and 17 complex) the remaining had lateral fractures. 50 patients were primarily treated non-operatively the remaining surgically. The indications were 42 nonunions, 11 delayed unions, 4 symptomatic malunions and a single pseudoartrosis. Pain was primary symptom in all except one case and 28 were smokers. From 2008 to 2015 a total of 722 patients (age > 18 years) were diagnosed with a clavicle fracture at our institute, estimating an overall complication rate of approximately 8%.

Conclusions: The complication rate following primary treatment of clavicle fractures is not negligible. Compared to epidemiological studies patients with complications seem characterised by older age, female of sex, a displaced midshaft fracture and more are smokers.
Risk factors predicting complications after ankle fracture surgery

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Background: The reported complication rates after ankle fracture surgery are reported as high as 40%. Diabetes, obesity and peripheral vascular disease are factors strongly associated with complications. Whether primary radiographic pathology is related to postoperative complications remains debatable.

Purpose / Aim of Study: Identify patient-, fracture- and surgery-related risk factors associated with complications after surgery for bi- and trimalleolar ankle fracture.

Materials and Methods: 406 patients operated treated for bi- and trimalleolar ankle fracture were retrospectively assessed. Through inquiry of pre- and postoperative radiographs and electronic patient files following data was collected: Demographic data, smoking status, AO classification, medial clear space, width of syndesmosis, fibular length, tibiotalar dislocation. Following was regarded as a complication: infection, wound problems, nonunion, thrombosis and fracture collapse.

Findings / Results: The overall complication rate was 17.2%. Most complications were associated with transsyndesmotic fibula fractures with a medial lesion. Patients with complications seemed older (mean 64 y vs 56y) had higher BMI (BMI > 25 19.2% vs 15.5%) more had diabetes (28.9% vs 16.4%) and more were active smokers (20.4% vs 16.4%) compared to the group without complications. However none of the differences were significant. None of the preoperative or postoperative radiographic findings were statistically significant predictors of complications.

Conclusions: The overall complication rate after ankle fracture surgery seems still high. Our results could not identify any pre- or postoperative factors useful in predicting complication. Transsyndesmotic fibula fractures with a medial lesion should have more attention.
Exposed implant in below knee osteosynthesis – can hardware be preserved until fracture healing?

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**Background:** The treatment goals in case of wound complications with exposed hardware prior to fracture healing are: fracture consolidation, healed soft tissue envelope and prevention of osteomyelitis. Formation of biofilm impedes the chance of eradicating the pathogen without implant removal. Newly developed vacuum therapy systems (NPWTi-d) allow automated intermittent instillation of topical wound solutions with dwell time, supposedly loosening contaminants and subsequently removing them during the negative pressure phase.

**Purpose / Aim of Study:** To illustrate a possible treatment path with NPWTd-i for patients with wound breakdown, exposed implant and an unhealed fracture.

**Materials and Methods:** 7 consecutive patients were included based on following criteria: Stable osteosynthesis below the knee, skin defect of min 1 cm with exposed hardware no later than 8 weeks after the primary surgery, presence of palpable foot pulses or ankle pressure>70 mm hg. Patients with peripheral ischemia were excluded. Surgical debridement with the implant left in situ was followed by vacuum wound therapy with instillation (VAC-veraFlo, KCI), successively conventional NPWT until granulation coverage of implant. Antibiotic treatment was given according to microbiological findings. Radiographic follow up was done 3 months postoperatively. All patients were followed until complete wound healing.

**Findings / Results:** Preservation of the implant until fracture healing was achieved in all patients. The mean length of vacuum wound therapy with instillation was 15 ± 3,4 days, followed by 10 ± 2,9 days of conventional NPWT. The mean inpatient time was 19± 7,8 days.

**Conclusions:** Debridement combined with NPWTi–d seems to provide fracture consolidation as well as soft tissue coverage in this series of early wound complications.
The case for continuing Clopidogrel® therapy during hip-fracture surgery. Results of a retrospective study and systematic review with meta-analysis.

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Background: Hip-fracture patients should optimally receive prompt surgery preferably within 36 hours, but the increasing use of Clopidogrel poses a dilemma for orthopaedic surgeons and anaesthesiologists. Should the treatment be continued in order to reduce the risk of Thromboembolic Events (TE's) or, be discontinued to avoid excessive and/or uncontrollable blood loss and then resumed after surgery.

Purpose / Aim of Study: We investigate if hip-fracture surgery conducted on patients under the effect of Clopidogrel therapy is safe?

Materials and Methods: We have conducted a retrospective observational study of 36 hip-fracture patients with extra-capsular fractures operated with a short intramedullary nail. We combined our results with a systematic review of the English language literature, with meta-analysis of Surgical Bleeding Events (SBE) and 30-day mortality. The retrospective study conducted at our institution combined with five other studies located in a systematic search of PUBMED and EMBASE included a total of 200 patients operated for hip-fractures while under the effect of Clopidogrel. We found; no incidences of uncontrollable blood loss during surgery; a significantly increased OR of 3.64 (95%CI = 1.04 — 12.78, p = 0.044) for SBE in the Clopidogrel group; and no difference in 30-day mortality OR of 0.99 (95%CI = 0.39 — 2.53, p = 0.986).

Findings / Results: Continued Clopidogrel therapy carry an increased risk of hematoma or wound discharge (SBE) after hip-fracture surgery, but does not carry a high risk of uncontrollable blood loss during surgery, nor does it impact 30 day mortality.

Conclusions: We recommend that hip-fracture surgery should be carried out without delay and without discontinuation of Clopidogrel therapy before surgery.
Double-Blinded Randomized Controlled Trial of Patellofemoral vs. Total Knee Arthroplasty for Isolated Patellofemoral Osteoarthritis

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Background: Controversy exists over surgical treatment of patellofemoral osteoarthritis (PF-OA). Registers consistently show poor results of patellofemoral arthroplasty (PFA) compared to total knee arthroplasty (TKA), but case series show good results of PFA.

Purpose / Aim of Study: This study aims to compare the clinical and patient-reported outcomes of treatment with PFA and TKA.

Materials and Methods: A double-blinded (for the first year), multi-centre trial with intraoperative randomization between TKA and PFA was performed. Participating hospitals included 205 patients from 2007 until 2014. The inclusion criterion was bone-on-bone on the skyline view. Of the inclusions, 67 patients rejected participation, and a further 38 patients were excluded intraoperatively due to tibiofemoral lesions. The remaining 100 patients were operated in one of five hospitals, 50 received a PFA and 50 a TKA. Clinical, radiological and patient-reported data was collected. This paper reports the 1–7 year results.

Findings / Results: There were 76 females and 24 men. The OKS was 23.8/23.1 for the PFA/TKA groups at inclusion. For the PFA group, the OKS was 39.6, 39.0, 40.2 and 39.5 at 9 months, 1, 3 and 5 years, respectively, and for the TKA group, the OKS was 34.6, 36.3, 36.0 and 35.7 (p<0.01 for all time points before one year, n.s. thereafter). Similar results were found for other PROMs. The flexion range at two years was 130 degrees for the PFA group and 123 for the TKA group (p<0.05).

Conclusions: Patient-reported outcomes were significantly better for PFA compared to TKA for the first year. This difference between PFA and TKA results are also in favour of PFA for all later time points, although non-significant. Patients receiving a PFA had significantly better range of movement. There were more reoperations in the PFA group, but the number of implant revisions was identical.
Plate fixation compared with nonoperative treatment of displaced midshaft clavicular fractures. A randomized controlled trial

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Background: Newer studies have questioned traditional nonoperative treatment of midshaft clavicular fractures, indicating superior results following operative treatment, including higher healing rates.

Purpose / Aim of Study: To compare the efficacy of osteosynthesis with that of nonoperative treatment regarding shoulder function, non-union rates, and sick leave in patients with a displaced midshaft clavicular fracture.

Materials and Methods: In a multicenter, prospective trial, 147 adult patients with an acute displaced fracture of the middle third clavica were randomized to either osteosynthesis with a precontoured plate and locking screws (75) or nonoperative treatment with a sling (72). Outcome parameters included Disabilities of the Arm, Shoulder and Hand (DASH) Score, Constant Score, duration of sick leave, and radiographic union. Patients were followed for 1 year.

Findings / Results: At three months follow-up both DASH (median 1.7 vs. 8.3) and Constant Scores (97 vs. 90) were significant better in the operated group (p<0.05). After one year there was no difference in DASH (0.83 in both groups) or Constant Scores (98 vs. 97). The non-union rate was lower in the operated group (2 of 65 vs. 11 of 64 patients, p<0.02). Nine patients in the non-operated group were surgically treated for non-union. Plate removal was performed in sixteen patients after primary osteosynthesis. Ninety percent of surgically treated patients had returned to work after three months compared with seventy-four percent of conservatively treated patients (p<0.05).

Conclusions: Osteosynthesis of displaced midshaft clavicle fractures with precontoured plates and locking screws results in higher union rate and quicker return to work. There is, however, no difference in functional outcome after one year.
Autologous cartilage chip implantation improves cartilage repair tissue quality in osteochondral defects

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Background: Osteochondral injuries in the knee have a poor endogenous healing potential and no gold standard treatment has been established. Recently, the use of cartilage chips has been emerging in the literature with promising short-term clinical results.

Purpose / Aim of Study: The aim of this study was to investigate the repair response of cartilage chips in a Göttingen minipig (GMP) osteochondral defect model. The hypothesis was that the presence of cartilage chips would improve the quality of the cartilage repair tissue in osteochondral defects.

Materials and Methods: Twelve GMP’s received two 6 mm deep osteochondral defects in each knee. The defects were randomized to autologous bone graft combined with autologous cartilage chips (Autologous dual-tissue transplantation, ADTT) or autologous bone graft alone (ABG). Six GMP’s were euthanized at six months and six GMP’s at 12 months. Evaluation of repair was performed by histomorphometry.

Findings / Results: The presence of cartilage chips in the defects resulted in significantly more hyaline cartilage in the ADTT group compared with the ABG group at both six months (25.8% vs. 12.8%) and at 12 months (20.1% vs. 4.8%). There was significantly more fibrocartilage in the ADTT group compared with ABG alone at both time-points (44% vs. 27.5% and 60.8% vs. 41%, respectively) and there was significantly less fibrous tissue in the ADTT group compared with the ABG group at both time-points (27.6% vs. 57.7% and 16% vs. 48.3% respectively).

Conclusions: The presence of cartilage chips in an osteochondral defect facilitated the formation of fibrocartilage as opposed to fibrous tissue at both six- and 12- months follow-up. This study confirms the chondrogenic effect of cartilage chips on cartilage repair tissue in osteochondral defects.
Combined Intra-articular and Intravenous Tranexamic Acid Significantly reduce Blood Loss in Knee Arthroplasty

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Background: In total knee arthroplasty (TKA) both systemic and topical administration of tranexamic acid (TXA) has been proven to reduce blood loss in several RCT’s though routine use of systemic TXA is considerably more common. However, additional benefit of topical TXA in addition to systemic TXA has not previously been investigated.

Purpose/Aim of Study: The aim was to evaluate if combined topical and systemic TXA administration reduced total blood loss compared to systemic TXA alone.

Materials and Methods: In this randomized, double-blind, placebo-controlled, trial 60 patients scheduled for TKA were assigned to receive either 1) combined TXA administration 1 g intravenously (IV) preoperatively + intra-articular (3 g TXA diluted in 100 ml saline) prior to wound closure (TXA IA + IV) or 2) 1 g TXA IV alone + 100 mL saline intra-articular (TXA IV + placebo). IA TXA was administrated through a puncture needle. Primary outcome was 24 h calculated blood loss. Secondary outcomes were blood loss on 2nd postoperative day, thromboembolic complications and transfusion rate. Blood loss was calculated by hemoglobin differences.

Findings/Results: Data on primary outcome was available for all 60 included patients. 24 h blood loss was 466 (SD±313) mL in the TXA IV + IA vs. 743 (SD±358) mL in the TXA IV + placebo group, treatment effect 277 (95% CI 103 – 451; p = 0.002) mL. 2nd day blood loss was 644 (SD±382) mL in the TXA IV + IA vs. 1017 (±519) mL in the TXA IV + placebo group, treatment effect 373 (95% CI 132 – 614; p = 0.003) mL. No thromboembolic complications were observed within 90 days postoperatively.

Conclusions: The combined administration of systemic and intra-articular TXA resulted in a clinically relevant reduction in blood loss of 37% both 24 h and 2nd day after surgery compared to intravenous TXA alone. No thromboembolic events were observed.
Background: Treatment of mallet finger fractures with a bony fragment of more than one third of the articulating surface is controversial. Surgery is commonly recommended, but conservative treatment has been proposed regardless the size of the bony fragment.

Purpose / Aim of Study: This study aimed to compare the outcomes after conservative treatment with splinting and surgical extension block pinning (EBP) of mallet finger fractures.

Materials and Methods: Based on sample size calculation we included thirty patients in this study. The inclusion criteria’s were acute mallet finger fracture with a bony fragment of at least one third of the articulating surface and no subluxation. Patients were randomized to a 6 weeks of splinting or surgical EBP. Patients were followed up at 3 and 6 months. The primary outcome was degrees of extension lag. Secondary outcomes were range of motion and finger pulp-distal crease distance. At final follow up patients reported pain intensity on a Numeric Rating Scale (0-10), DASH score was filled in and complications were recorded.

Findings / Results: At 3 months follow up the extension lag was 10° (95% CI; 6-15) in the splinting group and 9° (95% CI; 4-15) in the surgical EBP group (p=0.84). Range of motion was 54° (95% CI; 48-59) in the splinting group and 35° (CI; 25-46) in the surgical EBP group (p<0.05). The finger pulp-distal crease distance were 0 centimeter (range 0-1) and 1.5 (range 0-5) in the splinting and surgical EBP group, respectively (p< 0.05). The complete six months results will be ready for presentation at the DOS conference 2015.

Conclusions: To our knowledge this is the first randomized controlled trial comparing splinting and surgical treatment with EBP in mallet finger fractures. Based on results from this study we recommend splinting in the treatment of mallet finger fractures without subluxation.
Migration and bone remodeling after uncemented TKA. A randomized RSA and DEXA study comparing monoblock and modular tibial component designs.

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**Background:** Previous studies have shown very low migration rate of the uncemented Zimmer Nexgen Trabecular Metal Monoblock tibial component (A), but there are no data regarding the modular version (B) of the implant exists.

**Purpose / Aim of Study:** To investigate the effects of the 2 different uncemented tibia component designs on the migration of the implants and the changes in bone mineral density (BMD) of the proximal tibia.

**Materials and Methods:** 67 patients scheduled for an uncemented TKA (Zimmer NexGen Trabecular metal) were included in the study and block randomized to 2 groups of either monoblock (A) or modular (B) polyethylene design. We performed 2 year follow-up of 53 patients (mean age 62 (38–70) years, F/M=27/26, BMI 29.5) using radiostereometric analysis (RSA) and dual energy X-ray absorptiometry (DEXA). Statistics: Nonparametric tests (Wilcoxon signed rank-sum test and Mann–Whitney U-test).

**Findings / Results:** We found no significant difference in maximum total point migration (MTPM) between the groups at 3 months (p=0.16) or 6 months (p=0.10), but at 12 and 24 months of follow-up a difference in MTPM between groups of 0.36 mm (p=0.021) and 0.42 mm (p=0.017) was found with the highest total migration of 1.01 mm in group B. In group A we found a decrease in BMD of 15% and 13% in respectively the medial and lateral tibia condyle, whereas in group B BMD at 2 years was almost unchanged compared to the preoperative level. The differences in BMD change were statistically significant between the groups in both the medial (p=0.034) and lateral (p=0.016) ROI. In the distal ROI we found no significant change in BMD in either group.

**Conclusions:** We found a higher MTPM in group B, but a beneficial migration pattern was seen in both groups. A higher degree of bone loss was seen in group A.
Analgesic and sedative effects of perioperative gabapentin in total knee arthroplasty: A randomized, double-blind, placebo-controlled, dose-finding study

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Background: The acute postoperative pain intensity is pronounced after TKA. Gabapentin has shown promising analgesic effects, but the optimal dose and procedure-specific benefits vs. harm have not been clarified.

Purpose / Aim of Study: We aimed to investigate the dose-related effect of gabapentin in patients undergoing TKA by conducting the largest, randomized, double-blind, placebo-controlled, dose-finding study.

Materials and Methods: The study was approved by relevant health authorities and followed GCP-standards. It was conducted at 3 high volume knee arthroplasty centers; Hvidovre, Farsø and Grindsted. 300 patients scheduled for unilateral TKA were randomized (1:1:1) to gabapentin 1300 mg/day (group A), gabapentin 900mg/day (group B) or placebo (group C) daily from 2 hours preoperatively to postoperative day 6. In addition, all patients received a standardized multimodal analgesic regime. The primary outcome was pain upon ambulation (walking 5 meters) 24 hours after surgery; the secondary outcome sedation 6 hours after surgery. Further, we evaluated pain, morphine use, side-effects and adverse reactions in detail during the entire study period.

Findings / Results: Pain upon ambulation [VAS, mean (95% CI)] 24 hours after surgery in group A vs. B vs. C was: 41 (37-46) vs. 41 (36-45) vs. 42 (37-47), p=0.93. Sedation [NRS, median (range)] 6 hours after surgery was: 3.2 (0-10) vs. 2.6 (0-9) vs. 2.3 (0-9), the mean difference A vs. C being 0.9 (0.2–1.7), p=0.046. Sleep quality was better during the first 2 nights in group A and B vs. C, but dizziness was more pronounced from day 2-6 in A vs. C. More severe adverse reactions were observed in group A vs. B and C. No other between-group differences were observed.

Conclusions: Gabapentin has limited if any role in acute postoperative pain management of TKA patients and should not be recommended as standard of care.
Preoperative treatment of Giant-Cell Tumors of Bone with Denosumab

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Background: Giant cell tumor of bone (GCT) is a locally aggressive tumor classified as borderline malignant. GCT consists of multinucleated giant cells (osteoclast-like cells) and stromal cells which lead to destruction of the bone. Treatment has so far been surgical resection. Denosumab (Dmab) is a RANKL-inhibitor which inhibits osteoclasts and impairs the growth of GCT

Purpose / Aim of Study: To describe the clinical, radiographic and pathological effects on the first 5 GCT-patients in Denmark treated with Dmab

Materials and Methods: 5 patients (15–30 years) with GCT considered operable only by amputation or with a high risk of functional impairment were treated preoperatively with Dmab, 120mgx1 s.c. at day 1, 8 and 15 and every 4 week. Treatment was continued until the patients were considered operable (3–8 months) Patients were surgically treated with curettage and cement (3), bone graft (1) and wide resection (1). Tumor-size was evaluated on MRI and X-ray until surgical treatment. Local tumor bone mineral density (BMD) and bone turnover markers (osteocalcin and CTX) was followed in 3 patients. GCT was evaluated histologically before and after treatment with Dmab

Findings / Results: Dmab treatment resulted in reduction in tumor size in 3 patients. BMD increased by 37–44% and bone formation increased. The GCT tissue almost disappeared and was replaced by benign fibrous histiocytoma tissue. All patients experienced pain reduction after 5 weeks of treatment. No adverse events were reported. Two patients had a recurrence of which 1 was amputated and 1 had a wide resection of the tumor

Conclusions: Dmab has a deleterious effect on GCT tissue resulting in increased bone deposition. Recurrence may occur probably due to presence of stroma cells not affected by Dmab. It is questioned whether Dmab treatment should be continued after surgery in this selected group of patients
Background: The Danish Hip Arthroscopy Registry (DHAR) was initiated in January 2012 as a web-based prospective registry.

Purpose / Aim of Study: The purpose of this study was to evaluate and report the outcome data of a Danish population with radiological and clinical FAI undergoing hip arthroscopy. Our primary hypothesis was that patients undergoing hip arthroscopy would improve significantly in both pain, quality of life and in sports related outcome measurements in Patient Related Outcome Measures (PROM).

Materials and Methods: Perioperative data and PROM data from DHAR between January 2012 and May 2015 was extracted. Radiological pincer-type FAI was defined as LCE > 35 degrees and CAM-type FAI as Alfa angle > 55 degrees. These data was combined with FAI surgical data such as osteoplasty and labral repair or resection. PROMs consisting of iHOT12, HAGOS, EQ-5D and VAS pain scores were submitted online by the patients preoperatively and at 1, 2 and 5 years follow-up.

Findings / Results: We extracted data from 1480 FAI patients in DHAR. HAGOS demonstrated significant improvement in all subscales at follow up. EQ-5D demonstrated improvement after 1 and 2 years from 0,66 pre-op to 0,78 at 2 years. Mean iHOT12 was respectively 47 (pre-op), 49 (1 year FU) and 43 (2 year FU). At 1 year follow up iHOT12 shows improvement in 5 subscales, deteriorating in 3 subscales and no change in 4 subscales. At 2 year follow up there was a worsening in 6 subscales including pain in hip, getting up from floor, sexual activity, carrying children, walking distances, pushing and lifting. The pain score data demonstrated improvement in VAS 55 to 33 at follow up.

Conclusions: We conclude that patients with femoroacetabular impingement undergoing hip arthroscopy experience improvement in pain and quality of life but only in some aspects of function and sports.
Danish Hip Arthroscopy Registry:  
An epidemiologic and perioperative description  
of the first two thousand patients.

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**Background:** The Danish Hip Arthroscopy Registry (DHAR) was initiated in January 2012 as a web-based prospective registry.

**Purpose / Aim of Study:** The purpose of this study was to evaluate and report the epidemiologic and perioperative data of the first two thousand patients in the DHAR and to describe the registry. We hypothesized that patients undergoing hip arthroscopy have considerable hip and/or groin pain, loss of function and reduced quality of life measured and that the majority of patients were treated for femoroacetabular impingement (FAI).

**Materials and Methods:** Surgeons report operative and radiographic data on-line to the database. Patients submit on-line preoperatively and at follow-up several patient reported outcome measures (PROM). These PROMs are all validated scores suitable for Danish patients undergoing hip arthroscopy. Perioperative data and PROM data from the DHAR between January 2012 and May 2015 was extracted.

**Findings / Results:** The 2000 patients consisted of 56% females and 44% males. Mean age 37.5 years. Mean surgical time was 86 minutes and mean traction time 49.7 minutes. The most frequent procedure was CAM and Pincer resection in 86% and labral refixation in 70% of the cases. Acetabular chondral damage Grade III and IV changes were seen in 41% of the cases. The preoperative iHOT12 PROM was mean 45 based on all 12 items. EQ-5D was 0.65 and HAGOS sub scores were 51 (pain), 49 (symptoms), (ADL), 35 (sport), 20 (physical activity) and 29 (QoL) respectively.

**Conclusions:** We conclude that patients undergoing hip arthroscopy report considerable pain, loss of function, reduced activity level and reduced quality of life prior to surgery. The majority of patients undergo procedures for FAI treatment. We consider the development of a national clinical registry for hip arthroscopy successful as both a clinical and scientific tool.
Healthy patients with colonized implants -
a ticking bomb for the future of orthopedics?

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Background: Many chronic infections are caused by aggregates of bacteria called biofilm. The biofilms are small, heterogeneously spread within the infected area and have a low metabolism. Because of this, the bacteria are hard to eradicate with standard antibiotic treatment, but they are also hard to diagnose. Not much is known about the early stages of infection.

Purpose / Aim of Study: The purpose of this study was to identify and describe whether healthy implants are colonized with microbiological agents.

Materials and Methods: Over a two-month period 20 implants were collected from adult patients, using a standard aseptic surgical procedure. Inclusion criteria were no clinical sign of infection. Implants were placed into sterile containers with physiological saline adequate for sonication. Implants were vortexed and sonicated followed by centrifugation. The pellet was re-suspended, plated on agar-plates and DNA was purified. Colonies were analysed by MALDI-TOF (Matrix Assisted Laser Desorption/Ionization - Time of Flight Mass Spectrometry), DNA was analysed with RT-PCR and sequenced to identify bacterial and fungal agents.

Findings / Results: The median time for an implant in our 20 patients was 10 months with a range from 0.3–432 months. 14 patients had implants removed after fracture surgery; five implants came from arthroplasty surgery and one from ligament reconstruction. We found 12 positive at agar-plates and MALDI-TOF. PCR found 8 positive for bacterial agents and 6 for fungal agents. Only one set of seven Kamme-Lindberg cultures were found to be positive.

Conclusions: Clinically non-infected implants may be colonized by bacterial and fungal agents. This study indicates that bacteria can prosper on implants without causing pathology. Further research should examine a greater cohort of patients.
Patient reported effect of arthroscopic subacromial decompression after failure of conservative treatment

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Background: Impingement of the shoulder is the most common shoulder complaint. Though previously investigated, an international consensus in treatment of impingement is inconclusive. Several studies have provided good evidence of the effects of an Arthroscopic Subacromial Decompression (ASD), but recent studies have cast doubt if surgery is beneficial in treating impingement. However, few studies have investigated which patients would benefit the most from an ASD, after conservative treatment has failed.

Purpose / Aim of Study: To decide the effect of ASD in patients suffering from impingement after conservative treatment has failed. Furthermore, an investigation of which patients benefit the most from ASD.

Materials and Methods: 235 patients with no limitations of age were prospectively included in the study. All patients were treated with an ASD at the department of Orthopedics at Randers Regionshospital, Denmark. Patients submitted two questionnaires before surgery and at 6 months follow-up. The questionnaires included The Oxford Shoulder Score (OSS), EQ-5D and VAS of arm function.

Findings / Results: Patients were divided into 3 subgroups according to low/moderate/high Pre-OSS. The Low Pre-OSS group had a mean difference in OSS of 18.8 [12.9 ; 24.7]p=0.0001. The Moderate Pre-OSS group had a mean difference in OSS of 11.9 [6.6 ; 17.3]p=0.0001 The high Pre-OSS had a mean difference in OSS of 4.1 [-1 ; 9.3]p=0.11. The EQ-5D and VAS of arm function also concluded a significant shift in the low/moderate Pre-OSS group, and also pointed out that quality of life was compatible for all groups postoperatively.

Conclusions: ASD is an effective treatment for patients suffering from impingement after conservative treatment has failed. Furthermore our study provides evidence that patients with lower/moderate Pre-OSS benefit the most from surgical intervention.
Does an accelerated hip fracture pathway in a non-orthogeriatric unit reduce hospitalization without changes in 30 day mortality?

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Background: Hip fractures pose a socio-economical challenge and often result in long-term hospitalization. This is hazardous for weakened elderly patients who risk infections, deterioration and thereby increased mortality. Accelerated hip fracture pathways in orthogeriatric units have shown to have a positive effect on hospital Length Of Stay and mortality.

Purpose / Aim of Study: To evaluate if implementation of an accelerated hip fracture pathway in a non-orthogeriatric unit reduces LOS while not increasing mortality or readmission rates.

Materials and Methods: A multidisciplinary hip fracture study-group involving doctors, other health professionals and the community care was created. An optimized accelerated hip fracture program was designed. Early contact to community care, early surgery, mobilization and accelerated rehabilitation after discharge was intended. The program was enrolled on the 1/9/2014. A consecutive group of patients with ICD (S72.0/1/2) proximal femoral fracture admitted through the Emergency Department from the 1/9/2014 to 31/12/2014 was compared with a consecutive group of patients admitted 1/9/2011 to 31/12/2011 with the same ICD codes.

Findings / Results: Demographic data, ASA-score and fracture types were comparable. LOS decreased significantly from a mean at 133 hours (5.5 days) 95%CI [124;142] to 97 hours (4.0 days) [89;107], p < 0.0001. Thirty-day mortality of 9 % was seen in both cohorts which compares to that of similar studies. The readmission rate did not change significantly. Data showed an unforeseen increase in proximal femoral fractures of 36,2% admitted to the hospital in the observation period from 2011 to 2014.

Conclusions: Implementation of an accelerated hip fracture pathway in a non-orthogeriatric unit decreased LOS without increasing mortality or readmission.
Comparison of Clinical Results with Bone Allograft or PMMA after Intralesional Curettage for Giant Cell Tumors of Bone

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Background: PMMA is a popular option for reconstruction after curettage of giant cell tumors (GCT). However, bone remodeling is precluded by the presence of PMMA, which is why cancellous allograft remains the preferred material for bone defect reconstruction in some centers. Wide resection is usually only considered when the joint is deemed unsalvageable.

Purpose / Aim of Study: To determine local recurrence rates after wide resection of GCT compared to intralesional treatment.

Materials and Methods: A retrospective review of all consecutive patients (n=104, M/F: 60/44, mean age 35 (11–84 years) treated for GCT in the appendicular skeleton at two orthopedic oncology centers between 1998 and 2013. Choice of treatment and local recurrence rates was recorded and evaluated with statistical methods including Kaplan-Meier survival analysis and log rank test.

Findings / Results: Wide resection (16 arthroplasties, 15 local bone resections and 4 amputations) was performed in 35 patients. The remaining 69 patients underwent curettage and bone defect reconstruction with cancellous allograft (n=37) or PMMA (n=32). Local recurrence occurred in only 1 case of patients treated with wide resection, whereas it occurred in 23 cases of patients treated by intralesional curettage. This difference between wide and intralesional treatment was statistically highly significant (P<0.001). When comparing local recurrence rates of reconstruction methods for intralesional treatment, we found no statistical difference (p=0.75) between bone cement (n=10) and bone graft (n=13).

Conclusions: Wide resection of GCT’s is associated with very low recurrence rates compared to intralesional treatment. We were unable to detect a statistical difference in recurrence rates when using PMMA for bone defect reconstruction compared to bone allograft without further adjuvant therapy.
Clinical Results after Intralesional Curettage in Benign and Borderline Bone Tumors

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Background: Intralesional curettage is a common surgical treatment for benign bone tumors. Although, in principle, the tumor recurrence rate is higher with intralesional surgery, the functional outcome is often better than in wide resections.

Purpose / Aim of Study: To determine the clinical results following curettage and bone grafting.

Materials and Methods: We performed a retrospective review of all consecutive patients (n=166, F/M: 86/80, mean age 31 (2-72 years)) who underwent intralesional curettage for benign or borderline bone tumors in the appendicular skeleton at our orthopedic oncology center, between 2009 and 2013. We recorded histology and anatomic region of the bone tumors, choice of treatment and biopsy verified local recurrence rates.

Findings / Results: The most common lesions treated were enchondromas (n=57), simple cysts (n=31), aneurysmal bone cysts (n=16), fibrous dysplasia (n=14) and GCTs (n=13). Cancellous allograft was used for bone defect reconstruction in the majority of the cases (n=141). Autograft was used in 3 cases and a bone graft substitute in 5 cases. In 17 cases, the bone defect was left empty. The most commonly affected long bones were femur (n=47), tibia (n=26) and humerus (n=10), and the most commonly affected region was the knee (n=47). We recorded 10 complications, with postoperative infection (n=3), postoperative fracture (n=2) and nerve palsy (n=2) being the most common. Local recurrence occurred in 13 cases (8%), with simple cysts in children (n=3) surprisingly being the most common.

Conclusions: In this 5-year review of 166 patients, treated for a benign or borderline bone tumor in a single orthopedic oncology center, we found that intralesional curettage and bone defect reconstruction with cancellous bone allograft is a reliable treatment with acceptable recurrence and complication rates.
Reoperation factors in malleolus fracture surgery

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Background: Malleolus fractures often require operation. They have a high reoperation rate – the second highest in Denmark only surpassed by proximal femoral fractures. Reoperation is followed by longer rehabilitation time and is uneconomical.

Purpose / Aim of Study: The reason for the high reoperation rate has yet to be determined. The purpose of the study was to provide a descriptive analysis of malleolus fracture operation cases that were followed by reoperation and to determine factors in primary operations that led to increases in reoperations.

Materials and Methods: This study included patients with operations registered in the Danish Fracture Database (DFDB) from November 2008 to May 2014 who were reoperated. The factors leading to reoperation were found.

Findings / Results: 111 of 281 reoperations had a primary operation registered in the DFDB: 43 underwent hardware removal due to irritation or pain from material; 26, postoperative infection; 22, suboptimal osteosynthesis, and 13, osteosynthesis failure. A resident or intern performed 79 of the 111 primary operations; 25 of the 111 were supervised by an attending surgeon or traumatologist AO fracture classification 44C was higher in reoperated patients with suboptimal osteosynthesis and osteosynthesis failure than in any primary operations.

Conclusions: Operations by unsupervised residents tended to have a higher reoperation rate than attending surgeons or supervised residents. More complex malleolus fractures seem to have a higher risk of suboptimal osteosynthesis or failure.
Bone shortening of clavicular fractures: comparison of measurement methods

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Background: A relative indication for operative treatment of the fresh clavicular fracture is bone shortening over 2 cm; nonetheless this is controversial within the scandinavian countries were such a connection has not been found. A review of the literature shows different measurement methods for shortening are used scientifically.

Purpose / Aim of Study: We wanted to investigate if the scientifically used measurement methods were interchangeable to each other by comparing intra-class correlation, standard error of measurement and minimal detectable change as well as using Bland-Altman plots.

Materials and Methods: Two raters measured clavicle shortening on 65 patients using conventional radiographs on two separate sessions. The two methods described by Hill et al and Silva et al were used on unilateral pictures. Side comparison were done on panoramic radiographs.

Findings / Results: We found that none of the methods were directly interchangeable. We found fewer patients patients with bone shortening over 2 cm when using side comparison.

Conclusions: Our results cautions for the interpretation of scientific results on clavicular bone shortening. In a clinical context the measurement method used for clavicular bone shortening could be an explanatory factor in differences of operative care rates between countries.
Positiv cultures in primary cuff surgery

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Background: High rate of positive tissue cultures are reported from primary shoulder arthroplasty but it is unclear whether open cuff surgery have similar rates.

Purpose / Aim of Study: To characterize and investigate the rates of positive cultures in patients undergoing open shoulder surgery

Materials and Methods: The study was designed as a prospective cohort study enrolling consecutive patients scheduled for open shoulder surgery between May 2014 and May 2015. Previously ipsilateral shoulder-operated patients were excluded. During surgery five tissue biopsies were obtained ad modum Kamme Lindberg and cultured for aerob and anaerob growth on three different plates, and in Serum broth and Semi-solid agar. All cultures were checked daily the first four days to identify growth. Serum broth and Semi-solid agar was furthermore observed after 14 days. Infection was defined as three or more positive cultures with the same bacteria and contamination as less than three. Results are presented with counts or percentage including 95% confidence interval (95% CI).

Findings / Results: Until February, 2015, 39 cases were included with an average age of 67 years (range: 47-79) and 15 were male (38.46%). Preliminary results showed seven infected cases 17.95% (95%CI 5.35-30.55) and two cases as contaminated (7.69%). All infected cases were propionibacterium acne, all diagnosed after the extended growth period. The cases showed no clinical signs of infection postoperatively, although they later were diagnosed as infected or contaminated.

Conclusions: High rate of positive biopsies were found in assumable sterile shoulders. The clinical implication is unclear and raises the question of the need for prolonged prophylactic treatment after open shoulder surgery.
No effect on tissue oxygenation at the ankle level after sciatic and saphenous nerve block

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**Background:** Wound healing complications is a significant problem after major foot and ankle surgery. A frequency of more than 30% wound healing complications is reported after total ankle replacement. The frequency has apparently not changed over the years despite strict selection of patients and interventions in order to reduce wound healing complications. Therefore other components of clinical practice are examined for possible negative effect on wound healing. A possible contributory factor to reduction of oxygen tension and thereby negative effect on wound healing frequency could be peripheral nerve blocks.

**Purpose / Aim of Study:** The purpose was to detect any influence of sciatic and saphenous nerve block on tissue oxygenation at the ankle level.

**Materials and Methods:** 20 patients scheduled for major foot surgery had a sciatic and saphenous nerve block prior to surgery. Transcutaneous oxygen tension (tcpO2) was measured before and after the nerve block and after surgery. TcpO2 was measured at the ankle level and at the thigh of both legs. The TCM400 Transcutaneous pO2 Monitoring System (Radiometer, Copenhagen) was used for all measurements.

**Findings / Results:** The median tcpO2 at the ankle level was 63 mmHg (IQR 53–66 mmHg) before and 60 mmHg (IQR 54–66 mmHg) after the nerve block (p>0.05, Wilcoxon sign test). No significant changes occurred in the ipsilateral thigh or the contralateral leg. Generally, a small increase of TcpO2 was observed both in the operated leg and the non-operated leg the first few postoperative hours. However, one patient had a marked reduction at the ankle level in tcpO2 from 66 mmHg to 45 mmHg after the nerve block has been applied.

**Conclusions:** Sciatic and saphenous nerve blocks have generally no influence on the tissue oxygenation at the ankle level measured by transcutaneous oxygen tension.
Can MRI predict the tissue quality of a meniscus tear?

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Background: Studies suggest that arthroscopic treatment of degenerative meniscus tears in middle-aged and elderly patients have a small effect, but not more than supervised physical exercise. The question is however, can MRI predict if a meniscus tear is degenerative or not?

Purpose / Aim of Study: The objective of this study was to investigate the correlation between meniscus tissue quality (degenerative/non-degenerative) assessed on MRI and during arthroscopy, in order to predict degenerative meniscus tears by MRI.

Materials and Methods: 51 menisci from 50 patients (31 males, 19 females, mean age 41.2 years), who underwent arthroscopic meniscus surgery due to clinical signs of meniscus tear, were included in order to describe the meniscus tissue quality (degenerative/non-degenerative/combination of both/undetermined) arthroscopically and on MRI. All surgeries were performed or supervised by a senior surgeon in knee arthroscopy. The tissue quality of the torn meniscus was classified as hard or soft at resection. MRI was analyzed by a senior musculoskeletal radiologist according to a validated MRI score.

Findings / Results: 15 menisci were rated non-degenerative and 17 menisci were rated degenerative both arthroscopic and on MRI. (p=0.003, Fisher’s exact test). This suggests a statistically significant relationship between meniscus tissue quality rated arthroscopic and meniscus tissue quality rated on MRI. Cramer’s V was calculated to V=0.38 indicating a medium to large effect size.

Conclusions: Our results suggest a statistically significant relationship between meniscus tissue quality rated arthroscopically and on MRI in patients with a meniscus tear. Degenerative and non-degenerative tears could not be predicted in all cases by MRI. The predictive effect was medium to large.
Preoperative Oral Anticoagulants in Fast-track Hip and Knee Arthroplasty, Practice and Outcomes

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Background: Perioperative management of oral anticoagulants (OAC) is an increasing challenge in major joint arthroplasty. Current guidelines are complex and the benefit of preoperative bridging in patients with preoperative OAC treatment vs. potential increased risk of bleeding is uncertain.

Purpose / Aim of Study: Investigation of management of OAC and adherence to local and Danish Society of Thrombosis and Hemostasis guidelines, postoperative symptomatic thromboembolic (TE), venous thromboembolic (VTE) and major bleeding events.

Materials and Methods: Descriptive cohort study in THA and TKA, prospective data on comorbidity and dispensed prescriptions on OAC 6 months prior to surgery. Information on perioperative management of OAC, cause of length of hospital stay (LOS) >4 days, and 30-days readmissions from the Danish National Patient Registry and medical records.

Findings / Results: Of 13775 procedures, 717 (5.2%) had OAC (649 Vitamin-K (Vit-K) antagonists/ 68 new oral anticoagulants (NOAC)) of which 78% were due to atrial flutter. Of Vit-K, 66% received pre and postoperative heparin bridging while 33% paused preoperatively and were bridged postoperatively. Local and national guidelines were followed in 75% and 50% of OAC-patients respectively. There were 5 (0.8%) TE in Vit-K (p<0.05) vs 22 (0.2%) in non-OAC patients. No TE occurred in NOAC patients. We found no difference in VTE between OAC and non-OAC-patients (0.4 vs 0.5%). There were 11 (1.5%) vs. 76 (0.5%) major bleedings in OAC vs non-OAC patients (p<0.05), 7 (1.6%) were in bridged Vit-K and 3 (4%) in NOAC (p<0.05 vs non- OAC).

Conclusions: National guidelines for OAC management are not routinely used in clinical practice. There was no difference in VTE, but increased risk of TE and major bleeding with OAC, especially in bridged Vit-K and NOAC patients.
The influence of infecting microorganisms on outcome after infectious revision knee arthroplasty. A two year nationwide study

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Background: The initial surgical treatment of the infected knee arthroplasty is in most cases a partial revision (surgical debridement and exchange of tibial insert) or a revision to spacer procedure. Impact of the ethiological agent on outcome is unknown.

Purpose / Aim of Study: To describe the distribution of microorganisms causing primary infection and influence on outcome after revision surgery, measured as re-infection or death.

Materials and Methods: 105 partial revisions and 218 revision-to-spacer procedures were registered in the Danish Knee Arthroplasty Register (DKR) from July 1 2011 to June 30 2013. Re-infections causing re-revision (follow-up=396 days) and 90 days mortality were obtained from the Danish National Patient Register and DKR. Microbiology data was obtained from the Danish Microbiology Database. 7 cases without microbiology data were excluded.

Findings / Results: In 66(20.4%) cases cultures were negative and in 12(3.3%) cases 1/5 intraoperative biopsies were culture positive and thus considered contaminated. S.aureus infections were most common (n= 67;28%) and associated with 13.4% re-infections, 6.0% mortality and 2(0.8%) cases of methicillin resistance (MRSA). S.epidermidis was found in 46 (19.2%) cases with 8.7% re-infections and no deaths. Gram-negative species caused infection in 16(6.7%) cases with 23.5% re-infections and 12.5% mortality. In 63 (26.4%) cases a mixed genera caused infection with 17.5% re-infections and 1.6% mortality. S.epidermidis infections were more common in revision-to-spacer procedures (23.1%) than in partial revisions(11.4%). The distribution of the remaining species did not differ between surgical subgroups.

Conclusions: The most frequent ethiological agent was s. aureus, but with a low rate of MRSA. The highest re-infection rates after revision surgery were found in polymicrobial or gram-negative infected knees.
Safety of Metal-on-Metal Articulation

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Background: Results after MoM THAs are generally good. Reports have emerged of abnormal soft-tissue reactions to MoM THAs and Total Hip Resurfacing (THR).

Purpose / Aim of Study: To assess the prevalence of pseudotumours in patients, who have received a large diameter MoM prosthesis. To assess the revision rate of large diameter MoM prosthesis. To correlate these findings to the type of prosthesis (THA versus THR).

Materials and Methods: 182 hips (160 patients), 103 THR (Recap Biomet) (93 patients) and 78 MoM THA (uncemented Bi-Metric, Biomet and Magnum head, Biomet) (67 patients) were included in the study designed as an observational cross-sectional study. The follow-up included a clinical hip examination, standardized AP pelvic and lateral hip radiographs, blood serum samples for metal ion level of chrome and cobalt. Patients with elevated metal ion levels (119nmol/L for cobalt and 134,5 nmol/L chromium) or patients with groin pain lasting at least one month considers CT imaging indicated in these patients.

Findings / Results: Mean observation 3,5 year (1-7). X-ray showed two acetabular components with retroversion (1 THA / 1 THR) (elevated ion levels) underwent revision. In total 14 patients (7 THA/7 THR) had elevated ion levels. These and six patients with reaction pain from the hip underwent CT scan (9 THA/ 11 THR). The CT scan showed one pseudotumor (1227 nmol/L Cobalt and 1589 nmol/L Chromium) underwent revision and one minor cyst without clinical symptoms (123 nmol/L Cobalt and 107 nmol/L Chromium) is still under observation. One patient (THR) with groin pain is additional revised.

Conclusions: The main subject was to find the prevalence of cyst formation and correlate to the types of MoM prostheses (THA/THR). There was one in the THA group and NS to the THR group. Revision rate was 2,2 % (2 THA / 2 THR) NS and comparable to traditional hip arthroplasty.
Mononucleated Bone Marrow Cells do not Survive During Long-Term in vitro Culture

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Background: The use of mononucleated cells in bone marrow aspirate concentrate (BMAC) for cartilage repair has shown promising early clinical results. The mode of action of the BMAC used with biodegradable scaffolds is unknown.

Purpose / Aim of Study: The purpose of this study was to investigate the chondrogenic differentiation of bone marrow mononucleated cells (BM-MNCs) in vitro. We hypothesized that the chondrogenic response of BM-MNCs was comparable to differentiated chondrocytes following long-term culture.

Materials and Methods: BM-MNCs from 7 healthy donors were isolated using Ficoll-Hypaque solution and centrifugation. Chondrocytes were obtained from 3 donors undergoing anterior cruciate ligament reconstruction. BM-MNCs or chondrocytes were seeded on Chondro-Gide© scaffolds and cultured in HG DMEM with 100 nM Dexamethasone, 50 µg/mL L- Ascorbic Acid 2-Phosphate, 40 µg/mL L- Proline, 1 mM Sodium Pyruvate, 1x ITS, and 10 ng/mL TGFβ3 or DMEM-F12 with 10% FCS, respectively. Cellular distribution in scaffolds was investigated by Hoechst staining on day 7, 14, 21, 28, 42 and 56.

Findings / Results: A very limited number of BM-MNCs was present in the scaffolds after 7 days and after 28 days no viable cells were found. In contrast, chondrocytes remained viable in scaffolds cultured for 56 days. No RNA could be extracted after 28 days from the scaffolds on which the BM-MNCs had been seeded; therefore the chondrogenic response on mRNA level was not investigated.

Conclusions: BM-MNCs cultured in chondrogenic medium on Chondro-Gide© scaffolds do not remain viable over the course of 28 days, and thus do not undergo chondrogenic differentiation. This suggests that the clinical benefits of using BMAC in a one-step procedure with scaffolds may exclusively be due to short-term, humoral effects on native cells, and not long-term proliferation and differentiation of BM-MNCs.
Recurrent patellar dislocation in 37 adolescent knees treated with a modified Roux-Goldthwait procedure; a follow-up study with inferior results

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**Background:** Patients with recurring patellar dislocations are often treated with stabilising surgery to prevent additional events. In immature patients with open growth zones, only soft tissue operations are used in order not to interfere with further growth. One of these procedures is the Roux-Goldthwait operation. Although the published literature regarding this technique and immature patients are sparse, it has shown very good results through the last 115 years. Nevertheless, it has been abandoned in favour of various MPFL reconstruction techniques.

**Purpose / Aim of Study:** The purpose of this study is to evaluate the outcome after the Roux-Goldthwait procedure in adolescent patients with open growth plates.

**Materials and Methods:** Between 2000–2009, 37 adolescent knees (30 patients) underwent surgery with the Roux-Goldthwait technique due to recurrent patella dislocation. Mean age 14,3 years (11,3–17,9 years). The same surgeon performed all operations. Follow-up was completed after a mean time of 6,6 years (2,6–11,8 years), with specific interest in subsequent dislocation of the patella. The patients were also evaluated by a KOOS questionnaire.

**Findings / Results:** 28 patients answered (35 knees), whether they have experienced patella dislocations after surgery or not, and 26 patients (30 knees) returned the KOOS questionnaire. 2 patients (2 knees) were lost during follow-up. 23 out of 35 knees had experienced one/several patella dislocation(s) during the follow-up period. The average KOOS scores were; Pain = 81; Symptoms = 76; ADL = 85; Sport/Rec = 54; QOL = 54.

**Conclusions:** The present study supports the discarding of the Roux-Goldthwait procedure in immature patients. The majority of patients experienced dislocations after their operation. The study contradicts the already published literature, properly due to publication bias.
Success rates and failures after infectious revision knee arthroplasty in Denmark.  
A two year nationwide study

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Background: The surgical treatment of peiprosthetic knee infection is generally either a partial revision procedure (open debridement and exchange of tibial insert) or a two-stage exchange arthroplasty procedure.

Purpose / Aim of Study: To describe success rates and failures of these procedures.

Materials and Methods: 573 knee arthroplasties revised due to infection from 1st July 2011 to 30th June 2013 were identified from the Danish Knee Arthroplasty Register. Revisions from spacer to spacer, one-stage total exchange procedures, arthrodesis and femoral amputations were excluded. 105 partial revisions, 218 revisions to spacer and 212 spacer to revision-TKA procedures were included in the final analysis. Data on hospitalizations and mortality were obtained from the Danish National Patient Register. Failure was defined as surgically related death ≤90 days postoperatively or re-revision due to re-infection (follow-up 396 days).

Findings / Results: Re-revision rate (due to re-infection) was 24.8% and mortality rate was 2.8% resulting in a success rate of 72.4% after partial revisions. The median time from partial revision to previous arthroplasty procedure was 34 days, without differences in re-revision rates between cases revised within 28 days or later. Re-revision rate was 9.2% and mortality was 4.6% after revision to spacer procedures, whereas re-revision rate was 12.7% and mortality 0.9% after spacer to revision-TKA procedures. Only 75.6% of the revision to spacer procedures (first stage) performed within our study period were later successfully revised from spacer to revision-TKA (second stage).

Conclusions: The success rate of 72.4% after the partial revision procedure may be acceptable taking the relative limited surgical trauma in consideration, whereas the success rate of 75.6% of the resource-intensive two-stage revisions may call for reconsideration.
Chemical neutralization of carry-over contaminants in the evaluation of topical antimicrobial effectiveness

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**Background:** Valid measurement of bacterial quantities on human skin following disinfection often requires the use an appropriate neutralization system to prevent carry-over contamination from topical antimicrobials. Failure to neutralize such contamination may result in overestimation of disinfection efficacy. Some active components are known, but there is no consensus on an effective formulation for neutralization of chlorhexidine gluconate and iodophor.

**Purpose / Aim of Study:** The aim of this study was to validate the formulation of a chemical neutralization system for use when sampling human skin prepared with chlorhexidine gluconate or iodophor, using the cylinder-sampling method.

**Materials and Methods:** The system was tested in accordance with ASTM standard 1054-08. We performed the test using an antiseptic challenge solution collected from human skin with the cylinder-sampling method. The skin had been disinfected with chlorhexidine gluconate in ethanol with and without subsequent covering with an iodophor impregnated incise drape prior to sampling. A test organism (staph epidermidis) was exposed to the antiseptic challenger for 1 and 30 minutes, with and without added neutralizer, and compared to a control. The organism was also added to the neutralizer alone, observing for toxic properties.

**Findings / Results:** We observed complete neutralization of carry-over chlorhexidine gluconate and iodophor. Not adding the neutralizer resulted in significant loss in viability of the test organism. No organism loss was observed during an exposure time of 30 minutes to the neutralizer alone.

**Conclusions:** The neutralizer formulation was an effective chemical neutralizer of carry-over contamination from chlorhexidine gluconate in topical skin disinfection products and iodophor from iodine impregnated incise drapes in samples collected using the cylinder sampling method.
Changes in Bone Mineral Density of the Proximal Tibia After Uncemented Total Knee Arthroplasty. A Prospective Randomized Study Comparing a Novel Porous Titanium Construct (Regenerex) surface to a Well-Proven Porous-Coated Implant surface

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Background: Regenerex is a novel porous titanium construct with a 3-dimensional porous structure and biomechanical characteristics close to that of normal trabecular bone. It is believed that these characteristics will facilitate bone ingrowth and secure a better fixation to the host bone, thus increasing the implant survival.

Purpose / Aim of Study: The aim of this study was to evaluate the adaptive bone remodeling of the proximal tibia after uncemented total knee arthroplasty (TKA) using a tibial tray with this novel coating compared to a well-proven standard porous coated (PPS) tibial tray.

Materials and Methods: Sixty patients scheduled for TKA were randomized to receive either a Regenerex or a PPS tibial component. Changes in bone mineral density (BMD) of the proximal tibia were measured at 3, 6, 12 and 24 months by dual-energy x-ray absorptiometry (DEXA).

Findings / Results: In the lateral region (ROI 3), a significant increase in BMD was seen in both groups at 3, 6, and 12 months after surgery. The relative increase at 12 months was 8.1% (P = 0.007) for the PPS group and 6.5% (P = 0.002) for the Regenerex group. Positive values were retained at 24 months in both groups. At 24 months BMD in the distal region below the central stem (ROI 1), had decreased in the PPS group by 3.4% (P = 0.005) and in the Regenerex group by 2.4% (P = 0.17). In the medial region (ROI 2) BMD remained unchanged at all follow-up evaluations in both groups. There were no significant differences between the 2 groups (P = 0.45).

Conclusions: The significant increase in BMD of the lateral proximal tibia plateau with very limited changes medially and distally seen in both implants suggests that the novel porous titanium construct and the PPS implant have a pronounced beneficial effect with regard to maintaining periprosthetic BMD in all regions of interest investigated.
Rising incidence of Bacteremia in a Danish Orthopedic Department

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**Background:** Infections play an important role for the prognosis of orthopedic patients with a high impact on length of stay in the hospital, final mobility outcome and quality of life. Bacteremia is the most severe and life-threatening infection. The incidence of bacteremia in orthopedic patients is poorly elucidated.

**Purpose / Aim of Study:** To describe the incidence of bacteremia in the Orthopedic Department at Herlev Hospital in the 15-year period 2000-2014.

**Materials and Methods:** Data about positive blood cultures was extracted from the laboratory database at the Department of Clinical Microbiology, Herlev Hospital. In patients with more than one episode of bacteremia only the first episode was included. Incidence of bacteremia was calculated for the three 5-year periods 2000-2004, 2005-2009 and 2010-2014 and reported as number of bacteremic episodes per 1,000 occupied bed days.

**Findings / Results:** The incidence of bacteremia was 0.59, 1.13 and 1.74 per 1,000 occupied bed days in the periods 2000-2004, 2005-2009 and 2010-2014, respectively. This almost 3-fold increase of the incidence of bacteremia was highly significant (p<0.001).

**Conclusions:** The rising incidence of bacteremia in orthopedic patients is worrying and deserves further investigation with focus on predisposing factors, microbial etiology and resistance patterns.
Conventional Supine MRI with a Lumbar Pillow an alternative to Weight-Bearing MRI for diagnosing functional spinal stenosis? A Cross-Sectional Study

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**Background:** An important aspect of Lumbar Spinal Stenosis (LSS) is the relationship between posture and symptoms, which are often accentuated when standing, walking or with spinal extension. It is well known that the dimensions of the spinal canal increases with flexion and decreases with extension.

**Purpose / Aim of Study:** To investigate if a lumbar pillow is comparable to standing weight-bearing MRI for diagnosing functional LSS

**Materials and Methods:** Clinical MRI scans were screened for a single level moderate LSS defined by a Dural Cross-Sectional Diameter (DCSD) between 7-10mm. If present, the patient was asked to participate in this study, where a second scan in a (0.25T) open G-MRI unit was performed in: 1) standing 2) the conventional supine position with a pillow under the legs and 3) supine position with extended legs and a lumbar pillow. The L2– S1 lumbar lordosis angle (LA), Spinal Cross-Sectional Diameter (SCSD), Dural Cross-Sectional Diameter (DCSA) and DCSD were measured in each position.

**Findings / Results:** Twenty–seven patients (mean age 60.6 years; ±9.4) were included. All had increasing symptoms while standing or extending their lumbar spine. The LA increased significantly when changing from supine to the standing posture (MD: 3.4; P<0.001) and with the lumbar pillow (MD: 13.1; P<0.001). One–way ANOVA for repeated measurements indicated significant differences between positions (P<0.001). The following pairwise comparison showed decreased SCSD, DCSA and DCSD in both standing weight– bearing position and with the lumbar pillow compared to the conventional supine position (P<0.001). Higher average pain scores (VAS) were reported during scans with the lumbar pillow (5.4±2.7) than standing (4.0±2.7) and the conventional position (3.6±2.8).

**Conclusions:** A lumbar pillow may be an inexpensive method to improve the supine MRI diagnostics of functional LSS.
Rate of unsuspected malignancy in patients with vertebral compression fracture undergoing percutaneous vertebroplasty

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**Background:** Osteoporotic vertebral compression fractures (VCF) affect approximately 20% of postmenopausal women and can lead to long-term disability. Percutaneous Vertebroplasty (PVP) is a minimally invasive procedure, primarily used in patients with severe pain after VCF. Even with a thorough clinical examination, MRI scans and blood samples, some fractures maybe caused by an underlying malignant disease.

**Purpose / Aim of Study:** To determine the malignancy rate and histology in bone biopsies obtained during PVP for VCF.

**Materials and Methods:** 144 consecutive patients underwent PVP for painful VCF, at the Center for Spine Surgery and Research, Middelfart Hospital. All patients had bone biopsies obtained during the PVP, and these biopsies were sent to the Department for Pathology at Vejle Sygehus for histologic diagnosis.

**Findings / Results:** 144 patients were included in this study. The majority of the biopsy specimens (137, 95.1%) were acceptable for histological diagnosis. 129 (89.6%) of the biopsies showed no signs of malignancy. Seven (4.9%) were positive for malignancy. 1 biopsy was positive for MGUS. Seven (4.9%) of the biopsies were unsuitable for histologic diagnosis.

**Conclusions:** Our study shows an incidence of unsuspected malignancy in biopsies during PVP of 4.9%. Conservative treatment with analgesics and brace can potentially delay diagnosis and treatment of underlying malignant disease. We recommend biopsy during PVP as a standard-procedure, to insure not to overlook any underlying malignancy despite the MRI-scan, blood analysis and clinical examination being inconspicuous.
Selective motor branch block of the rectus femoris as diagnostic tool before surgical rectus transfer

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Background: Stiff knee gait is defined as decreased knee flexion in the swing phase of gait, and may be due to hyper activity in the rectus femoris (RF), the whole quadriceps muscle and/or tightening of the muscles. Surgical RF transfer may not improve gait, if other factors than the RF is influencing gait.

Purpose / Aim of Study: The purpose was to investigate if pre-surgery selective motor branch block (SMBB) of the RF may predict outcome of subsequent RF transfer surgery.

Materials and Methods: Seven patients with hemi- or diplegic cerebral palsy and with stiff knee gait, age 11-55, 3 males and 4 females were included in the study. Biomechanical gait analyses (GA) were performed before and after SMBB using a local anaesthetic. Maximal knee flexion in swing phase obtained from pre- and post lidocain GA as well as from a 12 months post- surgery GA was compared using non-parametric statistics.

Findings / Results: In one patient the nerve block acted on the entire femoral nerve, this patient was therefore excluded from this study. One patient declined surgery due to a less than 2 degrees improvement by SMBB and was therefore excluded. The remaining five patients showed better gait function following the block and at follow up 12 months after RF transfer surgery. The range of motion in swing phase increased significantly from median 32.3 to 38.6 degrees (p=0.043) after SMBB and 12 months after RF transfer surgery to 51.3 degrees (p=0.043).

Conclusions: The present study on preliminary data therefore indicates, that SMBB of the RF may be a feasible way to predict positive outcome of RF surgical transfer in patients with stiff knee gait. However, post-surgery data on patients with negative results of SMBB would be necessary in order to perform a proper sensitivity analysis for this new diagnostic tool. It was not possible in this study for ethical reasons.
The STarT Back Screening can predict pain problems after spine surgery

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Background: Following spine surgery a number of patients develop complex pain problems. To prevent these problems, it is important to identify these patients before surgery in order to optimize their postoperative pain management. A simple and convenient tool is needed to identify these patients.

Purpose / Aim of Study: To investigate if the STarT Back Screening Tool can identify patients in risk of developing complex pain after spine surgery. This tool separates the patients into low, medium or high risk of developing complex chronic pain. STarT has not been tested on surgical patients.

Materials and Methods: Patients who had a lumbar spine surgery in our department during a 3-month period completed the STarT Back Tool preoperatively. Postoperatively their back and leg pain were scored on a visual analogue scale (VAS) day one after surgery and at discharge. The score was repeated four or twelve weeks after surgery. The VAS -scores preoperatively and at 1-year follow-up were acquired from DaneSpine.

Findings / Results: There were 255 patients (93%) rated by the STarT Back Tool. Of these 139 (54%) were in the high risk group, 83 (33%) in the medium risk group, and 33 (13%) in the low risk group. At discharge patients in the high risk group had higher back and leg pain scores compared to the patients in the medium and low risk groups. This did not reach statistical significance. Follow-up data, 4 or 12 weeks postoperatively from 222 (87%) patients showed that patients in the high risk group had statistically significantly higher back and leg pain scores compared to the patients in medium and low risk group. This difference were also statistically significant at 1-year follow-up.

Conclusions: The STarT Back Screening Tool can predict prognoses in short and long term, but it does not predict pain problems in the perioperative phase.
Arthroscopic evaluation of degenerative changes in the trapeziometacarpal joint

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**Background:** Osteoarthritis of the trapeziometacarpal joint is common in post-menopausal women and men above the age of 50. Younger patients may however present clinical symptoms of osteoarthritis without significant degenerative signs on radiographs.

**Purpose / Aim of Study:** To evaluate the effectiveness of arthroscopy in evaluation of suspected degenerative changes of the trapeziometacarpal joint in cases with only minor radiological changes.

**Materials and Methods:** We retrospectively evaluated the result of 13 arthroscopies of the trapeziometacarpal joint in 13 patients (2 males and 11 females) mean age 46 years (range 19-58) with persistent pain in the trapeziometacarpal joint at rest and activity but with only minor or no degenerative findings on radiographs or CT scan. Post traumatic osteoarthritis was suspected in 4/13 patients aged 19-51, and in the remaining 11 patients primary osteoarthritis was suspected.

**Findings / Results:** In all patients degenerative changes were found ranging from cartilage degeneration in part of the joint to denuded bone at both sides of the joint. In 9/13 the changes were so severe, that the patients were treated with further surgery such as total joint arthroplasty. In four patients a clear diagnosis was found, but so far further surgery has not been performed.

**Conclusions:** Arthroscopy seems effective in diagnosing degenerative changes of the trapeziometacarpal joint in cases with none or only minor radiological changes but persistent and significant clinical symptoms of osteoarthritis.
Revision procedures do not affect survival after surgical treatment of acute metastatic spinal cord compression (MSCC)

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Background: Spinal metastases occur frequently in patients with oncological conditions and patients with acute MSCC may benefit from surgical treatment followed by radiation therapy. Due to the poor general condition in the majority of these patients, revision surgery may result in significant morbidity.

Purpose / Aim of Study: The purpose of the present study was to assess the impact of revision procedures on survival in patients undergoing surgical treatment for acute MSCC. Hypothesis: Revision procedures after surgical treatment of acute MSCC affect survival negatively.

Materials and Methods: Design: Single-center, prospective, cohort study. Methods: All patients undergoing acute surgery for MSCC in the period January 1st, 2008 through December 31st, 2013 were prospectively enrolled in a clinical database. All relevant variables were registered and survival status per December 31st, 2014 was retrieved through the National Health Service.

Findings / Results: A total of 556 patients were included in the six-year study period with a minimum follow-up of one year. Twelve patients had emigrated or were non-Danish citizens, resulting in a 98% data completion comprising 544 patients in the final study population. The mean age of the patients was 64 years and 57% of the patients were men with no significant difference in survival between genders. The primary location of the metastasis was thoracic (55%) and 74% of patients underwent instrumented procedures. At least one revision was carried out in 45 patients corresponding to an overall revision rate of 9%. There was no significant difference in survival between patients undergoing revision and patients who only underwent one procedure; mean 566 days vs. 489 days (P=0.4).

Conclusions: Revision surgery does not affect survival in patients operated for acute MSCC.
Evaluation of cell binding peptide (P15) in silk fibre enhanced hydroxyapatite bone substitute for posterolateral spinal fusion in sheep

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Background: Posterolateral fusion (PLF) is indicated in the surgical management of various spinal disorders. To ensure stable fusion, bone graft materials are used. CE approved ABM/p15 (Anorganic Bone Matrix) has in a previous preclinical study from our group shown extensive ability of migration when used in uninstrumented PLF. In this study, silk fibers were added to the graft material to make a mesh for the ABM/p15 granules. Silk fibers have high biocompatibility and strength. P15 is a synthetic, 15 amino acid peptide sequence, with osteoinductive properties. In this study we investigate the effect of P15 peptide when coated on ABM combined with a silk fiber mesh.

Purpose / Aim of Study: Compare fusion rates using silk fibre enhanced ABM with or without P15 peptide in uninstrumented PLF

Materials and Methods: Two level uninstrumented PLF at L2/L3 and L4/L5 were performed in 12 sheep. Levels were randomised to silk fibre enhanced ABM bone graft with or without P15 coating bilaterally. After 4.5 month, levels were harvested and evaluated with MicroCT 50 scans and qualitative histology. Fusion rates were assessed with 2D sections and 3D reconstruction images and fusion was defined as intertransverse bridging.

Findings / Results: Spinal fusion was found in 72% of levels receiving silk fibre enhanced ABM/P15 graft material and 41% in levels without P15 (P<0.05). No major migration was detected. Histology indicated more bone formation in P15 group with laminar initiation. In both groups good osteointegration was found.

Conclusions: P15 peptide enhanced fusion rates when coated to ABM in silk fibre enhanced bone graft. Reported fusion rates are equal to earlier reported rates using allo- or autograft. This preclinical study indicates that silk fibre enhanced ABM/P15 is a potential graft material for clinical use which should be evaluated in a controlled clinical study.
Revision of total wrist arthroplasty

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**Background:** Third generation implants for total wrist arthroplasty (TWA) has now been available for more than 17 years. Consequently, an increasing number need revision.

**Purpose / Aim of Study:** To report on our experience with revision surgery after failed TWA

**Materials and Methods:** We prospectively and consecutively collected data on all TWA’s that were revised in two clinics and made a general follow-up examination in May - June 2015.

**Findings / Results:** We revised a total of 19 cases: 8 with rheumatoid arthritis, 11 with other diagnoses. 12 were revised to a Remotion TWA, 1 to an Amandys interposition implant and 6 were fused. At final follow-up, at an average of 31 months after operation, median improvement in QuickDASH score was 25 points, median improvement in VAS-score for pain was 50 points. 3 revision TWA had been re-revised and 1 was loose and scheduled for re-revision. There was no difference in QuickDASH- or in VAS-score between patients with fusion and patients with TWA.

**Conclusions:** Both fusion and revision to a new TWA are feasible after a failed TWA. Revision to a new TWA may require supplementary major procedures.
3D Correction by CB Growth Rod Concept in Severe Deformities of the Immature Spine (EOS)

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**Background:** Management of severe EOS should ensure a 3D-correction with preserved pulmonary function and truncal growth. We have developed a novel growth rod concept.

**Purpose / Aim of Study:** Aims of this study were to 1) analyse 3D-curve-correction and truncal height and 2) monitor adverse events.

**Materials and Methods:** 34 patients have been treated with the new concept based on 4.5 mm pediatric implants since 2010. We excluded patients with less than 2 years follow-up (n=13) and complex salvage procedures (n=2). The study group of 19 patients has a mean follow-up of 3.0 years (2.1-3.9), mean age at index surgery 9.8 years (4-14) and mean scoliosis Cobb angle 77° (47-129). Etiologies: neuromuscular (n=9), idiopathic (n=4), and others (n=6). The triple rod system is mounted on pedicle screws in 3 platforms, cranial, apical and caudal, using minimal invasive technique. Deformity correction is achieved by concave distraction, apical translation and derotation by applying apical compression. Lengthening as a one day procedure every 6 months until skeletal maturity by concave distraction and locking, leaving convex growth tubes unlocked.

**Findings / Results:** Index surgery decreased scoliosis Cobb by median 37° (15-68). Thoracic hyperkyphosis decreased, without significant change in lordosis. Torsion was corrected by 14% with partial loss over time. Truncal height assessed as T1-S1 on digital x-rays, increased by 0.9±0.7 cm/year. 16 adverse events in 11 patients. Six complications lead to unintended reoperation (32%). Asymptomatic metal debris (n=6).

**Conclusions:** Our triple growing rod concept proves 3D-correction in the surgical management of severe EOS. Complication rate is 32%. Further improvement on rotatory control and prevention of metal debris needed.
Risk factors for recurrent lumbar disc herniation

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**Background:** The rate of recurrent lumbar disc herniation (rLDH) following lumbar discectomy varies from 3–11 % and thereby being the most common complication. Though many studies have reported the rate of rLDH, few have provided statistical evidence of risk factors. Current literature reports multiple risk factors, however with diverging incidence. Overall, the current literature provides limited certainty regarding risk factors of rLDH.

**Purpose / Aim of Study:** The purpose of the present study is to examine if age, gender, smoking habits and BMI are risk factors for rLDH.

**Materials and Methods:** All patients who underwent primary lumbar discectomy due to LDH at Lillebaelt Hospital from June 2009 to January 2015 were included. Self reported data on age, gender, smoking status and BMI were prospectively collected in the database DaneSpine. All statistical analyses were carried out using STATA version 12.1.

**Findings / Results:** A total of 1572 patients were included. 124 patients (7.9%) were re-operated; 109 patients (7.0%) due to rLDH. Other reasons included persisting stenosis, cerebral spinal fluid fistula, etc.. The mean age was significantly lower in the rLDH group (48.3(CI 47.5;49.0) vs. 44.7(CI 42.5;46.9)) (P=0,01). The rate of smokers was significantly higher in the rLDH group (34% vs. 53%)(P=0,001). There was no statistical difference in gender or BMI between the two groups.

**Conclusions:** The rate of rLDH in the present study corresponds to results presented in previous studies. We found that the mean age was lower in the rLDH group and that the rate of smokers was higher. We can also conclude that the rate of smokers in the total surgery group was higher than in the general Danish population. This indicates that smoking not only increases the risk of rLDH and there seems to be a higher prevalence of smokers among patients undergoing lumbar discectomy.
Background: Periacetabular reconstruction for metastatic bone disease (MBD) can be accomplished with a composite construct of PMMA and any combination of metal augments, mesh, pins, cages and/or plates. Reinforcement of such constructs by trans-iliac Steinmann pin fixation according to the technique described by Harrington, is typically recommended for more extensive lesions involving the acetabulum.

Purpose / Aim of Study: To investigate results when treating MBD acetabular fractures with tri-flange reconstruction cages without the use of trans-iliac Steinmann pin fixation.

Materials and Methods: We performed a retrospective review of a consecutive cohort of adult patients with MBD, who underwent endoprosthetic reconstruction because of pathologic acetabular fractures in our department between January 2008 and September 2014. We identified 18 patients (F/M=11/7) with a mean age of 70 (49-92) years, who received a standard, long flanged stainless steel cage (Link partial pelvis replacement). Cemented acetabular components (Lubinus Eccentric) were used in all patients.

Findings / Results: Seven patients succumbed to their disease within the first year after operation (probability of 1-year overall survival 61%). 4 complications required second intervention. Two dislocations were observed within the first year and were treated with implantation of a constrained devise. One patient had revision of wound. One patient suffered from deep infection and is currently undergoing 2-stage revision. All patients but one regained ambulatory function and we did not observe any failures of the pelvic reconstruction constructs.

Conclusions: Our findings suggest that standard tri-flange pelvic reconstruction cages can be a valuable treatment option in the management of pathologic acetabular fractures.
Functional outcome and patient satisfaction following implant removal in patients treated for a clavicle fracture

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**Background:** Implant related discomfort (soft-tissue irritation, pain and cosmetics) are often seen in patients with a clavicle fracture treated surgical. Even the newer low profile and precontoured plates are associated with a high discomfort rate as close to 30% of these plates are removed. Whether implant removal results in improved functionality and patient satisfaction is unknown.

**Purpose / Aim of Study:** Primary aim was to investigate whether plate removal following clavicle fracture treatment had a desired effect and satisfaction according to the patient. Secondary aim was to assess functionality and complications following implant removal.

**Materials and Methods:** 97 patients, (73 males, mean age 43 years) had between 2007 and 2014 a clavicle plate removed at our institute. A purpose made questionnaire was used to assess self-perception of cause of implant removal, remission, complications and overall satisfaction. Functionality was assessed using the short version of Disabilities of the Arm, Shoulder and Hand score (QuickDASH). Assessment was primarily by phone interview.

**Findings / Results:** 74% of the plates that were removed were primarily used to treat midshaft fractures, with the rest used for lateral fractures. Pain or soft tissue irritation was indication in 52% of all cases with another 11% caused by cosmetic deficits. 58% of all patients were available for phone interview with a minimum of 1 year follow-up. 75% reported satisfaction with plate removal. 29% had complete remission in symptoms. Another 46% had partially remission, 14% had no remission and 11% reported worsening. Mean QuickDASH was 8 [range 0 to 91]. 67% reported no complication with 19% complaining of larger scar tissue.

**Conclusions:** Clavicle plates causing nuisance to the patient can be removed expecting satisfying results with close to normal functionality and few complications.
Eighty-seven patients operated due to Herniated Disc. No correlation between the presence of Modic changes and Propionibacterium Acnes

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**Background:** A recent systematic review has found moderate evidence for a correlation between the presence of p. acnes and back pain and/or Modic changes in patients with disc herniation. Further studies are needed to determine whether these findings are results of contamination or represent a low grade infection.

**Purpose / Aim of Study:** To investigate the presence of propionibacterium acnes in patients operated due to disc herniation. Further, to examine a hypothesised association within the presence of Modic changes and bacteria.

**Materials and Methods:** Eighty-seven patients undertaking an open MIS approach due to disc herniation. During operation, a total of six disc-tissue samples, using separate sterile single use instruments were obtained. Five samples were inoculated into thioglycolate agar tubes and long-time incubated (14 days) and observed for growth. Positive samples were interpreted according to the Kamme & Lindberg definition, the “standard” used for discrimination between contamination and true infection. One sample was stored for later PCR. Modic changes were examined on MRI scans (preoperatively).

**Findings / Results:** Modic changes were seen in 51% of patients. 5 patients (6%), had disc tissue infected by p. acnes. 2 of the 5 patients with disc infection had no Modic changes.

**Conclusions:** A low incidence of p. acnes in herniated discs (6%) was found using an open MIS approach combined with a tissue-handling technique am. Kamme. No correlation was found between the presence of Modic changes and p. acnes. The low incidence of infection might be due to a low contamination-rate i.e. the peroperative sample handling-technique am. Kamme and/or an open surgical technique versus scopic techniques.
The use of Quantitative Sensory Testing as predictive measure of surgical outcome in Lumbar Disc Herniation

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Background: Lumbar disc herniation (LDH) is associated with great morbidity and significant socio-economic impact in many parts of the world. Patients where pain and disability is unacceptable, surgical intervention provides effective clinical relief in many cases. Unfortunately, 10–20% of patients who undergo surgery have little or no effect of the intervention. Currently the selection of patients suited for surgery is based on clinical workup and surgeon experience.

Purpose / Aim of Study: The aim of this study is to evaluate if quantitative sensory testing (QST) can be used as a preoperative tool for identifying patients with higher chance of favorable outcome following surgical intervention.

Materials and Methods: Patients with first-time LDH found eligible for surgery were included in an ongoing study and tested using a standardized protocol for QST preoperatively and 6 weeks post-op. Patient reported outcome measures; EQ5D, VAS-leg and -back were also collected. All patients followed normal surgical and post-operative regime.

Findings / Results: Preliminary data on 16 patients were used in these analysis. A correlation of 0.59 was found between the preoperative result of a cold pressor test (CPT) and the 6 weeks post-operative change in EQ5D, with a significance level of 0.01. A correlation of 0.43 was found for CPT and change in VAS-leg with a significance level of 0.10. There seems to be a correlation between pressure pain response and surgical outcome, however current data does not provide significant results.

Conclusions: Preoperative cold pressor test results seems to be correlated with post-operative PROMs, and current data also suggest correlation between other parameters in quantitative sensory testing and prediction of surgical outcome in LDH. Quantitative sensory testing may have potential as a preoperative predictive tool of patient outcome.
Noises from total hip arthroplasty and patient-reported outcome (PRO)

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Background: Noises from total hip arthroplasty (THA) with ceramic-on-ceramic (CoC) and metal-on-metal (MoM) bearings have been described in small series of patients – but not with comparison to metal-on-polyethylene (MoP) bearings.

Purpose / Aim of Study: We aimed to describe the frequency of patient-reported noises from THA with CoC, MoM, and MoP bearings and compare PRO scores from patients having noisy THA to PRO scores from patients having silent MoP THA.

Materials and Methods: We identified 3,762 patients from the Danish Hip Arthroplasty Registry operated from 2002 to 2009 and with no revision, who received the following PROs: The hip disability and osteoarthritis outcome score (HOOS), the EQ-5D, the UCLA activity score, and a questionnaire about noises from the THA. 145 patients were excluded due to confirmed revision, and 3,082 patients responded (response rate 85%). Multivariate linear regression was used to compare mean values of PRO scores within the noisy THAs with the 3 types of bearings to silent MoP THA.

Findings / Results: Among responders, 1,393 (45%) had CoC, 512 (17%) MoM, and 1,177 (38%) MoP THA. 27% of patients with CoC, 29% of patients with MoM, and 12% of patients with MoP bearings had experienced noises from the THA. Significantly lower mean scores of all HOOS subscales, EQ-5D index, and EQ-5D VAS were shown for patients experiencing noises from the CoC, MoM or MoP THA compared to patients having silent MoP THA. Only for the ULCA activity score, no difference was found for noisy CoC THA compared to silent MoP THA, but patients having noisy MoM and MoP THA had significantly lower mean UCLA activity scores when compared to patients having silent MoP THA.

Conclusions: The frequency of noises was high and even present in MoP THA. Patients with noises from CoC, MoM, and MoP THA had lower PRO scores than patients without noises from their MoP THA.
Malformation is a risk factor for osteoarthritis in young THA patients - a prospective multicenter cohort study

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Background: In Denmark, 120,988 total hip arthroplasties (THA) has been registered from 1995 to 2012. Twenty % are younger than 60 years. The indication is in 79.2% primary idiopathic osteoarthritis (OA). OA is a multifactorial disease correlated to age and hip malformations like CAM-deformity. In population studies this deformity has been identified in 17–24% of men and in 4% of women. Still it is uncertain why young adults develop primary idiopathic OA.

Purpose / Aim of Study: Our aim was to assess the correlation between hip malformations and OA in a cohort of younger patients undergoing THA by analyzing distribution and type of hip malformations.

Materials and Methods: In this consecutive multi-center cohort study, 96 consecutive patients (107 hips) met the inclusion criteria. One observer performed radiographic measurements for malformations and radiographic OA defined by Tönnis-grade on a dichotomous scale. Inter- and intraobserver variability was measured. Data is presented as prevalence and OR.

Findings / Results: Male/female prevalences of hip malformations were; CAM-deformity 60.4%/28.3%, coxa profunda 34.9%/26.4%, acetabula dysplasia 11.3%/3.8%, acetabular retroversion 34%/27.4%. Concomitant hip malformation was 100%. The Tönnis grade was 22.2% and 77.4%. No association were found, all OR<1 for malformations and the Tönnis grade.

Conclusions: All patients showed malformations. CAM- deformity was more than three times as frequent as in population studies. Acetabular deformities were coxa profunda and acetabular retroversion. Hip dysplasia was less typical. In conclusion, our observations showed a high prevalence of hip malformations in young OA patients, supporting the emerging consensus that hip malformations lead to OA in a young age. Focus on hip malformations for correct registration and referral to joint-preserving surgery is essential.
The association between preoperative symptoms of obesity in knee and hip joints and the change in quality of life after laparoscopic Roux-en-Y gastric bypass

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Background: Weight loss after bariatric surgery is shown to reduce knee and hip pain in the majority of the severely obese. Studies indicate that with a reduction in musculoskeletal symptoms quality of life (QoL) will improve. The group of severely obese with knee and hip symptoms might, therefore have potential for a large improvement in QoL after a bariatric surgery.

Purpose / Aim of Study: to assess the association between the degree of knee and hip symptoms before a laparoscopic Roux-en-Y gastric bypass (LRYGB) and the improvement of QoL, one year after the surgery, in severely obese.

Materials and Methods: This study is a historical cohort study based on data collected consecutively at the private hospital Mølholm, Denmark. Before LRYGB surgery 4,548 severely obese completed a questionnaire on knee and hip symptoms of obesity and QoL. One year after surgery, 2,862 (62.9%) of the participants answered the same questionnaire again.

Findings / Results: 81.6% of the participants with knee symptoms and 74.5% of participants with hip symptoms experienced a reduction of these after the LRYGB surgery. Participants with moderate or severe knee or hip symptoms, before the surgery, experienced a statistically significantly larger improvement of their QoL, compared to participants without symptoms before the surgery. Furthermore, an association between the reduction of knee and hip symptoms and the improvement in QoL was found.

Conclusions: Severely obese with moderate or severe preoperative knee and hip symptoms experienced a larger improvement of their QoL after a LRYGB compared to participants without symptoms before the operation.
Clinical and radiological improvement after trochleoplasty in patients with patellar dislocation secondary to trochlea dysplasia. A pilot study

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**Background:** Trochlear dysplasia is an important risk factor for patellar instability. Trochleoplasty is a surgical procedure which reshapes the trochlea groove. Previous studies in smaller series shows encouraging results after trochleoplasty.

**Purpose / Aim of Study:** To evaluate the quantitative changes in radiological measures and clinical outcome after trochleoplasty as a pilot study.

**Materials and Methods:** Since August 2009, 54 patients (59 knees) with recurrent patellar instability underwent a Bereiter-type trochleoplasty. Except for three knees, the procedure was combined with an additional procedure according to the underlying etiological cause of patellar dislocations. Based on availability of pre- and postoperative MRI we selected 9 knees for evaluation of the patella-femoral joint. Clinical condition was evaluated preoperatively and one year postoperatively with the Kujala score. We compared the sulcus angle, patellar tilt, tibial tuberosity- trochlea groove distance (TTTG), patellar- trochlear index (PTTI) and modified Insall-Salvati index in pre- and postoperative MRI scans.

**Findings / Results:** Postoperatively, mean Kujala score increased (Mean Difference (MD): 16.11, Confidence Interval (CI): 6.6-25.62; P=0.005). The sulcus angle (MD: 11.43°, CI: 4.02-18.85°; P=0.007) and the patellar tilt (MD: 12.19°, CI: 7.60-16.77°; P<0.001) decreased postoperatively. No difference was found between TTTG (MD: 4.39 mm, CI: -2.57-11.35 mm; P=0.184), PTTI (MD: 0.05, CI: -0.14-0.24, P=0.542) or modified Insall-Salvati index (MD: 0.12, CI: -0.02- 0.26; P=0.075) postoperatively.

**Conclusions:** After trochleoplasty the Kujala score demonstrated clinical improvement. There was a marked change in some radiological measures demonstrating improvement of trochlear morphology and patellar tracking after trochleoplasty. We await the analysis of the complete cohort.
MCL as a pulley in MPFL reconstruction

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Background: Treatment of lateral patellar instability is complex, usually requiring a surgical reconstruction of the medial patellofemoral ligament (MPFL).

Purpose / Aim of Study: The study aims to describe the postoperative outcomes and patient reported outcome measures (PROMs) when using a new type of MPFL reconstruction with the knee’s medial collateral ligament (MCL) as a pulley.

Materials and Methods: From 2011 to 2015, 44 knees (38 patients; 24 females/14 males) underwent an MPFL reconstruction with the MCL as a pulley due to serious patellar instability. Patient records were reviewed for minor and major complications. 32 patients (38 knees) responded to the following PROMs: Kujala and Tegner-Lysholm knee scoring scales, and EuroQol EQ-5D-3L.

Findings / Results: The data collected showed that 38 knee operations (86.4%) had a postoperative course without complications. 4 knees (9.1%) were registered with minor complications (2 superficial infections and 2 suture problems). Major complications (e.g. re-dislocation) resulted in re-treatment for 3 knees (6.8%). The mean Kujala score was estimated to 82.4 ± 10.4 SD, whilst the Tegner-Lysholm score was 84.7 ± 15.6 SD. The EQ-5D-3L showed to be 0.87 ± 0.15 SD. 24 patients (75.0%) described the result of their operation as “splendid or very good”. Only 2 patients (6.3%) communicated their disappointment at the result of the reconstruction. Furthermore, 28 patients (87.5%) stated that they would choose the applied MPFL surgery again. 30 of the patients (93.8%) no longer used analgesic due to their knee.

Conclusions: Using the MCL as a pulley in MPFL reconstruction is very promising in the treatment of patellar instability. However, despite reporting successful reconstruction in 93.2% of cases, further studies and especially a long-term analysis is recommended.
Two case reports on the use of negative pressure wound therapy with instillation (NPWTi) as adjuvant treatment of infected total hip replacements

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Background: Negative pressure treatment has been combined with instillation of cleansing solutions (NPWTi ) in cases of complicated infected wounds with promising results. Two patients having infected total hip replacements treated with this new technique are reported, which to our knowledge is the first Scandinavian report describing the use of this technique.

Purpose / Aim of Study: we want to describe first results in treating infected total hip replacements with this new technique.

Materials and Methods: we are describing 2 cases where NPWTii was applied to treat deep infection in total hip replacements.

Findings / Results: It was our hope that this supplementing treatment could help us in retaining the hip replacement in the case of early chronically infected arthroplasties and improve our chances for success in treating acutely infected hip replacements. In both cases macroscopically healthy looking wounds were seen after few days of NPWTi treatment. After wound closure, however, both patients were suffering from wound healing problems with defects, secretion and elevated infection parameters. In case 1 it seems that a deep E. coli infection was successfully eradicated; however, a secondary infection made regular 2 stage revision necessary.

Conclusions: Treatment results seemed non-inferior to standard regimens. Optimization of technique and selection of patients that may benefit from this treatment have to be elucidated.
Persistent pain following surgically treated distal radius and malleolar fractures

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Background: Persistent pain is a well-recognized problem after various types of surgery, such as amputation, thoracotomy, and inguinal hernia repair. Less is known about persistent pain after fracture-related surgery

Purpose / Aim of Study: We investigated the prevalence, characteristics of, and risk factors for persistent pain one year after following surgically treated distal radius and malleolar fractures

Materials and Methods: Between June 2014 and March 2015, a postal questionnaire was sent to 599 patients who had undergone surgery one year previously at Hvidovre and Odense University Hospitals, Denmark, and whose surgical data were registered in the Danish Fracture Database. The questionnaire contained questions about 1) pain in the operated wrist or ankle (intensity (numeric rating scale (NRS, 0-10)), impact of pain on daily activities), 2) signs of Complex Regional Pain Syndrome (CRPS), 3) quality of life (EQ-5D), and 4) psychological aspects (PCS)

Findings / Results: 328 patients returned the questionnaire (response rate: 54.7 %). 193 patients were operated at Hvidovre University Hospital (ankle fracture, n=87; wrist fracture, n=104) and 137 were operated at Odense University Hospital (ankle fracture, n=65; wrist fracture, n=72). Overall, 62 patients (18.9%) experienced persistent pain in the operated extremity one year +/- 6 weeks after surgery [NRS 6 (5-8)]. Patients with ankle fracture were more likely to report persistent pain compared with patients with wrist fracture [23.7% (CI 16.8-30.5) vs. 14.8% (CI 9.5-20.1) P=0.04]. 12 patients (3.6%) fulfilled the diagnostic patient-reported research symptoms for CRPS

Conclusions: A substantial number of patients reported pain in the operated extremity. Patients should be informed of the high risk of persistent pain
The basic mobility status at the time of acute hospital discharge is an independent risk factor for long-term mortality after hip fracture

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Background: One might ask; does it really matter if patients with hip fracture regain an independent ambulatory status in the acute hospital towards reducing odds of the ultimate fatal event after trauma, death?

Purpose / Aim of Study: To evaluate the importance of the basic mobility status at the time of acute hospital discharge to 1- and 5-year deaths after hip fracture.

Materials and Methods: 491 patients who followed a multimodal fast-track hip fracture program until discharged from an acute orthopedic ward. The median (IQR) age was 81 (74-87) years; 133 men and 358 women; 250 cervical and 241 with a trochanteric fracture. The national hip fracture register Cumulated Ambulation Score (CAS 0-6 points) was used to evaluate the basic mobility status. A CAS=6 point equals an independent basic mobility status.

Findings / Results: 107 (22%) patients with a CAS<6 at time of hospital discharge stayed in the acute ward a median of 22 (15-32) days post-surgery as compared to a median of 11 (8-16) days for those 384 patients who achieved a CAS=6. Overall 1-year mortality was 15%, and 11% and 29% for those with a CAS=6 versus CAS<6, respectively. Corresponding data for 5-year deaths was 38% and 67%. Cox regression analysis demonstrated that the likelihood of not surviving the first year after HF was 2 times higher for those with; a CAS<6, a low prefracture functional level, for men, and for those with an American Society of Anesthesiologists rating of 3–4 points, when adjusted for age and cognitive status.

Conclusions: The regain of basic mobility independency (CAS=6) within the primary acute hospitalization seems highly relevant towards reducing long-term deaths following hip fracture. Enhanced efforts should be instigated to improve the basic mobility status of patients with hip fracture before discharge from the acute hospital.
Patient-reported quality of life and hip function after revision of total hip arthroplasty due to chronic periprosthetic infection: An analysis of one-stage revision and a comparison of one-stage and two-stage revision

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Background: Two-stage revision is currently regarded the gold standard treatment in chronic hip periprosthetic joint infections (PJI). However, one-stage revision is assumed to benefit the patient. There are currently no studies comparing patient-reported outcome measures of cementless one-stage versus two-stage revision, and little is known on how the patients perceive either treatment strategy.

Purpose / Aim of Study: To investigate the health-related quality of life (HRQOL) and patient reported hip function after cementless one-stage revision. Further, to compare HRQOL and patient-reported hip function for patients treated with either one-stage or two-stage revision of a chronic hip PJI.

Materials and Methods: The patients in the one-stage revision group had a prospective two-year follow-up on an outpatient basis, where they completed three questionnaires; EQ-5D, SF-36 and OHS. The patients in the two-stage group were identified retrospectively in the National Patient Register and were contacted by mail with the questionnaires EQ-5D and OHS.

Findings / Results: In the one-stage group the improvement in HRQOL appeared in the first six months after surgery, reached a plateau, and for most parameters decreased slightly again. The largest improvements over two years were OHS with effect size (ES) on 1.3 and SF-36’s physical role limitation as well as bodily pain with ES on 1.1. The mean scores (CI 95%) for one-stage revision were significantly higher compared to the two-stage revision group on EQ-5D VAS 12.9 (2.4;23.3 p=0.02) and OHS 5.9 (0.5;11.2 p=0.03).

Conclusions: Two years after one-stage revision, HRQOL and hip function increased significantly. Patients receiving one-stage revision obtain higher HRQOL and hip function compared to two-stage revision. However the comparison of the two groups can be questioned, due to difference in follow-up.
Metacarpophalangeal Joint Silicone Arthroplasty – A Review Of Surgery Performed At Aarhus University Hospital In The Period 2007–2012

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Background: Rheumatoid arthritis (RA) is a chronic inflammatory disease. RA leads to the destruction of the joints. In particular, peripheral joints and tissue are affected resulting in bone erosion and destruction of the articular cartilage. This is seen in particularly severe degree in the metacarpophalangeal (MCP) joints resulting in loss of joint integrity and disability in everyday life for the RA patient.

Purpose / Aim of Study: The aim of this study is to describe if there has been a change in the number of MCP-joint arthroplasty (MCP-JA). Our a´priori theory is that the new array of non-surgical treatment modalities introduced over the last decades, including DMARD and biological medication, have contributed to improved disease control. Subsequent reduced joint destruction and therefore less demand for surgery.

Materials and Methods: Descriptive study based on a review of surgery carried out by the Devison of Hand Surgery, Ortopedic Department, AUH in the period 2007–2012. Inclusion criteria was primary silicone MCP-JA on basis of joint destruction caused by RA.

Findings / Results: In the period 49 patients were offered surgical treatment with MCP-JA of the affected joints. Demographics: 42 female: Mean age 59 years (range 36Y– 85Y). 7 male: Mean age 60 years (range 45Y– 78Y). By exponential regression analysis, we found no significant change in surgery over time (R2 ≈ 0,007)

Conclusions: In regard to patient characteristics we found that 85 % of the patients were femal, with a peak age for surgery from 50 Y – 70 Y accounting for 57% of the overall surgery for the females. In the period 2007– 2012 we have found no significant decrease in the number of MCP-JA surgery. Further studies with a longer timespan would be needed to determine the changes in MCP-JA sugery on the basis of RA.
Clinical outcome of posterior tibial support brace treatment of isolated or combined posterior cruciate ligament rupture with the PTS Jack bandage

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Background: Non-operative treatment is the first choice in patients with isolated grade 1 and 2 ruptures of the posterior cruciate ligament (PCL), while grade 3 ruptures are often treated operatively.

Purpose / Aim of Study: To evaluate the clinical outcome of non-operative treatment of PCL using the posterior tibial support brace in combination with physiotherapist supervised rehabilitation.

Materials and Methods: Between January 2013 and January 2015, 34 patients (21 males; mean age 32.6 years; range 14-65) were treated conservatively with a posterior tibial support Jack Brace (JB). Patients were diagnosed by MRI and objective PCL instability. Ten patients had isolated PCL injury and 24 had multi-ligament (11 knee luxations) injuries. Mechanism of injury: Sports 59%, traffic accidents 23% and falls 18%. Rehabilitation: Range of motion 0-90 degrees and JB usage for 8-12 weeks including weekly training sessions. Patients started JB treatment (range 2-52 days), JB treatment period was mean 62 days (range 43-97). Outcome was evaluated using the posterior step off PCL laxity grading system and conversion to PCL reconstruction treatment.

Findings / Results: At baseline, 62% had a PCL laxity ≥ grade 2. After brace treatment (8-12 weeks) laxity ≥ grade 2 was 36%; 55% of the patients were clinically graded ≥ grade 1 at follow up. Five patients (15%) were converted to operative PCL treatment; four of these had multi-ligament injury after knee luxation.

Conclusions: A total of 85% of patients with PCL injury starting treatment with posterior tibial support brace within 60 days after injury avoided PCL reconstruction surgery. Knee dislocation injury increased the risk of undergoing PCL reconstruction surgery.
**Ulnar Head Arthroplasty – short term results**

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**Background:** Arthritic changes at the distal radioulnar joint (DRUJ) can lead to pain, worsening of grip strength, and disability. Ulnar head resection may result in destabilizing the wrist as well as forearm. To restore stability and resist the pressure loads, ulna head replacement has been introduced.

**Purpose / Aim of Study:** To report our experience using distal ulnar head prosthesis in treatment of painful disorders of the DRUJ.

**Materials and Methods:** 20 ulnar head arthroplasties have been implanted from March 2005 to June 2015. Of these, 13 had a follow-up of at least 6 months, mean 37.8 months. SBI Ulnar Head was used in 10 cases, Eclipse in 3. 7 were combined with total wrist arthroplasty (TWA). There were 5 men, 8 women with mean age of 57.6 years. The diagnosis was rheumatoid arthritis in 4 cases, degenerative arthritis in 6, posttraumatic arthritis in 2, Kienboeck in 1.

**Findings / Results:** No intraoperative complications have been recorded. None of the implants have been revised. Mean VAS-score for pain was 66 before operation and 26 at follow-up. Median QuickDASH was 58 before operation and 34 at follow-up. The mean grip strength improved from 15 to 25 kgF. There were no statistically or clinically significant changes in wrist motion or forearm rotation. 10 of the 13 patients were very satisfied or satisfied at follow-up.

**Conclusions:** Ulnar Head Arthroplasty yielded improvement of pain, grip strength and function at short time follow-up. Longer follow-up studies are desirable.
The odds of receiving a knee arthroplasty is higher in patients with a high Pain Catastrophizing score

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Background: Psychological factors such as pain catastrophizing is associated with low physical function and pain after knee arthroplasty (KA), but only few studies have described self-reported function and pain catastrophizing in patients referred to the orthopedic outpatient clinic with symptoms of knee osteoarthritis (OA).

Purpose / Aim of Study: To describe self-reported function and pain catastrophizing in Danish patients with symptoms of knee OA and test the hypothesis, that low self-reported function with severe symptoms is associated with receiving KA whereas pain catastrophizing is not.

Materials and Methods: All patients referred with clinical symptoms of knee OA from March – October 2013 completed a set of questionnaires: EuroQol (EQ-5D), Short Form (SF-36 (PF)), Oxford Knee Score (OKS), Pain Catastrophizing Scale (PCS) and expectations to the consultation. In total 431 patients (234 women) mean age 64.6 years were included. Of those, 193 were scheduled for KA directly and additionally 15 within 12 months after the consultation. 48 were scheduled for a knee arthroscopy and 175 were treated conservatively.

Findings / Results: The odds of getting a KA is 2.72 (p= 0.001) if a patient has a high PCS score (>24) compared with patients with low PCS score (<12). 59% of the patients with high PCS score received KA and only 37% of the patients with low score. Low OKS and low SF-36 (PF) score is also associated with getting a KA (OR: 1.98, p= 0.02; OR: 2.20, p=0.006). Furthermore, patients expecting KA as treatment has higher odds for KA compared with patients expecting conservative treatment (OR: 6.81, p<0.001).

Conclusions: Patients selected for KA have lower self-reported physical function but also higher PCS score than patients treated conservatively. Thus, some patients offered KA are at high risk of having postoperative pain and low physical function.
DVR® Anatomic volar plating system vs. VA2 Variable Angle LCP Two Column Volar Distal Radius Plate. A comparison of two volar locking plates for treatment of distal radius fractures

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**Background:** Fracture of the distal radius (DRF) can require open reduction and internal fixation (ORIF) and there are many different volar locking plates on the market, but no studies have compared the plates in terms of complications and clinical outcome.

**Purpose / Aim of Study:** To compare complications and functional outcome after ORIF of dorsally displaced distal radius fractures with the DVR® Anatomic Plate (DePuy) vs. 2.4 mm Variable Angle LCP Distal Radius Plate (VA2) (Synthes) in adults above 50 years.

**Materials and Methods:** 50 patients were in 2009 treated with the DVR® and in 2013 41 patients were treated with the VA2, and their patient health records were reviewed for complications that required additional surgery within 1 year after primary surgery. In total 67 patients were seen at six months evaluating range of motion (ROM), relative grip strength (fractured wrist compared with un-fractured wrist) and DASH score.

**Findings / Results:** The median (interquartile range – IQR) age were 70,7 (IQR: 63,7–81,8) and 70,6 (IQR: 65,2–80,1) in the DVR® and VA2 group. There were 8 (16%) complications in the DVR® group and 6 (15%) in the VA2 group. The median (IQR) score for DVR® and VA2 were respectively 9,6 (IQR: 4,3–28,3) and 14,0 (IQR: 6,0–29,0) for the DASH score (p<0.395). There were a statistical better ROM for flexion, extension, supination, pronation, ulnar and radial deviation in the VA2 group (p<0.0012 for all) but this was probably due to interrater measurement bias.

**Conclusions:** The DVR® and VA2 systems had similar results regarding complications and functional outcome in our setting.
The induced membrane technique for healing of bone defects. A review of 9 cases

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**Background:** Segmental defects of long bones are notoriously demanding to treat. We evaluate nine cases where the Masquelet induced membrane technique to substitute bone loss has been used.

**Purpose / Aim of Study:** We discuss the method compared to other types of bone reconstruction and share our tips and tricks to reduce treatment time and improve patient comfort.

**Materials and Methods:** Eight patients (nine injuries) operated between 2011 and 2014 were included. Four were infected. Outcome was time-to weight-bearing, consolidation, complications, bone grafting.

**Findings / Results:** All patients were weight bearing fully after 270 days. Mean time to weight bearing was 225 days. Time to full weight bearing was shorter in patients where nails were used to stabilize the construct: median 115 (range 0–268) compared to plates: median 244 (range 219–271). Two cases are not fully consolidation at present. Three cases needed grafting, one was misaligned. There were no amputations, no persistent infections, and no implant failures

**Conclusions:** The induced membrane technique is a relevant alternative to traditional bone substitution in select cases, yet somewhat unpredictable in its course and prolonged immobilisation is often required. Nailing seems to improve the outcome by reducing treatment time and volume of bone graft needed and should be considered when feasible.
Analysis of drain fluid particle content after implantation of an antibiotic eluting bone graft substitute close to a partial pelvic replacement

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Background: Endoprosthetic reconstruction for pathologic acetabular fractures is associated with a high risk of periprosthetic joint infection. In this setting, bone defect reconstruction utilising co-delivery of a synthetic bone substitute with an antibiotic, is an attractive treatment option from a prophylactic perspective.

Purpose / Aim of Study: We wished to investigate the possible presence of potentially wear inducing HA particles in the periprosthetic haematoma.

Materials and Methods: We analysed a drain fluid sample from an endoprosthetic reconstruction of a pathologic acetabular fracture with implantation of a gentamicin eluting, biphasic bone graft substitute, consisting of 40% hydroxyapatite (HA) and 60% calcium sulphate (CERAMENTTMG), into the residual peri-acetabular bone defect. This sample was divided into two 1.5ml subsamples, to one of which 100mg HA particles were added as control before burning off all organic substance at very high temperature. These heat treated samples were then examined with scanning electron microscopy (SEM) and energy dispersive x-ray analysis (EDAX) and compared to a reference sample consisting of HA particles only.

Findings / Results: On SEM, hydroxyapatite particles were readily recognisable in the control and reference samples, whereas only very few particles over 2ìm were apparent in the “pure” drain sample. EDAX revealed that very large amounts of salts were present in both drainage samples. The pure drainage sample contained markedly lower amounts of calcium and phosphate compared to reference and control samples. No HA particles as such, were seen in the pure sample.

Conclusions: We could not find clear evidence that the drain fluid really contained HA particles. More thorough investigations are needed and future analyses with prior removal of the high salt content would likely yield more conclusive results.
Utility of the Ganz Trochanteric Flip Osteotomy and Surgical Dislocation of the Hip for Benign Tumors of the Hip

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Background: Adequate access is critical for complete and thorough intralesional removal of benign bone lesions in order to ensure a low local recurrence rate. This can be a challenge for some tumors located in the femoral neck or the hip joint.

Purpose / Aim of Study: The surgical technique for operative dislocation of the hip described by Ganz affords excellent exposure of the femoral head, neck and acetabulum. We present 2 cases to illustrate the utility of this approach in the musculoskeletal oncology setting.

Materials and Methods: The technique consists of a posterior approach with a ‘trochanteric flip’ osteotomy, followed by a z-shaped capsulotomy, designed to preserve the blood supply to the femoral head, which allows surgical dislocation in an anterior direction. To illustrate the utility of each of the steps of this approach, two different case examples are described: Firstly, defect reconstruction of a large enchondroma of the proximal femur through a trochanteric flip osteotomy and secondly, complete removal of extensive synovial chondromatosis through a formal surgical dislocation.

Findings / Results: In both cases, generous access could be achieved comfortably, allowing controlled removal of the lesion under direct vision, while affording ample space for thorough and safe application of adjuvants such as burring, and/or surgical reconstruction of the defect, if required. Wound closure including transosseous refixation of the trochanter fragment, as well as immediate post operative course were straightforward and without complication. Both patients maintain complete restoration of function at 1-year follow up.

Conclusions: This approach can be useful to the musculoskeletal tumor surgeon in portions or its entirety, to approach various benign intra-articular, as well as intra-osseous bone and soft tissue tumors of the hip and the proximal femur.
Surgical treatment of severe scoliosis in young children using magnetically controlled growing rods – initial experience in a prospective cohort

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Background: The surgical treatment of scoliosis in young children often requires multiple surgical procedures in general anesthesia to distract the spinal implant corresponding the growth of the spine. Recently, magnetically controlled growing rods have been introduced allowing non-invasive, outpatient distraction.

Purpose / Aim of Study: The purpose of the present study was to assess the efficacy and safety of magnetically controlled growing rods in a Danish patient population.

Materials and Methods: Eight patients have been operated; four girls and four boys. The median age at the time of surgery was 10 years (range 6 – 13). Three patients had idiopathic scoliosis and the remaining patients had neuromuscular or syndromic curves. Anchoring points were constructed caudally and cranially with pedicle screws or hooks, with intramuscular placement of the rods. Patients underwent rod distraction with 3-months intervals as outpatient procedures using a magnetic external remote controller.

Findings / Results: The median pre-operative Cobb angle was 66 degrees (range 54-95) and the immediate post-operative Cobb angle was 27 degrees (20-50)(p = 0.01). No intraoperative complications occurred. One patient underwent revision surgery 19 months after the primary procedure due to screw loosening. The average lengthening per distraction procedure was between 2.4 and 3.8 mm. All the lengthening procedures were carried out in the outpatient clinic not requiring general anesthesia or any type of analgesics.

Conclusions: The use of magnetically controlled growing rods in this cohort with severe scoliosis showed no intraoperative complications. A satisfactory correction at index operation was obtained and distraction of the rods was possible in the outpatient clinic every 3 months. The method seems promising in the growing child.
Early Clinical Experience with Local Bisphosphonate Delivery for Bone Defect Reconstruction in Aggressive Benign Bone Tumors

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**Background:** Bisphosphonates inhibit osteolysis associated with benign bone tumors mediated by osteoclasts. They also induce apoptosis of tumor cells and have shown promising reduction of local recurrence rates in small case series. We have developed a surgical method for reconstruction of cavitory bone defects with a combination of cancellous allograft and a synthetic bone graft substitute, able to deliver and elute antibiotics as well as zoledronic acid locally.

**Purpose / Aim of Study:** To report our early clinical experience with local delivery of zoledronic acid for bone defect reconstruction in benign, aggressively behaving bone tumors.

**Materials and Methods:** We prospectively followed 11 patients (9f, 2m, mean age 35 (range 18–62)) with aggressively behaving benign bone tumors (5 GCT, 4 ABC, 2 UBC) who underwent tumor resection with curettage, high speed burring and subsequent bone defect reconstruction utilising a combination of a gentamycin eluting bone graft substitute (Cerament™G, BONESUPPORT, Lund, Sweden) and cancellous allograft with serial imaging (X-ray/CT) for a mean of 11 months (range 7–17).

**Findings / Results:** Radiographic evidence of local bone formation and remodeling by far exceeded rates and amounts usually observed with either single component alone. Rapid and homogeneous remodeling typically started in areas with cancellous bone contact in the periphery of the defects but was not limited to the cavities only. Substantial periosteal bone formation was also observed in areas of ungrafted surrounding cortical bone.

**Conclusions:** Effective local delivery and elution of zoledronic acid appears to substantially enhance and accelerate local bone formation/remodeling in our patients. Further studies to confirm this hypothesis are needed.
Complications following distal radius fracture osteosynthesis using two different volar locking plates

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Background: Open Reduction and Internal Fixation (ORIF) of distal radius fractures using a volar locking plate, has become one of the most common operations performed. However, to date there is a limited amount of literature describing the complications following this procedure.

Purpose / Aim of Study: We wanted to investigate the complications after ORIF of distal radius fractures using two different volar locking plates, and how often these complications occurred.

Materials and Methods: We included 241 patients with a distal radius fracture which had been operated on with ORIF using one of the two volar locking plates at Kolding Hospital in the period January 1, 2013 to July 1, 2014. We did a retrospective cohort study using the patient journal and X-rays, and we registered any complications which indicated a second operative intervention. The patients were operated on using either a “Variable angle two column plate” (VA2, Synthes) or a “Distal Volar Radius plate” (DVR, Depuy).

Findings / Results: 28/241 (11.6%) patients experienced a complication which needed a second operative intervention. There were no differences in incidents of complications when operated on using either VA2 or DVR (p-value: 0.671). Patients suffering from more complex fractures (i.e., AO 23-C fractures) had a tendency towards more complications than patients suffering from simple fractures when operated on using either VA2 or DVR, but this was not significant and there were no statistically significant differences between the two groups.

Conclusions: We registered 11.6% complications, which needed interventions. There was no difference in complications when using either a VA2 or DVR, although there was a tendency towards more frequent complications after more complex fractures. Other studies have shown similar results regarding the frequency of incidents of complications.
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