

# DOS BULLETIN



ABSTRACTS OKTOBER 2011 40. ÅRGANG

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# **DOS BULLETIN**

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## **Udgiver**

Dansk Ortopædisk Selskab  
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## **DOS Bestyrelse**

Se hele bestyrelsen side 186.

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### **NÆSTE BULLETIN**

**DEADLINE: uge 34, 24.08.2012**  
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# **Session 1: Hip/knee**

Onsdag 26. oktober

09:00 – 10:30

*Lokale: A*

**Chairmen: Micheal Ulrich-Vinter, Rune Dueholm Bech**

**1. Shoulder and hip patients' pain, mental health and quality of life**

*Randi Bilberg, Birgitte Noergaard, Kirsten Kaya Roessler, Søren Overgaard*

**2. Continuous evaluation of the metabolism in the femoral head and neck after Resurfacing Hip Arthroplasty. A randomized controlled clinical trial**

*Nina Dyrberg Lorenzen, Michael Ulrich-Vinther, Maiken Stilling, Kjeld Søballe, Hanne Birke-Sørensen*

**3. Patient satisfaction, expectations, and quality of life following periacetabular osteotomy: An 8-12 year follow-up study**

*Jakob Klit, Charlotte Hartig Andreassen, Steffen Jacobsen, Kjeld Søballe, Anders Troelsen*

**4. Cup anteroversion appears to be dependent on surgical approach – do surgeons overcompensate to prevent dislocation?**

*Peter Gebuhr, Henrik Palm, Audrey K Nebergall, Meridith E Greene, Henrik Malchau*

**5. The genetic influence on symptomatic osteoarthritis of the hip. A nationwide population and register based study in Danish twins**

*Søren Glud Skousgaard, Axel Skytthe, Jacob Hjelmberg, Lars Brandt, Søren Overgaard*

**6. Survival of Total Hip Arthroplasty with Ceramic-on-Ceramic Bearings - Results from Danish Hip Arthroplasty Registry**

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

**7. Neuromuscular exercise improves functional performance in patients with severe osteoarthritis**

*Allan Villadsen, Søren Overgaard, Anders Holsgaard-Larsen, Ewa Roos*

**8. BMD changes in the femoral neck, Gruen zones and the acetabulum following total and resurfacing hip arthroplasty. 2 year results from a RCT.**

*Jeannette Penny, Kim Brixen, Ole Ovesen, Jens-Erik Varmarken, Søren Overgaard*

**9. Compaction vs. Broaching Surgical Technique with the Cementless Bi-Metric Femoral Stem. A 5 year RCT evaluating implant fixation and clinical outcome**

*Maiken Stilling, Kjeld Søballe, Poul Torben Nielsen, Poul Hedevang Christensen, Søren Overgaard, Søren Kold*

**10 Number of patients needed to discriminate between subgroups in patient reported outcome measures**

*Aksel Paulsen, Alma B. Pedersen, Søren Overgaard, Ewa M. Roos*

## **Session 2: Foot/ankle + hand/wrist**

Onsdag 26. oktober

09:00 – 10:30

*Lokale: B*

**Chairmen: Inge Lunding Kjær, Bo Munk**

**11. Lowest occlusion pressure technique for bloodless field in foot and ankle surgery**

*Frank Linde, Tine Benzen, Niels Chr. Jensen, Hanne Mainz, Kristian Kibak Nielsen*

**12. Short-term outcome of arthroplasty of the first metatarsophalangeal joint with a non-cemented, three-part prosthesis**

*Mette Grøndahl Rosenstand, Otto Langhoff*

**13. Diabetes does not increase short term mortality after non-traumatic unilateral lower limb amputation**

*Klaus Kirketerp-Møller, Gitte Holm, Michael Krasheninnikoff, Morten Tange Kristensen*

**14. Electra prosthesis for trapezio-metacarpal osteoarthritis: a follow-up of 39 consecutive cases**

*Anders Klahn, Marianne Nygaard, Robert Gvozdencovic, Michel E H Boeckstyns*

**15. SRTM-MCP Arthroplasties. A prospective consecutive study for 1 month to five years.**

*Allan Ibsen Sørensen*

**16. SRTM-PIP Arthroplasty. A prospective study for 1 month to six years.**

*Allan Ibsen Sørensen*

**17. Acu-Loc volar distal radius plate outcome. A retrospective case-study.**

*Mathias Bjerring Ho*

**18. Concomitant Injury to the Wrist with Severe Distal Radius Fracture**

*Hans Tromborg*

**19. A Three Dimensional Analysis of Osteoarthritic Changes in the Trapeziometacarpal Joint**

*Sepp de Raedt, Maiken Stilling, Martijn van de Giessen, Geert J. Streekstra, Frans M. Vos, Torben B. Hansen*

**20. An online registry for total wrist replacement**

*Michel Boeckstyns, Guillaume Herzberg, Allan Ibsen Sørensen, Peter Axelsson, Karsten Krøner*

# **Session 3: Pediatrics + shoulder/elbow**

Onsdag 26. oktober

09:00 – 10:30

*Lokale:C*

**Chairmen:** Hans Viggo Johannsen, Tobias Nygaard

**21. The roll of Fat Pad sign in diagnosing occult elbow fractures in the pediatric patient: A prospective MRI study**

*Zaid Al-Aubaidi, Trine Torfing, Torben Stryhn, Niels Wisbech Pedersen*

**22. CPOP (Cerebral palsy follow-up program) in The Region of Southern Denmark**

*Niels Wisbech Pedersen, Helle Mätzke Rasmussen, Ulrike Dunkhase-Heinl*

**23. Is reversible total epiphysiodesis using 8-plates a safe practice?**

*Martin Gottliebse, Bjarne Møller-Madsen, Hans Stødkilde-Jørgensen, Ole Rahbek*

**24. Surgical treatment of distal biceps tendon ruptures.**

*Rasmus Elsøe, Thomas Falstie Jensen, Janne Ovesen*

**25. Low failure rate after primary and revision arthroscopic Bankart repair with a knotless anchor**

*Klaus Bak*

**26. Reconstruction of the chronic, unstable acromio-clavicular joint. A prospective case control study comparing the modified Weaver-Dunn procedure with Anatomical reconstruction of the coraco- and acromio-clavicular ligaments.**

*Klaus Bak*

**27. The Danish Shoulder Arthroplasty Registry**

*Jepe Rasmussen, John Jakobsen, Stig Brorson, Bo Sanderhoff Olsen*

**28. The sternoclavicular joint: Biomechanical effects of arthroscopic procedures in a cadaveric model**

*Mads H. Okholm, Jørgen Trantum-Jensen, Andreas Knudsen, Martin W. Rathcke, Dariush Radi, Michael R. Krosgaard*

**29. Revision Total Elbow Arthroplasty with the Semi Constrained Coonrad-Morrey Total Elbow Arthroplasty**

*Hans Christian Plaschke, Theis Muncholm Thillemann, Anne-Kathrine Belling-Sørensen, Bo Sanderhoff Olsen*

**30. Hemiarthroplasty for fractures of the distal humerus**

*Lars Henrik Frich, Peter Gaster, Søren Skødt Kristensen*



# **Session 4: Experimental + hip/knee**

Torsdag 27. oktober

13:30 – 15:00

*Lokale:A*

**Chairmen: Henrik Husted, Anders Troelsen**

## **31. Topical Bisphosphonate Treatment of Cemented Prosthesis Fixation – An Animal Study**

*Andreas West, Kasra Zainali, Jørgen Baas, Kjeld Søballe*

## **32. Zoledronate-treated Allograft Improves the Fixation of Orthopaedic Revision Implants**

*Mette Sørensen, Jørgen Baas, Jeppe Barckman, Joan E. Bechtold, Kjeld Søballe*

## **33. Cortical-Marrow Ratio: A revised method to detect low bone mineral density in plain x-rays of the hip**

*Bjarke Viberg, Frederik SG Harbo, Jens Lauritsen, Søren Overgaard, Ole Ovesen*

## **34. Have operative indications weakened in primary TKA? An evaluation of preoperative osteoarthritis and SF-36 scores in 2004 and 2009.**

*Morten G. Thomsen, Henrik Husted, Kristian S. Otte, Thue Ørsnes, Anders Troelsen*

## **35. Why in hospital after fast-track hip and knee arthroplasty?**

*Henrik Husted, Troels H Lunn, Anders Troelsen, Lissi Gaarn-Larsen, Billy B Kristensen, Henrik Kehlet*

## **36. Migration, bone quality and clinical performance of PFC Sigma TKA, fixed bearing vs. mobile bearing**

*Michael Tjørnild, Kjeld Søballe, Maiken Stilling*

**37. What is the importance of cortical fissures of the femur and tibia following stemmed revision TKA?**

*Mads Vinding, Henrik Husted, Kristian S. Otte, Thue Ørsnæs, Anders Troelsen*

**38. Increased Periprosthetic Stress Shielding with an I-Beam compared with a Finned Tibial Component Stem Design. An RCT with 2-years Follow-up by RSA and DXA**

*Maiken Stilling, Anders Odgaard, Ole Rahbek, Niels Trolle Andersen, Kjeld Søballe, Frank Madsen*

**39. Survival study of 298 open-wedge osteotomies in patients with unilateral gonarthrosis; Region North in the period 2000 to 2010**

*Anders Christian Laursen, Poul Torben Nielsen, Mogens Berg Laursen*

**40. The Pegged Trabecular Metal Tibial Plateau Remain Superior to Screw-fixed Pegged Porous Titanium Fiber-mesh Tibial Plateaus at 5 years: A randomized clinical RSA study of cementless tibial components.**

*Maiken Stilling, Frank Madsen, Anders Odgaard, Claus Fink Jepsen, Lone Romer, Kjeld Søballe*

# **Session 5: Trauma**

Torsdag 27. oktober

13:30 – 15:00

*Lokale: B*

**Chairmen: Henrik Eckardt, Michael Brix**

**41. Circumferential wires as a supplement to intramedullary nailing in inter- and subtrochanteric hip fractures**

*Lasse Birkelund, Ilija Ban, Henrik Palm, Michael Brix, Anders Troelsen*

**42. Surgeons agree more on treatment recommendations than on classification of proximal humeral fractures**

*Stig Brorson, Bo Sanderhoff Olsen, Lars Henrik Frich, Steen Lund Jensen, Anne Kathrine Belling Sørensen, Michael Krogsgaard*

**43. Complications associated with supra- and intracondylar distal humerus fractures treated with contoured locking plates**

*Ann Gillberg, Jakob Klit, Paul Hjortberg, Anders Troelsen*

**44. Local infiltration analgesia in the management of pain after osteosynthesis of extracapsular hip fracture: A randomized, placebo-controlled, double-blind clinical trial**

*Rune Dueholm Bech, Ole Ovesen, Jens Lauritsen, Claus Emmeluth, Peter Lindholm, Søren Overgaard*

**45. Secondary hyperparathyroidism and mortality in hip fracture patients**

*Christian Medom Madsen, Henrik Løvendahl Jørgensen, Bent Lind, Troels Riis, Benn Rønnow Duus, Jes Bruun Lauritzen*

**46. Complications and reoperations following locked plate osteosynthesis of periprosthetic fractures of the distal femur: A review of 41 cases from two centers.**

*Anders W. Paulsen, Michael Brix, Kim Holck, Morten S. Larsen, Anders Troelsen*

**47. Periprosthetic fractures around hip replacements treated by locking plate osteosynthesis: Follow up on 63 consecutive Vancouver type B1 and C fractures**

*Lonnie Froberg, Michael Brix, Carsten Fladmose Madsen, Morten Schultz Larsen*

**48. Supracondylar Humeral Fractures in Children: Open vs. Closed Reduction**

*Morten Søholt Wad, Peter Søndergaard, Louise Jørgensen, Karen Lisbeth Dirksen*

**49. Results of 44 bone lengthening procedures with Fitbone for post-traumatic malunion.**

*Søren Kold, Kristian Guldbæk Bundgaard, Knud Stenild Christensen*

**50. X-ray follow-up of surgically treated fractures of the adult distal forearm**

*Sune Jauffred, Mitra Sepehri, Susanne Mallet*

# **Session 6: Pediatrics + sports medicine/ arthroscopy**

Torsdag 27. oktober

13:30 – 15:00

*Lokale: C*

**Chairmen: Bjarne Møller Madsen, Michael Krogsgaard**

**51. Anterior tibial hemiepiphysiodesis for the treatment of recurrent equinus deformity after surgical treatment of club feet**

*Zaid Al-Aubaidi, Niels Wisbech Pedersen, Bjarne Lundgaard*

**52. Long-term outcome after delayed surgery for Bado type 1 radial head dislocation**

*Ole Rahbek, Søren Deutch, Søren Kold, Jens Ole Søjbjerg, Bjarne Møller-Madsen*

**53. Is radiological screening for hip dysplasia necessary for breech infants?**

*Ann-Sofie Broundal Ibfelt, Bjarne Møller-Madsen, Ivan Hvid, Ole Rahbek, Michel Bach Hellfritzsch*

**54. Three-Dimensional Kinetic and Kinematic Analysis of Knee Rotational stability in ACL-deficient patients.**

*Marie B Bohn, Mette K Petersen, Dennis Nielsen, Henrik Sørensen, Kjeld Søballe, Martin Lind*

**55. Incidence and outcome after revision ACL reconstructions. Results from the Danish registry for knee ligament reconstructions with 5 years follow-up**

*Martin Lind, Frank Mehnert, Alma Pedersen*

**56. Correlation between different patella alta measurements in patients with and without patella-femoral instability.**

*Sinan Said, Svend Erik Christainsen, Peter Faunø, Bent Lund, Martin Lind*

**57. Tunnel bone density after allogenic bone chip and bone cylinder transplantation in staged revision anterior cruciate ligament reconstruction**

*Sinan Said, Katriina B. Puhakka, Svend Erik Christainsen, Peter Faunø, Bent Lund, Martin Lind*

**58. Reducing donor site morbidity after after ACL reconstruction with hamstring tendons**

*Peter Faunø, Svend Erik Christiansen, Bent Lund, Marc Strauss, Martin Lind*

**59. Outcome after re-revision ACL reconstruction in 17 patients from a single institution. 2-15 years follow-up**

*Marc Jacob Strauss, Martin Lind, Bent Lund, Svend Erik Kristiansen, Peter Faunø*

**60. Arthroscopy of the sternoclavicular joint. Establishing portals, anatomy, structures at risk and possible arthroscopic procedures using fresh frozen cadavers.**

*Martin Rathcke, Jørgen Trandum-Jensen, Dariush Radi, Andreas Knudsen, Mads Okholm, Michael Krogsgaard*

# **Session 7: Hip/knee**

Fredag 28. oktober

09:00 – 10:30

*Lokale: A*

**Chairmen: Ole Ovesen og Maiken Stilling**

**61. Peri-Acetabular Osteotomy Improves Sport Performance in Patients with Dysplasia of the Hip**

*Michael Ulrich, Kjeld Søballe*

**62. Blood Perfusion and Bone Formation before and after minimally invasive periacetabular osteotomy analysed PET combined with CT**

*Inger Mechlenburg, Flemming Hermansen, Theis Thillemann, Kjeld Søballe*

**63. Evaluation of a Verbal Rating Scale for post-operative pain in hip fracture patients**

*Bech Rune Dueholm, Jens Lauritsen, Ole Ovesen, Søren Overgaard*

**64. Clinical and radiographic outcome 10-17 years following surgical treatment of a slipped capital femoral epiphysis.**

*Jakob Klit, Kasper Gosvig, Steffen Jacobsen, Kjeld Søballe, Anders Troelsen*

**65. Do RSA measurements of femoral head penetration and acetabular cup migration in THR depend upon shell and liner segment assignment?**

*Karl Tobias Haak, Henrik Palm, Meridith E Greene, Henrik Malchau, Peter Gebuhr*

**66. Multicenter RSA Evaluation of In Vivo Wear of Vitamin E Stabilized Highly Cross-linked Polyethylene**

*Henrik Palm, Meridith E Greene, Poul Torben Nielsen, Mogens Berg Laursen, Karl Tobias Haak, Henrik Malchau*

**67. Increased wear of polyethylene in first generation modular metal-backed cups with ETO sterilized acetabular components. A minimum 11 years follow-up and clinical assessment.**

*DM Hengst, PB Thomsen, TB Hansen, M Homilius, M Stilling*

**68. Correlation between conventional radiographs and computed tomography in acetabular retroversion**

*Christoffer Skovkjær Jensen, Søren Overgaard , Trine Torfing, Ole Ovesen*

**69. Two year Metal ions and lymphocyte counts. An RCT between the ASR Resurfacing system (RHA) and ceramic on poly Total Hip Arthroplasty (THA)**

*Jeannette Penny, Christian Nielsen, Ole Ovesen, Jens-Erik Varmarken, Søren Overgaard*

**70. Early micro motion of the ASRTM femoral component. 2 year radiostereometry (RSA) results**

*Jeannette Penny, Ming Ding, Jens-Erik Varmarken, Ole Ovesen, Søren Overgaard*



# **Session 8: Experimental + rehabilitation + tumors**

**Fredag 28. oktober**

**09:00 – 10:30**

**Lokale: B**

**Chairmen: Michael Mørk Petersen, Peter Holmberg Jørgensen**

**71. Topical Bisphosphonate Augments Fixation of Bone-grafted  
Implants, BMP-2 causes Resorption-based Instability**

*Jørgen Baas, Marianne Vestermark, Thomas Jakobsen, Thomas Jensen,  
Joan Bechtold, Kjeld Søballe*

**72. Antibiotic impregnation of allograft bone and the effect on  
implant fixation**

*Jeppe Barckman, Jørgen Baas, Mette Sørensen, Jeppe Lange, Joan  
Bechtold, Kjeld Søballe*

**73. Active and passive immunization against Staphylococcus aureus  
periprosthetic osteomyelitis in rats**

*Niels H. Søb, Nina Vendel Jensen, Steen Seier Poulsen, Frank Espersen,  
Gerald Pier, Helle Krogh Johansen*

**74. Hypoxia Enhances Chondrogenic Differentiation of Human  
Cord Blood Multilineage Progenitor Cells Seeded on a Novel Scaf-  
fold of Freeze Dried Polycaprolactone**

*Samir Munir, Ryan Figueroa, Thomas Gadegaard Koch, Dang Quang  
Svend Le, Jens Vinge Nygaard, Michael Ulrich-Vinther*

**75. Why do non-traumatic lower limb amputee patients stay in hos-  
pital and where are they discharged to?**

*Morten Tange Kristensen, Gitte Holm, Klaus Kirketerp-Møller, Peter  
Gebuhr*

**76. Setting up an orthogeriatric unit, seen from an orthopaedic point of view**

*Christian Tollund, Benn Duus, Susanne Van Der Mark*

**77. Optimizing Multidrug Resistance Protein 1 silencing in osteo- and chondrosarcoma**

*Sarah Stammose Freund, Michael Bendtsen, Akmal Safwat, Peter Holmberg Jørgensen*

**78. Reverse shoulder prosthesis after removal of the proximal humerus due to tumour**

*Anne Kathrine Kaa, Hans Viggo Johannsen, Johnny Østergaard Keller, Bjarne Hauge Hansen, Thomas Einer Baad-Hansen, Peter Holmberg Jørgensen*

**79. The Diagnostic Value of 18F-FDG PET/CT in Staging of High-grade Bone and Soft Tissue Sarcomas**

*Hanna Maria Fuglø, Simon Møller Jørgensen, Dorrit Hovgaard, Annika Loft, Michael Mørk Petersen*

**80. The Early Experience with the GMRS Mega-prosthesis**

*Michala Skovlund Sørensen, Henrik Schrøder, Michael Mørk Petersen*

## **Session 9: Spine + trauma**

Fredag 28. oktober

09:00 – 10:30

*Lokale: C*

**Chairmen: Benny Dahl, Morten Schultz Larsen**

**81. A prospective randomized trail between Transforaminal (TLIF) and instrumented posterolateral fusion (PLF) a two year follow- up.**

*Kristian Høy, Bent Niederman, Peter Helmig, Ebbe Stender Hansen, Thomas Andersen, Cody Büniger*

**82. A retrospective study of infectious spondylodiscitis managed at the Department of Orthopedic Surgery, Spine unit, Aarhus University Hospital between 2000 and 2010.**

*Kestutis Valancius, Ebbe Stender Hansen, Kristian Høy, Peter Helmig, Bent Niedermann, Cody Büniger*

**83. Long-term results after short-segment pedicle fixation of thoracolumbar fractures**

*Michael Mølmer, Tobias Aasvang, Martin Gehrchen, Benny Dahl*

**84. Routine Blood Tests as Predictors of Mortality in Hip Fracture Patients, A Literature-Based Meta-Analysis**

*Anne Sofie Laulund, Jes Bruun Lauritzen, Henrik Løvendahl Jørgensen*

**85. Arthroscopy as an aid in treating tibial plateau fractures**

*Steffen Skov Jensen, Flemming Hansen, Janni Stroem*

**86. What to expect following locked plate osteosynthesis of midshaft clavicle fractures? Complications, reoperations and patient reported outcome.**

*Ulrik Branner, Ilija Ban, John Kloth Petersen, Anders Troelsen*

**87. In-hospital mortality following hip fracture- before and after orthogeriatrics**

*Anna Gaki Lindestrand, Claes Carson, Susanne Van der Mark, Benn Duus*

**88. Does the postoperative regime influence complications and reoperations following locking plate osteosynthesis of clavicle fractures?**

*Marie Fridberg-Tobiassen, Zaid Issa, Ilija Ban, Michael Krasheninikoff, Anders Troelsen*

**89. Mobilization inhibited by Post operative pain predicted by fracture type and type of surgery**

*Troels Riis, Henning Ogarrjo, Henrik Jørgensen, Jes Lauritzen, Susanne van der Mark, Benn Duus*

**90. Municipal cost and impact on home aid utilisation and nursing home services following hip fracture: A population-based study**

*Martin L. W. Engeland, Gunnar F. Hvattum, Lars E. Matzen, Søren Overgaard, Jan Sørensen, Jesper Ryg*

# **Foredragskonkurrence:**

Fredag 28. oktober

13.30 – 14:30

*Sal: A*

**Chairmen: Jeannette Østergaard Penny, Martin Lind**

**91. Cemented or Uncemented Fixation of Proximal Interphalangeal Joint Implants? A 2 year RCT of implant fixation, periprosthetic bone density and finger function.**

*Maiken Stilling, Karsten Krøner, Bo Munk, Ole Rahbek, Inge Helleberg, Kjeld Søballe*

**92. A prospective randomized clinical trial using an uncemented and screw fixated porous coated cup with or without hydroxyapatite in revision total hip arthroplasty**

*Ole Ovesen, Ming Ding, Søren Overgaard*

**93. The effect of local infiltration analgesia in the management of pain after periacetabular osteotomy: A randomized, placebo-controlled, double-blind clinical trial**

*Rune Dueholm Bech, Ole Ovesen, Peter Lindholm, Søren Overgaard*

**94. Acetabular cup position is better using the direct anterior approach with fluoroscopy compared to the postero- and antero-lateral approaches**

*Henrik Palm, Meridith E Greene, Roger H Emerson, James Huddleston, Henrik Malchau, Peter Gebuhr*

**95. Factors predicting failure following periacetabular osteotomy: A 2-12 years follow-up study of 406 periacetabular osteotomies**

*Charlotte Hartig-Andreasen, Anders Troelsen, Michael Ulrich-Vinther, Theis Thilleman, Kjeld Søballe*

# **Poster Udstilling**

*Lokale: Foyer*

**96. Strontium-substitution of Hydroxyapatite Coating did not Improve Osseointegration and Implant Fixation**

*Marianne Toft Vestermark, Ellen-Margrethe Hauge, Joan Elizabeth Bechtold, Thomas Jakobsen, Heiko Gruner, Jøregen Baas, Kjeld Søballe*

**97. Telos ankle stress test for lateral ankle instability, Should the test be performed with the patient awake or during general anaesthesia?**

*Kristian Kibak Nielsen, Frank Linde, Niels Chr. Jensen*

**98. Quality assurance in the surgical treatment of distal radius fractures: Initial results from a new database in the Hand Surgery Unit, Department of Orthopaedic Surgery, Aarhus University Hospital.**

*Ann Sobrón, Anders Ditlev Jensen*

**99. Results of Thumb Trapeziometacarpal Joint Replacements in Young Patients**

*Hans Tromborg, Anders Peter Højlund, Anders Lorentsen*

**100. Localized Statistical Shape Model for Detection of Osteoarthritis in the Trapeziometacarpal Joint**

*Sepp de Raedt, Martijn van de Giessen, Maiken Stilling, Torben B. Hansen, Lucas J van Vliet, Frans M. Vos*

**101. Promising preliminary results from the CORIHA study (Cementless One-stage Revision of chronic Infected Hip Arthroplasty)**

*Jeppe Lange, Anders Troelsen, Kjeld Søballe, Kristian Otte, Søren Solgaard, Martin La On behalf of CORIHA research group*

**102. The lateral approach to the hip in hemiarthroplasty surgery: Results of a “Danish experience”.**

*Ulrik Knudsen, Lief Broeng, Anders Troelsen*

**103. Rehabilitation after THR: Telephone interview and individual support versus visits in outpatient clinic.**

*Britta Hørdam, Linda Koldsgaard, Preben U Pedersen, Kjeld Søballe*

**104. Are there any benefits of preoperative methylprednisolone in primary TKA surgery when pain treatment is opioid based?**

*Amir Pasha Attarzadeh, Jesper Fabrin, Klaus Poulsen, Jens Kurt Johansen, Anders Troelsen*

**105. Physical activity levels measured in patients prior to total joint replacement compared with healthy controls**

*Anders Holsgaard-Larsen, Ewa M. Roos*

**106. Total hip arthroplasty with the Thrust Plate Prosthesis. Late results in a pilot series.**

*Janus D. Christiansen, Poul T. Nielsen, Mogens B. Lauersen*

**107. Incidence of THA after acetabular fracture**

*Dennis Hallager Nielsen, Søren Lange Rasmussen, Søren Peter Eiskjær, Poul Torben Nielsen, Sten Rasmussen*

**108. Effect of continuous Adductor-Canal-Blockade on pain and mobilization after total knee arthroplasty**

*Pia Jæger, Morten T. Jenstrup, Jørgen Lund, Søren Bache, Tommy K. Larsen, Jonna S. Fomsgaard*

**109. Hemiarthroplasty with the Aequalis fracture stem in the treatment of comminuted fractures of proximal humerus**

*Thomas Jensen, Otto Falster*

**110. Septic Arthritis in the Sternoclavicular Region. Clinical and Radiological Aspects.**

*Tina Boedker, Mikkel Tøttrup, Klaus Kjær Petersen, Anne Grete Jurik*

**111. Impact of different graft types after ACL reconstruction, result from the Danish registry of Knee ligament reconstruction**

*Lene Rahr Wagner, Theis M Thillemann, Alma B Pedersen, Martin Lind*

**112. Use of an ambulatory infusion pump after harvesting a semitendinosus and gracilis graft to manage postoperative pain, in outpatient having ACL reconstructive surgery**

*Karl Bertil Jöhnk, Steffen Skov Jensen*

**113. Delirium assessment in orthopedic surgery**

*Peter Kjær Nielsen, Benn Duus, Henrik Løvendahl Jørgensen, Susanne van der Mark*

**114. Reproducibility of goniometric measurements of passive hip mobility and hand-held dynamometry of hip muscle strength in patients with hip osteoarthritis – an intra- and inter-rater study**

*Erik Poulsen, Henrik Wulff Christensen, Jeannette Østergaard Penny, Søren Overgaard, Werner Vach, Jan Hartvigsen*

**116. Epiphysiodesis Made with Radio Frequency Ablation: First Results From a Pilot Study**

*Juan Manuel Shiguetomi-Medina, Ole Rahbek, Hans Stødkilde-Jørgensen, Bjarne Møller-Madsen*

**117. Precision of Radiological Methods novel in relation to Resurfacing Humeral Head Implants: Assessment by radiostereometric analysis, DXA, and Geometrical Analysis.**

*Inger Mechlenburg, Anette Liljensøe, Maiken Stilling, Anders Amstrup, Kjeld Søballe, Thomas Klebe*

**118. Minimally invasive dynamic hip screw for fixation of hip fractures**

*Zaid al-Saadi*

**119. Non-union rate in humeral shaft fractures treated with a functional brace**

*Karl Bertil Jöhnk, Michael Toft Væsel*



# **Poster session I:**

Torsdag 27. oktober

11.30 – 12.30

*Lokale: A*

**Chairmen: Jens Erik Varmarken, Jeannette Østergaard Penny**

**120. Metal ion levels in the blood of patients with metal-on-metal (MoM) hip joint articulations. Does storage of blood samples matter?**

*Martin Lindberg-Larsen, Jeannette Ø. Penny*

**121. Quality of Life and Hip-Function is improved during the first month after Total Hip Arthroplasty**

*Peter Uhrbrand, Kjeld Søballe, Michael Ulrich-Vinther*

**122. Eccentric hip abductor weakness in patients with symptomatic external snapping – A cross-sectional study**

*Julie Sandell Jacobsen, Kristian Thorborg, Kjeld Søballe, Michael Ulrich-Vinther*

**123. Survival of the hip after periacetabular osteotomy.**

*Line Borreskov Dahl, Michael Mørk Petersen, Jens Stürup*

**124. Revision Total Knee Arthroplasty with the use of Trabecular Metal Cones.**

*Claus L. Jensen, Michael M. Petersen, Henrik M. Schrøder, Gunnar Fli-vik, Bjarne Lund*

**125. Stem alignments influence of migration of cemented femoral component in THA**

*Jens Trærup, Juozas Petruskevicius, Poul Torben Nielsen, Mogens Berg Laursen*

**126. The Incidence of stem fracture of monoblock and modular revision stems in Denmark 1995-2008**

*Jamal Bech Bouknaitir, Søren Overgaard, Jane Schwartz Leonhardt , Alma Becic Pedersen, Per Kjaersgaard-Andersen*

**127. The predictive values of perioperative biopsies in periprosthetic infections**

*Mikkel Rathdach Andersen, Stine Hangaard, Benn Duus*

**128. Monitoring patients with metal-on-metal hip implants**

*Arne Borgwardt, Søren Ribel-Madsen, Tine Bertelsen, Sandra Fabricius*

**129. A proof-of-concept evaluation of a new semi-quantitative urine test to exclude ongoing coagulation activity after THA and TKA**

*Lars Borris, Michael Lassen, Akos Pap*

**130. Catastrophic results after the use of a selfretaining running suture in total hip replacement**

*Søren Solgaard, Anne Grete Kjersgaard*

**131. Periacetabular osteotomy in young adults with Calvé-Legg-Perthes disease.**

*Jens Lindhardt Palm, Ole Ovesen, Søren Overgaard*

## **Poster session II:**

Torsdag 27. oktober

11.30 – 12.30

*Lokale: B*

**Chairmen: Sten Rasmussen, Claus Munk Jensen**

**132. Forensic finite element simulation of skull fracture**

*Tina Lercke Skytte, Lars Pilgaard Mikkelsen*

**133. Bispebjerg (Hvolris) Orthopadic PreSurgery Score (HOPSS)**

*Jesper Hvolris, Kenneth Jensen, Jens Børghlum*

**134. Twenty-nine ankle arthrodesis with the Calandruccio external compression fixator. Is the rate of bony union affected by preoperative bone stock?**

*Niels Chr. Jensen, Claus Sundsatrup, Frank Linde, Kristian Kibak Nielsen*

**135. Parametric study of a drop foot brace**

*Ragnhild i Skorini, Lars P. Mikkelsen, Tom L. Andersen, Christian Wong*

**136. The Elektra prosthesis for total replacement of the first CMC-Join: Prospective study with follow-up of one to six years.**

*Allan Ibsen Sørensen*

**137. The role of MRI in the diagnosis of wrist fractures**

*Wail Ahmad, Merete König, Ole Holm, Annette Sylvest*

**138. No differences in growth plate zone fractions in a comparative porcine study on 8-plates versus staples**

*Martin Gottliebse, Bjarne Møller-Madsen, Hanne Damgaard Poulsen, Ole Rahbek*

**139. Guided growth for the abnormal physis. Experience with the 8-plate technique in non-idiopathic cases**

*Martin Gottliebsen, Manoj Ramachandran, Mark Paterson, Matthew Barry*

**140. A Retrospective Examination of the Copeland Resurfacing Humeral Head Implant with respect to Overstuffing**

*Inger Mechlenburg, Anders Amstrup, Thomas Klebe, Stig Storgaard Jacobsen, Gerhardt Teichert, Maiken Stilling*

**141. Comparison of Two Humeral Head Resurfacing Implants. 1 year Results of a Randomized Controlled Clinical Trial.**

*Inger Mechlenburg, Maiken Stilling, Kaj Døssing, Kjeld Søballe, Thomas Klebe*

**142. Dose optimization of O-arm paediatric 3D spine protocol**

*Asger Greval Petersen, Søren Eiskjær, Jon Kaspersen, Karen Petra Weigert, Sten Rasmussen*

**143. The feasibility of prospective quality of life measurement in metastatic spinal cord compression**

*Søren Schmidt Morgen, Rikke Søgaard, Cody Bünger , Claus Falck Larsen , Benny Dahl*

## **Poster session III:**

Torsdag 27. oktober

11.30 – 12.30

*Lokale: C*

**Chairmen: Frank Farsø Nielsen, Steen Lund Jensen**

**144. Anterior Distal Femoral Epiphysiodesis for the treatment of fixed knee flexion contractures**

*Zaid Al-Aubaidi, Bjarne Lundgaard, Niels Wisbech Pedersen*

**145. Osseointegrated prosthesis for the femoral amputees**

*Peter Holmberg Jørgensen, Klaus Kjær Petersen, Jens Ulrik Pedersen, Maiken Stilling, Inger Krog-Mikkelsen, Kjeld Søballe*

**146. Task shifting in orthopaedic out-patients – an audit of shoulder patients**

*Jette W Vobbe, Sven T D Lausen, Thomas Soerensen, Lilli Soerensen*

**147. Nerve injury after hip arthroscopy with labral repair, a prospective cohort study - is there a learning curve?**

*Christian Dippmann, Otto Kraemer, Søren Winge*

**148. The myotendinous junction in humans: A method to study its structure and reaction to exercise and immobilisation.**

*Andreas Knudsen, Mathias Hjort, Karin Kjær-Hansen, Abigail Mackey, Michael Kjær, Michael Rindom Krogsgaard*

**149. Experience with surgical skin Closure System within orthopaedic surgery**

*Flemming Hansen, Janni Stroem, Louise Hosbond, Steffen Skov Jensen*

**150. High incidence of long term chronic complications after ankle sprain**

*Per Hviid Gundtoft, Sten Rasmussen*

**151. Per-operative fluid challenge in hip fracture patients**

*Viktoria Oline Barrios Poulsen*

**152. Initial results of treating femoral trochanteric fractures with a double screw nail**

*Steffen Skov Jensen, Flemming Hansen, Maj-Britt Brinkmann, Mikael Skov Nielsen, Rasmus Stokholm*

**153. Benefits and harms of locking plate osteosynthesis in intra-articular (OTA Type C) fractures of the proximal humerus: a systematic review**

*Stig Brorson, Jeppe Vejlgård Rasmussen, Lars Henrik Frich, Bo Sanderhoff Olsen, Asbjørn Hróbjartsson*

**154. Self-administrated home intravenous antibiotic therapy using elastomeric infusion pumps in orthopaedic patients**

*Jens ER Svendsson, Hilde Omestad, Klaus Kjær Petersen*

**155. Work up of sarcomas in The North Denmark Region before and after implementation of National Integrated Cancer Pathways (“Pakkeforløb for sarkomer i knogle og bløddele”)**

*Lene Dremstrup, Poul Verner Madsen*

# ***ABSTRACTS***

## 1.

### **Shoulder and hip patients' pain, mental health and quality of life**

*Randi Bilberg, Birgitte Noergaard, Kirsten Kaya Roessler, Soeren Overgaard*  
The Department of Orthopedic Surgery Kolding Hospital, a part of Lillebaelt Hospital, Denmark; Emergency department, Kolding Hospital, a part of Lillebaelt Hospital, Denmark; Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense; Department of Orthopaedics and Traumatology, Odense University Hospital, Denmark

**Background:** Studies have shown a significant reduction in pain after operation of hip patients, but report not the same effect on shoulder patients, which might be explained by different preoperative mental health and health-related quality of life.

**Purpose / Aim of Study:** The aim of this study is to investigate preoperatively difference in depression, anxiety, concern, somatisation and quality of life in patients with hip and shoulder pain.

**Materials and Methods:** The cross sectional study included 49 patients (age: 69 CI: 67-71) with hip pain scheduled for THA and 223 patients (age: 52 CI: 50 – 54) with shoulder pain referred from a general practise to an orthopaedic department. The patients filled in the questionnaire assessing mental health CMD-SQ (Common Mental Disorders – Screening Questionnaire), health-related quality of life SF-12 (Short form – 12) and EQ-5D (Euroqol 5 items) and the disease specific questionnaire. OHS (Oxford Hip Score) or OSS (Oxford Shoulder Score). There were no significant differences in gender, civil status, education and BMI between the two samples.

**Findings / Results:** The patients with shoulder pain were significantly more depressed, concerned and more somatised than the patients with hip pain ( $p < 0.05$ ). There were no significant differences in anxiety in the two groups. There were significant ( $p < 0.001$ ) correlations ( $r = 0.31$ ) between depression, concern and pain in patients with shoulder pain and also a significant ( $p < 0.001$ ) correlation ( $r = 0.36$ ) between quality of life (EQ-5D) and pain (OSS) in patients with shoulder pain.

**Conclusions:** Patients with shoulder pain are preoperatively more depressed and concerned than patients with hip pain, which ask for further research concerning prevention and treatment of these patients in order to select patients for surgery.



## 2.

### **Continuous evaluation of the metabolism in the femoral head and neck after Resurfacing Hip Arthroplasty. A randomized controlled clinical trial**

*Nina Dyrberg Lorenzen, Michael Ulrich-Vinther, Maiken Stilling,  
Kjeld Søballe, Hanne Birke-Sørensen*

Department of Orthopaedic Surgery, Orthopaedic Research,  
Aarhus University Hospital, Tage-Hansens Gade

**Background:** Resurfacing hip arthroplasty (RHA) is a recognized choice for younger patients, though associated with two specific complications; avascular necrosis of the femoral head and femoral neck fracture. These complications may be initiated during surgery, due to interruption of the arterial supply.

**Purpose / Aim of Study:** The aim was to investigate the effect of the surgical approach on the metabolism in the femoral head and neck in RHA. Our hypothesis was that the blood flow to the femoral head would be preserved and metabolism restored using antero-lateral compared to posterior surgical approach. This was investigated using Laser Doppler Flowmetry (LDF) to monitor blood flow during surgery and microdialysis (MD) to monitor the metabolism continuously in the femoral head and neck after surgery.

**Materials and Methods:** 38 patients were allocated to one of two treatments; posterior approach (Post) or antero-lateral approach (AntLat). LDF measurements were performed before and after the implant was inserted. MD was performed after surgery until the patient was discharged. The MD samples were collected and analyzed for the content of: glucose, lactate, pyruvate and glycerol. The lactate/pyruvate ratio (L/P) was calculated as an indicator of ischemia.

**Findings / Results:** The mean reduction in blood flow was 122.8 Flux Units (FU) (Post) and 73.1 FU (AntLat). There was no difference between groups ( $p=0.814$ ). At 44-50 hours after surgery the mean L/P was higher in the Post group; 198.5(40.9) in Post and 128.0(27.2) in AntLat ( $p=0.021$ ). There was no difference between groups regarding glucose, lactate, pyruvate and glycerol.

**Conclusions:** RHA surgery results in ischemia in the femoral head and neck in both groups, but the degree of ischemia is higher in the Post group. The long-term consequences of these findings are currently unknown, but will be investigated.

### 3.

## **Patient satisfaction, expectations, and quality of life following periacetabular osteotomy: An 8-12 year follow-up study**

*Jakob Klit , Charlotte Hartig Andreassen, Steffen Jacobsen, Kjeld Søballe, Anders Troelsen*

Orthopaedic Hvidovre Hospital; Orthopaedic, Aarhus University Hospital

**Background:** Periacetabular osteotomy (PAO) is performed in patients with hip dysplasia to prevent joint degeneration. The focus of previous studies has been improvements in surgical technique, hip joint survival and function. However, little is known about patient satisfaction and quality of life after PAO.

**Purpose / Aim of Study:** The purpose of this study was to assess patient satisfaction and quality of life 8-12 years after PAO.

**Materials and Methods:** Included patients were 73 preserved hip joints (55 patients) operated between 1999-2002 previously seen for medium- term functional and radiographic follow- up. A questionnaire, developed and evaluated by the authors, regarding various aspects of patient reported outcome were administered and returned by 49 of 55 patients (64 hips). The study population (70% women) had a mean age of 31 years. Follow-up ranged from 8-12 years. Preoperative grade of osteoarthritis, and pre- and postoperative center-edge angles were evaluated.

**Findings / Results:** Median preoperative CE-angle was 13° (-29°-+30°) and postoperative CE-angle was 29° (+4°-+43°). Preoperative Tönnis grade was 0-1 in 83%. Median satisfaction at follow-up was 4 (scale 1- 5). Forty-four of forty-nine patients were willing to undergo PAO again. Significant improvement between the preoperative and follow-up status were seen in; quality of life, ability to do sports, ability to participate in social activities, and in the patients' sex-life (all  $p < 0,001$ ).

**Conclusions:** For the first time aspects of quality of life and patient satisfaction following PAO is reported at medium and long- term follow-up. We found significant improvements in quality of life, social living, ability to do sports and the patients' sex-life.

#### 4.

### **Cup anteversion appears to be dependent on surgical approach – do surgeons overcompensate to prevent dislocation?**

*Peter Gebuhr, Henrik Palm, Audrey K Nebergall,  
Meridith E Greene, Henrik Malchau*

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Harris Orthopaedic Laboratory, Massachusetts General Hospital,  
Harvard Medical School, Boston MA, USA

**Background:** In Denmark, most total hip replacements are inserted through the posterolateral and less frequently the anterolateral approach. Subsequent dislocations most often occur in the approach direction. Cup anteversion is however increasingly appreciated among surgeons as a key factor for preventing dislocations

**Purpose / Aim of Study:** The purpose of this study was to establish if the cup anteversion differed between posterolateral and anterolateral inserted cups

**Materials and Methods:** 15 European and North American centers are participating in a 10-year prospective randomized study of acetabular component survivorship and polyethylene wear. Data collected included surgical information, approach and cup position measured on standardized anterior-posterior pelvic radiographs using the Martell technique. Mann-Whitney range sum test was used for comparison

**Findings / Results:** From a series of 524 hips, 308 were performed through the posterolateral and 216 through the anterolateral approach. Posterolateral procedures had less blood loss (398 vs. 440 ml,  $p=0.02$ ), less skin to skin time (75 vs. 99 min,  $p<0.001$ ), but a longer incision length (17 vs. 14 cm,  $p<0.001$ ). The average (range) anteversion was 17 (0-45) degrees among the posterolateral cups versus 11 (0-33) degrees among the anterolateral inserted cups ( $p<0.001$ ). We found no differences between groups in cup abduction (overall average 43 (range 23- 68) degrees) or number of cups in optimal position, with only 216 (41%) of all cups inserted within 30-45 degrees abduction and 5-25 degrees anteversion

**Conclusions:** Posterolateral inserted cups were positioned in more anteversion than anterolateral inserted cups. This paradox might be explained by a surgeon intention to prevent subsequent dislocation in the approach direction. Also more cups should be optimally positioned

## 5.

### **The genetic influence on symptomatic osteoarthritis of the hip. A nationwide population and register based study in Danish twins**

*Søren Glud Skousgaard, Axel Skytthe, Jacob Hjelmborg,  
Lars Brandt, Søren Overgaard*

Dept. of Occupational and Environmental Medicine and Dept. of Orthopedic Surgery and Research Unit Odense University Hospital;  
The Danish Twin Registry, University of Southern Denmark;  
Dept. of Orthopedic Surgery and Research Unit, Odense University Hospital

**Background:** Primary hip osteoarthritis (OA) is a frequent form of OA encountered in the western world. However, little is known about the genetic influence on symptomatic hip OA.

**Purpose / Aim of Study:** To investigate the genetic influence on symptomatic primary hip OA in men and women.

**Materials and Methods:** The Danish Twin Register is a nationwide population based register and comprises app. 80.000 twin pairs. The Danish National Health Register holds information on every hospital admission and discharge including the proper diagnosis covering the hospital stay. In 2007 these two registries were merged. Data from the 1931-82 cohort in The Danish Twin Register and hospital discharges in The Danish National Health Register for the period of 1977-2003 were sampled and analysed.

**Findings / Results:** The study population comprised 267 discordant and 13 concordant twin pairs. Mean age was 55.4 years (95% CI: 53.6-57.1) and 53.8 years (95%CI: 52.2-55.3) for women and men respectively ( $p=0.19$ ). Overall concordance rates were 0.204 (0.106-0.332) for MZ and 0.031 (0.064-0.086) for DZ twin pairs ( $p=0.001$ ). Concordance rates for males were 0.160 (0.047-0.344) for MZ and 0.018 (0.005-0.093) for DZ ( $p=0.012$ ). Concordance rates for females were 0.250 (0.102-0.444) for MZ and 0.049 (0.006-0.161) for DZ ( $p=0.012$ ). Tetrachoric correlations for males were 0.595 for MZ and 0.105 for DZ. Tetrachoric correlations for females were 0.714 for MZ and 0.306 for DZ. The AE model had the best fit with 0.69 (95%CI: 0.49-0.80) accounting for an additive genetic effect. There was no significant effect of gender.

**Conclusions:** Additive genetic factors have a highly significant contribution to symptomatic primary hip OA in men and women and accounts for 69% of the variation in the population liability to the disease. The effect of age and sex differences are presently under study.

## 6.

### **Survival of Total Hip Arthroplasty with Ceramic-on-Ceramic Bearings - Results from Danish Hip Arthroplasty Registry**

*Claus Varnum, Alma B. Pedersen, Per Kjærsgaard-Andersen, Søren Overgaard*  
Orthopaedic Surgery Vejle Hospital / Odense University Hospital; Clinical Epidemiology, Aarhus University Hospital; Orthopaedic Surgery, Vejle Hospital; Orthopaedic Surgery and Traumatology, Odense University Hospital

**Background:** Ceramic bearings were introduced to reduce wear debris, as polyethylene wear can result in osteolysis and loosening of implants. Ceramic bearings have been associated with early complications such as implant fracture and squeaking.

**Purpose / Aim of Study:** In this population-based follow-up study we wanted to study medium-term survival of total hip arthroplasties (THAs) with ceramic-on-ceramic (CoC) bearings and to investigate the revision causes.

**Materials and Methods:** From the Danish Hip Arthroplasty Registry 51.412 primary THAs operated from 2002 to 2009 were identified. 2.129 THAs had CoC bearings, 8.519 ceramic-on-polyethylene (CoP) bearings, 25.384 metal-on-polyethylene (MoP) bearings, and 1.393 metal-on-metal (MoM) bearings. Total 13.987 THAs were not registered with an unambiguous couple of bearings and therefore excluded.

**Findings / Results:** The 8.7 years survival for uncemented THAs was 95.2% (95% CI, 93.8-96.3%) for CoC bearings, 96.1% (95% CI, 95.5- 96.7%) for CoP bearings, 95.1% (95% CI, 94.5-95.6) for MoP bearings, and 96.8% (95% CI, 95.6-97.7%) for MoM bearings. The relative risk (RR) for any revision of CoP THA was significant lower (adjusted RR=0.84, 95% CI: 0.73- 0.96) during complete follow-up compared to MoP THAs, but no difference in RR for any revision were found when comparing CoC and MoM THAs to MoP THAs. 1.317 (3.5%) revisions were identified in the study population. CoC THA had significantly higher rate of revision because of component failure, pain, and other revision causes in total than other bearings, and the incidence of ceramic head fracture was 0.28% for CoC bearings.

**Conclusions:** We have not found any difference in survival and RR for any revision of CoC THA at medium-term follow-up, but reasons for revision differ between CoC and other bearings. RR for any revision of CoP THA was lower compared to the "standard" MoP THA.

## 7.

### **Neuromuscular exercise improves functional performance in patients with severe hip osteoarthritis**

*Allan Villadsen, Søren Overgaard, Anders Holsgaard-Larsen, Ewa Roos*  
Unit for Musculoskeletal Function and Physiotherapy Institute for Sports Sciences and Clinical Biomechanics, University of Southern Denmark; Orthopaedic Research Unit, Department of Orthopaedics and Traumatology, Odense University Hospital, Institute of Clinical Research, University of Southern Denmark, Denmark; Institute for Sports Sciences and Clinical Biomechanics, University of Southern Denmark

**Background:** Exercise is regarded a cornerstone in the treatment of mild to moderate osteoarthritis (OA). However, little is known of the effects in patients with advanced and end-stage OA.

**Purpose / Aim of Study:** The purpose was to evaluate the effect of neuromuscular exercise in patients with severe hip OA.

**Materials and Methods:** Design. Randomized controlled trial (Clinicaltrials.gov identifier: NCT01003756). 84 patients, 51% female, mean age 68.6±7.8 years, BMI 28.7±4.7 scheduled for total hip replacement at Svendborg Community Hospital, Odense University Hospital, Denmark were included. Intervention. Participants were randomized to an eight-week neuromuscular exercise (NEMEX-TJR) intervention or care-as-usual (verbal and written preoperative information). Intervention was supervised and offered twice a week with each session lasting one hour. The program is considered feasible and safe in this patient group and previously described in detail. Assessments were carried out at baseline and within one week after the intervention. Outcomes. Functional performance: 20-m walk at maximal pace and 5 repeated chair stands timed. Muscle power: Unilateral multi-joint leg extension power and unilateral single-joint knee extension power evaluated with a leg extension press and a seated knee extension machine (Oemmebi, Moglia, Italy) adapted with a linear encoder, respectively.

**Findings / Results:** On average the intervention group attended 13±4 sessions (Table 1). In favor of the intervention group, the between-group difference was significant for 20-m walk (2.2 seconds,  $p=.009$ ), chair stands (1.7 seconds,  $p=.022$ ) and leg extension for the non operated leg (.17 W/kg,  $p=.049$ )

**Conclusions:** Eight weeks neuromuscular exercise according to the NEMEX-TJR program improves functional performance and leg extension power in patients with severe OA of the hip joint.

## 8.

### **BMD changes in the femoral neck, Gruen zones and the acetabulum following total and resurfacing hip arthroplasty. 2 year results from a RCT.**

*Jeannette Penny, Kim Brixen, Ole Ovesen,  
Jens-Erik Varmarken, Søren Overgaard*

Dept. of Orthopedic Surgery and Traumatology Næstved Hospital and Odense University Hospital, Institute of Clinical Research, University of South; Dept. of Endocrinology, Odense University Hospital, Institute of Clinical Research, University of Southern Denmark; Dept. of Orthopedic Surgery and Traumatology, Odense University Hospital, Institute of Clinical Research, University of Southern Denmark; Dept. of Orthopedic Surgery, Næstved Hospital; Dept. of Orthopedic Surgery and Traumatology, Odense University Hospital, Institute of Clinical Research, University of Southern Denmark

**Background:** The hypothesis of Resurfacing Hip Arthroplasties (RHA) is that it may prevent femoral stress shielding and maintain bone stock. Due to the bearings the load transferred and stresses might differ between RHA and Total Hip Arthroplasty (THA) resulting in differential bone loss.

**Purpose / Aim of Study:** To compare femoral and acetabular Bone Mineral Density (BMD) in RHA to THA within the first 2 years.

**Materials and Methods:** 38 osteoarthritis patients were randomised to RHA or THA. Cups placed in press fit. DXA scans postoperatively, at 8 weeks, 1 and 2 years. BMD was measured in 4 acetabular (W1-4) and 7 femoral (Gruen1-7) zones and for RHA only, in 6 femoral neck zones (M1-3/L1-3).

**Findings / Results:** Results reported as mean (95%CI). During the first two years, the net BMD of all acetabular regions in the RHA group dropped to 96(94-99) % ( $p=0.03$ ) and for the THA is 98(94-102) % ( $p=0.68$ ). A clear decrease to 90( 81- 99)% (RHA) and 91( 86- 96)% (THA) ( $p<0.01$ ) was found just medial for the cup in W2. No difference between the groups. On the femoral side the RHA BMD increased in all Gruen zones with a maximum increase in zone 7 of 108(103- 113) % ( $p<0.01$ ) In contrast the THA performed significantly different from RHA with a loss in zone 7 to 85(78- 92) % ( $p<0.001$ ) 1-2% poorer in zones 3 and 6 ( $p<0.05$ ) and similar in zones 1, 2 and 5. Overall the femoral neck BMD around the RHA gained 10 (103-116) % ( $p<0.001$ ), with the largest increases on the lateral side of the pin with L1 reaching 126(107-145) % ( $p=0.01$ )

**Conclusions:** Both RHA and THA experience a little stress shielding on the acetabular side and the load seems to be distributed in a similar pattern for the different concepts. The major advantage of the RHA is seen on the femoral side, where it maintains and increases the femoral bone BMD especially in the calcar area.

## 9.

### **Compaction vs. Broaching Surgical Technique with the Cementless Bi-Metric Femoral Stem. A 5 year RCT evaluating implant fixation and clinical outcome**

*Maiken Stilling, Kjeld Soballe, Poul Torben Nielsen,*

*Poul Hedevang Christensen, Soren Overgaard, Soren Kold*

Department of Orthopaedics Aarhus University Hospital, THG; Department of Orthopaedics, Aarhus University Hospital, THG; Department of Orthopaedics, Aalborg University Hospital; Department of Orthopaedics, Aalborg University Hospital; Department of Orthopaedics, Odense University Hospital; Department of Orthopaedics, Aalborg University Hospital

**Background:** Bone compaction(C), as opposed to traditional broaching(B), retains the cancellous bone and increase mechanical implant stability in short-term dog studies. Reservation for clinical implementation of C was related to concern for peri-prosthetic fractures.

**Purpose / Aim of Study:** The purpose of this study was to compare implant fixation and fracture risk with C versus B preparation of the femoral canal.

**Materials and Methods:** 44 patients (19 males) were randomly treated with either C by a smooth tamp or B by a broach in preparation for cementless HA-coated Bi-Metric stems (Biomet Inc). Patients were operated in two sites (Århus, Farsø) but were all followed in Aarhus with radiostereometry (RSA) through 5 years of follow-up. Complications throughout the observation period were recorded. Supplementary clinical outcomes were collected at a mean 7 years (range 5- 8.8) follow-up.

**Findings / Results:** All migration-data between the groups were comparable at all follow-ups. No progressive migration was seen. 5 year total translation was 0.75mm (SD 1.2) for B (n=19) and 0.84mm (SD 0.64) for C (n=19) (p=0.19). Early (6 weeks) stem- subsidence was 0.01mm (sd 0.19) for B and 0.27mm (sd 0.99) for C (p=0.24). Rotation in anteversion was a mean  $0.7^{\circ}$ (SD 1.5). One patient with B had a peri-prosthetic fracture. Male gender, young age, patient satisfaction, and pain were not different between the two groups and did not correlate to implant migration.

**Conclusions:** RSA showed similarly well-fixed Bi- Metric stems throughout 5 years observation regardless of compaction or broaching technique. No peri-prosthetic fractures were seen with bone- compaction, and clinical outcomes were similar. Long-term follow-up and bone density studies are needed to clarify if a compacted and tighter sealing of the bone-implant interface can prevent particle-disease, osteolysis and loosening.



## 10.

### **Number of patients needed to discriminate between subgroups in patient reported outcome measures**

*Aksel Paulsen, Alma B. Pedersen, Søren Overgaard, Ewa M. Roos*

Department of Orthopaedic Surgery and Traumatology Odense University Hospital; Department of Clinical Epidemiology, Aarhus University Hospital; Department of Orthopaedic Surgery and Traumatology, Odense University Hospital; Research Unit for Musculoskeletal Function and Physiotherapy, Institute of Sports Science and Clinic, University of Southern Denmark

**Background:** Patient reported outcome-measures (PROs) are increasingly used in orthopedics. Information on number of patients needed in different settings is warranted.

**Purpose / Aim of Study:** To assess the number of patients needed for different PROs to discriminate between subgroups of age, gender, and diagnosis.

**Materials and Methods:** 5777 primary THA patients, operated 1-2, 5-6, and 10-11 years ago. SF-12 Health Survey (SF-12), EQ-5D, Oxford 12--item Hip Score (OHS), and Hip dysfunction and Osteoarthritis Outcome Score (HOOS) were included. The different PRO subscales abilities to discriminate between groups were studied using analysis of variance. The hypothetical number of subjects needed to find the significant difference in PRO mean value between groups (assuming a significance level of 5 % and a power of 85 % to detect differences between the actual groups in our current study) was estimated for each PRO subscales with sample size calculations or by power calculations and simulated ANOVA F tests, depending on the number of groups.

**Findings / Results:** To discriminate between gender, the least number needed to find a statistically significant difference in mean sum score in each group was 298 (OHS) while HOOS QoL required the most number of subjects (760 in each group). PCS had the least number needed in relation to diagnoses (51 patients per group needed), while HOOS Pain required the most (116 patients per group needed). Concerning age, the least number needed was 270 (EQ-VAS), and OHS required the most (1566 in each group).

**Conclusions:** Subgroup analyses in a hip registry setting require group-sizes from 51 to 1566 dependent on descriptive factor and choice of PRO which seems feasible in registry context.

## 11.

### **Lowest occlusion pressure technique for bloodless field in foot and ankle surgery**

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**Background:** The thigh cuff pressure for bloodless field during major foot and ankle surgery is usually set empirically to 300-350 mmHg by the surgeon. The cuff pressure is potentially harmful to the muscles and nerves.

**Purpose / Aim of Study:** An automated limb occlusion measurement system was tested in a series of foot and ankle operations in order obtain effective bloodless field with a minimum cuff pressure.

**Materials and Methods:** 126 patients who underwent major foot and ankle surgery (34 total joint replacements, 23 ankle arthrodeses, 25 hind foot arthrodeses, 44 others) were included. The patients were operated in general or spinal anaesthesia. The limb occlusion pressure (LOP) was measured during anaesthesia by plethysmography on the second toe. The cuff pressure during operation was selected as the measured LOP + 50 mmHg in the LOP-interval 90-130 mmHg, + 75 mmHg in the interval 131-190 mmHg and + 100 mmHg in the interval 191-300 mmHg.

**Findings / Results:** The cuff pressure during operation was determined to between 150 and 200 mmHg in 52 patients, between 201 and 250 mmHg in 49 patients, between 251 and 300 mmHg in 14 patients, between 301 and 350 mmHg in 3 patients, and above 350 mmHg in 3 patients. The highest LOP was 268 mmHg. In 5 cases the LOP could not be measured. The cuff pressure was adjusted in 12 cases (raised in 11 cases and lowered in 1 case). In 7 cases the surgeon judged the bloodless field as poor. Overall 80% of the patient were operated using a thigh cuff pressure below 250 mmHg and more than 40% were operated with a cuff pressure below 200 mmHg.

**Conclusions:** The thigh cuff pressure can be reduced significantly during operation in most cases by using a plethysmographic limb occlusion measurement system compared with empirically set cuff pressure of 300-350 mmHg.

## 12.

### **Short-term outcome of arthroplasty of the first metatarsophalangeal joint with a non-cemented, three-part prosthesis**

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**Background:** Even though 1st Metatarsophalangeal (MP) joint arthroplasties have been inserted for several years, there is still some controversy about their use and there are only few reports on the long-term results of this operative procedure.

**Purpose / Aim of Study:** Our aim is to evaluate the clinical and radiological results after insertion of the Rotoglide three-part prosthesis.

**Materials and Methods:** A series of 35 Rotoglide arthroplasties in 33 patients were retrospectively reviewed after a mean follow-up of 40 months (13-64 months). The operative results were assessed according to the American Orthopaedic Foot and Ankle Society (AOFAS) score and standard radiographs were examined for signs of loosening and implant dislocation. The patients were also asked for their subjective satisfaction with the result.

**Findings / Results:** The mean flexion-extension range of motion at follow-up was 31° (from 15- 45°). The mean AOFAS score was 79.5 of 100 possible. 24 patients were subjectively satisfied and would undergo the procedure again, 7 patients would not. The AOFAS score was markedly higher among the satisfied patients. All of the dissatisfied patients scored 20 or below in the pain category in the AOFAS score (of 40 possible). 75% of all x-rays showed radiological signs of bone resorption around the prosthesis, supposedly because of stress shielding. Complications included 1 case of slow post-operative infection, which resulted in removal of the prosthesis. 1 patient had a supplementary wedge resection and 1 patient had a bunion removed.

**Conclusions:** Despite some success in relieving pain, the achieved movement in the MP-joint is not as great as expected. We have found a disturbingly high degree of radiological changes around the prostheses. We advise further investigations to establish whether these changes are progressive.

## 13.

### **Diabetes does not increase short term mortality after non-traumatic unilateral lower limb amputation**

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**Background:** Diabetes is a risk-factor in most surgical procedures and a risk factor for being amputated.

**Purpose / Aim of Study:** To study the influence of diabetes to short-term mortality in patients who had a non-traumatic unilateral lower limb amputation.

**Materials and Methods:** Ninety-three consecutive non- traumatic unilateral lower limb amputations (16% toe/foot, 33% trans- tibial, 9% through knee, and 42% trans- femoral amputations) who were amputated in the year 2009, in an acute Orthopaedic ward, were studied. Mean (SD) age was 75.8 (11.4); 55 (59%) male and 18 (19%) had a previous amputation of the contra lateral limb. Amputations were performed due to diabetes (n=39) or peripheral artery diseases (PAD) (n=54). Co-morbidities were grouped as 0-1, 2-3, or 4-5 for analysis.

**Findings / Results:** Thirty days mortality was 30% with no significant (P=0.5) difference between diabetic (33%) vs. non-diabetic (28%) patients. Factors independently associated with 30-day mortality in univariate analysis (P<0.04) were older age, admitted from an institution, and more co-morbidity. Cox regression analysis demonstrated that 30-day mortality was associated with older age (P=0.006), and number of co- morbidities (P=0.005), but not with diabetes when adjusted for gender, previous amputation, the present amputation level, and residential status. Thus, a patient with 4 or 5 co- morbidities (n=20) was 5 times more likely to die within 30 days, as a patient with 0-1 co-morbidities (n=16). Further, odds of not surviving increased with 5% per each additional year of age.

**Conclusions:** The high mortality rate in this sample agrees with previous findings. Still, we were surprised to find that as many as 30% of patients died within 30 days post-surgery and with no difference between diabetic and non-diabetic patients.

## 14.

### **Electra prosthesis for trapezio-metacarpal osteoarthritis: a follow-up of 39 consecutive cases**

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**Background:** The early results of trapeziometacarpal osteoarthritis treated with Electra prosthesis were encouraging with a fast recovery, good mobility and grip strength, and a revision rate of 15% after 53 months. Since then very little has been presented on long term follow up.

**Purpose / Aim of Study:** Prospective clinical results and a long term follow up are not quite elucidated. For this reason we wish to contribute with our clinical results in a prospective long term follow up of 39 Electra prosthesis implanted in the TMC joint.

**Materials and Methods:** We present a prospective follow up of 39 Electra prostheses in 37 patients, 32 women and 5 men mean age 56,5 years. There were 36 patients with osteoarthritis and 3 with rheumatoid arthritis. Patients were followed by clinical examination including measurement of VAS, mobility and strength after at 6, 12, 26 and 52 weeks and after that annually. Radiological examination was done preoperatively, after 6, 26, 52 weeks and annually. Mean follow up time was 48 months (range 3-91).

**Findings / Results:** We found a fast recovery, maintenance of mobility, and a gradual increase in grip strength. However we experienced a need for revision with a revision rate of 18% after 48 months increasing to 43% after 84 months.

**Conclusions:** The main reason for revision was loosening of the trapezium component and the biomechanical properties of the trapezium may be the key problem in treating trapeziometacarpal osteoarthritis by total prosthesis.

## 15.

### **SRTM-MCP Arthroplasties. A prospective consecutive study for 1 month to five years.**

*Allan Ibsen Sørensen*

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**Background:** A resurfacing of the MCP joint has been an option for years to the Golden Standard of flexible of the MCP joint.

**Purpose / Aim of Study:** There has only been presented few reports of Avanta SR-MCP with long time follow up. Results of a prospective study is presented.

**Materials and Methods:** This prospective study includes 105 SRTM-MCP arthroplasties with a follow up from 1 month to 5 years (74 with a minimum of 1 year). Median age 59 years (29-86). Main indications are Rheumatoid Arthritis 88 joints and 14 Osteoarthritis. In the rheumatoid group, severe conditions with volar sub- or volar dislocation also are included. In 7 joints Tupper arthroplasty and 2 joints flexible Silicone athroplasties has been performed.

**Findings / Results:** Results: Preop. ROM (median) 42 degrees (0-88) and 1 year follow up ROM was 46 degrees (16-90). VAS preop. 35mm (0-99) and at 1 year 0 mm (0-100). Grip strength preop. 14 kgF (2-60) and at 1 year 14 kgF (2-60). Pinch grip preop. 15 KPa (0-38) and at 1 year 24 Kpa (0-70). Complications: No infections. Loosening around the stem 1 prostheses at 3 years follow up. Eight early postoperatively joint dislocations due to insufficient collaterale ligament and these collaterale ligaments were reconstructed and did not have any influence on the postop. ROM, VAS, and grip strength.

**Conclusions:** SRTM-MCP arthroplasty is a god alternative to the flexible silicone prostheses in rheumatoid and osteoarthritic patients with not displaced joints and there are few complications postoperatively. And SR- MCP is an option in patients with more severe rheumatoid changes if ligaments are to be reconstructed.

## 16.

### **SRTM-PIP Arthroplasty. A prospective study for 1 month to six years.**

*Allan Ibsen Sørensen*

Clinic of Handsurgery University Hospital Sahlgrenska

**Background:** A resurfacing of the PIP joint has been an option for years to flexible Prostheses and arthrodeses of the joint.

**Purpose / Aim of Study:** The aim of this study is to report results of uncemented SRTM-PIP arthroplasties.

**Materials and Methods:** This prospective study includes 78 SRTM PIP arthroplasties with a follow up from 1 month to 6 years (55 with a minimum of 1 year). Median age 62,3 years (25-83). Main indications are Reumatoid Arthritis 18 joints, 45 Osteoarthritic joints and 15 other indications. In the reumatoid group few cases with severe conditions of Boutonnière deformity or MCP arthroplasty in the same finger were included.

**Findings / Results:** Results: Preoperative ROM (median) 36 degrees (0-75) and at 1 year follow up ROM was increased to 42 degrees (0- 102). VAS preoperative 62 mm (0-100) and at 1 year 2 mm (0-98). Grip strength preoperative 16 KgF (2-51) and at 1 year 18 kgF (1-34). Pinch grip preoperative 20 KPa (0-52) and at 1 year 29 Kpa (8-52). The increase of ROM, strength and decrease in VAS are unchanged 6 years postoperatively. Complications: No infections. Due to loosening around the stem of 8 prostheses were revised to new SRTM PIP prostheses. 20 patients reoperated one or more than one time. Five arthrodesis and three of these due to dislocation in severe rheumatoid conditions. Tenolyses more than once in 7 joints caused by adhesions the extensor tendon. One stem was repositioned postoperatively due to incorrect position. Three FDS tenodeses performed due to hyperextension.

**Conclusions:** SRTM PIP increases ROM and strength and a decreases pain, but are related to soft tissue problems postoperatively as reported in other papers. 11,8% loosening of the prostheses and revision. Cementing or HA coating of the stem should be considered. Severe rheumatoid cases including Boutoniere deformity should be avoided.

## 17.

### **Acu-Loc volar distal radius plate outcome. A retrospective case-study.**

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**Background:** Surgical management of unstable distal radius fractures is changing towards modern low-profile anatomical locking- plates. Introducing new surgical techniques and equipment demands careful monitoring of the clinical and radiological outcome.

**Purpose / Aim of Study:** Our aim was to evaluate clinical and radiological outcome of fractures treated with the Acu-Loc plate.

**Materials and Methods:** 81 patients were treated from June 2007 to April 2009. 65 (80%) patients were available for interview and examination. Mean age were 60.1 and A, B, and C fractures according the AO classification were all present. Outcome-parameters: DASH score. Range of movement evaluated in both fractured and non-fractured wrist at one- year follow-up. Primary, postoperative, and one-year follow-up X-rays were evaluated (radio- ulnar length, volar tilt, radial inclination, AO-classification). Complication was defined as where secondary surgery was necessary.

**Findings / Results:** Mean DASH was 18.6 at one-year follow- up. 85 % were excellent/good, 12 % fair, 3 % poor. No loss of fixation or significant change in radiology was recorded. Fractures was fixated with a mean volar tilt of 3° a radial inclination of 22° and a radio-ulnar length of 0 mm. ROM showed a relative decrease in wrist flexion (82%) and grip-strength (74 %) when compared to the non-fractured side (worse for the B & C type fractures). 65 (82 %) had no or minor complications. 14 (18 %) had secondary surgery, 11 due to medianus-nerve symptoms, 3 due to tendon-ruptures. No statistically significant difference was found regarding seniority of the surgeon and outcome- parameters.

**Conclusions:** The Acu-Loc plate provides a very reliable and stable method of maintaining reduction of unstable distal radius fractures. An overall good functional outcome after 1 year. High rate of secondary surgery, however, remains an issue.



## 18.

### **Concomitant Injury to the Wrist with Severe Distal Radius Fracture**

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**Background:** The use of arthroscopic guidance (ASKG) during reduction and fixation of distal radius fractures is still controversial. There is, however, good evidence that unsatisfactory reduction of the joint surface will produce arthritic changes and pain (Ghormley, Frykmann, Knirk). There is good evidence that simple X-ray is not always adequate to evaluate the fracture properly compared to CT (Dahlen 2004).

**Purpose / Aim of Study:** To document the frequency of concomitant injuries to the wrist with a distal radius fracture

**Materials and Methods:** 31 consecutive young patients (age 16 to 60 years) with severe distal radius fractures (AO C-type). All x-rayed in ER before and after primary reduction and subsequent casting. All patients had CT scan of distal radius, ulna and carpus. All patients were booked for ASKR and fixation of their distal radius fracture (but without any scientific protocol for inclusion). No patients had preoperative diagnosed concomitant injuries. We have no clinical outcome data.

**Findings / Results:** Age (range 19-59 mean 58 years), male/female = 27/4 Lesions found (several patients had more than one injury): • 23 TFCC Lesions • 8 Scaphoid fractures • 12 SL-ruptures • 4 major cartilage injuries (Capitate, Hamate) • 16 minor cartilage injuries of scaphoid, lunate or triquetrum radio-carpal.)

**Conclusions:** The author recommends taking steps to diagnose concomitant injuries of the wrist in young patients with severe distal radius fractures (AO type C). Discussion: We do not know if some of the minor injuries benefitted from our treatment. Most of the major injuries would be expected to influence the outcome if they had not been treated. Some injuries could not be treated even though they were expected to seriously influence the outcome.

## A Three Dimensional Analysis of Osteoarthritic Changes in the Trapeziometacarpal Joint

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**Background:** Osteoarthritis (OA) is a disabling disease commonly affecting the trapeziometacarpal (TMC) joint. In clinical practice, TMC OA is verified on conventional radiographs using the Eaton Glickel (EG) classification. However, the inherent overprojection of carpal bones in standard radiographs make quantitative measurement of OA indicators difficult.

**Purpose / Aim of Study:** The purpose of this study was to obtain a better understanding of OA changes in the TMC joint because they may affect the biomechanics and outcome of surgical interventions such as joint replacements.

**Materials and Methods:** A total of 90 wrists (45 controls and 45 OA) were included after EG classification by experts. Automated novel measurement methods were developed and used on CT scans. The carpal bones in the CT slices were segmented and characteristic points were automatically determined on the scaphoid, trapezium, and first metacarpal. The trapezium and scaphoid of each wrist was registered allowing measurements of the subluxation of the first metacarpal with respect to the trapezium. The bone-gap width was measured between the metacarpal and the trapezium points. The scaphoid- metacarpal height was measured between the scaphoid and metacarpal points.

**Findings / Results:** In comparison with the normal wrists the OA wrists had a radial-dorsal metacarpal subluxation of 2.45mm ( $P<0.001$ ), a decrease in scaphoid-metacarpal height of 1.65mm ( $P<0.001$ ), and a decrease in bone- gap width of 0.53mm ( $P<0.001$ ).

**Conclusions:** The congruency and normal bone contacts between the trapezium and scaphoid is significantly affected in TMC OA. Aiming towards a correction of the disturbed bone alignment and a restoration of soft tissue balance might be an important step in improvement of survival and function of TMC joint replacements.

## 20.

### **An online registry for total wrist replacement**

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**Background:** 1. Single centers can only obtain data on a restricted number of cases. An international database offers the possibility to create and analyze data on larger number of cases 2. An online registry with instant calculation of statistics and generation of reports is a new tool in clinical research concerning total wrist arthroplasty

**Purpose / Aim of Study:** 1. To create an international webbased registry 2. To analyze statistics concerning a larger number of cases

**Materials and Methods:** To this date, 168 cases from 11 centers in 6 European countries have been registered, but as the number of cases and registered centers increases continuously and the data are analyzed instantly and automatically when new data are added, updated data and analyses will be presented. Analysis comprises life tables for implant survival and follow-up results at regular intervals.

**Findings / Results:** E.g.: at this moment a 2-year follow is available on 59 cases, a 4-year follow-up on 23 cases and a 5-year follow-up on 18 cases. The follow-up data show, that pain - measured on a visual analogue scale - was reduced efficiently. Function - evaluated by the QuickDASH - was improved, in almost all cases. Grip strength increased in average by 70 percent, dorsal flexion by 20 percent, ulnar flexion by 25 percent and forearm rotation by 13 percent, while volar and radial flexion remained essentially unchanged. The 7-year survival rate of the implants was 95 percent.

**Conclusions:** Conclusion: The registry offers the possibility continuously to analyze a larger number of cases than any single center would be able to. Based on the analyses, the results obtained with the Remotion total wrist implants are very favorable.

## 21.

### **The roll of Fat Pad sign in diagnosing occult elbow fractures in the pediatric patient; A prospective MRI study**

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**Background:** Elbow joint injuries encounter a high percent in the pediatric skeletal injuries. In 1954, Norell described "Fat pad sign" for the first time. This stands simply for the radiological visualization of the intracapsular but extra-synovial posterior and anterior fatty tissue

**Purpose / Aim of Study:** To clarify the relation between the presence of positive fat pad sign on the lateral X-ray and the type of injury verified on MRI

**Materials and Methods:** 31 children were diagnosed primarily by the attendant emergency physician with positive fat pad sign. An above the elbow cast was applied and all patients were referred to a sub acute MRI

**Findings / Results:** 5 patients found to have negative fat pad sign and were excluded. 26 patients, 10 males and 16 females, with a mean age of  $10 \pm 2.62$  years. Time between the injury and initial radiological examination was  $0,8 \pm 0,27$  days and the MRI was obtained on an average of  $6,6 \pm 3,84$  days. 12 patients had injury of the left and 14 of the right side. The MRI showed posterior positive sign in all but 5 cases and 6 occult fractures (23%). 19 patients (73%) had bone bruise. 13 cases had soft tissue injury. All patients but one had normal range of movement with no pain on the last clinical examination after 2-3 weeks. Finding these fractures on MRI did not alter the treatment. All fractures were judged to be stable and therefore no follow up radiographs were taken

**Conclusions:** The presence of positive fat pad sign is not a synonymous with occult fractures, but should alert the treating physician for the possibility of intraarticular fractures or intraarticular diseases. Finding occult fractures on MRI does not alter the final treatment of these patients.

## 22.

### **CPOP (Cerebral palsy follow-up program) in The Region of Southern Denmark**

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**Background:** Children with cerebral palsy need a regular and standardized follow-up. In Sweden it was shown that such a follow-up succeeded by relevant treatment reduced the incidence of hip dislocation, severe contractures and severe scoliosis. CPOP was established in Southern Denmark in 2009. In 2010, it was approved by the National Board of Health as a Regional Clinical Quality Database for children with Cerebral Palsy (CP)

**Purpose / Aim of Study:** To evaluate the quality of CPOP

**Materials and Methods:** Depending on the GMFCS (Gross Motor Function Classification Scale) registration of data is performed regularly based on 4 protocols (physiotherapeutic, neuropediatric, radiographic and surgical record). Registrations have been performed on children born in 2003 or later who are enrolled in CPOP. The quality of the database was assessed with regard to number of children enrolled, 4 process indicators and 9 outcome indicators.

**Findings / Results:** The percentage of registered children in CPOP born after 2003 is estimated to be 88% of the CP population. The quality requirement was set at 90%. Process indicators: o Hip X-ray protocols have been completed in 62% of the target group (75% required) o Assessment of gross motor function has been completed in 90% (80 % required) o Assessment of functional mobility is completed in 87% (75% required) o Description of physiotherapy is completed in 98% (90% required) Outcome indicators: o Subluxation of the hip was found in 20% (should be below 15%) o Dislocation of the hip was found in 2% (should be below 10%) o Frequency of other outcome indicators can not be determined at present

**Conclusions:** The CPOP database is still in its early phase of implementation. The degree of coverage and the data completeness is not fully satisfactory. Therefore the data should be considered preliminary and used with caution

## 23.

### **Is reversible totalepiphyodesis using 8-plates a safe practice?**

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**Background:** Permanent fusion of the growth plate (epiphyodesis) is an established method to correct leg length discrepancy (LLD) between 2 and 5 cm. The 8-plate technique is widely used for reversible hemiepiphyodesis and may be used to obtain total reversible epiphyodesis in treatment of LLD thus avoiding the need for timing of the procedure. No clinical or experimental reports on the efficiency and safety of this practice has yet been published.

**Purpose / Aim of Study:** To study the ability of 8-plate epiphyodesis to control longitudinal bone growth in a paired randomised animal study.

**Materials and Methods:** 40 kg pigs (n=5) were randomised to either total epiphyodesis on right proximal tibia with medial and lateral 8- plates or no treatment. The left side received the opposite treatment. Implant removal after 10 weeks treatment and euthanasia after additional 5 weeks of housing. A 1.5 Tesla clinical magnetic resonance (MR) scanner was used to examine both tibias at baseline, after 10 weeks and 15 weeks. The distance between the distal and proximal growth plate (interphyseal distance) was measured on T1 whole tibias MR images using a standardized method.

**Findings / Results:** At baseline the interphyseal distances were equal in all animals left and right legs. We measured a mean discrepancy in interphyseal distance of 11.1 mm after 10 weeks and 9.3 mm after 15 weeks with the treated leg being shortest in all cases ( $P = 0.031$ ). Reversibility of growth was noted. Coronal slices indicate deformation of the tibial plateau due to uninhibited central growth. No implant failure or infection were observed.

**Conclusions:** Total reversible epiphyodesis can be obtained in this animal model. Using longer screws may increase the stability of growth arrest. Adjacent joint line deformation might be a concern. Further research is needed before clinical application.

## 24.

### **Surgical treatment of distal biceps tendon ruptures.**

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**Background:** Injuries to the distal biceps brachii, account for 3-10 % of all biceps injuries. It is virtually unknown in females and usually occurs in the dominant extremity of middle-aged males engaged in heavy lifting activities

**Purpose / Aim of Study:** The purpose of this study was to measure the clinical outcome of an anatomic repair of the distal biceps tendon rupture using a 2-incision technique with a limited dorsal muscle splitting incision for exposure of the bicipital tuberosity using implantable bone suture anchors

**Materials and Methods:** Patients with a distal biceps tendon rupture who were presented to the shoulder- and elbow clinic at Randers Hospital were selected. All patients underwent a standardized evaluation before surgery that included a detailed interview, radiological and clinical examination. Between 2004 and 2011, 24 patients (all males), with a mean age at surgery of 43 years (range, 24 to 58 years) underwent surgery. There were 12 right and 13 left ruptures. One patient had a bilateral rupture. At a mean follow-up of 13.7 months, all elbows were assessed with the Mayo Elbow Performance Score and a modified functional elbow score (Constant)

**Findings / Results:** 20 patients (83.3 %) had no reduction in range of motion. By use of the MEPS, the nonoperative elbows had a mean score of 99.8 points, whereas the operated elbows had a mean score of 88.1 points. The functional elbow score showed a mean difference of 6.6 points between the operated and nonoperative elbows. One patient was reoperated because the suture anchors were placed wrong, one patient developed heterotopic bone and one patient had a superficial infection. No deep infection or neurologic deficit developed after surgery in any case

**Conclusions:** Distal biceps tendon repair with a double-incision approach is a reliable and safe technique to provide satisfactory clinical results

## 25.

### **Low failure rate after primary and revision arthroscopic Bankart repair with a knotless anchor**

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Dept of Shoulder Services Parkens Privathospital

**Background:** With increasing evolution of techniques, implant strength, suture quality, and proper patient selection, the results of arthroscopic Bankart repair are more promising.

**Purpose / Aim of Study:** In this material we present the results of both primary and revision arthroscopic Bankart repairs in an active population.

**Materials and Methods:** Thirty-seven consecutive patients underwent arthroscopic Bankart repair from 2008-2010. There were 26 males and 11 females (median age 31 (16-58) years). Duration of symptoms was median 25 (1-1156) months. Twenty-seven were primary repairs while 10 were revision cases (median 3 previous procedures (1-4)). There were 22 athletes and 15 non-athletes. Boileau's Instability Severity Index Score was median 2 (0-6) preoperatively. A knotless anchor (Pushlock, Arthrex) was used together with a FibreWire #2 (Arthrex). The median number of anchors used was 2 (1-3). One surgeon performed all operations. Follow-up evaluation was done by the Western Ontario Instability Score (WOSI), Rowe score and a telephone interview at median 20 (12-30) months after the operation.

**Findings / Results:** One patient (2.7 %) had a redislocation, and three others reported single episodes of subluxation, of which one reported the shoulder to be unstable at follow-up (failure rate 5.4 %). The WOSI-score improved from median 38 (10-56) to median 77 (41- 97) % at follow-up. The Rowe score was median 80 (25-100) at follow-up. None of the 10 revision cases had recurrence, while one redislocation occurred among primary repairs. The recurrence rate was 2/22 (9.1 %) in the athletes, while no non-athletes suffered of recurrence.

**Conclusions:** The short-term results of arthroscopic Bankart repair with knotless Pushlock anchor show good results with regards to stability and improvement of function.



## 26.

### **Reconstruction of the chronic, unstable acromio-clavicular joint. A prospective case control study comparing the modified Weaver-Dunn procedure with Anatomical reconstruction of the coraco- and acromio-clavicular ligaments.**

*Klaus Bak*

Dept of Shoulder Services Parkens Privathospital

**Background:** The chronic unstable AC-joint may cause prolonged symptoms and dysfunction in selected individuals. The number of different surgical techniques is in contrast to the limited number of series with acceptable high numbers of patients and controls.

**Purpose / Aim of Study:** The purpose of the study is to compare two prospective series of two different AC-joint reconstructive procedures.

**Materials and Methods:** From 2003-2009 51 consecutive patients underwent modified open Weaver-Dunn (WD) repair (n=19, 3 F and 16 M) (2003- 2007) or anatomical coraco-clavicular and acromioclavicular (ACCAC) tendon autograft reconstruction (n=32, 4 F, 28 M) (2007-2009). One in the WD-group and three in the ACCAC-group were revisions from previous failed procedures. The mean age at surgery was 40 (18-70) years for the W-D group and 44 (18-73) years for the ACCAC group.. The patients were evaluated with the Western Ontario Shoulder Instability (WOSI) score preoperatively and at follow-up median 60 (36-84) months (WD) and 24 (12-36) months (ACCAC) after the operation.

**Findings / Results:** The WOSI scores improved from median 58 (24-75) % to median 85 (49-97) % in the WD-group, and from median 49 (37-78) % to median 86 (47-96) % in the ACCAC- group (NS between groups). There were 2 (10.5%) failures in the WD-group and 4 (12.5 %) failures in the ACCAC group (NS). The patients graded their result as good or excellent in 90 % and 92 % respectively. The mean satisfaction (0-10, 10 best) was median 8 (3-10) in both groups. All patients would undergo the same procedure again if needed.

**Conclusions:** In this case control series there was no difference in medium to long term outcome comparing the non-anatomical Weaver Dunn and the anatomical coraco- and acromioclavicular reconstruction. Both groups exhibited significantly improved function

## 27.

### The Danish Shoulder Arthroplasty Registry

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**Background:** The Danish Shoulder Arthroplasty Registry (DSR) was established with the purpose of registering and improving the results after shoulder replacement in Denmark.

**Purpose / Aim of Study:** We present the DSR and report demographic data, short-term outcome and implant survival.

**Materials and Methods:** The DSR was established in 2004. All Danish hospitals performing arthroplasty surgery are reporting. Data are collected electronically by the operating surgeon providing demographic and operative data. Follow-up results are collected 10- 14 months post-operatively using Western Ontario Osteoarthritis of the Shoulder index (WOOS). We use descriptive statistics for presentation and the Kaplan-Meier statistics for survival data.

**Findings / Results:** 2139 primary shoulder arthroplasties were reported between January 2006 and December 2008. There were 70.3% women. Mean age was 69.4 (SD 12.4). 53.8% patients were diagnosed with a proximal humeral fracture; 29.8% with osteoarthritis; 4.3% with arthritis; 6.5% with rotator cuff arthropathy; and 3.3% with caput necrosis. Median WOOS for all diagnoses was 59.1, interquartile range 36.9-81.6. WOOS for patients with arthritis, osteoarthritis, fractures, rotator cuff arthropathy and caput necrosis was 59.3; 68.1; 54.3; 65.6; and 49.4 respectively. 107 (5.0%) primary arthroplasties had been revised by the end of June 2010. The most frequent indications of revision were dislocation (n = 26) and glenoid attrition (n=18). The cumulative revision rate was lowest for patients diagnosed with a proximal humeral fracture or caput necrosis and highest for patients diagnosed with rheumatoid arthritis.

**Conclusions:** We have presented the funding, data collection and organization of the DSR. As data increases, DSR will become a valuable tool for obtaining knowledge on risk factors, functional outcome and implant survival.

## The sternoclavicular joint: Biomechanical effects of arthroscopic procedures in a cadaveric model

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**Background:** Arthroscopic procedures of the sternoclavicular joint (SCJ) are not described in literature. In inflammatory, degenerative or traumatic disease, arthroscopic synovectomy or resection of the intraarticular disc (RD) and the medial clavicular joint surface (RMC) could be treatment options. It is unknown if these procedures will influence SCJ stability.

**Purpose / Aim of Study:** To establish whether RD, RMC, resection of the superior, inferior and anterior joint capsule (RJC) or the costoclavicular ligament (RCCL) causes joint laxity in the anterior- posterior (A-P) and caudal-cranial (C-C) directions of the SCJ.

**Materials and Methods:** Twenty SCJs in 10 cadaveric torsos were divided into 4 groups, each group treated with either RD (n=6), RMC (n=6), RJC (n=5) or RCCL (n=3). Before and after each procedure a calliper gauge was used to measure SCJ instability while applying 5.7- 6.0 kgs of traction on the clavicle 4 cm from the SCJ.

**Findings / Results:** Significantly increased A-P laxity was only found after RD (before/after ratio: 1.84 (0.80-3.00),  $p = 0.046$ ), as the mean laxity increased from 3,6 mm to 6,3 mm. Significant increase in C-C laxity was found after RMC (ratio 1.75 (0.42-2.32),  $p = 0.046$ ) and RD (ratio 1.33 (1.00-2.59),  $p = 0.043$ ). Surprisingly, neither RCCL nor RJC resulted in any significant instability.

**Conclusions:** Arthroscopic resection of the intact intraarticular disc (RD) of the SCJ causes a significant increase in joint C-C and A-P laxity (33 and 84%, respectively), and trimming of a torn disc might therefore be better than complete resection. RMC was shown only to cause a significant increase in C-C laxity (75%), and RJC and RCCL did not result in significant instability.

## Revision Total Elbow Arthroplasty with the Semi Constrained Coonrad-Morrey Total Elbow Arthroplasty

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**Background:** Revision after total elbow arthroplasty remains a challenge. In this context we evaluated the short- to medium-term results after Coonrad-Morrey revision total elbow arthroplasty (TEA).

**Purpose / Aim of Study:** To provide a report on the results after revision TEA with the Coonrad-Morrey prosthesis.

**Materials and Methods:** We retrospectively included a consecutive series of revision TEAs performed at our institution from 2004- 2010. At mean follow-up of 29 months patients were clinically evaluated using the Mayo Elbow Performance Score (MEPS ), and radiographically we evaluated standard elbow anterior- posterior and lateral radiographs. Patient reported outcome measures were performed using the Oxford Elbow Score (OES) and the Disabilities of the Arm, Shoulder and Hand questionnaire (DASH).

**Findings / Results:** 18 primary TEAs and 2 revision TEAs were revised in 19 patients. Median time of implant survival for primary prosthesis TEA was 115 months. Revisions were performed due to infection(1), loosening (15), peri-prosthetic fracture(2), mechanical failure(1) and maltraction(1). Mean postoperatively MEPS was 79. Mean DASH at follow-up was 48 and mean OES was 58, 66 and 53 for function, pain and psychosocial dimension respectively. Mean preoperatively flexion/extension range of motion (ROM) was 79 degrees and improved to 111 degrees at follow-up. There were two cases of radiolucent line, however, none of the implants were clinically loose. In one case deep infection led to a new revision. Five patients had ulnar nerve paraesthesia.

**Conclusions:** Results after revision TEA using the Coonrad-Morrey prosthesis are acceptable with low short to midterm failure rate. Revision improves both range of motion and pain scores. Two cases of radiolucent line are of concern and needs attention. The treatment can be recommended as a good option for failed TEA.

## 30.

### Hemiarthroplasty for fractures of the distal humerus

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**Background:** Distal humerus fractures can successfully be treated with open reduction and double plate fixation. However, in cases of severe comminution and poor bone stock as seen in elderly results are often hampered by stiffness and non-union.

**Purpose / Aim of Study:** The purpose of this study was to introduce a new treatment modality and to report the results of 4 cases.

**Materials and Methods:** 3 patients aged 68, 78 and 81 with complex distal humerus fractures were treated with a hemiarthroplasty. In all cases the fracture was considered impossible to treat with a stable internal fixation (AO type C and/or Dubberly type III). We used the Latitude humeral implant (Tornier). All patients were evaluated according to the Mayo Elbow Performance Score and the Oxford Elbow Score. Follow-up period was 5- 22 months

**Findings / Results:** The joint fulcrum and joint stability was restored in all patients. All 4 patients had excellent scores according to the mayo Score and the Oxford Elbow Score. All patients reported no pain. No complications were observed. At follow-up radiologic evidence of healing of the collateral ligaments around the prosthesis was seen in all cases.

**Conclusions:** This study on 4 patients indicates that primary hemiarthroplasty seems to be a safe procedure for the treatment of distal humerus fractures in elderly. Joint congruity and stability can effectively be restored. This modality demands further investigation. We have therefore initiated a protocolled Intra-Scandinavian randomised study in order to evaluate traditional plaiting against hemiarthroplasty.

## 31.

### Topical Bisphosphonate Treatment of Cemented Prosthesis Fixation – An Animal Study

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**Background:** The long-term success of cemented joint replacements relies on a stable interdigitation of cement and bone. Cementation is known to be followed by remodeling of the bone stock surrounding the cement, which may lead to instability in the bone-cement-interface.

**Purpose / Aim of Study:** We hypothesized that soaking bone with bisphosphonate prior to cementation decelerates bone remodeling, which would increase the stability of the interdigitation.

**Materials and Methods:** The design chosen was a paired animal study in 12 dogs. In the proximal tibia of each dog, we cemented one extra-articular drill hole. Prior to cementation the drill holes were soaked in either bisphosphonate or placebo. Equal pressurization of cement was achieved by volume displacement. After 4 weeks of observation, bones were harvested and the tissue surrounding the cement was evaluated by histomorphometrical analysis.

**Findings / Results:** Stereological histomorphometry showed that drill holes treated with bisphosphonate prior to cementation had significantly higher volumes of retained lamellar bone and significantly lower volumes of osteoid, bone marrow cells, and fibrous tissue surrounding the cement. These bone adaptations are consistent with a deceleration of the bone remodeling in bisphosphonate treated drill holes.

**Conclusions:** Topical bisphosphonate treatment may be a valuable adjuvant therapy for cemented implant fixation, as it reduces the transient loss of mechanical support around the cement in the early phases of remodeling where lamellar bone is replaced by immature woven bone.

## Zoledronate-treated Allograft Improves the Fixation of Orthopaedic Revision Implants

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**Background:** Aseptic loosening of a total joint replacement is a common cause of revision. Quality of bone stock may be reduced and it can be necessary to impact morcelized bone allograft around the implant. Bone allograft is subject to resorption, which may reduce early implant fixation.

**Purpose / Aim of Study:** The overall purpose of the present study was to improve early fixation of bone-grafted revision implants. We hypothesized that soaking morcelized bone allograft in bisphosphonate would improve the fixation of orthopaedic implants following revision.

**Materials and Methods:** Twenty-four micromotion implants were inserted bilaterally into the knees of 12 dogs according to our revision protocol, allowing formation of a standardized revision cavity (loose implant, fibrous tissue, and sclerotic bone rim). Eight weeks later revision surgery was performed with removal of the fibrous capsule and reaming of the endosteal neocortex. This left a 1.1 mm gap around the stable, plasma-sprayed titanium revision-implant. The gap was impacted with morcelized allograft. On the intervention side the allograft was soaked in zoledronate (0.005mg/ml) for 3 minutes and rinsed while the allograft for the control side was soaked in saline following the same procedure. Observation period after revision was 4 weeks. Data was evaluated by paired t-test. P- values <0.05 were considered statistically significant.

**Findings / Results:** Zoledronate-treatment of the allograft resulted in at least 50 % improved fixation for all biomechanical parameters (shear stiffness,  $p=0.002$ ; shear strength,  $p=0.02$ ; energy absorption,  $p=0.01$ ).

**Conclusions:** Allograft soaked in Zoledronate improves biomechanical fixation in revision of loose cementless implants. Previous experimental studies have shown that bisphosphonates can be overdosed, and protocolled clinical trials are needed.

## **Cortical-Marrow Ratio: A revised method to detect low bone mineral density in plain x-rays of the hip**

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**Background:** Osteoporosis is associated with hip fractures. The gold standard to assess osteoporosis is to measure bone mineral density (BMD) by dual-energy x-ray absorptiometry, which is quick and reliable but not available in most orthopaedic departments. A fast and feasible way to assess bone quality is using plain x-rays but previous attempts to correlate plain x-rays to osteoporosis are inconclusive.

**Purpose / Aim of Study:** Evaluate the reliability of the Cortex-Marrow Ratio (CMR) measure and precision for CMR as a screening test for osteoporosis

**Materials and Methods:** From a previous study we extracted all consecutive patients with femoral neck fractures referred for BMD measurements, n=133 patients (mean 78.1 years, 100 female). On preoperative digital AP hip x-rays two observers measured the outer cortex diameter just below the minor trochanter (TM) on a 20 inch screen or larger with maximal possible zoom. Two diameters distal to TM the outer and inner cortex distance were measured. The outer cortex divided by the inner cortex is defined as the CMR. One observer measured twice, 3 months apart. Intra- and interrater reliability was assessed with Intra Class Correlation (ICC) and smallest detectable change (SDC). Osteoporosis was defined as a Total-hip T-score below -2.5, which 53.5 % of the patients had.

**Findings / Results:** Mean CMR 1.81 (1.76;1.87), range 1.19-2.52. Intrarater ICC 0.97 (0.96;0.98) and interrater ICC 0.84 (0.78;0.88). SDC was 0.16 and 0.10. No indication of systematic bias (Bland-Altman Plot). With a cutpoint at  $CMR \leq 1.5$  specificity is 95.5 % for having osteoporosis (16.5 % of the patients), at  $CMR \geq 2.05$  specificity is 95.5 % for not having osteoporosis (20.3 % of the patients).

**Conclusions:** CMR is a reliable measure and osteoporosis status is settled for 36.8 % of patients of having either osteoporosis or not. Further exploration of CMR is needed.



## 34.

### **Have operative indications weakened in primary TKA? An evaluation of preoperative osteoarthritis and SF-36 scores in 2004 and 2009.**

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**Background:** Between 2004 and 2009 the incidence of primary total knee arthroplasty (TKA) in Denmark has almost doubled. It has been speculated that this increase is a result of patients being operated based on weaker indications, in terms of less osteoarthritis and less affection of general health related quality of life.

**Purpose / Aim of Study:** To compare preoperative degrees of osteoarthritis and health related quality of life in patients receiving primary TKA in 04 and 09. A change in these indices may indicate a change in operative indications.

**Materials and Methods:** Through database search we identified 154 and 369 primary TKAs inserted at our institution in 04 and 09, respectively. Patients had been asked to complete the SF-36 questionnaire preoperatively. Two groups of patients, representative with regard to age and gender, were randomly sampled and compared (n=44 in 04 vs. n=106 in 09). The Kellgren- Lawrence (K-L) grade of osteoarthritis was assessed on preoperative radiographs in all patients and compared between groups together with patient demographics.

**Findings / Results:** We found no significant differences in gender distribution and mean age at surgery comparing 04 and 09. The K-L grades did not differ significantly, with K-L grades 2-4 in 83.0% vs. 85.3% of patients in 04 and 09 (p=0.52). Mean SF-36 physical component scores were 32.6 and 33.7 in 04 and 09 (p=0.44). Mean SF-36 mental component scores were 43.0 and 49.3 leaving the score 6.3 points higher in 09 (p=0.003).

**Conclusions:** Preoperative degrees of osteoarthritis and physical health related quality of life have not changed in primary TKA. Thus, it seems that operative indications have not weakened. The increased SF-36 mental component score, however, may indicate that patients receive treatment earlier and thus suffer less negative affection of mental health related quality of life.

## 35.

### Why in hospital after fast-track hip and knee arthroplasty?

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**Background:** Length of stay following total hip and knee arthroplasty (THA and TKA) has been reduced to about 3 days in fast-track set-ups with functional discharge criteria. Earlier studies have identified patient characteristics predicting LOS, but little is known on specific reasons for being hospitalised following fast-track THA and TKA.

**Purpose / Aim of Study:** To evaluate clinical and logistical factors detaining patients in hospital for the first postoperative 24-72 hours following fast track THA and TKA.

**Materials and Methods:** A cohort-study of consecutive, unselected patients operated with unilateral primary THA (n=98) or TKA (n=109) with a median length of stay of 2 days were studied. Patients were operated in spinal anaesthesia and received multimodal analgesia with paracetamol, a COX-2 inhibitor and gabapentin and opioid on request only. Fulfillment of functional discharge criteria was assessed twice daily and specified reasons for not doing so were registered.

**Findings / Results:** Pain, dizziness and general weakness were the main clinical reasons for being hospitalized at 24 and 48 hours postoperatively while nausea, vomiting, confusion and sedation had minimal influence to delay discharge. Logistical challenges were early upstart of physiotherapy (day of surgery) to establish ambulation, and transfusion of blood when required.

**Conclusions:** Future efforts to enhance recovery and reduce length of stay after THA and TKA should focus on analgesia, orthostatic and muscle function.

## 36.

### **Migration, bone quality and clinical performance of PFC Sigma TKA, fixed bearing vs. mobile bearing**

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**Background:** Mobile bearing (MB) total knee arthroplasty (TKA) was recommended for lower risk of tibial implant loosening, lower wear rate, and better clinical performance. Current literature shows limited or no improvement with mobile bearings compared with fixed bearings (FB).

**Purpose / Aim of Study:** To facilitate evidence based information to our patients when deciding between FB and MB TKA a randomized controlled trial evaluating tibial implant migration, periprosthetic bone mineral density (BMD) changes, and patient satisfaction was initiated.

**Materials and Methods:** 50 patients with osteoarthritis were included from 2007 to 2010 (26 FB/24 MB). PFC Sigma (DePuy) implants were used. Implant migration was assessed by model based Radiostereometric Analysis. The post-operative stereo- radiograph was used as baseline, and migration was calculated at 3, 6 and 12 months follow-up (mfu). Peri-prosthetic BMD changes in 3 regions of interest (ROI) around the stem was assessed by DXA between post- op and 12 mfu.

**Findings / Results:** Clinical performance was evaluated by Oxford Knee Score (OKS) and American Knee Society Score (AKSS) at baseline, at 6- and 12 mfu. Implant migration was higher for FB implants at all follow-ups when comparing the total translation ( $p=0.037$  at 1 year). Total periprosthetic BMD decreased (range 2.81-11.04%) in both implant groups between baseline and 1 year ( $p<0.05$ ). Total boneloss was similar in the groups ( $p=0.062$ ) and no differences was found in the smaller ROIs. Knee scores were equally good in both groups at 1 year (Mean OKS: FB 17/MB 18;  $p=0.25$ , mean AKSS: FB 75/MB 71;  $p=0.16$ ).

**Conclusions:** The FB implants migrated more than the MB implants at all follow-ups and the longterm consequence is unknown. Bone loss in proximity of the implants was similar and in range of the expected, and clinical performance similar and good with both implants.

## 37.

### **What is the importance of cortical fissures of the femur and tibia following stemmed revision TKA?**

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**Background:** Cortical fissures of the femur and tibia are known complications to press fit stemmed revisions of total knee arthroplasties (TKA). The progression of fissures into actual fractures is feared. However, little is known about the importance of these cortical fissures during the postoperative course of revision knee surgery.

**Purpose / Aim of Study:** To investigate complications and reoperations following the occurrence of cortical fissures in stemmed revision TKA, and to assess if allowance of weight bearing postoperatively is a viable solution.

**Materials and Methods:** Through database search we identified all revision TKAs performed at our arthroplasty section since Jan. 2000 (n=120). The radiographic material and patient files were assessed to identify 20 patients with cortical fissures of the femur and/or tibia on postoperative radiographs. Two were lost to follow-up. Thus, the study group of 18 patients had a median age of 72 yrs, 13 females, and 16 with ASA score 1-2. We retrospectively assessed complications and reoperations. All patients were allowed full weightbearing postoperatively.

**Findings / Results:** Two patients were reoperated: 1 had a locking plate osteosynthesis of a periprosthetic tibial fracture following a fall; 1 was revised due to infection. No patient experienced complications directly related to the occurrence of cortical fissures, however, it can not be ruled out that the fissure may play a role in the patient sustaining a fall and a full scale periprosthetic fracture. No patient had died during the follow-up ranging from 6 months to 5 years.

**Conclusions:** We found no complications or reoperations directly related to cortical fissures of the femur and tibia. It seems that allowance of full weightbearing is a viable solution when cortical fissures present following stemmed revision TKA.

## **Increased Periprosthetic Stress Shielding with an I-Beam compared with a Finned Tibial Component Stem Design. An RCT with 2-years Follow-up by RSA and DXA**

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**Background:** The tibial component often has a stem to aid fixation in the tibia. **Purpose / Aim of Study:** The purpose of this study was to compare implant fixation, periprosthetic bone change, and clinical outcome of tibial components with different stem design.

**Materials and Methods:** 54 patients/knees (15 males) with knee osteoarthritis at a mean age of 77 years (70 – 90) were randomly allocated to receive tibial components with either an I- Beam stem (n=27) or a finned stem (n=27) (CoCr modular Tibial Tray Interlok, Biomet Inc). The tibial component was cemented on the cut surface (Palacos R bone cement) but not around the stems. Five patients (I-Beam stems) were lost to follow-up. Implant migration (Model- Based RSA), periprosthetic bone mineral density (BMD), and American Knee Society Score (AKSS) was evaluated through 2 years follow-up.

**Findings / Results:** At 2 years follow-up, total translation ( $p=0.24$ ) was 0.70mm (SD 0.66) and 0.47mm (SD 0.42), and total rotation ( $p=0.45$ ) was  $1.11\phi^a$  (SD 0.85) and  $0.88\phi^a$  (SD 0.52), for the I-beam stem and the finned stem tibial components, respectively. Migration (MTPM) between 1 and 2 years was less than 0.2 mm and all implants were considered stable. Between baseline and 1 year the peri- prosthetic BMD on AP scans decreased 10% (0.09 g/cm<sup>2</sup>) around I-beam and 2% (0.02 g/cm<sup>2</sup>) around the finned stem components ( $p=0.02$ ). In the tibia below the stem BMD decreased by 6% and increased by 3% ( $p=0.01$ ) at 1 year for the I-beam and finned stem components, respectively. At 2 years BMD loss progressed in general in both groups. Knee score, function score, pain, and satisfaction were similar.

**Conclusions:** RSA showed similar stability of the tibial components with I-Beam and finned stems at 1 and 2 years follow-up. The heterogeneous BMD changes raise concerns of potential component subsidence or loosening for the I-Beam stem at longer-term.

## 39.

### **Survival study of 298 open-wedge osteotomies in patients with unilateral gonarthrosis; Region North in the period 2000 to 2010**

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**Background:** Open-wedge osteotomy (OWO) as treatment of unilateral gonarthrosis with malalignment is quite well established, and the efficacy of the procedure proven in a number of studies. Even so, issues are still debated and studies with large patient numbers and long follow-up periods are very rare.

**Purpose / Aim of Study:** The purpose of the study was to investigate survival of our OWO's. Survival analysis was performed on all osteotomies, using re-osteotomy, total knee arthroplasty (TKA) and death as endpoints. Modes of failure were also recorded, if applicable.

**Materials and Methods:** In the period 2000 to 2010, 298 osteotomies were performed in Region North on patients with unilateral knee osteoarthritis and malalignment. Surgery types including mainly open-wedge high tibial osteotomy (HTO) and few femur osteotomies. There were 190 male and 108 female patients with a median age of 51 and 48 years, respectively. At the time of investigation 107 patients were available for 5-year survival analysis.

**Findings / Results:** In the entire follow-up period for all 298 osteotomies, 7 patients underwent re-osteotomy, 16 TKA, 1 re-osteotomy and TKA, and 3 died. We recorded a 5-year survival of 94%. In no cases did the primary osteotomy compromise re-osteotomy or TKA.

**Conclusions:** Alignment correcting osteotomy, especially HTO, is a good option for patients with unilateral knee arthrosis and malalignment, with good survival rate.

## **The Pegged Trabecular Metal Tibial Plateau Remain Superior to Screw-fixed Pegged Porous Titanium Fiber-mesh Tibial Plateaus at 5 years: A randomized clinical RSA study of cementless tibial components.**

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**Background:** Trabecular-metal is highly biocompatible and has a porous structure similar to bone. Recently, we showed superior fixation of trabecular metal (TM) tibial monoblocs in comparison with modular titanium (Ti) fiber-mesh tibial metal- backings as measured by radio- stereometric analysis (RSA) at 1 and 2 years follow-up.

**Purpose / Aim of Study:** The purpose of this study was to continue follow-up of radiological and clinical outcomes at 5 years.

**Materials and Methods:** 41 of the total 50 included patients remained for a 5-year analysis. They had randomly received treatment by cementless NexGen components (Zimmer Inc, Warsaw); either a porous Ti fiber-mesh metal-backing fixed by 4 titanium screws/4 short pegs, or a trabecular metal (TM) monobloc fixed press-fit by two hexagonal pegs. Evaluation of implant migration, radiolucent lines (RLL), polyethylene wear (loaded RSA set-up), and clinical outcomes (AKSS and OKS) was performed.

**Findings / Results:** The TM implant (n=21) migrated less (total translation) than the Ti implants (n=20) at 5 years (p=0.001). 10/20 Ti and 0/21 TM implants had RLL of 1-2 mm below the baseplate between the pegs. Knee- and function-scores and OKS were similar between the groups. 1 Ti tibial component was revised at 2? years. 2 patients with a TM implant reported constant pain, low function (knee\_score < 40) and dissatisfaction with the treatment in spite of a stable and low TT throughout 5 years follow- up. Analysis of polyethylene wear is currently ongoing.

**Conclusions:** Superior fixation of the TM monobloc tibial plateau continued at 5 years in comparison with the porous pegged Ti fiber-mesh tibial metal-backing; yet, the clinical outcomes were similar. Half of the Ti metal-backings had radiolucent lines whereas the TM monoblocs were radiologically fully osseous-integrated. We expect better long-term survival with the TM tibial tray.

## **Circumferential wires as a supplement to intramedullary nailing in inter- and subtrochanteric hip fractures**

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**Background:** The use of cerclages remains controversial because of the traditional view that a circumferential cerclage compromise the blood supply to the underlying bone. In grossly displaced inter- and subtrochanteric fractures, open reduction and application of cerclages prior to osteosynthesis may however facilitate reaming, intramedullary nail positioning, and a reduced postoperative fracture displacement.

**Purpose / Aim of Study:** We investigated the complication and reoperation rates in patients with inter- and subtrochanteric fractures operated with an intramedullary nail and one or more supplemental cerclages.

**Materials and Methods:** 60 patients with inter- and subtrochanteric fractures operated by use of cerclages and an intramedullary nail were identified from prospective databases at two centers. Complications and reoperation rates within the first postoperative year were retrospectively assessed by inquiry to patient files and radiographs.

**Findings / Results:** In 37/60 patients, two or more cerclages were used. Anatomic reduction was achieved in 24/60 patients and a total cortical displacement  $\leq 10$ mm was achieved in further 26/60 patients. Only 6 of the 43 patients with radiographic audit after 12 weeks, sustained a fracture displacement of more than 5 mm. 4 patients underwent reoperation: 1 due to deep infection, 1 due to technical failure during osteosynthesis, 1 had a screw cut out and 1 sustained a new fracture following a new fall.

**Conclusions:** It seems that cerclages facilitates intraoperative fracture reduction and prevents postoperative fracture displacement in inter- and subtrochanteric fractures. Although the intramedullary nails were supplemented by cerclages, the reoperation rate was comparable to literature reports where cerclages was not used.



## 42.

### **Surgeons agree more on treatment recommendations than on classification of proximal humeral fractures**

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**Background:** Orthopaedic surgeons disagree considerably when classifying fractures of the proximal humerus. However, the clinical implications of low observer agreement remain unclear.

**Purpose / Aim of Study:** We wanted to compare the agreement on Neer classification with the agreement on treatment recommendations.

**Materials and Methods:** We conducted a multi-centre observer- study. Five experienced shoulder surgeons independently assessed a consecutive series of 193 radiographs at two occasions three months apart. All pairs of radiographs were classified according to Neer. Subsequently, the observers were asked to recommend one of three treatment modalities for each case: non-operative treatment, locking plate osteosynthesis, or hemiarthroplasty.

**Findings / Results:** At both classification rounds mean kappa-values for inter-observer agreement on treatment recommendations (0.48 and 0.52) were significantly higher than the agreement on Neer classification (0.33 and 0.36;  $p < 0.001$  at both rounds). The highest mean kappa-values were found for inter-observer agreement on non-surgical treatment (0.59 and 0.55). In 36% (345 out of 965) of observations an observer changed Neer category between first and second classification round. However, in only 34% of these cases (116 out of 345) the observers changed their treatment recommendations.

**Conclusions:** We found a significantly higher agreement on treatment recommendations compared to agreement on fracture classification. The low observer agreement on the Neer classification reported in several observer studies may have less clinical importance than previously assumed. However, interobserver agreement did not exceed moderate levels.

43.

## **Complications associated with supra- and intracondylar distal humerus fractures treated with contoured locking plates**

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**Background:** Distal humerus fractures in adults are now preferentially treated with contoured locking plates as reduction and stability can be maintained. However, there is little literature evidence about what level of complications to expect following this treatment.

**Purpose / Aim of Study:** To evaluate complications, re-operations and clinical outcome following treatment of distal humerus fractures in adults.

**Materials and Methods:** Through database search we identified 44 patients operated for a distal humerus fracture (AO 13A-C) with contoured locking plates from 2007- 2011, and with follow-up at our hospital. By inquiry to patient files and radiographic material we retrospectively assessed fracture type, operative details, complications, re-operations, functional measures, and radiographic outcome. Minimum follow-up was 3 months. The study population (29 women) had a median age of 70 years and ASA was  $\leq 2$  in 36 patients. Fracture types were 13A (n=16), 13B (n=6), and 13C (n=22).

**Findings / Results:** Median waiting time for operation was one and a half day. Twenty-two patients were operated by a specialist and ten by a supervised junior doctor. Thirty-four patients received postoperative physiotherapy. A good fracture reduction was achieved in 35 patients. Fourteen patients showed signs of nerve contusion / nerve damage. The median flexion were 100° (range: 70°-150°) and the median extension defect 30° (range: 5°-60°) at last follow-up. Twelve patients were re- operated (including plate removals).

**Conclusions:** Management of distal humerus fractures is challenging. Contoured locking plates offers good means of fracture stabilization. However, nerve contusion, functional limitations, and secondary operations occur frequently.

## 44.

### **Local infiltration analgesia in the management of pain after osteosynthesis of extracapsular hip fracture: A randomized, placebo-controlled, double-blind clinical trial**

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**Background:** The outcome after hip fracture may be impaired by pain. Conventional methods of pain treatment using paracetamol, systemic opioids or specific nerve blocks are associated with side effects. Simple techniques of local infiltration analgesia may be effective for pain relief after hip and knee arthroplasties.

**Purpose / Aim of Study:** We studied the effect of repeated infiltration with ropivacaine with the primary outcome to decrease the need for postoperative opioids after osteosynthesis of extracapsular hip fracture.

**Materials and Methods:** Forty-nine patients undergoing osteosynthesis with a sliding hip screw were randomized into two groups in a double blind study (ClinicalTrials.gov: NCT01119209). The patients received intraoperative infiltration followed by 6 postoperative injections through a multi-holed wound catheter in eight-hour intervals. 23 patients received ropivacaine and 26 received saline. The intervention period was 48 hours and the observational period was 5 days. In both groups there were no restrictions on the total daily dose of opioid rescue analgesics. Pain was assessed at specific postoperative time-points and the daily opioid usage was registered.

**Findings / Results:** There was no statistically significant difference between the groups regarding opioid consumption ( $P=0.29-0.90$ ) or pain ( $P=0.13-0.99$ ) during the observational period. Opioid consumption during intervention on day one and two were 15 mg and 10 mg in the intervention group and 15 mg and 7.5 mg in the placebo group ( $P=0.90$  and  $P=0.47$  Mann-Whitney).

**Conclusions:** Repeated application of ropivacaine provides no reduction in opioid requirements or pain after osteosynthesis of extracapsular hip fracture using a sliding hip screw. This suggests that the technique has no clinically relevant analgesic effect in this patient category.

## Secondary hyperparathyroidism and mortality in hip fracture patients

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**Background:** Little attention has been paid as to how disturbances in the PTH – calcium – vitamin D – axis, such as secondary hyperparathyroidism (SHPT), relate to mortality among hip fracture patients.

**Purpose / Aim of Study:** 1) Determine if SHPT is associated with increased mortality in hip fracture patients and the background population. 2) Determine the prevalence of SHPT among hip fracture patients and the background population.

**Materials and Methods:** The study included 562 consecutive hip fracture patients (HF) (age $\geq$ 70 years) from our hip fracture database. Each hip fracture patient was exactly matched according to age and sex with two controls randomly chosen from a control population (Con) of 21,778 subjects who had s-PTH, s-total calcium and s-25(OH)D measured at the Copenhagen General Practitioners Laboratory after referral from their general practitioner.

**Findings / Results:** General 1-year mortality: Con-female 8.4%, Con-male 15.3%, HF-female 24.6%, HF-male 33.3%,  $p < 0.0001$  (log rank). SHPT and related 1-year mortality: Con- no SHPT 8.9%, Con-SHPT 16.8%, HF- no SHPT 22.7%, HF-SHPT 34.9%,  $p < 0.0001$  (log rank). The mortality rates were higher for controls with SHPT (OR 2.06, 95% CI: 1.32-3.23), hip fracture patients without SHPT (OR 3.00, 95% CI: 2.14-4.20) and hip fracture patients with SHPT (OR 5.46, 95% CI: 3.32-8.97) compared to the controls without SHPT. Prevalence of SHPT: Con 16%, HF 20%,  $p = 0.09$  (chi-square).

**Conclusions:** Our study clearly shows that SHPT is associated with increased mortality in both hip fracture patients and the background population. The primary contributor to this association seems to be increased levels of PTH, and not low levels of vitamin D per se. There was no significant difference in the prevalence of SHPT between the two groups. (This work has previously been presented at the 12th EFORT Congress, 2011)

46.

## **Complications and reoperations following locked plate osteosynthesis of periprosthetic fractures of the distal femur: A review of 41 cases from two centers.**

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**Background:** As a consequence of the increasing incidence in inserted TKA's the challenges in periprosthetic fracture surgery are becoming more evident. Successful treatment algorithms aiming at high rates of fracture healing should be established. Locking plate osteosynthesis of the distal femur may be important in successful treatment.

**Purpose / Aim of Study:** To investigate the rate of complications and reoperations following locking plate osteosynthesis of periprosthetic fractures of the distal femur.

**Materials and Methods:** We retrospectively assessed distal femoral periprosthetic fractures operated with locked plate osteosynthesis at 2 orthopedic departments from 2002-2010. Patient files and radiographic material were assessed for complications and reoperations as the primary endpoints. The study group consisted of 41 patients (34 females) with a median age of 75 yrs (52-97 yrs), and median ASA score of 2. Rorabeck type 2 fractures (displaced fracture, stable arthroplasty) were present in 33 patients.

**Findings / Results:** There were no intraoperative complications. There were no infections or complications related to wound healing demanding surgery. There were loss of fixation and fracture displacement in 4 of 41 patients. Pseudoarthrosis developed in 3 of 41 patients. Reoperations were performed in 6 of these 7 cases. One patient declined reoperation. Other reoperations related to the primary surgery were 7 cases of plate removal of which one later had a revision knee arthroplasty. The 3-month and 1 year mortality was 4/41 and 7/41, respectively.

**Conclusions:** The rates of reoperations and complications are comparable to that in the few existing studies. Thus, locked plate osteosynthesis of periprosthetic distal femoral fractures seems to be a viable surgical solution. Understanding of fracture healing principles is a corner stone in successful treatment.

47.

## **Periprosthetic fractures around hip replacements treated by locking plate osteosynthesis: Follow up on 63 consecutive Vancouver type B1 and C fractures**

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**Background:** Periprosthetic femoral fracture (PFF) is a severe complication to hip joint replacement. Treatment of such fractures is technically demanding, with a frequency of reoperations up to 30%.

**Purpose / Aim of Study:** The purpose of this study was to describe the outcome of PFF around hip implants in a consecutive cohort of patients treated by locking plate osteosynthesis. The primary outcome was reoperation.

**Materials and Methods:** From May 2002 to October 2010, 61 consecutive patients (63 fractures) with Vancouver type B1 or C PFF around hip joint replacement were osteosynthesised at Odense University Hospital, Denmark.

**Findings / Results:** Twenty-five fractures were classified as type B1 and 38 as type C. The median age at PFF was 82 years (range, 49-97). In addition to locking plate osteosynthesis locking attachment device (n=4) and cables (n=5) were used. At a mean follow up 28 months after PFF (range, 0-99 months) 31 patients (33 fractures) had died and 30 patients (30 fractures) were still alive. At follow up seven fractures (11%) had a reoperation due to: failure of fixation (n=4), deep infection (n=2) or loosening of prosthesis (n=1). In addition three had their plate removed due to local irritation at the insertion place. All patients reoperated due to failure of fixation had a new low energy fall, whereby a fracture occurred at the stress rising area where the plate overlapped the prosthesis. In those patients, the plate overlapped half the length of the prosthesis.

**Conclusions:** A low re-operation rate can be obtained in patients suffering from type B1 and C PFF treated by locking plate osteosynthesis. In concordance to other studies we recommend: 1) Careful preoperative evaluation of the fracture type according to the Vancouver classification system 2) spanning of the prosthesis all the way to avoid stress rising areas.

48.

## Supracondylar Humeral Fractures in Children: Open vs. Closed Reduction

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**Background:** Many different methods have been suggested as effective and safe when treating supracondylar humeral fractures and the discussion on whether open or closed surgery should be preferred is ongoing.

**Purpose / Aim of Study:** The purpose of this study was to compare by means of outcome and complications two surgical techniques: open and closed reduction followed by pinning.

**Materials and Methods:** 164 patients under the age of 15 with displaced and surgically managed supracondylar humerus fractures, during the four year period 2006-2009, were retrospectively evaluated. The investigated end points were pre- and postoperative nerve injuries, infections, reoperations, postoperative function and radiographic outcome.

**Findings / Results:** 98 operations in 96 patients were evaluated. 49 patients received open reduction, 49 patients closed reduction. The two groups were similar with regard to sex, method of fixation and sufficiency of primary reduction. The openly reduced group was slightly older ( $p < 0,05$ ), had a higher incidence of Gartland type III fractures ( $p < 0,01$ ) and a higher incidence of preoperative nerve damage ( $p < 0,001$ ). There were no significant differences in infections, overall nerve deficiencies, reoperations, radiographic outcome or postoperative function. Two cases of postoperative ulnar nerve deficiencies followed crossed pinning with closed technique, both resolved spontaneously. Postoperative function was inconsistently evaluated and the result should be interpreted carefully.

**Conclusions:** The two methods of reduction and pinning were comparable in this study. We conclude that closed reduction and pinning should be considered as first choice in treating supracondylar humerus fractures in children if no other factors such as neurovascular compromise warrant open reduction.

## Results of 44 bone lengthening procedures with Fitbone for posttraumatic malunion.

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**Background:** Posttraumatic malunion may be treated by deformity correction and bone lengthening with a motorized intramedullary nail (Fitbone).

**Purpose / Aim of Study:** Analyse the results of the Fitbone lengthening procedure for posttraumatic malunion.

**Materials and Methods:** Retrospective analysis of the first 44 (13 females and 31 males with a mean age of 36 years (range 11-63 years)) posttraumatic malunions treated with Fitbone and followed to healing of the bone regenerate. 37 femurs had previously been treated with: ext. fix (n=5), nail (n=20), plates/screws (n=6), conservative (n=6). 7 tibias had previously been treated with: ext. fix (n=1) or conservative (n=6). Mean (range) preop. mechanical axis deviation was: 19 mm (0-73 mm).

**Findings / Results:** Mean (range) limb length discrepancy was preop.: 35 mm (14 - 76 mm) and postop.: 5 mm (0-18 mm). The nail was inserted through the knee (n=37) or at the hip (n=7). All patients were allowed immediate partial weight-bearing. Full weight-bearing was first allowed after a mean (range) of 60 (20-125) days/cm bone lengthening. The Fitbone must be removed at the end of treatment. A subgroup of 18 patients who had the Fitbone explanted for a mean (range) of 20 (7-42) months was further analysed. Complications were recorded according to Paley. The complicationrate was 0,7 per segment. There were 2 problems, 11 obstacles and zero sequelae. 17 out of 18 patients were content with the final result. The mean knee extension/flexion was 0/140. Four of 18 had knee pain at rest with a mean (range) VAS score of 2 (1-4), and 11 of 18 had knee pain at kneeling with a VAS score of 3 (1-10).

**Conclusions:** The Fitbone procedure results in reliable bone lengthening and deformity correction after a wide spectrum of posttraumatic malunions. Hereby the need for bone reconstruction with external fixation is reduced.



## **X-ray follow-up of surgically treated fractures of the adult distal forearm**

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**Background:** The standard postoperative follow-up for fractures of the distal forearm, consists of a clinical as well as x- ray follow up, some time after the operation. In our clinic this takes place 2-weeks postoperatively. In the opinion of these authors it is unclear whether this follow-up means any change in treatment for the patients.

**Purpose / Aim of Study:** We wanted to find out whether the postoperative x-ray follow-up has any therapeutic consequence for the patients, especially whether they resulted in any re-operations.

**Materials and Methods:** This study was performed as a retrospective cohort study. We assessed all 323 adult patients with a fracture of the distal forearm, receiving surgical treatment (volar LCP on the radius, with or without fixation of the ulna) in our clinic over a 27 month period. 12 patients were excluded, so 311 patients were included in the study. It was assessed, whether the x-ray follow-up resulted in any change of treatment.

**Findings / Results:** Out of 311 patients at the two weeks clinical and x-ray follow-up, 8 had their treatment changed as a result of the clinical examination. As a result of the x-ray, 8 were re-examined with x-ray, fluoroscopy or CT, to further evaluate fracture complications. None of these were re-operated. One patient was re-operated, because of a secondarily dislocated fracture. This patient, however, did not comply with the postoperative regimen because he immediately began weight bearing.

**Conclusions:** Out of 311 x-ray follow-ups, re-operation was only indicated in one case. This patient did not comply with the postoperative regimen, because he began weight bearing too early. On this background it seems fair to conclude that 2-weeks routine x-ray follow-up after surgically treated distal forearm fractures in the uncomplicated and compliant patient, is unnecessary as it does not have any consequences.

## 51.

### **Anterior tibial hemiepiphysiodesis for the treatment of recurrent equinus deformity after surgical treatment of club feet**

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**Background:** Many methods have been used in the treatment of relapse following surgical release of clubfeet: Supramalleolar osteotomy, new posteromedial release or correction using the Ilizarov fixator.

**Purpose / Aim of Study:** The aim of this study is to evaluate the effect of anterior epiphysiodesis of the distal tibia on recurrent equinus deformity in patients with clubfeet treated surgically.

**Materials and Methods:** Retrospectively we evaluated 25 children (31 feet) with recurrent equinus deformity after surgical treatment of clubfoot treated in our institution in the period 2003 through 2009. There were 16 boys and 9 girls, 11 on the left side, 8 on the right side and 6 bilateral. Three patients were treated with Blount's staples and 22 were treated with 8- plates. Patients were examined clinically and radiologically preoperatively. The mean dorsiflexion of the ankle was 2,5 degrees (minus 5-10 degrees) and the Anterior Distal Tibial Angle (ADTA) was 85 degrees. The patients were followed postoperatively and evaluated clinically and radiographically. The plates or staples were removed if the desired effect of around 15 degrees of dorsiflexion was achieved, or the ADTA shifted more than 20 degrees.

**Findings / Results:** Mean follow up was 22 months. The mean improvement of dorsiflexion was 2 degrees, with a mean of dorsiflexion of 4,5 degrees. The mean change of ADTA was 13 degrees. We found no correlation between the radiological changes and the clinically measured dorsiflexion.

**Conclusions:** Anterior distal tibial epiphysiodesis does not seem to give a clinical significant improvement in dorsiflexion of the ankle in spite of a marked shift in the ADTA.

## Long-term outcome after delayed surgery for Bado type 1 radial head dislocation

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**Background:** Persistent radial head dislocation in children after trauma is a serious condition. The treatment of this condition is controversial. Only few series of patients treated with open reduction and ulnar osteotomy exists with long-term follow-up.

**Purpose / Aim of Study:** To present long-term results after delayed surgery for Bado type 1 radial head dislocation with open reduction and ulnar osteotomy.

**Materials and Methods:** Retrospective study with 16 consecutive patients with traumatic anterior radial head dislocation. Mean age at the time of traumatic dislocation was 6 years ranging from 2 to 9. We found a mean delay of 17 (range 1-83) months before open reduction and ulnar open wedge osteotomy. Follow-up time was 8 (range 3-17) years. Patients were investigated with bilateral x-ray, arthrosis status, congruency of the radiocapitellar joint, Oxford Elbow Score, force measurements and range of motion.

**Findings / Results:** There were no major complications to surgery such as infection, nerve palsies or pseudarthrosis. Radiological results showed 10/16 with reduction of the radial head and with no arthrosis, 4/16 with arthrosis or subluxation, and 2/16 with a dislocated radial head. We found a significant correlation between radiological outcome and delay to ulnar osteotomy ( $p=0.03$ ). At follow up the mean Function score was 92 (SD 9), Social/psychological score 83 (SD 14) and Pain score was 88 (SD 15).

**Conclusions:** The present study underlines the importance of minimising the delay between trauma and open reduction. If surgery is performed before 40 months after trauma good to fair longterm radiological results can be obtained. After 40 months there is a high risk of recurrent dislocation of the radial head.

## Is radiological screening for hip dysplasia necessary for breech infants?

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**Background:** The screening of risk populations for developmental dysplasia of the hip (DDH) is currently debated. Most centers do ultrasound screening, however it has recently been questioned that this approach is sufficient for infants in breech position and follow-up radiographs have been recommended even in cases with normal ultrasound examination.

**Purpose / Aim of Study:** To investigate if follow-up radiographs is necessary in breech infants with a normal ultrasound examination.

**Materials and Methods:** In the period from september 2009 - december 2010 all breech infants was screened radiographically in the age of approximately 6 months although the hips were normal at initial ultrasound screening. Ultrasound screening was performed with modified Grafts method. Ultrasonographically abnormal hips were followed or treated until normalization. AP pelvis and Lauensteins projections were used for radiographically screening. Acetabular dysplasia was indicated by radiographic parameters if there was severe blunting of the sourcil, abnormal acetabular index for age, or if there was significant asymmetry of acetabular indices side-to-side.

**Findings / Results:** In total 109 infants with normal ultrasound were screened radiographically. 11 (12%) infants had indications of DDH at radiographic screening. These infants went on to further radiographic follow-up and there was no need for immediate treatment.

**Conclusions:** Radiographic sign of acetabular dysplasia can be present in the age 6 months although ultrasound screening in the perinatal period with modified Grafts method is normal. The clinical significance for this finding is unknown until we have a long-term follow-up. These findings may apply for other risk populations as well.

## Three-Dimensional Kinetic and Kinematic Analysis of Knee Rotational stability in ACL-deficient patients.

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**Background:** During the last five years there has been a shift towards more anatomic ACL reconstruction, with the purpose of restoring natural knee biomechanics. There is a need to have precise methods for evaluation of knee kinematics and kinetics to evaluate the outcome of the new surgical methods. 3D-motion analysis is such a method.

**Purpose / Aim of Study:** The aim of the study was to determine the functional knee rotation of ACL deficient knees (ACL D) and to compare results with healthy knees using 3-D motion analysis.

**Materials and Methods:** 42 ACL D patients and 16 healthy subjects were included in the study. Motion data was captured using 8 cameras and QTM software. All data was analyzed by Visual-3D and Matlab. Reflective markers were attached to bony landmarks of the lower limb and clusters of markers placed on the shank and thigh. A pivoting task was conducted by descending a stairway and immediately pivot on the landing leg 90° and walk away from the stairway.

**Findings / Results:** The average rotational stiffness (moment/angle rotation ((Nm/g)/deg) of the ACL-deficient and ACL-intact knee was 5,9 (95% CI: 3,8-7,9) and 6,7 (95% CI: 6,0-7,5), respectively ( $p < 0.001$ ). The average rotational stiffness of the healthy control group was 7,0 (95% CI: 5,9-8,0). No statistically significant difference was found between the ACL- intact knee and the control group (both legs) ( $p = 0,702$ ).

**Conclusions:** 3D-motion analysis of the knee revealed a significant lower rotational stiffness of the ACL-deficient knee compared to the contra-lateral intact knee. No significant difference in rotational stiffness was seen between the ACL intact knee and the healthy control group. 3D-motion analysis is a valid method to measure rotational stability of the knee.

55.

## **Incidence and outcome after revision ACL reconstruction. Results from the Danish Registry for Ligament Reconstructions with 5 years follow-up**

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**Background:** Revision anterior cruciate ligament (ACL) reconstruction is poorly described due to rare incidence and only small case series presented in the literature. The Danish ACL Registry has since 2005 monitored development in revision ACL reconstruction.

**Purpose / Aim of Study:** This study presents the epidemiology and outcome after revision ACL reconstruction in Denmark.

**Materials and Methods:** All clinics performing ACL reconstructions in Denmark reports to the ACL Registry. Revision rate was calculated from revised cases of primary ACL registreted in the period 2005-2010 (n=9850). Revision rates and temporal revision rate profiles were determined. Outcome one year after revision was reported by, KOOS score and Tegner function score and objective knee stability measurement.

**Findings / Results:** Revision rate was 3.8 % after 5 years. Revision are performed most frequently after 2-3 years. The main causes for revision was new trauma (37 %, mainly sports), unknown cause (25 %) and poor femur tunnel placement (21 %). The KOOS scores at 1 year follow-up was 78 for symptoms, 57 for pain, 83 for ADL, 51 for Sports and 51 quality of life. Tegner function score was 3.9 after 1 year. Side to side difference in knee laxity improved from 5.8. mm preoperatively to 2.1 mm after year postoperatively.

**Conclusions:** The revision rate is low with a 5 year revision rate of 4 %. An important cause for revision surgery is reinjury during sport. The outcome is poorer that after primary ACL reconstruction based on KOOS and Tegner scores. Since revision ACL reconstruction is performed in young patients there is strong need to monitor incidence and outcome in order to be able to improve the future outcome of the procedure.

## Correlation between different patella alta measurements in patients with and without patella-femoral instability.

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**Background:** There is an increasing focus on the influence of patella alta in the pathogenesis and surgical treatment of patello-femoral instability. However there is no consensus of which radiological methods is reliable for patella alta characterization and surgical decision-making.

**Purpose / Aim of Study:** The present study aims to determine the correlation between three different MRI based patella alta measurements in patients with and without patella instability.

**Materials and Methods:** MRI scanning of 100 patients was analyzed. There were 50 patients with patella instability and 50 patients with meniscus lesions without patella instability representing a control group. The Caton-Deschamp (CD), Insall- Salvati (IS) and Patella-trochlear index (PT) was measured and calculated. Correlations between the different indexes were determined with non- parametric correlation test. Patella- femoral dysplasia, sulcus angle and Tibia Tuberosity trochlea Groove (TTTG) distance were determined.

**Findings / Results:** Patients with patella instability had significantly higher TTTG distance, sulcus angel and patella alta index measured with CD and IS methods. The PT patella alta index was not correlated to patella instability. Patella alta index measured with CD and IS were significantly correlated in patella instability group ( $P>0,00$ ) and in the control group ( $P>0,003$ ), whereas the PT index was not correlated to CD and IS indexes.

**Conclusions:** Increased Patella Alta index measured with SI and CD methods, TTTG distance and sulcus angel are characteristic for patella instability patients, while patella-trochlea index is not related to patella instability patients.. The Patella-trochlea index did not correlate to the CD and IS indexes or patella instability and is thus not suitable for evaluation of patella instability.

## **Tunnel bone density after allogenic bone chip and bone cylinder transplantation in staged revision anterior cruciate ligament reconstruction**

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**Background:** Tunnel widening in failed anterior cruciate ligament reconstruction (ACLR) can result in the staged revision procedures with a need for bone transplantation prior to revision reconstruction. Limited knowledge exists regarding to quality of different transplantation methods. The present study used CT-scanning to evaluate tunnel bone density after allogenic bone chips and bone cylinder transplantation.

**Purpose / Aim of Study:** The hypothesis of the study is bone chips transplantation resulted in higher bone density than bone cylinder transplantation due to possible voids between individual cylinders in the tunnels.

**Materials and Methods:** The records of 25 patients operated for 1st stage revision ACLR from January 2003 to march 2010 were included in the study. Thirteen patients had their tunnels transplanted with bone chips and twelve patients with bone cylinders from allogenic femoral heads. Allograft bone chips were produced using a bone mill and allograft cylinders were created by 7-8 mm diameter core drilling. Bone density 3-4 months after transplantation were evaluated by CT scanning reconstruction slides with 5 mm intervals throughout the tunnel length using histomorphometry as well as a computer software system for areal measurements.

**Findings / Results:** There were 15 females and 10 males with an average age of 32 yrs. In femoral bone tunnels bone density was 64% and 58 % when using bone chips and bone cylinders respectively ( $p>0.05$ ). In tibial bone tunnels bone density was 63% and 54 % when using bone chips and bone cylinders respectively ( $p>0.05$ ).

**Conclusions:** No difference in bone density after either chip or cylinder allograft bone transplantation in revision ACL reconstruction was demonstrated.



58.

## **Reducing donor site morbidity after after ACL reconstruction with hamstring tendons**

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**Background:** The most prevalent morbidity after hamstring ALC surgery is donor site pain.

**Purpose / Aim of Study:** Can local applied hamstring block reduce donor site pain after hamstring ACL surgery?.

**Materials and Methods:** This is the preliminary result from the first 17 out of 40 planned included patients. It is a randomized double blind study, where 20mL 0,25% bupivacain is compared to 20mL isotonic saline. Just before wound closure the test medication is placed in the space from the harvested hamstring muscles with a sterile suction catheter. All patients were operated in general anesthesia and all had a femoral nerve block. The patient and the staff in the recovery were blinded for the result of the randomization. The pain from the donor site and the use of analgesics was registered for each hour the first 6 hours and for each day the first two weeks.

**Findings / Results:** The preliminary data reveal that the bupivacain group had significant less pain the first 2 days after surgery and used significant less analgesic medicine the first 4 days after surgery. However no difference could so far be found in the overall 2 weeks observation period.

**Conclusions:** The use of 20mL of 0,25% Bupivacain placed in the donor site can reduce postoperative pain in ACL hamstring operated patients.

59.

## **Outcome after re-revision ACL reconstruction in 17 patients from a single institution. 2-15 years follow-up**

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**Background:** Outcome after re-revision anterior cruciate ligament reconstruction (RRACLR) is poorly described due to rare incidence and lack of presented literature. Due to status of the referral center at our clinic we have the possibility to follow-up a reasonable size of ACL re-revisions patients.

**Purpose / Aim of Study:** The present study aims to present epidemiology and clinical outcome after ACL re-revisions with an intermediate follow-up length.

**Materials and Methods:** A retrospective study of 17 patients treated with RRACLR from 2001-2009 were included at our clinic. The follow-up study was performed in 2011 and included objective IKDC scores, KT-1000 knee laxity measurements, and registration of reoperations and complications

**Findings / Results:** 17 patients were available for follow-up. Mean age was 28 years, 41 % were males. All the patients were reconstructed with allograft tendons. Median follow-up was 6 years. KOOS subscores were preoperatively 63, 70, 81, 43 and 28 for Symptoms, Pain, Activity of Daily Living, Sports, and Quality Of Life respectively. At follow-up scores were 59, 69, 67, 33 and 43 for Symptoms, Pain, Activity of Daily Living, Sports, and Quality Of Life respectively. The quality of life score was significantly increased. KT-1000 was 4,9 mm preoperatively and 2,2 mm at follow-up.

**Conclusions:** Subjective outcome scores indicate significant knee impairment with low sport and quality of life scores. This despite the finding of acceptable follow-up objective sagittal knee stability. This study shows that preoperative patient information for RRACLR of expected outcome is of utmost importance

## **Arthroscopy of the sternoclavicular joint. Establishing portals, anatomy, structures at risk and possible arthroscopic procedures using fresh frozen cadavers.**

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**Background:** The description of the sternoclavicular joint (SCJ) in orthopaedic literature is scanty. Because of the vicinity to nearby vital structures, knowledge of the joint anatomy and surroundings is essential for establishing portals for therapeutic procedures in the SCJ.

**Purpose / Aim of Study:** To characterize the arthroscopic and macroscopic anatomy of the SCJ, establish arthroscopic portals and try out various arthroscopic procedures, viewing the results by dissection.

**Materials and Methods:** In twenty SCJs from ten freshly frozen cadaveric torsos the optimal portal placement to the SCJs two compartments was established. Four defined arthroscopic procedures were performed using a 2,7 mm arthroscope and shavers. The joints were dissected and the results of the procedures were determined. In macroscopic preparations the anatomy of the SCJ and surrounding structures was determined.

**Findings / Results:** Several of the cadaveric specimens showed signs of degenerative joint disease. The SCJ is an inverse saddle joint with features of a ball and socket joint. The SC-disc (SCD) normally separates the SCJ in a medial (MC) and a lateral compartment (LC). The SCD inserts proximally on the upper end of the clavicular head, distally between manubrium and 1st rib cartilage; posterior continuous with, and anterior often separated from the capsule. The disc seems to function as a ligament, stabilizing the clavicular head, and as a pressure distributor. Scope access to LC is possible through a low horizontal portal and access to MC is possible through a cranial portal. Resection of SCD and synovectomy was possible. Resection of the medial end has a learning curve. Vital structures is at risk in the posterior vicinity of the SCJ.

**Conclusions:** Arthroscopic procedures of the SCJ is possible, but caution mandatory due to the proximity of vital structures posterior to the SCJ.

## 61.

### **Peri-Acetabular Osteotomy Improves Sport Performance in Patients with Dysplasia of the Hip**

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**Background:** Peri-acetabular osteotomy (PAO) is a recognized treatment of developmental dysplasia of the hip. There is, however, a lack of information on the subjective outcome of these patients.

**Purpose / Aim of Study:** The purpose of this study was to assess the influence of PAO on the patients' post-operative function in sport.

**Materials and Methods:** 37 consecutive patients undergoing PAO were followed in a prospective investigation. Using minimal-incision PAO, CE-angle was corrected from  $15\pm 1$  degree to  $33\pm 1$  degree, and AI was corrected from  $18\pm 1$  degree to  $3\pm 0$  degrees. Patients completed self-assessment questionnaires before operation, two months, six months and one year after surgery (compliance 95%). Data are presented as mean  $\pm$  SEM. Student's paired t-test or Wilcoxon matched pairs test and Fishers' Exact Test have been used. Level of significance was 0.05.

**Findings / Results:** PAO-patients initiated sport-activity  $6\pm 1$  months post-operatively. Before PAO, only 9% of the patients were performing sport. After one year, 73% were performing sport with a training duration per week of  $3\pm 1$  hours. The HOOS sub-score "Sport and Recreation" was improved from  $44\pm 1$  pre-operatively to  $78\pm 3$  at 12 months post-operatively ( $p<0.001$ ). The maximum progress was achieved from 2 months ( $51\pm 1$ ) to 6 months ( $74\pm 2$ ) post-operatively ( $p<0.001$ ). Pain in maximal activity was reduced from  $6.9\pm 0.3$  pre-PAO to  $1.8\pm 0.2$  one year after PAO ( $p<0.05$ ). Accordingly, the uses of both prescriptive and non-prescriptive analgesics were also reduced throughout the period. One year after PAO, EQ-5D was improved with 30% ( $p<0.05$ ). Patients' willingness to repeat PAO was 89%.

**Conclusions:** PAO improved patients' ability to perform sport. The major improvement was seen from 6 to 12 months post-operatively. After PAO, patients were more satisfied with their hip function in sport and quality of life.

## Blood Perfusion and Bone Formation before and after minimally invasive periacetabular osteotomy analysed PET combined with CT

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**Background:** Sufficient blood perfusion is held to be essential to successful bone healing after periacetabular osteotomy (PAO). It is never examined in vivo how blood perfusion to the acetabular fragment is affected by PAO and whether perfusion contributes to new bone formation in the acetabular fragment.

**Purpose / Aim of Study:** The purpose of this study was to quantify blood perfusion and bone formation before and after PAO analysed by Positron Emission Tomography (PET) combined with Computed Tomography (CT).

**Materials and Methods:** Ten dysplastic patients (nine women) were included consecutively and had their hip joints PET/CT scanned immediately before PAO and 3-4 weeks after. Due to patients moving while scanning, data of sufficiently high quality was only available for six out of ten. [O- 15]-water was used to quantify blood perfusion and [F-18]-fluoride was used to produce quantitative images interpreted as new bone formation in the acetabular fragment.

**Findings / Results:** The blood perfusion on the operated acetabulum before surgery was  $0.07 \pm 0.02$  ml/min/ml, and after surgery  $0.19 \pm 0.03$  ml/min/ml ( $p < 0.00$ ). Blood perfusion on the non-operated acetabulum was  $0.07 \pm 0.02$  ml/min/ml before PAO and  $0.07 \pm 0.02$  ml/min/ml after surgery ( $p = 0.47$ ). The fluoride-clearance per volume bone on the operated acetabulum was  $0.02 \pm 0.01$  ml/min/ml preoperatively, and  $0.06 \pm 0.01$  ml/min/ml postoperatively ( $p < 0.00$ ). Fluoride-clearance on the non-operated acetabulum was  $0.01 \pm 0.01$  ml/min/ml before PAO and  $0.02 \pm 0.01$  ml/min/ml after PAO ( $p = 0.49$ ).

**Conclusions:** Blood perfusion and new bone formation increased significantly in the acetabular fragment demonstrating that blood perfusion to the acetabular fragment is not critically compromised after minimally invasive PAO. Three to four weeks after PAO, bone formation in the acetabular fragment on the operated side had increased significantly.

## 63.

### Evaluation of a Verbal Rating Scale for post-operative pain in hip fracture patients

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**Background:** Quantifying pain reliably after surgery is essential to optimize analgesic treatment. Hip fracture patients represent a particular challenge due to the high prevalence of cognitive impairment.

**Purpose / Aim of Study:** To determine the reliability of a Verbal Rating Scale (VRS) for assessment of pain after hip fracture surgery.

**Materials and Methods:** Prospectively, patients were asked to rate pain on a five point VRS during admission to hospital after hip fracture surgery. Paired ratings were obtained at rest and by passive straight leg rise. Furthermore, in relation to pain assessments, patients were asked to rate their actual proportion of pain to the previous assessment of pain assisted by five categorical descriptors of change in recalled pain. The agreement between the paired measures on the VRS and the agreement between recalled pain was expressed as kappa coefficients. Cognitive status was quantified by the short Orientation-Memory-Concentration Test (sOMC).

**Findings / Results:** 110 patients were included. At rest 97% of the paired scores had a maximum disagreement of one scale point. 95% of the paired scores had a maximum disagreement of one scale point at straight leg raise. Test retest agreement expressed as linear weighted kappa coefficients ranged from 0.68 (95% CI=0.59-0.77) at hip flexion to 0.75 (95% CI=0.65-0.85) at rest. Unweighted kappa coefficients of the first and the second change in recalled pain compared to agreement in paired VRS scores ranged from 0.57 (95% CI=0.49-0.65) to 0.36 (95% CI=0.31-0.41).

**Conclusions:** Formal assessment of pain with the VRS has better retest reliability than non formal rating of change in recalled pain. Despite severe cognitive impairment only few patients are unable to use the VRS, and we consider that the applied version of the scale is reliable for formal assessment of pain after hip fracture surgery.

## 64.

### **Clinical and radiographic outcome 10-17 years following surgical treatment of a slipped capital femoral epiphysis.**

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**Background:** It has been hypothesized that a slipped capital femoral epiphysis (SCFE) in adolescence could result in cam deformity and femoroacetabular impingement (FAI). Thus, these patients could experience hip joint symptoms, functional compromise, and even osteoarthritic development as adults. However, the long-term effects of SCFE remain unclear

**Purpose / Aim of Study:** To investigate clinical, radiographic, and patient reported outcome at long-term follow-up after SCFE with emphasis on deformity assessment and joint degeneration.

**Materials and Methods:** Through database search we identified patients treated with fixation for SCFE at two orthopaedic departments between 1991-1998. Seventeen patients (24 hip joints, 10 women), with a median age of 12 years at operation, were seen for clinical and radiographic follow-up in 2008 including conventional radiography, MRI, WOMAC and SF-36 questionnaires, clinical examination, and structured interview. Indices of hip deformity and osteoarthritis were assessed on the radiographs. MRI's were assessed for alpha angles, labral pathology and subchondral defects.

**Findings / Results:** The median postoperative Southwick angle was 40° (range: 3-84°). At follow-up 15 affected hips had a pathological Triangular index. Tönnis grade >1 was present in only one affected hip. MRI showed pathological alpha angles in 13 hips, degeneration in 10 hips and chondrolabral damage in 3 hips. The median SF-36 physical and mental component (scores were 54.1 and 55.7, respectively). The median WOMAC score was 100 (range: 73-100) for the affected hips and 99 (range: 90-100) for the unaffected hips.

**Conclusions:** In this 10-17 -year follow-up study, we found signs of structural hip deformity following SCFE. However, clinical examination, SF-36 or WOMAC scores did not indicate physical compromise at this stage of follow-up.

65.

## Do RSA measurements of femoral head penetration and acetabular cup migration in THR depend upon shell and liner segment assignment?

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**Background:** Radiostereometric analysis (RSA) is a useful tool for early measurement of femoral head penetration and acetabular cup stability in total hip replacements (THR). Because the polyethylene liner is assumed to be stable in the shell, the two components are assigned to the same segment in RSA. However, when beads are inserted into the liner, the components can be separated into two segments.

**Purpose / Aim of Study:** To identify if RSA measurements of femoral head penetration into the poly liner and acetabular cup stability were influenced by identifying the shell and liner as one or two segments.

**Materials and Methods:** 40 THR RSA patients (MGH, Boston) with tantalum beads in their pelvis and liner were included. All patients had 6 month, 35 had 1 year, and 20 had 2 year follow-up. RSA radiographs were analyzed with UmRSA software to measure proximal migration of the femoral head, liner, and cup. Paired t- tests were used to determine differences among the measurement methods.

**Findings / Results:** At 6, 12 and 24 months, the median (range) liner migration was -30 (-694 to 218); -10 (-357 to 313) and -10 (-279 to 223)µm as compared to the shell. Acetabular cup migration was 130, 93 and 112µm, when compared alone to the pelvis segment, but 145, 141 and 115µm, when the shell and liner were combined (all  $p < 0.001$ ). Head penetration was 42, 49 and 54µm, when compared to the liner, but 41, 31 and 38µm, when the shell and liner were combined (all  $p > 0.026$ ). Head penetration into the shell was -17, -20 and -31µm, which at 12 months was different from penetration measured into the liner ( $p < 0.001$ ).

**Conclusions:** Although differences are small, RSA measurements of femoral head penetration and acetabular cup migration appear to be influenced by the assignment of shell and liner segments. Inserting beads into the liner allows for the option of separate measurements.



## Multicenter RSA Evaluation of In Vivo Wear of Vitamin E Stabilized Highly Cross-linked Polyethylene

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**Background:** Vitamin E doping is a method for enhancing long-term oxidative stability of highly cross-linked polyethylene in total hip replacements. In vitro material studies show promising results, but in vivo studies have yet to be presented.

**Purpose / Aim of Study:** To evaluate in vivo wear properties of highly cross-linked polyethylene without (Arcom XL) and with vitamin-E doping (E1) in patients with 32mm metal and 36mm ceramic femoral heads using Radiostereometric Analysis (RSA).

**Materials and Methods:** 69 patients with 1 year follow-up enrolled in RSA studies were included from Massachusetts General Hospital and Ålborg University Hospital, 21 of the MGH patients also had 2 year follow-up. Using RSA edge detection, the cup and femoral head were defined to measure head penetration into the liner. At MGH, 37 patients received 32mm cobalt- chrome femoral heads with E1 liners. In Ålborg, patients received 36mm ceramic femoral heads where 14 had E1 liners and 18 had Arcom XL liners. Statistics were performed using paired t-test and Mann-Whitney test.

**Findings / Results:** The median (range) proximal femoral head penetration in 32mm metal head patients was -24 $\mu$ m (-322 to 174) after one year, with no significant additional penetration in the second year, -4 $\mu$ m (- 138 to 174). Patients with 36mm ceramic heads had a penetration of - 15 $\mu$ m (-251 to 1408) in to the E1 liners, while patients with Arcom liners had 18 $\mu$ m (-174 to 1029). No significant differences were found among the groups at one year.

**Conclusions:** This study provides the first in vivo wear measurement of E1 liners using RSA. The amount of femoral head penetration into E1 liners is low and comparable to Arcom XL, regardless of femoral head material or size. The results from the MGH patients seen at 2 years show no sign of additional proximal deformation or wear in E1 liners.

**Increased wear of polyethylene in first generation modular metal-backed cups with ETO sterilized acetabular components. A minimum 11 years follow-up and clinical assessment.**

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**Background:**

**Purpose / Aim of Study:** Polyethylene (PE) wear and osteolysis is a recognized problem with non- crosslinked PE and first generation modular cup designs. The porous-coated 3-spiked Duraloc 300 cup was introduced in 1990 with UHMWPE (PE) sterilized in inert gas. The porous-coated Reflection cup was marketed in 1992 based on a wear-reducing design (highly polished inner surface and micro-stable locking-mechanism) with ETO sterilized UHMWPE liners. We used both cups in our department in the late 1990s with expectancy of less PE-wear with the Reflection cup.

**Materials and Methods:** From January 1996 to July 1999, 107 patients (133 hips) at a mean age of 55 years (range 34-67 years) were treated for hip arthritis by uncemented primary THA. 73 Reflection, and 35 Duraloc 300 cups were used. 85 patients (108 hips) participated in an invited long-term follow-up (non-participants: 15 died, 2 early revisions, 6 with poor health). Stems were alike (Profile, DePuy). Radiological (PE wear, cup migration, cup position and osteolysis) and clinical (HHS and OHS) comparison was performed.

**Findings / Results:** At 13 years (range 11-15) the 2D linear PE wear-rate of the Reflection liner (n=59) of 0.22 mm/year, SD 0.11 (range 0.02-0.52) was 100% higher ( $p < 0.01$ ) compared with the Duraloc 300 liners (n=21) of 0.11 mm/year, SD 0.06 (range 0.04-0.33). Effect size was large (1.83). There were 4 revisions in the Reflection cup group and 2 infections. Osteolysis was minimal. We found 1 loose cup in both groups. HHS and OHS were similar.

**Conclusions:** The doubled wear-rate in the Reflection liners is likely related to the ETO sterilization. At 13 years osteolysis does not seem problematic; however, many liners are close to wear-through in asymptomatic patients. A long-term follow-up in patients with similar implants/liners seems advisable.

## Correlation between conventional radiographs and computed tomography in acetabular retroversion

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**Background:** Acetabular retroversion can lead to femoroacetabular pincer impingement, which produces pain and might lead to secondary osteoarthritis. In the diagnosis of acetabular retroversion the gold standard is CT, but significant signs have been found on conventional radiographs of the pelvis.

**Purpose / Aim of Study:** We aimed to find a correlation between acetabular retroversion diagnosed on conventional radiographs of the pelvis and the acetabular version on CT.

**Materials and Methods:** 40 patients (n=78 hips) with verified pincer impingement due to acetabular retroversion were included in this cohort study. Two groups were formed; patients with (a) supine (n=54 hips) and (b) standing weight-bearing AP radiographs (n=24 hips). On conventional AP radiographs we assessed cross-over-sign (COS)-ratio, posterior wall sign (PWS)-ratio and the prominence of the ischial spine sign (PrISS) in each group. On the respective CT-scans the roof-edge-angle (RE-angle) and the acetabular version (AcAV) were measured.

**Findings / Results:** The linear relationship between RE-angle and AcAV measured on CT-scans was statistically significant ( $p=0.025$ ), as a decreased RE-angle resulted in a decreased AcAV. Lower quantities of COS-ratio, PWS-ratio and PrISS were found throughout the data from the standing weight-bearing radiographs. On supine radiographs we showed significant correlations between AcAV and both COS-ratio and PWS-ratio ( $p=0.002$ ;  $p=0.06$ ). COS-ratio and PrISS measured on standing weight-bearing radiographs revealed significant correlation with AcAV ( $p=0.004$ ;  $p=0.05$ ). RE-angle correlated with COS-ratio, however not statistically significantly.

**Conclusions:** This study showed a significant correlation between acetabular retroversion diagnosed on conventional radiographs and CT, when using the acetabular anteversion (AcAV) at the femoral head center as reference on CT.

## **Two year Metal ions and lymphocyte counts. An RCT between the ASR Resurfacing system (RHA) and ceramic on poly Total Hip Arthroplasty (THA)**

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**Background:** RHA was marketed to allow for an active lifestyle. The risk of metal articulations is high ion levels of chromium (Cr) and cobalt (Co). High metal ions have been associated with a depressive effect on the systemic lymphocyte count.

**Purpose / Aim of Study:** The present RCT reports clinical status, investigates metal ion concentrations and the relationship of Co and Cr ions on lymphocyte counts during the first 2 years.

**Materials and Methods:** Following randomization to RHA(n=19) or THA(n=19) we obtained HHS, UCLA activity, WOMAC, whole blood Co/Cr concentrations and total/subgroup lymphocyte counts at baseline, 8 w, 6 m, 1 and 2 years.

**Findings / Results:** Mean (sd) HHS at two years for RHA and THA was 92.5 (9.6) and 90.9 (14.2), UCLA 7.3 (1.8) and 7.2 (2.1) WOMAC 8.4 (13.4) and 13.0 (21.0) ROM 221.1° (35.4) and 226.1° (33.4). When adjusted for baseline values there was no group difference. Median ions stayed below 0.2 ppb for THAs. For RHA both Cr and Co rose sharply at 8 weeks followed by a slower ascent up to 1 year. From 1 year Co continued to rise from 1.02(0.58 to 5.22) to 1.43(0.46 to 8.27) ppb at two years, whereas Cr levelled out from 1.31 (0.40 to 7.97) to 1.29(0.47 to 7.22) ppb. Small components generated greater Co/Cr and female sex greater Co levels. Two patients had Cr or Co above 7ppb, but no adverse effects. No correlation between metal ion levels and lymphocyte counts were demonstrated.

**Conclusions:** In this population the resurfacing concept has no functional advantage compared to a standard THA. This study can not support the hypothesis that metal wear debris influence systemic lymphocyte counts. The median Co ion level for the ASR implant did not display the expected running-in pattern, but is still within the normal range for a metal- on-metal articulation. Presently all RHA hips are functioning well.

## Early micro motion of the ASRTM femoral component. 2 year radiostereometry (RSA) results

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**Background:** RSA can detect the early micro motion in unstable implant designs likely to experience above average failure rates. The ASR resurfacing implant was withdrawn from the market due to excess failure rates. A few RSA studies exist on competing femoral resurfacing components, all have displayed initial implant stability.

**Purpose / Aim of Study:** Primarily to measure the early micro motion in the ASR femoral resurfacing implant and secondary to correlate micro motion to known risk factors.

**Materials and Methods:** 19 patients from a randomised study received a tantalum marked ASR implant, 4 tip markers formed the analysing segment. Ten 0.8 mm tantalum markers in the greater and lesser trochanter constituted the reference segment. Supine RSA images were obtained postoperatively within 3 days of surgery, at 8 w, 6 m, 1 and 2 years, along with whole blood Cr and Co ions. Images from 14 patients available for the two year control.

**Findings / Results:** The mean (sd) micro motion over the first two years was a lateral movement of 0.061 (0.283) mm 0.034 (0.168) mm distal migration and an anterior movement of 0.041 (0.23) mm. The backward tilt around the x axis was 0.181° (0.513), an external rotation of 0.096° (0.567) and a varus tilt of 0.151° (0.337). None of the movements were statistically significant from zero movement. Most implants were stable after the first year, but 4 implants displayed continuous movement from one year onwards. None of them had symptoms from the operated hip. No correlation found between micro motion and gender, component size or metal ion levels.

**Conclusions:** Our early RSA results support that the implant achieves initial stability, and that early migration is not the mode of failure for the ASR implant. We will continue to monitor the migrating implants.

## **Topical Bisphosphonate Augments Fixation of Bone-grafted Implants, BMP-2 causes Resorption-based Instability**

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**Background:** Revision arthroplasties in osteopenic bone may need bone-grafting, but healing is inconsistent. rhBMP-2 (BMP) is a potent stimulator of new bone formation, but also accelerates bone resorption. The bisphosphonate (BP) Zolendronate induces osteoclastic apoptosis and slows down bone resorption.

**Purpose / Aim of Study:** The overall purpose of this research was to improve early fixation of bone-grafted joint replacement implants.

**Materials and Methods:** In the present study the two drugs in combination and alone was studied in our canine model of impaction bone grafting. Cancellous bone grafts were soaked in either saline or Zolendronate solution and then added vehicle or rhBMP-2 giving four treatment groups: A) control B) BMP C) BP and D) BMP+BP. The allograft treated with A,B,C or D was impacted into a circumferential defect of 2.5 mm around plasmaspray HA on Ti PoroCoat implants. Forty implants in 10 dogs were included.

**Findings / Results:** The group with allograft soaked in Zolendronate only was biomechanically better fixed than all other groups ( $p < 0.05$ ). It had less allograft resorption compared to all other groups ( $p < 0.005$ ) without any statistically significant change in new bone formation. The addition of BMP-2 to the allograft did not increase new bone formation significantly, but allograft resorption was accelerated. This was also the case were the allograft was treated with BMP-2 and Zolendronate in combination. This caused a decrease in mechanical implant fixation in both these groups compared to the control group, however only statistically significant in the BMP-2 group.

**Conclusions:** The study shows that topical Zolendronate can be a valuable tool for augmenting bone grafts when administered correctly. The use of BMP-2 in bone grafting procedures seems associated with a high risk of bone resorption and mechanical weakening.

## Antibiotic impregnation of allograft bone and the effect on implant fixation

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**Background:** Hip and knee arthroplasty present surgeons with difficult bone loss. In these cases the use of morselized allograft is a well-established way of optimizing early implant fixation. In revisions, the surgical field is potentially infected. The use of allograft bone creates a “dead space” in which the immune system has impaired access, and even a small amount of bacteria may therefore theoretically increase the risk of infection. In vivo studies have shown that allograft bone is suitable as a vehicle of local antibiotic delivery.

**Purpose / Aim of Study:** We hypothesized that the allograft bone could be used as a local antibiotic delivery vehicle without impairing the implant fixation, tested by mechanical push-out and histomorphometry.

**Materials and Methods:** Following approval of the Institutional Animal Care and use Committee we implanted a cylindrical (10x6 mm) porous-coated Ti implant in each distal femur of 12 dogs observed for 4 weeks. The implants were surrounded by a circumferential gap of 2.5 mm impacted with a standardized volume of morselized allograft. In the two intervention groups, 0.2ml tobramycin solution of high (800mg/ml) and low (200mg/ml) concentration was added to the allograft, respectively. In the control group 0.2ml saline was added to the allograft. Data were evaluated with Wilcoxon signed-rank test. P-values < 0.05 was considered statistically significant.

**Findings / Results:** There was no significant biomechanical or histological difference between the three groups.

**Conclusions:** We found no disadvantage in terms of implant fixation or new bone formation when adding tobramycin to the allograft bone. Tobramycin impregnation of the bone graft seems safe, and the results warrant further studies to elucidate its potential effect on infection prophylaxis.

## Active and passive immunization against *Staphylococcus aureus* periprosthetic osteomyelitis in rats

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**Background:** Commonly used antibiotics cannot always control *S. aureus* associated infections in orthopaedic implants and other strategies are needed

**Purpose / Aim of Study:** We have searched for vaccines to boost the immune system that could eradicate the infectious microbe. We have used a knee prosthesis model of osteomyelitis in rats to explore the effectiveness of the immune response achieved in active as well as passive immunization.

**Materials and Methods:** Fifty Sprague-Dawley rats were operated and divided into two active groups (N=14 *ica*+ / 12 *ica*-) and two passive immunization groups (N= 12 *ica*+ / 12 *ica*-). All groups received *S. aureus* in the tibia and the femur marrow before insertion of the prosthesis. Each of the immunized groups was compared to a non-immunised control group. The active immunization groups received immunization with a synthetic oligosaccharide 9G1cNH2 given 3, 2 and 1 week before implantation of the prosthesis. The passive immunization groups received immunization with immunoglobulin intraperitoneally 3 days before implantation and the day of operation. After two weeks, the animals were sacrificed and all the specimens were prepared for analysis.

**Findings / Results:** The active immunization groups showed a decrease of bacteria in the group that was infected with the *ica*+ strain. In the passive immunization groups there was a clear decrease of infection in the *ica*- strain and a reduction of bacteria in the *ica*+ strain.

**Conclusions:** Active immunization against *S. aureus* osteomyelitis significantly reduces the infection. However, immunization based on only single *S. aureus* virulence determinant may have problems with the degree of efficacy because of the multifactorial nature of the pathogenesis of Staphylococcal infection.



## Hypoxia Enhances Chondrogenic Differentiation of Human Cord Blood Multilineage Progenitor Cells Seeded on a Novel Scaffold of Freeze Dried Polycaprolactone

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**Background:** Cartilage defects are common and causes osteoarthritis. Articular chondrocytes or bone marrow-derived stromal cells are presently the favoured cells for cartilage tissue engineering. Human umbilical cord blood multilineage progenitor cells (MLPCs) are easily harvested and have capability of for chondrogenic differentiation. According to recent studies combined three-dimensional (3D) culturing in low oxygen tension enhances differentiation.

**Purpose / Aim of Study:** This study evaluates the chondrogenic potential of combined MLPCs culturing in a novel 3D-scaffold of polycaprolactone and 5% O<sub>2</sub>.

**Materials and Methods:** MLPCs were induced in conventional 3D pellets or on scaffolds in 5% O<sub>2</sub> or 21% O<sub>2</sub>. Culturing in 21% O<sub>2</sub> and non-inductive chondrogenic medium was used as control. Gene expression of aggrecan, SOX9, CD-RAP, collagen I, II and X was evaluated. Matrix deposition was visualized by histological staining with H&E and Alcian blue. Sulphated glycosaminoglycans (sGAG) and secreted CD-RAP performed were assessed as markers of cartilage anabolism.

**Findings / Results:** In 5% O<sub>2</sub> induced MLPCs pellets and scaffolds induced in 5% O<sub>2</sub> showed increased cellularity and matrix deposition than compared with induction in 21% O<sub>2</sub>. Matrix deposition in pellets was observed in a zonal pattern in relation to the oxygen tension. Induced scaffolds showed cellularity and matrix deposition superficially and to adjacent scaffold fibres. Induced MLPCs pellets and scaffolds had significantly higher gene expression of aggrecan, SOX9, CD-RAP, collagen I, II and X compared with controls. Ratios of collagen II/I and collagen II/X was increased in 5% O<sub>2</sub>. Induced MLPCs in 5% O<sub>2</sub> accumulated significantly higher levels of sGAG and CD-RAP compared with controls.

**Conclusions:** The importance of low oxygen in MLPCs differentiation is insufficiently covered in literature. In this current study, 5% O<sub>2</sub> apparently favours chondrogenic differentiation. Furthermore, combined culturing of MLPCs in a 3D polycaprolactone scaffold and 5% O<sub>2</sub> enhanced and stabilized the chondrocyte phenotype.

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## Why do non-traumatic lower limb amputee patients stay in hospital and where are they discharged to?

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**Background:** There is a lack of knowledge about the early outcome after lower limb amputations.

**Purpose / Aim of Study:** To describe and examine factors influencing the primary hospital stay of patients with major non-traumatic lower limb amputations, and staying in an acute orthopaedic ward.

**Materials and Methods:** Forty-seven consecutive patients (20 women and 27 men) with a mean age of 71.5 (SD, 10.9) years, admitted from their own home within 10 months. The primary amputation level was below- knee (n=32) and above-knee (n=15), with respectively 8, and 3 having a re- amputation (23%) within their primary admission, while 8 (17%) died in- hospital. Variables examined were post- operative days to; independence in basic activities, home visits, length of stay (LOS), and discharge destination. Basic activities evaluated by physiotherapists were defined as; independency in getting from lying to sitting in bed, transfer from bed to wheelchair, and indoor manoeuvring the wheelchair.

**Findings / Results:** Data of the 39 patients, of which 30 (77%) were discharged directly to their previous residence, showed that 31 (79%) achieved independence in basic activities at a mean of 6.5 days after the "final" amputation. A home visit was conducted for 22 (56%) patients, at a mean of 13 days, and with an additional 11.1 days before discharge. Total LOS for the 39 patients discharged was 31 days, while the 9 patients who were re- amputated stayed an average of 50.1 days versus 25.1 for patients not.

**Conclusions:** The majority of amputee patients achieve independence in basic activities within one week of amputation but an average patient stay in-hospital for more than 4 weeks. The total LOS is to some extent prolonged by the planning of home visits and especially by the number of re- amputations. The cause of re- amputations should be examined in detail in the future.

## Setting up an orthogeriatric unit, seen from an orthopaedic point of view

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**Background:** Bispebjerg University Hospital (BBH) admits 600-800 hip fracture patients annually. The hospital is in a part of Copenhagen with a large population of frail elderly as well as young substance abusers. Most of these patients suffer from high comorbidity, and have been difficult for orthopaedic surgeons to handle. On 1 September 2009, an orthogeriatric ward was established consisting of 21 beds, two full-time geriatricians and an orthopaedic surgeon. Geriatricians have never before been employed directly in an orthopaedic ward in Denmark. We admit pts suffering from severe medical comorbidity and polypharmacy, primarily hip fracture patients

**Purpose / Aim of Study:** We are evaluating the pre-requisites and the challenges in this co-existence of orthopaedics and geriatricians

**Materials and Methods:** A survey in 2008 at the orthopaedic ward revealed that 67% of the admitted patients were  $\geq 65$  years and  $> 69\%$  had severe medical or social problems that needed intervention.

**Findings / Results:** We are presenting the challenges and cultural barriers this joint effort has been confronted with and selected data, including changes in complications and mortality for the hip fracture patients. Our experience shows that it is vital that the geriatricians and the orthopaedic surgeons work as a team during their daily rounds. We also found that the nurses dedicated and specifically educated impact the outcome. Data show a drastic fall in mortality among patients. There is no question of taking over each other's areas of expertise, but rather a question of supplementing each other's clinical efforts. We are also discussing an appropriate model for joint clinical practice and advantages for our patients.

**Conclusions:** The creation of this new multi-disciplinary collaboration requires thorough preparation and new forms of interaction.

## Optimizing Multidrug Resistance Protein 1 silencing in osteo- and chondrosarcoma

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**Background:** Standard treatment of osteosarcomas (OS) and chondrosarcomas (CHO) still provides unsatisfactory survival rates, and new treatment modalities are desirable. Overexpression of multidrug resistance protein 1 (MDR1) promotes chemoresistance and treatment targeting MDR1 may have the potential to improve patient outcome.

**Purpose / Aim of Study:** To optimize the MDR1 mRNA inhibition with small interfering (si) RNA in vitro in two steps. Firstly, explore the toxicity of three widely used transfection reagents on OS and CHO, and secondly, evaluate silencing of MDR1 in OS and CHO applying the least toxic transfection reagent combined with siRNA at various concentrations.

**Materials and Methods:** A colorimetric MTT assay assessed the toxicity of TransIT-TKO (TKO), Lipofectamine 2000 (LF) and X-tremeGENE (X) transfection reagents in different concentrations after 4 and 24 hours on cell lines MG-63 (OS) and SW1353 (CHO). MDR1 mRNA silencing with siRNA (Invitrogen) was evaluated by quantitative real time polymerase chain reaction. Mismatch siRNA was used as negative control.

**Findings / Results:** In OS, no toxicity was displayed after 4 hours (overall ANOVA test  $p = 0.098$ ). After 24 hours only TKO and X displayed toxicity (up to 54%,  $p$ -values  $< 0.028$ ). In CHO, significant toxicity was displayed by TKO (up to 85%,  $p$ -values  $< 0.004$ ), LF (up to 23%,  $p$ -values  $< 0.032$ ) and X (up to 74%,  $p$ -values  $< 0.039$ ). MDR1 mRNA silencing  $>80\%$  in OS and  $>90\%$  in CHO was achieved using LF and a final siRNA concentration of 25 nM. Increasing concentrations of siRNA did not provide further silencing.

**Conclusions:** LF displayed acceptable toxicity in OS and CHO cell lines, and was less toxic than TKO and X. Impressive MDR1 mRNA silencing was achieved in OS ( $>80\%$ ) and CHO ( $>90\%$ ) using LF and siRNA. The results provide a promising basis for future research employing in vitro and animal models.

## Reverse shoulder prosthesis after removal of the proximal humerus due to tumour

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**Background:** By removal of a tumour in the proximal part of the humerus the surrounding soft tissue including the rotator-cuff will usually be removed. This will lead to impaired shoulder function, which can be partly compensated by using a reverse humerus prosthesis.

**Purpose / Aim of Study:** To examine patients who had a reverse shoulder prosthesis after removal of a bone tumour at the department of orthopedic surgery, Aarhus University Hospital, from 1998 to 2011.

**Materials and Methods:** The patients were asked to participate in the study either by mail or following scheduled examination at the outpatient clinic. The questionnaires were sent by mail. Registrations: age, sex, date of operation, removal above or below the insertion of the deltoid muscle, tumour type and classification, complications, adjuvant treatment, dead or alive. Examinations: Range of movement, Constant score and MSTS (Musculo Skeletal Tumor Society) score.

**Findings / Results:** 14 patients (7 female, 7 male), mean age of 51,5 years (19 to 77) were included. The mean follow-up was 3,6 years (6 months to 10,5 years). 8 patients had a primary and 6 patients a secondary bone tumour. 5 patients had died at the time of follow-up. Two had several infections. One patient had her arm amputated due to tumour relaps four months after the primary surgery. One prosthesis dislocated two times in the first postoperative week. One prosthesis has loosened after 3,5 years and is going to be changed. The average range of movements was: Abduction: 72 O (10 to 150). Flexion: 79 O(10 to 150). External rotation: 23 O degree (0 to 60). Internal rotation: 40 O (0 to 80). The mean MSTS score were 41 and mean Constant score were 50.

**Conclusions:** Use of the reverse Delta shoulder prosthesis in tumour patients yields acceptable results in terms of shoulder movement and life quality.

## The Diagnostic Value of 18F-FDG PET/CT in Staging of High-grade Bone and Soft Tissue Sarcomas

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**Background:** In cancer treatment staging is important for selection of the most appropriate treatment for the individual patient.

**Purpose / Aim of Study:** The aim of this study was to evaluate the feasibility of 18F-FDG Positron Emission Tomography in combination with diagnostic Computed Tomography (PET/CT) for staging in high-grade bone sarcomas (BS) and soft tissue sarcomas (STS).

**Materials and Methods:** During the years 2001-2010, 89 patients (mean age 45(11-87) years, F/M= 48/41) referred to the Department of Orthopaedic Surgery, Rigshospitalet for further evaluation and surgical treatment of a highly malignant BS (n=30) or STS (n=59) had a PET/CT. The PET/CT scans were performed preoperatively (n=68) or within 1 month after surgery (n=21). The patient files were reviewed and metastatic lesions suggested by PET/CT were confirmed or denied by histological evaluation, additional imaging or by follow-up. In 3 cases it was not possible from the available data to confirm or deny a suggested metastatic lesion (lymph node/distant=2/1).

**Findings / Results:** PET/CT suspected 13 metastatic lesions in BS patients (lymph node/distant=5/8) and 21 metastatic lesions (lymph node/distant=6/15) in STS patients. The calculated sensitivity (SE) and specificity (SP) was 1 and 0.90 for detection of lymph node metastases, and the predictive value (PV) of a positive or a negative test was 0.27 and 1 respectively. SE and SP was 0.95 and 0.93 for detection of distant metastases, and the PV of a positive or a negative test was 0.87 and 0.98 respectively.

**Conclusions:** PET/CT for staging of patients with high- grade BS or STS was feasible with high SE and SP, but for lymph node metastases the PV of a positive test was low.

## The Early Experience with the GMRS Mega-prosthesis

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**Background:** Ever since the introduction of mega- prostheses, manufactures have aimed to prolong the implant survival and maximise the functional outcome of the joint. A new mega-prosthesis system GMRS (Stryker®) was introduced in 2004 and have been used in our department since 2005.

**Purpose / Aim of Study:** The aim of this study was to evaluate the early complication rate, prosthesis survival, and the functional and radiological outcome of GMRS mega- prostheses inserted in hip and knee.

**Materials and Methods:** We reviewed the patient files of the first 23 patients who had a GMRS prosthesis inserted during 2005-2008. 18 patients were operated on because of a malignant bone tumour (sarcoma/metastases = 10/8) and 5 patients because of a failed total knee arthroplasty (TKA). The bone resections performed were: distal femur (n=16), proximal femur (n=6) and proximal tibia (n=1). At the site of resection 13 had straight fluted uncemented press-fit stems (125mm) and 10 had short straight cemented stems (127mm). Enneking score was used for evaluation of the function of the limb.

**Findings / Results:** 12 patients died 497 (32-1012) days after the operation and with the exception of one patient who had an amputation because of local recurrence, they all had their prosthesis in situ without any revisions performed. 11 patients were still alive at the time of follow-up 1525 (834-2204) days after operation. 1 patient (failed TKA-group) had revision surgery because of aseptic loosening of a cemented femoral stem. 1 patient (sarcoma-group) had knee arthroscopy because of severe arthrofibrosis. The mean Enneking score was 78 (27-100)% (n=10, 1 patient of the metastases-group was not available for examination).

**Conclusions:** Complication and early revision rate using GMRS prostheses was limited and surviving patients obtained an acceptable joint function.

## **A prospective randomized trial between Transforaminal (TLIF) and instrumented posterolateral fusion (PLF) a two year follow-up.**

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**Background:** Theoretically, circumferential fusion should improve outcomes.

**Purpose / Aim of Study:** To test Transforaminal interbody fusion (TLIF) compared to instrumented posterolateral fusion group (PLF)

**Materials and Methods:** During 01.11.2003-01.11.2008 100 pat`s were prospectively randomized to TLIF or PLF. The TLIF-group was operated using TSRH(Medtronic)and Implex (Zimmer) and allograft. The PLF- group was operated using TSRH (Medtronic) and allograft. Inclusions criteria: segmental instability due to disc degeneration, former disc herniation, spondylolisthesis < 2. Functional outcome was registered prospectively, after one & two year, using Dallas Pain questionnaire (DPQ), SF-36, Low Back pain questionnaire.

**Findings / Results:** Sex ratio was 40/58. 51 patients had TLIF, 47 PLF. Mean age 49(TLIF)/45 (PLF). No statistic difference in outcome between groups could be detected, concerning, daily activity, work leisure, Anxiety/depression, social interest. No statistic difference concerning Back pain or Leg pain. In both the TLIF and the PLF group the patients had significant improvement in functional outcome, back pain, and leg pain compared to preoperative. Daily activities  $p > 0.0002/0.00001$ , Back pain  $> 0.00001/0.00001$ , Leg pain  $> 0.0007/0.0002$ . Operation time in the TLIF group was significant higher  $p < 0.00001$ , than PLF group. The blood loss was significantly higher in the TLIF  $p > 0.0011$ . No statistic difference in radiological fusion.

**Conclusions:** No statistical difference between groups at 2 years follow up in functional outcome & fusion rate. Both groups improved significantly in DPQ, ODI, LBPRS and SF-36 . Since the operation time, blood loss was significantly higher in the TLIF group and there was a tendency towards more leg pain in the TLIF group one could argue why prolong operation time, and increase blood loss and economic expenses!



## **A retrospective study of infectious spondylodiscitis managed at the Department of Orthopedic Surgery, Spine unit, Aarhus University Hospital between 2000 and 2010.**

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**Background:** Spondylodiscitis is a rare destructive spinal infection with uncharacteristic symptoms. Management commonly involves conservative methods, but presence of complications or failure of medical treatment indicates surgical intervention. However there is a controversy regarding approach, instrumentation and staging.

**Purpose / Aim of Study:** The purpose was to analyze the presentation, bacteriology, management and outcome of infectious spondylodiscitis.

**Materials and Methods:** Review of patients treated for infectious spondylodiscitis between 01/2000 and 12/2010. Exclusions: infectious spondylodiscitis at the site of previous spinal instrumentation, spinal metastases, tuberculous (13) and fungal (2) spondylodiscitis.

**Findings / Results:** We identified 196 patients. Mean age at the time of treatment was 59 (range 1- 89,  $\pm 18$ ) years. Patients were symptomatic for an average 7,3  $\pm 6,2$  weeks before admission to the Spine surgery unit. Biopsies were diagnostic in 63 cases. 80 patients with negative biopsy cultures had positive blood strains. The most frequently isolated microorganism was *Staphylococcus aureus* (57%). Lumbosacral spine was mostly affected (63%), followed by the thoracic (21%). 7% of cases were multifocal. Epidural abscess occurred in 38%, destruction of vertebral body in 15% of patients. 24% had neurologic compromise, 4 of them presented with Cauda equina syndrome, 10 were paraplegic. 79 patients were managed conservatively. Posterior debridement with pedicle screw instrumentation was performed in 75, without instrumentation in 20 cases. 5 patients underwent anterior debridement alone, while in 17 cases anterior debridement was combined with pedicle screw instrumentation, 2 of them were two stage procedures. Average stay at the Spine unit was 20  $\pm 15$  days for patients treated conservatively, 25  $\pm 13$  days for operated patients. 81% of patients were hospitalized in average 15  $\pm 15$  days before admission to Spine unit. 47% of patients were discharged home, others continued management at the department of primary hospitalization. Patients were followed 1 year after treatment. 12 cases of conservative treatment failed. 14 patients were re-operated, 19 had neurological impairment, 4 of them were paraplegic. 14 died during follow up. Infection control was obtained in 100%.

**Conclusions:** Most cases were diagnosed with a delay. It may explain majority of patients treated surgically. Debridement via posterior approach combined with pedicle screw instrumentation was surgery of the choice in treatment of infectious spondylodiscitis.

## Long-term results after short-segment pedicle fixation of thoracolumbar fractures

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**Background:** The predominant principle in posterior surgical stabilization of thoracolumbar fractures is of correction of kyphosis with ligamentotaxis thereby repositioning a posteriorly displaced fragment, through distraction forces applied on the implant system.

**Purpose / Aim of Study:** The purpose of the present study was to assess the long-term functional outcome of surgical treatment of thoracolumbar fractures with a pedicle screw based system that only allows reduction of the kyphosis.

**Materials and Methods:** The study only included mono-trauma patients with thoracic or lumbar fractures without neurological injury. The hospital records from 2004 - 2009 were reviewed. A questionnaire was mailed to all patients who were alive as of January 2010. The questionnaires consisted of EQ-5D, Oswestry Disability Index (ODI) and SF-36

**Findings / Results:** A total of 114 patients were operated. In all patients posterior fusion with local bone was performed. The majority of fractures were at the thoracolumbar junction, T11 – L2 (n = 91). Questionnaires were returned from 74 patients (73%) after one reminder. The median age at the time of surgery was 47 years (16-65) and the male/female ratio was 1.6/1. The median follow-up time was 3 years (1-5). The mean scores on questionnaires reflecting health related quality of life were as follows: 25,6 (ODI), 59,9 (EQ-5D), 52,2 (PCS), and 61,4 (MCS).

**Conclusions:** The functional outcome in the present study is comparable to the Danish background population and to previous reports on patients operated with a system allowing both ligamentotaxis and reduction of kyphosis. We therefore conclude, that patients undergoing posterior fixation of thoracolumbar fractures without neurological injury and no other major trauma, have a high likelihood of a long-term acceptable functional outcome, even if ligamentotaxis is not attempted.

## Routine Blood Tests as Predictors of Mortality in Hip Fracture Patients, A Literature-Based Meta-Analysis

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**Background:** Hip fractures are associated with elevated mortality. Several studies have investigated the ability of different blood markers to predict this mortality.

**Purpose / Aim of Study:** The aim of this study was to assess the quality and quantity of evidence for the association between levels of different biochemical markers and mortality through a meta-analysis of observational studies.

**Materials and Methods:** Medline-, Embase-, Cochran Library and the Web of Knowledge were searched for cohort studies to be included in the meta-analysis. The eligible studies were observational studies, with a study population larger than 150 subjects, a mean age above 60 yr and study duration below 730 days. Data were pooled across studies for the individual biomarker using random- or fixed- effect analysis.

**Findings / Results:** 15 eligible studies of 5 different markers on mortality were studied. The following markers were found to be of prognostic value on mortality in hip fracture patients: haemoglobin (odds ratio, 2.78; 95% confidence interval, 2.18-3.55;  $P < 0.00001$ , 3153 subjects included), total lymphocyte count, TLC, (odds ratio, 2.64; 95% confidence interval, 1.64-4.25;  $P < 0.00001$ , 1687 subjects included), albumin (odds ratio, 1.62; 95% confidence interval, 0.99-2.63;  $P = 0.05$ , 1680 subjects included), low albumin/low TLC (odds ratio, 3.05; 95% confidence interval, 1.85-5.00;  $P < 0.0001$ , 704 subjects included), low albumin/high TLC (odds ratio, 2.67; 95% confidence interval, 1.45-4.91;  $P = 0.002$ , 704 subjects included), creatinine (odds ratio, 1.58; 95% confidence interval, 1.25-1.99;  $P = 0.0001$ , 3761 subjects included), and PTH (odds ratio, 15.43; 95% confidence interval, 3.60-66.14;  $P = 0.0002$ , 525 subjects included).

**Conclusions:** Biochemical markers are valid predictors of mortality in hip fracture patients.

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## Arthroscopy as an aid in treating tibial plateau fractures

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**Background:** Fractures of the tibial plateau are complex injuries which continue to challenge orthopaedic surgeons in achieving alignment and anatomic or near anatomic reduction.

**Purpose / Aim of Study:** The purpose of this retrospective study was to investigate the actual effect and possible complications of using arthroscopy assisted procedure as an aid in treating tibial plateau fractures.

**Materials and Methods:** Patients with tibial plateau fractures who had undergone this arthroscopic procedure within the last eight years were included in the study. 45 patients (16 men and 29 woman) with a mean age of 48 (range 16-86) comprised the study population. According to Schatzkers fracture classification, the fracture types were as follows: Type I – IV; 25 patients and V– VI; 20 patients.

**Findings / Results:** There were no demographic differences between the groups of fractures. The arthroscopic procedure in all 45 cases was done without complications. In 26 cases (57 %) the arthroscopic procedure had a therapeutic effect; in 11 cases the procedure resulted in further reduction of the fracture and in 19 cases the procedure resulted in a therapeutic arthroscopic procedure. 75% of patients with fracture types V-VI had profit of the arthroscopic procedure, compared to 44% of the patients with fracture types I-IV. Postoperatively no patients were seen with infection or acute compartment syndrome, related to the arthroscopy.

**Conclusions:** Arthroscopy seems to be an effective mean in achieving or confirming anatomic or near anatomic reduction of the fracture, and in more than 50 % of the patients arthroscopic therapeutic procedure was done. Arthroscopy was especially beneficial in the more severe fractures, Schatzkers, V-VI. In our study the arthroscopic procedure was without complications.

## **What to expect following locked plate osteosynthesis of midshaft clavicle fractures? Complications, reoperations and patient reported outcome.**

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**Background:** Through the past half decade there has been a major shift towards primary operative treatment of displaced clavicle fractures. Locked plate osteosynthesis (lpo) bears biomechanical advantages and has been popularized. Despite its extensive use little is known about what outcome to expect following lpo.

**Purpose / Aim of Study:** The aim was to quantify complications, reoperations and patient reported outcome following lpo of midshaft clavicle fractures.

**Materials and Methods:** We identified 42 patients (mean age 36; 40 males) with a displaced midshaft clavicle fracture (Edinburg 2b1 and 2b2) who had undergone surgery with a lpo from Jan 2008 - Apr 2010. Five of these were initially treated conservatively but later underwent surgery. Patient demographics, fracture characteristics, complications and reoperations were reviewed by inquiry to patient files and radiographic material with a minimum 1 year follow-up. To secure valid follow-up patients were contacted by telephone and asked to fill in the DASH questionnaire.

**Findings / Results:** Of the 37 patients primarily operated 12 underwent further surgery: One developed a non-union and another had hardware failure. In 8 cases the plate was removed due to a prominent plate. In the remaining two the plate was removed due to young age of the patients. All 12 reoperations were without further complications. One of the 5 patients with a delayed primary operation had surgery in the form of hardware removal. No infections or intra-operative complications were seen in any of the patients. DASH scores are currently being collected.

**Conclusions:** Osteosynthesis with a lpo is a viable treatment for displaced midshaft clavicle fractures: There are few complications. However, the plate was removed in about one quarter of patients. Thus, patients should be prepared for a second operation.

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## **In-hospital mortality following hip fracture- before and after orthogeriatrics**

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**Background:** Hip fracture patients are elderly and frail, with complicating medical comorbidities and polypharmacies. There is high mortality post fracture. This group needs special attention which can be hard to provide at a normal orthopedic ward. At the Orthopaedic Department at BBH, there had been high mortality among hip fracture patients for a lengthy period. Thus, an orthogeriatric ward opened 1 September 2009. The unit receives approximately 50% of all hip fracture patients. Since 2008, all hip fracture patients admitted at BBH have been registered in a database.

**Purpose / Aim of Study:** To establish cause of death for hip fracture patients during their primary admission, and evaluate the effect of orthogeriatrics on in-hospital mortality.

**Materials and Methods:** Medical data on hip fracture patients from September 2008 to March 2011 were collected based on The Hip Fracture Database at BBH. A total of 67 patients out of 1274 died while in hospital. A review of their medical records was performed to establish cause of death, co-morbidity, living status and mobility.

**Findings / Results:** Among the deceased, the mean age was 84.4 years for men, and 88.3 years for women. Surgery was performed in 86% within 48 hours. 59% were women, 30% were admitted from nursing homes, and 21% were able to ambulate without walking aids prior to their fractures. The most common cause of death for both men and women was infection. 40% had significant comorbidity, 49% had an ASA score of 3-4 and 9% died preoperatively. Prior to the introduction of orthogeriatrics, in-hospital mortality was 7.6%; subsequently it fell to 3.9% reflecting a reduction in OR to 0.5 for in-hospital death. Further analyses will be presented at the meeting.

**Conclusions:** Orthogeriatrics in its present form led to reduced in-hospital mortality.

## **Does the postoperative regime influence complications and reoperations following locking plate osteosynthesis of clavicle fractures?**

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**Background:** Locking plate osteosynthesis has become the preferred method for operative treatment of clavicle fractures. The method offers stabile fixation which could allow application of greater forces than those applied during traditional restrictive postoperative regimens.

**Purpose / Aim of Study:** To assess the overall rates of complications and reoperations following locking plate osteosynthesis of clavicle fractures and to investigate if these rates differs between restrictive and unrestricted postoperative regimens.

**Materials and Methods:** We identified all locking plate osteosynthesis of mid-shaft clavicle fractures (Edinburg type 2) operated in our department from Jan 08–Nov 10 (n=110). Nine patients did not attend to the follow-up at our institution. The study group of 101 operations (100 pts, 84males) had a median age of 36 yrs (14-75 yrs). Follow-up ranged from 0.5 to 3.5 yrs. No patients were allowed to load the upper extremity for 6 wks. 34 patients were allowed unrestricted shoulder motion, whereas the rest had a 90° abduction limitation. By inquiry to patient files and radiographic material we assessed complications and reoperations.

**Findings / Results:** Overall, there were 30 cases (30%) of plate removals due to discomfort. There were 5 cases (5%) of failure of osteosynthesis: 2 occurred early after app. 6 weeks and 3 late after 10-13 months postoperatively. Two (6%) of the failures (both late) occurred in the group of 34 patients allowed unrestricted motion, and three (5%) occurred in the group with restricted abduction.

**Conclusions:** The overall rate of failure of osteosynthesis is low (5%). It seems that unrestricted motion immediately postoperative does not result in more failures than if abduction restriction is prescribed. The burden of plate removals in approximately one third of patients should be contained in the preoperative information.

## **Mobilization inhibited by Post operative pain predicted by fracture type and type of surgery**

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**Background:** Clinical observations of significant difference in pain intensity among Hip fracture patients, and of the effect this has on post operative mobilization

**Purpose / Aim of Study:** identify sub groups of hip fracture patients with increased risk of inhibited mobilization due to post operative pain

**Materials and Methods:** Retrospective database study. A consecutive cohort of 898 hip fracture patients hospitalized within two years from September 2008 to July 2010 was used for this study. If the exact type of fracture was not known, if the patient was coming from nursing home or if the patient was admitted for rehabilitation after surgery at another hospital, the patient was excluded. 508 patients were included in the study. Mobilization inhibited by postoperative pain as documented in the patient files was registered. Overall mobilization was inhibited by pain in 26.7% of the 508 patients included. The following fracture types were studied: Garden 1-2, Garden 3-4, Evans 1-2, Evans 3-5, Basocervical and Subtrochanteric

**Findings / Results:** Mobilization inhibited by pain related to type of surgery: Cannulated Hip Screws 16/80 (20.0%), sliding hip screw 23/94 (24.5%), Intramedullary Nail 63/186 (33.9%), partial hip replacement 33/144 (22.9%), total hip replacement 1/5 (20.0%).  $P=0.09$  chi square. Mobilization inhibited by pain related to type of fracture: Femoral neck Garden 1-2: 13/64 (20.3%), Femoral neck Garden 3-4: 38/172 (22.1%), Pertrochanteric Evans 1-2: 18/69 (26.1%), Pertrochanteric Evans 3-5: 46/149 (30.9%), Basocervical: 6/28 (21.4%), Subtrochanteric 15/27(55.6%).  $P=0.009$  chi square

**Conclusions:** The fracture types Pertrochanteric Evans 3-5 and Subtrochanteric had the biggest inhibition of mobilization caused by pain. No significant association between type of surgery and inhibition of mobilization caused by pain was found



## **Municipal cost and impact on home aid utilisation and nursing home services following hip fracture – A population-based study**

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**Background:** Due to the growing elderly population the economic burdens of Hip fractures (HFx) are expected to increase and the society will have to make priorities and allocate resources. It is therefore important to know the health care costs following an HFx.

**Purpose / Aim of Study:** The aim of this study was to explore changes in home care (HC) and nursing home (NH) costs following an HFx.

**Materials and Methods:** We included all patients home dwelling before HFx, residing in Odense Municipality, aged 45+ years with HFx admitted to orthopaedic department during 2005. Cost data were collected for the period 90 days before HFx and 90 days after discharge. A barcode system was used by the Municipality to register exact time consumption of HC services and register data were used to obtain the number of days spent in NH. Costs were calculated using the municipal price tariff for HC and NH services accounting for patients dying and days spent in hospital for any reason during data collection period. Data are expressed as mean (SD) or median [25%, 75%].

**Findings / Results:** A total of 264 HFx patients (164 women, 100 men) aged 81.1 [71.4; 87.5] years were included, 6.4% died in-hospital, and further 7.7% during 90 days follow-up. The daily use of HC increased from 5.7 [0.0, 26.1] to 21.3 [0.0, 76.5] minutes per patient ( $p < 0.001$ ) and 19.7% were discharged from hospital to NH. The daily cost per patient increased from 3.71 [0.00, 16.92] to 22.85 [1.83, 72.54] ( $p < 0.001$ ). Patients living in own home throughout the period (74%) had the largest increases in cost per individual and as a group, while the highest average cost per individual was seen in those discharged to NH.

**Conclusions:** Our results show that HC and NH costs increase six fold following an HFx. With the increasing numbers of elderly at risk, it might be cost saving to initiate HFx prevention programs.

## **Cemented or Uncemented Fixation of Proximal Interphalangeal Joint Implants? A 2 year RCT of implant fixation, periprosthetic bone density and finger function.**

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**Background:** Relatively few surgical options exist for the painful arthritic proximal interphalangeal (PIP) joint. Arthroplasty provides pain relief and stability and is the only treatment to preserve motion. The Avanta SR implant is a newer anatomically-shaped semi-constrained soft-on-hard bearing design that requires little bone resection, and allows for preservation of the collateral ligaments and stability.

**Purpose / Aim of Study:** The purpose of this study was to evaluate cemented or uncemented fixation of the Avanta PIP implant.

**Materials and Methods:** 30 patients (7 males) were randomly treated with either cemented (C) (by Palacos G bone cement) or press-fit (PF) fixation of the Avanta SR PIP implant in one of the 4 ulnar fingers. Chamay approach with detachment of the extensor-tendon was used. Patients were seen for follow-up 6 times during 2 years. Outcome was evaluated by 1) implant migration, 2) periprosthetic bone mineral density (BMD) changes around and below the stem, and 3) clinical assessment of pain (VAS), ROM, pulpa- vola distance (PVA) and strength- measures.

**Findings / Results:** PF fixation of the proximal component resulted in less Total Rotation (TR) ( $p < 0.05$ ) at 6 months and 1 year. Total translation and Maximum Total Point Motion was similar. At 2 years BMD in the AP plane was reduced ( $p < 0.05$ ) by 8-12% below the stem in both groups, and by 6-7% around the stem in the C group. At 2 years: 5/13 and 1/13 patients with C and PF fixation, respectively, reported pain (VAS>4) with motion at 2 years. Active flexion and extension was  $61^{\circ}$  and  $-6^{\circ}$ , respectively. Average PVA was 4mm. 2 patients (1 in each group) were amputated because of poor function. Grip and Pinch was similar.

**Conclusions:** Cementless fixation appears to be superior in terms of better stability of the implant, better preservation of periprosthetic bone, and less pain at 2 years follow-up.

## **A prospective randomized clinical trial using an uncemented and screw fixated porous coated cup with or without hydroxyapatite in revision total hip arthroplasty**

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**Background:** Hydroxyapatite (HA) coating on porous surfaces has experimentally been shown to improve bone ingrowth and implant fixation in controlled micromotion and the presence of allograft. In Denmark 80% of cup revisions are carried out using an uncemented component with an increasing proportion using HA.

**Purpose / Aim of Study:** To compare results after cup revision using an uncemented and screw fixated porous coated cup (Ranawat- Burstein, Biomet, Warsaw, Ind) with or without HA.

**Materials and Methods:** 55 patients were consecutively included and randomized into 2 groups: HA- or porous coated (PC) group. HA group: 26 patients, 13 males, average age 71 (47-89) years, PC group: 29 patients, 16 males, average age 71 (47-85) years. Bone defects were classified according to Saleh et al 2001. Clinical evaluation was performed using Harris Hip Score (HHS) and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Radiostereometry (RSA) was used to study cup migration. Bone mineral density (BMD) in 4 periacetabular regions of interest (ROI) was studied using dual x-ray absorptiometry (DEXA). All patients had a minimum of 2 years follow-up.

**Findings / Results:** One patient in the HA group had an early cup revision and was excluded. Both groups had a significant improvement in HHS and WOMAC score, but there was no difference between the 2 groups. None of the cups were considered loose at the 2 year follow-up. Orthogonal translations and rotations did not show any significant difference between groups after 6 weeks, 3-, 12- and 24 months. No significant difference in BMD changes in any of the 4 ROI was found.

**Conclusions:** In this randomized study we could not find any significant beneficial effect of using HA on a porous coated cup in revision total hip arthroplasty.

## **The effect of local infiltration analgesia in the management of pain after periacetabular osteotomy: A randomized, placebo-controlled, double-blind clinical trial**

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**Background:** Periacetabular osteotomy (PAO) causes substantial postoperative pain if not treated sufficiently. Systemic opioids and nerve blocks have side effects. Recent reports indicate that local infiltration analgesia may cause pain relief after hip and knee arthroplasties.

**Purpose / Aim of Study:** Our primary outcome was to evaluate if local infiltration with ropivacaine after PAO could reduce postoperative opioid consumption or pain.

**Materials and Methods:** We performed a randomized, double-blind, controlled trial (ClinicalTrials.gov: NCT00815503) in 60 patients undergoing PAO. 29 patients received ropivacaine and 31 received saline. All subjects received systematic intraoperative injections to ensure uniform infiltration of all tissues incised or instrumented during the procedure followed by five postoperative injections in 10-hour intervals through a catheter placed at the surgical site. The intervention period was 50 hours and the observational period was 96 hours. All subjects received patient-controlled opioid analgesia without restrictions on the total daily dose. Pain was assessed at specific time-points and opioid usage was registered.

**Findings / Results:** We observed significant reduction in rest-pain scores on postoperative day 2 to 4 in the intervention group (VAS 18-25 in the intervention group and 28-31 in the placebo group), ( $P < 0.01$  to  $0.02$ ). No significant differences were observed during the observational period in mobility ( $P = 0.08$ - $0.94$ ), pain at mobility ( $P = 0.25$ - $0.99$ ), or opioid requirements (30-54 mg in the intervention group and 30-54 mg in the placebo group), ( $P = 0.30$ - $0.90$ ).

**Conclusions:** Wound infiltration with ropivacaine result in significant lower pain ratings on day 2-4 after PAO in our setup. The infiltration technique does not improve mobility or pain at mobility. Nor does the technique reduce opioid consumption.

## **Acetabular cup position is better using the direct anterior approach with fluoroscopy compared to the postero- and antero-lateral approaches**

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**Background:** Acetabular cup position in total hip replacement (THR) is increasingly appreciated as a key factor for subsequent impingement, dislocation, polyethylene wear and loosening. In Denmark, most THRs are inserted through the posterolateral and less frequently the anterolateral approach. In contrast to these, the direct anterior approach is performed with the patient in supine position, which allows use of per-operative fluoroscopic images

**Purpose / Aim of Study:** To study if the cup position was better among patients having the THR inserted through the direct anterior approach

**Materials and Methods:** 15 centers are participating in a 10-year prospective randomized study of acetabular component survivorship and polyethylene wear. Data collected included patient demographics, surgical approach and cup position measured on standardized anterior-posterior pelvic radiographs using the Martell technique. The optimal cup position was determined to be 30-45 degrees abduction and 5-25 degrees anteversion

**Findings / Results:** From a series of 572 hips, 308 were performed through the posterolateral, 216 through the anterolateral and 48 through the direct anterior approach, all the latter by fluoroscopy guidance. The rate of cups in optimal position was higher when inserted through the direct anterior approach than with the posterolateral and anterolateral approaches (69% vs. 41%,  $P < 0.001$ , logistic regression analysis including gender, age, BMI and side). The anterior approach cups were more often placed in optimal abduction (73% vs. 58%,  $p = 0.039$ ) and in optimal anteversion (90% vs. 72%,  $p = 0.008$ )

**Conclusions:** Cup positioning was better when using the direct anterior approach – presumably due to the use of fluoroscopy. Danish surgeons should be aware of other surgical approaches that might improve results

## Factors predicting failure following periacetabular osteotomy: A 2-12 years follow-up study of 406 periacetabular osteotomies

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**Background:** Periacetabular osteotomy (PAO) is performed worldwide to prevent osteoarthritic development in dysplastic hips. Little is known about what factors predict failure following PAO. Refinement in selection of patients and treatment strategies can be improved based on such information.

**Purpose / Aim of Study:** This study reports the outcome of the largest PAO cohort ever, and the aim of this study is to identify pre- and postoperative factors predicting failure after PAO defined as a WOMAC pain score > 10 or conversion to total hip replacement (THR).

**Materials and Methods:** Of the 462 hips treated with PAO from Dec 1998 to 2008 at University Hospital of Aarhus, 406 hips with a complete pre- and postoperative radiographic record were included in the study (median age: 34.1 yrs, range 13.2-61.4 yrs). Radiographic indices of hip dysplasia were assessed on conventional radiographs, and on preoperative CT-scans. The administered WOMAC questionnaires were completed by 329 (81 %) patients. By inquiry to the Danish Hip Arthroplasty Registry we assessed conversions to total hip arthroplasty.

**Findings / Results:** Defining THR as an end point the Kaplan-Meier analysis showed a hip survival rate of 78.1% (95% CI, 68.8%-84.9%) at 12.4 years. A WOMAC pain score of 10 or more was found in 47 of the preserved hip joints. Using Cox regression analysis the following statistically significant predictors of conversion to THR were identified: age at surgery > 45 yrs, severe preoperative dysplasia (CE-angle < 0 deg), the presence of os acetabuli, joint space width < 3.0 mm and a Tönnis grade of 2.

**Conclusions:** PAO is effective in treating hip dysplasia preserving approximately 4 of 5 hip joints at long term follow-up. Especially preoperative signs of joint degeneration and severe hip dysplasia are to be considered when selecting patients for a successful PAO.

## **Strontium-substitution of Hydroxyapatite Coating did not Improve Osseointegration and Implant Fixation**

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**Background:** The number of hip replacements increases. While the survival rate is about 90% after 10 years, up to 17% of all hip replacement surgeries are revisions of a failed primary implant. Pre-clinical investigations to further improve the longevity of implants are needed. Hydroxyapatite (HA) has been used successfully in clinical implants for over two decades. The bioactivity of HA can be altered by chemical modification.

**Purpose / Aim of Study:** The aim of this study was to determine if osseointegration and fixation of an implant were improved by strontium substitution of calcium in the hydroxyapatite coating.

**Materials and Methods:** Vacuum plasma sprayed coating of HA with 5% calcium substituted by strontium was compared to pure HA coating. The effect of strontium substitution was studied in a 1.3-mm gap model at 4 and 12 weeks observation in canines. The osseointegration and fixation of the implant was evaluated by histomorphometrical analysis and push-out test, respectively.

**Findings / Results:** The histomorphometrical analysis and the push-out test showed a high degree of osseointegration and strong mechanical implant fixation regardless of the strontium substitution of the HA coating. Strontium substitution had no statistically significant effect on the osseointegration nor the fixation of the implant.

**Conclusions:** Strontium substitution of HA implant coating did not improve the implant fixation when compared to a highly effective HA coating. While intended to provide a controlled and challenging gap setting, this study should be continued and completed by other doses of Sr substitution, also tested in a loaded environment.

## **Telos ankle stress test for lateral ankle instability, Should the test be performed with the patient awake or during general anaesthesia?**

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**Background:** Clinical evaluation of the ankle joint is challenging. To standardise the test procedures the Telos stress test apparatus is used to help in diagnosing insufficiency of the lateral ligaments of the ankle joint.

**Purpose / Aim of Study:** This study was performed to evaluate the influence of muscle and tendon tension, on the Telos test results.

**Materials and Methods:** 40 patients with suspected ankle instability had Telos stress tests performed on both the subjective stable and the unstable ankle measuring Talar Tilt angle (TT), and Anterior Talar Translation (ATT). The tests were performed as a standard procedure in the radiologic department using the Telos stress test apparatus. Later the tests were repeated in general anaesthesia in relation to operation. We obtained 40 paired measurements of TT and 35 paired measurements of ATT

**Findings / Results:** With the patient in general anaesthesia, the TT on the subjective unstable side increased on average 2.0 degrees and the ATT increased 1.67 mm. compared to the tests on the conscious patient. On the subjective stable side the TT increased on average 1, 8 degree and the ATT increased 2mm.

**Conclusions:** Earlier reports (Jon Karlsson et al.1991) have shown that a TT angle > 9 degrees or a difference in TT of > 3 degrees between the patient's stable and unstable ankle, or an ATT >10 mm or a difference in ATT of > 3mm. indicates that the patient might benefit from surgical treatment. According to these criteria we found 25 unstable ankles. One of these (4%) was not detected by the tests performed on the conscious patient, and one was not detected by the tests performed in general anaesthesia. These results show that the muscle tension does have an influence on the TT and ATT when testing the stability with the Telos test apparatus, and that testing in general anaesthesia can be helpful in borderline cases.



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## **Quality assurance in the surgical treatment of distal radius fractures: Initial results from a new database in the Hand Surgery Unit, Department of Orthopaedic Surgery, Aarhus University Hospital.**

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**Background:** In the Hand Surgery Unit of Aarhus University Hospital, we operate on 150 to 200 distal radius fractures annually.

**Purpose / Aim of Study:** As part of our commitment to continuing quality improvement, we introduced a surgical database in January 2011 to record comprehensive treatment details of all cases.

**Materials and Methods:** The initial paper version of the database was evaluated and revised after 3 months, and migration to an online master database is planned after 6 months.

**Findings / Results:** The database records patient data at six stages. Pre-operatively, fractures are classified according to the AO- classification. The inclination, lateral angle and radial height are measured. Involvement of the DRU-joint and intra- articular gap / step-off are recorded. Per-operative data includes name of surgeon, operative technique, type of implant, type of anaesthesia, duration of application of tourniquet, use of antibiotics, etc. Post-operative data (recorded at +2 weeks, +5 weeks, +3 months and +6 months) includes VAS, Quick DASH, Range of Movement of the wrist (ROM), grip strength and details of any complications.

**Conclusions:** We will present results based on our initial experiences.

## Results of Thumb Trapeziometacarpal Joint Replacements in Young Patients

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**Background:** Basal joint arthritis of the thumb (BJA) is a common reason for hand dysfunction. Simple trapeziectomy or arthroplasty (Veilby) are frequent procedures for treating BJA. Middle-aged patients with high functional demands are putting pressure on the orthopedic surgeon to deliver long lasting quick solutions to their problem. The development of thumb trapeziometacarpal joint replacements (TMJR) has been tried to solve this problem. Unfortunately many have not succeeded (Henk 1999, Chakrabarti 1997, Wachtl 1996). The theoretical possibility of a rapid return to work or leisure activities is driving the development of the arthroplasty technique.

**Purpose / Aim of Study:** To document results after TMJR a.m. “Motec” in young patients with arthritis of solely the trapeziometacarpal joint (TMJ).

**Materials and Methods:** Young and middle-aged (avg 53 years (40-60)) patients (n=16). Before surgery patients were tested with a local anesthetic (LA) in the TMJ and filled in a DASH questionnaire. If they had marked effect of the LA and had TMJ arthritis, they were included.

**Findings / Results:** Pinch Key Grip increased from 4.0kg (1,6kg) (Avg(Std)) to 5.3kg(2.5) after 6 months. Pain elicited from the pinch grip fell from 3.2(1.2) (Avg(Std)) point til 2.7 (1.4) point after 6 months (scale 1 to 5). DASH fell from 31.7(18.8) to 24.9(22.9) after 6 months. We had no failures.

**Conclusions:** It seems that TMJR a.m. “Motec” is a valuable treatment for younger patients with TMJ arthritis. Discussion: In this study we have included the first 16 patients. We have continued to do 48 “Motec”s and have had 2 failures (removal of “Motec”). These failures, however, have less than 6 months follow up and are not included in this study. We are planning a randomized study comparing TMJR and Veilby.

## Localized Statistical Shape Model for Detection of Osteoarthritis in the Trapeziometacarpal Joint

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**Background:** The prehensile function of the hand is largely due to the complex saddle shaped trapeziometacarpal joint. Unfortunately, the unique motion of the joint renders it vulnerable to attrition of the articular surfaces and impairment by osteoarthritis (OA). Changes in shape due to OA can lead to difficulties during joint replacement surgery and a suboptimal result. Localized statistical shape models can be used to describe bone shape and identify regions with the largest variation.

**Purpose / Aim of Study:** The aim of this study was to automatically identify the regions of the trapezium affected by OA using a newly developed localized statistical shape model for dense models.

**Materials and Methods:** A total of 60 wrists (38 healthy and 22 pathological) were included after classification by experts. Each wrist was segmented and point-to-point correspondences were calculated for the trapezia. The localized representation was obtained by using a differentiable locality measure based on the weighted variance of point coordinates per mode. Mode coefficients were compared using an two- group mean comparison test with equal variances.

**Findings / Results:** The two most significant modes of shape variation were found (1) on the radial-dorsal side of the articular surface and (2) on the ulnar-volar ridge of the trapezium adjacent to the first metacarpal. Comparison of the difference of the mode coefficients between the groups resulted in (Diff:1.58, P:0.0001) and (Diff:1.03, P:0.0003) respectively.

**Conclusions:** Mode (1) can be attributed to the surface deterioration as a result of wear caused by subluxation and the degeneration of the cartilage layer. Mode (2) can be attributed to the formation of osteophytes as expected in patients with advanced OA. When placing a prosthesis, it is important to consider the difference in bone shape to optimally restore hand function.

## **Promising preliminary results from the CORIHA study (Cementless One-stage Revision of chronic Infected Hip Arthroplasty)**

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**Background:** Infection of total hip arthroplasty (THA) occurs in approximately 1 % of primary operations. Currently, the gold standard of treatment for all deep chronic infections is “two-stage” revision. A less established procedure is “one-stage” revision. The potential benefits of cementless one-stage revision in chronic infected THA has not yet been investigated.

**Purpose / Aim of Study:** To investigate whether cementless one-stage revision can be performed in patients with chronically infected THAs with presumed substantial benefits for the patients in terms of fast rehabilitation, low re-revision rates and good long term results.

**Materials and Methods:** The study is performed as a prospective multicentre cohort study. All included patients receive cementless one-stage revision and identical perioperative regimen according to the CORIHA protocol. The primary endpoint is re-infection.

**Findings / Results:** As of April 2011, 9 patients were included: 3 male/6 females. The mean age 73 yrs (range: 61-82 yrs). The mean length of stay (LOS) was 14 days (range 10-31). No patients are reported re-infected at a mean follow-up of 8.4 months (range 1-12). 1 patient suffered transient renal insufficiency. 2 patients have had additional surgery to the hip after revision. 1 patient has suffered dislocation twice (treated by closed reduction). 1 patient fell during mobilization and sustained a severe femoral fracture (treated by open reduction and internal fixation).

**Conclusions:** So far no reinfections have occurred in this short term follow-up after cementless one-stage revision. The CORIHA protocol seems viable; however the cohort is still small and with insufficient follow-up at present.

## The lateral approach to the hip in hemiarthroplasty surgery: Results of a “Danish experience”.

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**Background:** In neighboring countries use of the lateral approach to the hip has proven successful in terms of lower dislocation rates following hemiarthroplasty surgery. In Denmark, tradition yields use of the posterolateral approach in the majority of arthroplasty surgery. However, a long standing “Danish experience” with the lateral approach exists.

**Purpose / Aim of Study:** To investigate the rates of complications, reoperations and mortality following use of the lateral approach in hemiarthroplasty surgery.

**Materials and Methods:** Through database search we identified all hemiarthroplasty surgeries (n=160) performed at our institution in the period 2007-2009. The posterolateral approach was used in 13 cases, and thus the study group consisted of 147 cases operated using the lateral approach (median age: 85 yrs, 77% females, ASA 3-4: 67 %; cognitive impairment: 27%). All patients were treated by insertion of an uncemented stem. We retrospectively assessed complications, reoperations and mortality through patient files and radiographic material with minimum 1- year follow-up.

**Findings / Results:** Dislocation occurred in 2 (1.4%) patients. Fractures occurred in 2 (1.4%) patients. Postoperative infection presented in 7 (4.8%) patients. Six patients were reoperated: dislocation (n=2), infection (n=2), pain (n=2). 1-month, 3-month, and 1- year mortality rates were 11.6%, 18.4% and 31.3%, respectively.

**Conclusions:** The Danish experience with the lateral approach in hip hemiarthroplasty surgery has resulted in a low dislocation rate (1.4%). Complications and reoperations are at an acceptable level and mortality rates are comparable to literature reports. There may be benefits associated with adoption of this approach at other centers.

## **Rehabilitation after THR: Telephone interview and individual support versus visits in outpatient clinic.**

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**Background:** Results from a RCT carried out from 2006 to 2007 including 180 patients aged 65 years and over based on patients' self-rated health and by using telephone interviews and individual counseling as intervention 2 and 10 weeks after discharge had a significant improvement in patients' self-rated health by using SF-36 scores within 3 months after surgery, whereas the control group had improvement after 9 months. Both groups had SF-36 filled out preoperatively and 3, 6 and 9 months after THR. In a new study a sub group was identified by having a reduction in general health during 12 months postoperatively.

**Purpose / Aim of Study:** To study the effect of intervention to patients after THR due to resources, organization and economy.

**Materials and Methods:** Based on power calculation 260 patients aged 18 years and over were enrolled from a waiting list. All patients had filled out SF-36 before surgery and 3, 6, 9, 12 months after. Participating patients were allocated to a control group or an intervention group after discharge. The intervention group had telephone-interviews and individual counseling 2 and 8 months after THR, and the control group had conventional visit in outpatient clinic 3 months after THR.

**Findings / Results:** Patients in intervention and control group had improvement in their SF-scores, besides patients in the intervention group had improvement in postoperative symptoms within 8 weeks. The overall outcome was totally characterized by improvement in patients self-rated health status. A possibility now is being able to choose whether patients can be followed by telephone intervention or by visits in outpatient clinic or depending on an individual prescription by orthopaedics.

**Conclusions:** Further research is needed due to documentation and use of resources and organizing in an economic perspective

## **Are there any benefits of preoperative methylprednisolone in primary TKA surgery when pain treatment is opioid based?**

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**Background:** Only one previous study has investigated the potential benefits of preoperative methylprednisolone (MP) administration in primary total knee arthroplasty (TKA). However, the effects found on pain and early recovery was investigated in a non- opioid based analgesic regime.

**Purpose / Aim of Study:** To investigate if preoperative MP administration in primary TKA surgery can reduce pain, nausea, vomiting, use of rescue medication, and enhance physiotherapy when postoperative pain treatment are opioid based.

**Materials and Methods:** Beginning in April 2011 we conducted a quality assessment study on primary TKA patients. Sixty consecutive patients receiving oxycodone based pain treatment were designated to undergo assessment of postoperative pain, nausea, vomiting, use of rescue medication, and ability during physiotherapy. Measurements were performed on the evening of surgery and on the following two days. Thirty patients received our standard of care, and the following 30 patients were set to receive a preoperative dose of 125mg of i.v. MP. The study will be concluded in August 2011 and we present our preliminary results of 30 patients receiving standard treatment vs. 9 patients receiving preoperative MP.

**Findings / Results:** Our preliminary results revealed the following tendencies in favor of the MP group: Less use of i.v. oxycodone on the day of surgery ( $p=0.08$ ); Fewer cases with vomiting on day 1 ( $p=0.16$ ); Fewer cases with nausea on day 2 ( $p=0.31$ ). Further, all patients in the MP group were able to undergo physiotherapy on day 2 ( $p=0.31$ ). CRP measured on day 2 was significantly lower in the MP group (171 vs. 87,  $p=0.002$ ).

**Conclusions:** From our preliminary results it could seem that benefits are associated with preoperative MP administration in primary TKA surgery when pain treatment is opioid based. We await our final results in August 2011.

## Physical activity levels measured in patients prior to total joint replacement compared with healthy controls

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**Background:** Osteoarthritis (OA) of the hip and knee causes pain and functional limitations which may lead to decreased physical activity (PA) level. However, no PA data exists on Scandinavian OA patients prior to surgery.

**Purpose / Aim of Study:** We tested the hypothesis that Scandinavian patients prior to total joint replacement had reduced PA and intensity levels compared with matched controls and that most patients did not fulfill international recommendations for PA.

**Materials and Methods:** PA and intensity were measured during 5 consecutive days with SenseWear™ Armband (SWA; BodyMedia, Inc., Pittsburgh, PA) in 51 patients with severe knee (n = 25) or hip (n = 26) OA prior to total joint replacement (51% women, age: 68 ± 5 years, BMI: 28.4 ± 4.6) and compared with data from 15 age-matched population-based controls (53% women, age: 68 ± 5 years, BMI: 26.9 ± 3.3). Sedentary, moderate, vigorous and very vigorous intensities were equivalent to Sense Wear Armband recordings of ≤3 MET, >3; ≤6 MET, >6; ≤9 MET, >9MET, respectively. In addition, total energy expenditure, average MET, numbers of steps/day, and the combined activity of moderate, vigorous, and very vigorous activity were calculated (min/day).

**Findings / Results:** The average activity of combined moderate, vigorous, and very vigorous activity for patients were 124 ± 72 min/day and 11.3% did not reach the recommended activity level. Patients spent significant less time being vigorously physically active (7.8%; p<0.05) and performed less steps/day (27.4%; p<0.05) than controls.

**Conclusions:** Physical activity recommendations can be achieved in patients diagnosed with severe knee or hip OA. An automatic increase in actual PA for Scandinavian OA patients cannot be expected from surgery if patients already achieve PA recommendations. This unexpected finding needs to be confirmed.



## **Total hip arthroplasty with the Thrust Plate Prosthesis. Late results in a pilot series.**

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**Background:** The total hip arthroplasty with or without cement gives immediate painrelief and restoration of mobility in patients with disabling and painful conditions of the hip. However sooner or later the patient returns for revision and after two or three revisions the bonestock left for reimplantation will often be very sparse. The Thrust Plate Prosthesis (TPP) was conceived as a bone-saving prosthesis with the aim of loading the proximal part of the femur as physiologically as possible.

**Purpose / Aim of Study:** In this study we evaluated the long term results of hip arthroplasty with the Thrust Plate prosthesis (TPP), a cementless femoral component. This study includes a 12 year follow up and the results are to be compared with earlier results of hip arthroplasty.

**Materials and Methods:** A comparison between patients with (TPP) and an age matched control group who had cementless Bi-Metric femoral components was performed. Both groups were studied prospectively with Harris Hip Scores, radiographic evaluation (including x-rays prepared for EBRA) and DEXA-scanning. Results from DEXA-scanner were measured in Regions of Interest (ROI).

**Findings / Results:** 19 patients from the TPP- group and 13 from the control group were included in the 12 year follow up analyses. In general patients in both groups were satisfied with the clinical results though they were most satisfied in the TPP group. Harris Hip Scores did not differ much from earlier studies. Neither did X-rays reveal any radiolucencies or major prosthetic migration.

**Conclusions:** As to prosthetic fixation and bone preservation the results are satisfying. Concerning the hip area even 12 year after operation most patients have not experienced pain, disabling conditions or decrease in mobility. More studies have to be performed to evaluate whether the no need for revision of the TPP still remains in future years.

## Incidence of THA after acetabular fracture

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**Background:** The primary complication following an acetabular fracture is posttraumatic osteoarthritis (OA) that may necessitate a total hip arthroplasty (THA). Although timeframe between event and development of posttraumatic OA is extremely variable and not well defined accuracy of the reduction is well known as the most important risk factor. Historic incidence of acetabular fractures seems to be consistent although incidence of THA following acetabular fractures varies widely between 6 and 28 %.

**Purpose / Aim of Study:** We report the incidence of posttraumatic OA treated with THA in patients admitted to our institution with acetabular fractures within a ten-year period (1999 and 2008) as well as time from initial trauma to THA.

**Materials and Methods:** A total of 145 acetabular fractures in 144 patients were included, median age 49 years (range 12-93), 78 % male. Open reduction and internal fixation (ORIF) were performed in 43%. Median follow up was 6,8 years (range 2,5-12,2). Classification of the fractures was performed according to Letournel and AO criteria when digital x-rays and/or computed tomography (CT) were available. Time from initial trauma to THA was recorded from patient journals at follow up.

**Findings / Results:** Posterior wall fracture was most common in ORIF group (39 %) followed by both column fractures (20 %). At median 20 months (range 6-66) after initial trauma 9 patients were treated with THA, all initially treated with ORIF at admission. Incidence of THA was 6 % (9/145) in the whole cohort and 14 % (9/63) in ORIF group.

**Conclusions:** The incidence of THA following ORIF of acetabular fracture at our institution is in accordance with the literature. Future studies will focus on hip function and self-reported general health in our cohort.

## Effect of continuous Adductor-Canal-Blockade on pain and mobilization after total knee arthroplasty

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**Background:** Total knee arthroplasty (TKA) is associated with intense postoperative pain. Besides providing optimal analgesia, it is important to reduce side effects and enhance mobilization in this elderly population. The Adductor-Canal-Blockade is theoretically an almost pure sensory blockade.

**Purpose / Aim of Study:** We hypothesized that the Adductor-Canal-Blockade would reduce morphine consumption (primary endpoint), and improve pain relief, enhance mobilization ability, and reduce side effects after TKA compared with placebo (secondary endpoints).

**Materials and Methods:** We included 71 patients scheduled for TKA in this double-blind placebo-controlled randomized trial. Patients were allocated to a continuous Adductor-Canal-Blockade via a catheter with either ropivacaine 0.75% or placebo. In addition, patients received paracetamol 1 g and ibuprofen 400 mg four times daily, and patient controlled analgesia with intravenous morphine.

**Findings / Results:** Morphine consumption (0-24 h) was significantly reduced in the ropivacaine group compared with the placebo group (40 (21) mg vs. 56 (26) mg (mean (SD),  $p=0.006$ ). Furthermore, pain at 45 degrees flexion of the knee was significantly reduced ( $p = 0.01$ ), but not at rest ( $p=0.058$ ). Patients in the ropivacaine group performed the mobilization test (Timed-Up-and-Go test) significantly faster ( $p=0.03$ ). There were no statistical differences between groups with regard to nausea, vomiting or sedation, but significantly fewer patients in the ropivacaine group required ondansetron ( $p = 0.01$ ).

**Conclusions:** The continuous Adductor-Canal-Blockade significantly reduced morphine consumption and pain at 45 degrees flexion of the knee compared with placebo. Furthermore, no walking disability was observed, and the Adductor-Canal-Blockade significantly enhanced mobilization ability.

## Hemiarthroplasty with the Aequalis fracture stem in the treatment of comminuted fractures of proximal humerus

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**Background:** The prerequisite for a satisfying functional result in the treatment of comminuted fractures of the proximal humerus with hemiarthroplasty is an anatomic reduction and stable fixation of the tuberculi around the prosthetic neck in order to obtain solid healing and restoration of normal function of the rotatorcuff.

**Purpose / Aim of Study:** Retrospective study to examine the outcome after hemiarthroplasty using a prosthetic stem designed to optimize re-attachment and healing of the tuberculi (Aequalis; Tornier).

**Materials and Methods:** At follow up clinical results were evaluated using the Constant score and WOOS index. All patients had two x-rays taken of the injured shoulder including anterior-posterior projections in neutral and internal rotation and one anterior-posterior projection in neutral rotation of the contralateral shoulder. To measure prosthetic height, acromiohumeral distance, tubercle healing and cortical thickness.

**Findings / Results:** 19 patients were included. Mean age was 71 years (range 47 to 88 years) at the time of injury. At the follow up (mean 37 months, range 23 to 67) the mean Constant score was 50 (range 22-87 points). The median WOOS index was 56,1 (range 15-95). We found a significant correlation between healing of the greater tubercle and Constant score ( $P=0,02$ ) and active elevation of the arm ( $P=0,004$ ).

**Conclusions:** Our results using a prosthetic stem designed to enhance healing of the tuberculi did not produce better results than published in several other studies. For the majority of our patients shoulder ROM was poor but painfree.

## Septic Arthritis in the Sternoclavicular Region. Clinical and Radiological Aspects.

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**Background:** Septic arthritis in the sternoclavicular region (SC-region) is a rare condition, which may be difficult to diagnose and differentiate from tumour and non-septic arthritis sometimes causing delay in treatment.

**Purpose / Aim of Study:** To present our clinical and radiological experiences with this disease.

**Materials and Methods:** In a ten year period (2001-2011) radiological materials from nine patients with infection in the SC-region and a positive culture from one of the joint were identified. The radiological materiel together with clinical informations from e-journal were retrospectively studied.

**Findings / Results:** Median age was 61(23-74) years. Seven patients had comorbidity: cancer (n=2), diabetes (n=2), dermatologic disease (n=3), rheumatic disease (n=2) and femur amputation (n=1). Six patients entered the hospital with clinical signs of infection; three patients had localized infection around sternum, two patients had sepsis and one had pneumonia. The remaining three patients had pain from the shoulder girdle. Durations of symptoms related to SC infection ranged from a few days to five months. Ultrasonography (UL) was performed in all patients except one and the diagnosis was confirmed based on both CT and MRI in 7 patients, and based on CT and MRI only in each one patient. All patients were treated with drainage by aspiration or operation followed by antibiotic therapy. *Staphylococci* were cultured from all patients.

**Conclusions:** The diagnosis of septic SC arthritis often damands a multimodality radiological approach with MRI and UL visualizing soft tissue involvement and CT clearly delineating osseous structure and spread to the mediastinum.

## Impact of different graft types after ACL reconstruction, result from the Danish registry of Knee ligament reconstruction

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**Background:** The choice of graft for Anterior Cruciate Ligament (ACL) reconstruction is still controversial. Since 2005 the Danish registry of Knee ligament reconstruction (DKRR) has monitored the quality and development in ACL reconstruction. This database contains data from all clinics in Denmark performing ACL reconstruction.

**Purpose / Aim of Study:** The objective of this study was to report the results with two graft types in primary ACL reconstruction, bone- patellar tendon-bone (BPTB) graft and semitendinosus and gracilis (ST/GR) graft.

**Materials and Methods:** We identified 10951 patients from the DKRR who underwent primary ACL reconstruction in the period from 2005 to 2010. The survival of different surgical techniques was determined using revision ACL reconstruction as primary endpoint. KOOS and Tegner scores were used as patient reported outcome measures

**Findings / Results:** The one year survival rate after ACL reconstruction with ST/GR graft and BPTB graft was 96% and 97%, respectively. KOOS score pre-operatively was identical for the two groups. One year postoperatively the KOOS score was comparable between the two groups for pain, symptoms, ADL and quality of life. However, the ST/GR group had a slightly higher score for sports 62,8 compared to 58,6 for the BPTB group

**Conclusions:** Previously, randomised controlled trials have shown no difference in survival using BPTB vs. ST/GR grafts. This is confirmed in our study. The KOOS score was comparable in the two groups postoperatively except for sports where ST/GR performed slightly better than BPTB. This is the first nationwide populationbased study reporting the results with different surgical techniques after primary ACL reconstruction. Our study suggests limited impact of graft choice for the outcome after primary ACL reconstruction

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### **Use of an ambulatory infusion pump after harvesting a semitendinosus and gracilis graft to manage postoperative pain, in outpatient having ACL reconstructive surgery**

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**Background:** Achieving a sufficient postoperative pain relief in the thigh in patients undergoing reconstructive ACL surgery with a harvested semitendinosus and gracilis tendon graft, can be difficult using conventional pain treatment.

**Purpose / Aim of Study:** we present this technique as a part of the postoperative pain management after harvesting the semitendinosus og gracilis tendon in ACL reconstructive surgery

**Materials and Methods:** From the beginning of 2009 we've used a pain catheter in the harvesting channel after harvesting the semi-t and gracilis. At the end of the operation a bolus of local analgetic was injected through the catheter and the catheter was then coupled to a 100ml ambulatory and singleuse autoinfusion pump, delivering 2ml. pr. hour, and using standard local analgetics. when empty the pump and catheter was removed by the patient himselfe. The catheter was placed in a standard fashion, through a separate needleincision.

**Findings / Results:** The procedure was conducted without problem and no complication was recognized. One patient accidentally removed the infusion pump to early.

**Conclusions:** It is possible to place a pain catheter in the harvesting channel after harvesting semi-t and gracilis in ACL reconstructive surgery and with a low risk of complication. It is possible to let the patient himselfe remove the catheter. The pain catheter seems to be beneficial in paintreatment after harvesting semi-t and gracilis.

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## Delirium assessment in orthopedic surgery

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**Background:** Multiple international studies show that acute surgical patients have a 20-50% risk of developing postoperative delirium, which increases mortality and length of stay thus calling for intensive assessment and treatment of comorbidity. Not all cases can be prevented, but attention to it can prevent some cases by identifying risk patients and shortening length of delirium for others. It is costly and creates a lot of stress in patients, families and staff.

**Purpose / Aim of Study:** Our study aims to reduce the rate of delirium and ensure correct treatment, i.e. patients medicated only with proper assessment in accordance with the instructions drawn up for the department. We wish to show that focussing on early identification, clinical examination and treatment will decrease incidence, severity and duration of delirium.

**Materials and Methods:** All patients  $\geq 60$  years hospitalized at Department M, BBH 1 January – 1 October 2011 and treated with Serenase® are included. This treatment is considered a marker of delirium. During the intervention period from 1 June 2011, we will be supervising the entire staff, nurses as well as doctors, about the importance of medical assessment and correct medication of patients at risk or at initial state of delirium to secure optimal treatment in accordance with current guidelines. Treatment of patients included is registered before and after intervention according to these guidelines.

**Findings / Results:** We expect to show that our intervention will reduce the rate of delirium and secure that Serenase® is given only after proper assessment of the patient. Reducing the risk of mortality during and after hospitalization might be shown, but a reference group can be difficult to find for all patients.

**Conclusions:** Delirium is life-threatening and costly. In this intervention study, we test one method to reduce its incidence.



## **Reproducibility of goniometric measurements of passive hip mobility and hand-held dynamometry of hip muscle strength in patients with hip osteoarthritis – an intra- and inter-rater study**

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**Background:** Patients with hip osteoarthritis (OA) have reduced hip mobility and hip muscle strength (MS). The precision of these clinical measurements are important to the clinician but until now, reproducibility studies have been performed with either a limited number of subjects, with equipment ill suited for primary care or with poor reporting of reliability and agreement coefficients.

**Purpose / Aim of Study:** To examine the intra- and inter-rater reproducibility of passive hip range of motion (ROM) and hip muscle strength in patients with hip OA

**Materials and Methods:** Patients with unilateral hip OA were assessed twice by one rater to evaluate intra-rater reproducibility and by four raters independently and in random order for inter-rater reproducibility. Passive hip ROM was measured using a standard two arm goniometer and hip MS was measured with a hand-held dynamometer.

**Findings / Results:** Fifty-one patients were assessed for the intra-rater study. Reliability and proportional agreement for passive hip ROM ranged from good to excellent, intraclass correlation coefficient (ICC) 0.73 - 0.93, agreement 88-100%. Hip MS reliability was moderate, ICC ranging 0.55 - 0.73. Sixty-one patients were assessed for the inter-rater study. Reliability for passive hip ROM in flexion was good, ICC 0.77 (95% CI 0.66-0.85), moderate for abduction, internal and external rotation and poor for extension and adduction. Inter-rater reliability for hip MS was moderate.

**Conclusions:** Using a goniometer and a hand-held dynamometer to evaluate hip mobility and hip muscle strength demonstrate good to excellent intra-rater reproducibility and poor to moderate inter-rater reproducibility in patients with hip OA. When assessing effect of intervention measurements should be performed by the same clinician.

## **Epiphysiodesis Made with Radio Frequency Ablation: First Results From a Pilot Study**

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**Background:** Anisomelia is a condition of leg length discrepancy. In children, it is often treated with epiphysiodesis of the growth plate. Current techniques involve opening cortical windows on both the lateral and medial sides of the bone. The growth plate is manually destroyed with curettes and/or drills. Complications such as breaching the anterior or posterior cortex of the treated bone have potentially serious consequences with risk of vascular and/ or nerve injury. Further damage to the metaphyseal region of the bone may be incurred through excessive curettage and drilling. Therefore, there is a need for a reliable and precise procedure which overcomes the complications.

**Purpose / Aim of Study:** Development of a new technique for epiphysiodesis using radiofrequency ablation on an animal model that involves less scarring, less exposure to X-rays, and reduces the risk of injuring the surrounding structures compared to current methods.

**Materials and Methods:** 3 non-mature 40 kg pigs were used. A control leg was randomly selected and the contralateral treated at two ablation sites (lateral and medial) identified at the proximal tibia growth plate using x-ray. A probe was inserted and the ablation performed. MR images were performed right after the procedure and 12 weeks later.

**Findings / Results:** The length of both tibiae was measured. Both legs were equal at the beginning of the study and there was a leg length difference of around 4mm at the end. No damage to the surrounding cartilage structures was found.

**Conclusions:** Epiphysiodesis using radio frequency ablation is an innovative technique that may represent an alternative way of treatment. These results show that it is possible to arrest growth using this technique but chronic studies must be performed in order to obtain more evidence of both the safety and effectiveness of the procedure.

**Precision of Radiological Methods novel  
in relation to Resurfacing Humeral Head Implants:  
Assessment by radiostereometric analysis,  
DXA, and Geometrical Analysis.**

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**Background:** Resurfacing humeral head implants (RHHI) are used to preserve bone stock and restore normal anatomy in the osteoarthritic shoulder joint.

**Purpose / Aim of Study:** The purpose of this study was 1) to describe novel methods in relation to RHHI 2) to estimate the precision of the radiological methods, 3) to present preliminary clinical and radiological results at 6 months follow-up after Copeland and Global Cap RHHI.

**Materials and Methods:** 21 patients (10 females) at a mean age of 64 (39-82) years and with shoulder osteoarthritis were included and randomized to a Copeland (n=11) or Global C.A.P (n=10) RHHI. The patients were followed clinically with Constant Shoulder Score (CSS) and Western Ontario Osteoarthritis of the Shoulder Index (WOOS). Conventional radiographs were obtained for measurement of Length of Gleno- Humeral Offset (LGHO). Migration of the RHHI was analyzed with RSA and the periprosthetic bone mineral density (BMD) was measured with DXA.

**Findings / Results:** The precision of the radiological methods was high for the LGHO and acceptable for RSA and for DXA. At 6 months, shoulder function had improved significantly for both RHHI groups. The median difference in LGHO pre- to postoperative for the Copeland increased significantly whereas the median difference for the Global C.A.P. was slightly reduced. The migration and BMD was comparable for both RHHI.

**Conclusions:** The protocol for RSA and DXA used in relation to RHHI in this study should be improved in order to enhance the precision of the methods. Based on these preliminary radiological and clinical results, the performance of the 2 RHHI is comparable.

## Minimally invasive dynamic hip screw for fixation of hip fractures

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**Background:** Hip fractures are a common cause of morbidity and mortality in the elderly population and are associated with considerable health expenditure in most industrialized countries . The dynamic hip screw (DHS) has been the standard type of fixation for intertrochanteric fractures.

**Purpose / Aim of Study:** In the attempt to find less invasive techniques to simplify surgery and minimise complications by reducing surgical time , blood loss ,and better mobilization

**Materials and Methods:** in the 2009, 6 patients underwent a minimally invasive DHS for fixation of their intertrochanteric hip fractures. all operations were performed by a single orthopaedic surgeon with a special interest in the procedure mean age 85, range 64-97 male 2 , female 4 AO fracture classification A1 & A2 the following outcome measures: 1- demand for pain killer during mobilisation. 2-duration of surgery 3-per op.bleeding 4-mean difference of pre- and postoperative haemoglobin(Hb) levels 5- time to mobilisation 6- The ability to perform transfers (get up from bed ,and stand up from a chair)

**Findings / Results:** length of hospital stay 9.5 (median) 3-14 (range) Duration of surgery 40 min (median) ,30- 50(range). Time from surgery to mobilisation 1,6 dags(median, 1-2 (range) get up from bed 1 dag (median), 1 day (range). stand up from a chair 1.1 day (median) 1- 2 days(range) Difference in pre-and post op Hb levels 1.01 (median), 0-3.5 (range)

**Conclusions:** The minimally invasive surgical technique described here resulted in short duration of surgery and length of mobilisation, as well as minimum intraoperative blood loss.

## Non-union rate in humeral shaft fractures treated with a functional brace

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**Background:** Humeral shaft fractures are traditionally treated conservatively. Functional bracing is the golden standard.

**Purpose / Aim of Study:** To evaluate the non-union rate in our ward, a retrospective study was conducted.

**Materials and Methods:** From January 1st 2007, to December 31st 2009, a total of 56 humeral shaft fractures were admitted to our ward, 11 underwent primary surgery, and 36 were treated conservatively with a functional brace. Median age was 71 years (range 10 – 98). 20 females and 16 males. Evaluations were based on x-ray and patient records. Union was considered when the patient was discharged, either due to clinical or radiological healing. 5 patients had other conservative treatment, 3 patients were referred to hometown hospital. One patient was excluded because of age (a 6 year old girl).

**Findings / Results:** AO fracture types were A (n=23); B (n=4) and C (n=9), with fracture localisation proximally (n=12), mid-shaft (n=24). Fracture angulation mean 17 degrees (range 4 – 45). Mean time of treatment with the functional brace was 12 weeks (range 4 – 31). Mean time to union were 12 weeks (range 6 – 27). 7 patients (7/30; 23%) presented a non-union, 6 females and one male, mean age 78 years (range 58 – 87). 4 patients had surgery after a mean time of 11 weeks (range 4 – 19). 6 patients died, mean age 84 (range 60 – 98), during treatment. One patient was lost during the follow-up period.

**Conclusions:** A non-union rate of 23% is high. The typical patient is characterized by high age, female gender, and low energy trauma. Originally the functional brace was used in patients characterised by young age, male gender and high energy trauma. We find it necessary to further investigate which category of patients that can benefit from a functional brace, and who could benefit from having primary surgery.

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## **Metal ion levels in the blood of patients with metal-on-metal (MoM) hip joint articulations. Does storage of blood samples matter?**

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**Background:** Wear and elevated chromium(Cr) and cobalt(Co) levels from metal-on-metal articulations may be related to adverse effects. A recent British Medical device alert has suggested monitoring at-risk patients using blood metal ions as one of the diagnostic tools. Usually the blood sample is frozen immediately and shipped frozen for analysis. Simply posting the sample in the mail would simplify the cost and logistics of metal ion testing.

**Purpose / Aim of Study:** The aim of this study is to find out whether the metal ion value in the blood is stable when it is kept at room temperature.

**Materials and Methods:** Following sample size calculations based on a Co and Cr value of 1 ppb, a sd of 0.05 and a MIREDIF of 0.2 ppb eight patients with large diameter MoM joint articulations were included after informed consent. Using ICP-SFMS we compared levels of Cr and Co in whole blood samples frozen immediately, after four and thirty days. The data were analysed in STATA 11.1 using Limits of agreement.

**Findings / Results:** We found Co ranging from 0.64 to 10.9 ppb and Cr from 0.76 to 5.16 ppb. There was no systematic reduction in the mean level of Cr and Co of the eight patients as we compared results from the blood frozen immediately with the blood frozen after four and after thirty days. There was a tendency to greater variation (limits of agreement) in the results of the individual blood samples after four and after thirty days, but these increases were non-significant(p values: 0.21, 0.71, 0.08, 0.23).

**Conclusions:** In a population of patients with MoM joint articulations the variation of Co and Cr ions in blood kept at room temperature up to thirty days is within clinically acceptable levels for diagnosing excess wear and monitoring pseudotumour at- risk patients.

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## Quality of Life and Hip-Function is improved during the first month after Total Hip Arthroplasty

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**Background:** Fast track surgery has been introduced to the treatment of patients receiving total hip arthroplasty (THA). There is, however, a lack of knowledge on how well patients cope with fast-track treatment in relation to THA surgery.

**Purpose / Aim of Study:** The purpose is to describe development in hip-function and quality of life during the first month after THA.

**Materials and Methods:** 32 primary THA patients were consecutively included. Self-assessment parameters were monitored for 31 days post-operatively: Every 3rd day pain (VAS) and use of analgesia were determined. Every 6th day, hip function (OHS), quality of life (EQ-5D), anxiety and depression (HADS) were assessed. A general quality of life (VAS 0- 10) was determined every 6th day.

**Findings / Results:** During the first month post-operatively, OHS was improved from  $24\pm 1$  to  $35\pm 1$  ( $p<0.001$ ). Pain was decreased both in rest ( $4.3\pm 0.5$  vs.  $1.4\pm 0.2$  ( $p<0.001$ )) and in activity ( $7.3\pm 0.3$  vs.  $2.1\pm 0.3$  ( $p<0.001$ )). To this end, patients' daily use of prescribed analgesia increased with 11% compared to before surgery and use of OTC analgesia increased with 21%. Fewer patients exceeded the HADS criteria in both the anxiety subscale (9 vs. 2 ( $p<0.001$ )) and the depression subscale (5 vs. 2 ( $p<0.001$ )). EQ-5D index values improved from  $0.63\pm 0.02$  to  $0.78\pm 0.03$  ( $p<0.001$ ). General quality of life was enhanced from  $6.6\pm 0.4$  to  $7.8\pm 0.3$  ( $p<0.001$ ). Willingness to repeat treatment was 100%. Six percent of the patients would have had the surgery performed as outdoor surgery (discharged the same day as surgery).

**Conclusions:** During the first month after THA, both function of the hip and quality of life were improved. Pain was also reduced. As expected, the usage of analgesia was increased in the short period of time. Patient satisfaction was high and not compromised by the fast track surgery principles

## **Eccentric hip abductor weakness in patients with symptomatic external snapping – A cross-sectional study**

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**Background:** Symptomatic external snapping hip can be a longstanding condition affecting physical function in younger people between 15-40 years. Gluteal weakness has been suggested, though not scientifically proven, to be associated with the condition.

**Purpose / Aim of Study:** Primarily to investigate whether eccentric hip abductor strength is decreased in patients with external snapping hip compared to healthy matched controls. Secondly, to examine isometric hip abduction, adduction, extension, flexion, internal rotation, and external rotation in patients with external snapping hip and matched controls.

**Materials and Methods:** Thirteen patients with external snapping hip were compared to thirteen healthy matched controls. The mean age of the patients was  $25.47 \pm 3.44$  years and the mean age of the healthy controls was  $25.64 \pm 2.61$  years. Seven women and six men were included in each group. Eccentric and isometric strength were assessed with a hand-held dynamometer, using reliable and valid test-procedures.

**Findings / Results:** Patients with external snapping hip had an eccentric hip abduction strength of  $1.50 \pm 0.47$  Nm/kg and healthy controls had an eccentric hip abductor strength of  $1.82 \pm 0.48$  Nm/kg. Eccentric hip abduction strength in patients was 16% lower compared with matched controls ( $p=0.01$ ). In isometric hip extension, a trend towards lower muscle strength compared to the matched controls was noted (16%,  $p=0.064$ ). No other strength differences were measured between patients and controls ( $p>0.05$ ).

**Conclusions:** Eccentric hip abductor weakness was present in patients with external snapping hip compared with healthy matched controls. It seems relevant to include hip abduction strength training with an eccentric emphasis in the rehabilitation of patients with external snapping hip.



## Survival of the hip after periacetabular osteotomy.

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**Background:** Periacetabular osetotomy (PAO) has been performed in Rigshospitalet since 1999. PAO for hip dysplasia is performed in young patients, in order to relieve symptoms and delay onset of severe osteoarthritis demanding a total hip arthroplasty.

**Purpose / Aim of Study:** The current study was performed in order to evaluate the clinical results and describe the leaning-curve for the first 117 operations.

**Materials and Methods:** 88 patients (mean age = 29,9 (range: 14- 49) years, F/M= 73/15) (117 hips) operated during 1999 to 2007, were reviewed with an average of 5,8 years follow up. Data was collected through questionnaires, patient files, and available radiograms. To describe the learning curve, data was divided in two groups: before and after 02/11/2004. This date coincides with change from standard to minimal incision approach. Statistics: Kaplan-Meier survival analysis.

**Findings / Results:** There was a response rate to the questionnaire of 93.2%. The probability of hip joint survival was 80 % after 10.6 years (total hip arthroplasty as endpoint). The survival curves for the two periods were almost identical. The patients in the latter group had THA performed earlier compared to the first group ( $p=0.021$ ). We found a significant reduction in operation time of 24 minutes ( $P<0.0005$ ), but more complications in the latter group ( $p=0.003$ ). Patients with later THA had higher grade of arthrosis preoperatively than unrevi-sed patients ( $P=0.04$ ). Patients with complications tended to be older than patients without complications ( $P=0.05$ ).

**Conclusions:** The survival of the hip joints was comparable with results found in the literature. Survival curves for first and second period were nearly identical. With experience and the use of MRI we are however faster to convert to THA today than in the beginning. This might camouflage the real learning curve.

## Revision Total Knee Arthroplasty with the use of Trabecular Metal Cones.

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**Background:** Porous Tantalum shaped as a cone, is available in different sizes under the trademark "Trabecular Metal Cone" (TM Cone) (Zimmer inc., Warsaw, USA) for reconstruction of bone loss in the proximal tibia during Revision Total Knee Arthroplasty (rTKA).

**Purpose / Aim of Study:** The aim of this study was to evaluate the migration of the tibial component in rTKA comparing the use of TM Cone versus conventional methods of reconstructing bone loss of the proximal tibia.

**Materials and Methods:** Forty-one patients were randomised to receive rTKA with or without TM Cone and 21 patients (mean age 62.8 years, range 40-78, mean BMI 27.1) data were qualified for final analysis. Classification of bone loss defects was done according to the AORI. The NexGen,µ revision system were used at all operations. Consecutive supine RSA examinations were performed postoperatively and after 3, 6, 12, and 24 months.

**Findings / Results:** MTPM in the TM Cone group showed a stable migration pattern after 3 (0.57 mm + 0.33 mm) to 24 months (0.67 mm + 0.35 mm) of follow-up. MTPM in the No TM Cone group migrated at a higher level at 6 months of follow-up (2.51+ 4.73) and then showed a decrease in MTPM until 24 months (1.00 mm + 1.16 mm). No statistically significant difference between MPTM in the two groups was found. Three implants showed continuous migration (> 0.2 mm, TM Cone (n=1) /NO TM Cone (n=2)) between 12 and 24 months. Segment motion at 24 months showed the same net-direction of rotation around the Y- and Z-axis for rotation and around the X- and Y-axis for translation. Statistical significant changes were found at 3 months of follow-up (rotation, X-axis) and after 24 months of follow-up (translation, Z-axis).

**Conclusions:** The tibial implants with TM Cone showed a tendency (not significant) towards less migration compared to the NO TM Cone group.

## Stem alignments influence of migration of cemented femoral component in THA

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**Background:** Aseptic loosening has been a major cause of failure in THA. Previous studies have shown femoral alignment is important to early loosening. The stem migration rates measured by radiostereometry (RSA) have good predictive value of early stem loosening.

**Purpose / Aim of Study:** In present study we investigated correlation between alignment and cemented stem migration using RSA.

**Materials and Methods:** Postoperative hip radiographs of 80 patients who were earlier enrolled in the prospective randomized study were evaluated. All patients underwent a hybrid hip arthroplasty with cemented matt-surfaced Ti stem (Bi-Metric®, Biomet). The patients were examined using RSA. Femoral head centre and tip migration of the stem were measured at 3 months, 1 and 2 years. One author (JT) completed measuring the valgus/varus alignment of the femoral stem compared to axis of the femur. After exclusion of dropouts we had 70, 69 and 64 patients at 3, 12 and 24 months for comparison between stem alignment and subsidence of femoral head centre. Spearman's correlation test was used.

**Findings / Results:** We found no correlation between stem subsidence and stem alignment at any follow-up intervals. Spearman's correlation's coefficients for subsidence of femoral head centre and alignment were  $r = 0.06, -0.02$  and  $0.01$ ; (p values- 0.6 and 0.9), at 3, 12 and 24 months. For stem tip  $r$  was  $0.07, 0.1$  and  $0.03$ ; (p values- 0.6, 0.4, 0.8). Even though no correlation was proved, three stems with malalignment  $>3^\circ$  of varus subsided more rapidly than other stems and one of them ( $7^\circ$  of varus) was revised 3 years after the index operation due to aseptic loosening.

**Conclusions:** Even though we didn't find evidence of correlation between early subsidence and alignment of the stem in our data, the stem positioning in neutral alignment should be always attempted during cementation of the femoral component.

## The Incidence of stem fracture of monoblock and modular revision stems in Denmark 1995-2008

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**Background:** The number of revision hip arthroplasty has increased in recent years according to Danish Hip Arthroplasty Registry (DHR). A serious complication is stem fracture and it has been debated whether the frequency is higher in modular than mono blocks.

**Purpose / Aim of Study:** The aim of the present study was to evaluate the number of stem fractures in relation to modular and monobloc stems after revision surgery in DK by using DHR .

**Materials and Methods:** This is a prospective study, of patients who have had a primary stem revision and following have had new revision surgery due to a stem fracture. All patients were identified through DHR, which includes all Danish clinics. Primary as well as revision operations performed in Denmark have been recorded to DHR since 1995.

**Findings / Results:** During the period 1995-2008 a total of 1.429 patients have had revision THA with either a monoblock (n=722) or modular revision femoral stem (n= 707). Of these, 6 stem fractures were recognized as a reason for a secondary revision. Five stem fractures were in modular stems; all of them ZMR. We observed fractures of modular stems with both taper and porous stem, as well as with spout and taper bodies, all with an average implantation time of 5.2 years. One fractured stem was on a monobloc system (Mallory- Head) reported only 33 days after the implantation, which suggest an implant production fault. The frequency of stem fractures was calculated to be 0,70% (95%CI:0,09;1,32) 0,14% (95%CI:0,00;0,27%) for modular and monoblocs, respectively. (Fischers exact test p= 0,283)

**Conclusions:** In a clinical perspective a relatively higher frequency of stem fractures was recognized among patients with modular stems but only within one brand which urge the surgeons to pay attention to the problem and to report every case to DHR.

## The predictive values of perioperative biopsies in periprosthetic infections

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**Background: Background:** The perioperative diagnosis of infection is essential in revision arthroplasty.

**Purpose / Aim of Study:** Purpose/aim of study: The purpose of this study is to compare the intraoperative frozen section analysis with microbiological cultures.

**Materials and Methods: Materials and Methods:** We made a retrospective study with 518 patients, representing arthroplasty revision surgery for knee, hip and shoulder from 2001-2009 at Bispebjerg Hospital. Intraoperative frozen sections were compared with findings from five microbiological cultures. For frozen sections the presence of more than 5 polymorphnuclear leukocytes per High Power Field was considered positive for infection. Three positive microbiological cultures were considered as infection.

**Findings / Results:** Findings/results The frozen section demonstrated a sensitivity and specificity of 41% and 91% respectively. Out of 518 revision arthroplasties 44 had three or more positive microbiological cultures, 87 had two or less positive microbiological cultures and were regarded as contaminated. In this study the frozen section outcome had a negative predictive value of 94%, and a positive predictive value of 31%. We found a high specificity 91 %, and a low Sensitivity 41 %.

**Conclusions:** Conclusion: Frozen sections obtained from surgical-site samples had a high specificity and a high negative predictive value for predicting absence of periprosthetic infection during revision surgery. However histology has false-negative results when infection is due to low-virulence microorganisms, especially coagulase negative staphylococcus.

## Monitoring patients with metal-on-metal hip implants

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**Background:** Hip arthroplasties with MOM bearings are durable and can not be worn out in clinical use. Release of cobalt and chromium may cause higher concentrations in tissues and blood than in patients with implants from other materials. The kidneys are able to regulate the body contents from dissolved cobalt and chromium to a physiological level, but concern has been raised that the release may exceed the clearance capacity in some patients.

**Purpose / Aim of Study:** To map out the serum concentrations of cobalt and chromium in patients who have had a metal-on-metal hip arthroplasty made in our department from 2006 to 2010 excluding 150 MOM hips in clinical studies, that has already been presented. To assess the renal clearance of cobalt and chromium. To evaluate the patients' physical function. To identify and characterize causes for the elevated metal concentrations in those patients presenting clearly elevated values.

**Materials and Methods:** 260 patients were operated 1 to 5 years ago. The patients have completed questionnaires for individual grading of pain, ability to do daily activities, revision surgery, allergies, possible heavy metal environmental exposition, number of joint prostheses, and consumption of foodstuffs with a high content of cobalt or chromium. Hip function is assessed as Harris Hip Score.

**Findings / Results:** 260 patients have been called in, but until now 169 patients have been assessed. Six of the 260 patients have been revised. Two infections, one stem loosening, three revisions for pain. A few moderately high serum chromium values were found, and the characteristics and activities of the patients concerned will be presented

**Conclusions:** The metal-on-metal arthroplasties have a high implant survival during their initial years of use, and a few patients have a moderately high serum concentration of cobalt or chromium.

## A proof-of-concept evaluation of a new semi-quantitative urine test to exclude ongoing coagulation activity after THA and TKA

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**Background:** The clinical usefulness of a new test device was evaluated in patients undergoing THA and TKA. The test measures F1+2 in urine (uF1+2) based on a predefined cut-off value of 47 pmol/l.

**Purpose / Aim of Study:** A direct comparison between the test results and the observed VTE events was carried out to evaluate the diagnostic capacity of the test.

**Materials and Methods:** 449 patients participating in two randomized clinical prophylaxis studies were divided into 225 VTE cases (93 % had non-symptomatic VTE events) and 224 sex and age-matched event-free control cases. Urine samples were collected before operation and in the morning on the day of venography (between 5 and 9 days after surgery). Laboratory analyses for uF1+2 using a standard ELISA kit were carried out together with an evaluation of all samples using the new test device. The readings were rated using a visual rating scale (from 1 to 10). Values  $\leq 3.5$  indicated a negative test result. All results were evaluated in relation to the occurrence of objectively proven VTE events during the studies in a blinded fashion.

**Findings / Results:** The test had a sensitivity and specificity and a positive- and negative predictive value of 70.3 and 37.6 and 51.9 and 56.8, respectively. However, in most patients with non-symptomatic VTE events and a negative test result the uF1+2 levels had returned to the preoperative level or below indicating that the coagulation activity was normalized. The same was seen in 4 patients with a negative test experiencing a symptomatic VTE event between 9 and 42 days after the urine sampling, presumably due to late occurring occult reactivation.

**Conclusions:** The accuracy of a negative test result was clinically acceptable. The test is a useful tool for postoperative surveillance of the coagulation activity shortly after operation and has the potential to be cost saving.

## **Catastrophic results after the use of a selfretaining running suture in total hip replacement**

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**Background:** A new selfretaining suture (Quill®) for closure of the wound after THR was introduced in our department in 2008. The suture is provided with barbes, directed in opposite directions from the middle of the suture, allowing closure of the deep fascia with one end of the suture and closure of the subcutaneous layer with the other end, using a running technique without the use of knots.

**Purpose / Aim of Study:** We report the complications after the use of this suture in THR and revision THR during a 7 months period.

**Materials and Methods:** In the period 01-08-2008 until 28-02- 2009 205 THR were performed. The Quill suture was used according to the manufacturers instructions in 79 patients. The conventional technique of closure with singular knots using absorbable Polysorb® suture was used in 126 patients.

**Findings / Results:** After a period of 7 months the use of the Quill suture was abandoned due to a high number of fascial ruptures and deep infections. 79 THR's were sutured with Quill; of these 4 (6%) developed a granuloma, 1 (1%) a haematoma, 9(11%) had oozing, 8(10%) were reoperated due to rupture of all layers in the wound including the fascia. 126 THR's were sutured with Polysorb; none had granulomas, 2(2%) had a haematoma, 4(3%) had oozing, 1 (0,8%) patient was reoperated due to deep infection without rupture of the wound. In all 8/79 patients sutured with Quill required reoperation due to cicatricial rupture and infection, whereas only 1/126 patient sutured with Polysorb was reoperated due to infection ( $p < 0,05$ ).

**Conclusions:** Wound closure with the Quill® suture as described above, though recommended by the manufacturer, should not be used in THR. Fascial rupture after THR is seldom, but we recorded it in 10% of patients sutured with Quill, leading to prolonged treatment and in several cases to multiple re-operations.



## Periacetabular osteotomy in young adults with Calvé-Legg-Perthes disease.

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**Background:** Developmental dysplasia of the hip (DDH) and Legg-Calvé-Perthes Disease (LCPD) are two different conditions leading to similar morbidity. Periacetabular osteotomy (PAO) is the preferred treatment of DDH, but has been evaluated to a less extent in LCPD.

**Purpose / Aim of Study:** Is to identify possible differences between correction, quality of life (EQ5D), activity, pain on a verbal rating scale (VRS) and Harris Hip Score (HHS), after PAO in patients with LCPD and DDH.

**Materials and Methods:** The case group consisted of 14 patients (9 males) with symptomatic LCPD (15 hips), average age 24 (15-40) years. Seven patients had combined surgery. The age- and sex-matched control group consisted of 14 patients with symptomatic DDH (15 hips). All patients had none or slight osteoarthritis (Tönnis 0-1). The radiological parameters were evaluated pre- and postoperatively on both groups and a questionnaire was sent out to evaluate the remaining parameters.

**Findings / Results:** In terms of preoperative acetabular index angle (AIA) and lateral center edge angle (LCE) the case group was significantly more dysplastic ( $p=0.01$ ) but showed significant improvement in AIA from  $20^\circ$  to  $8^\circ$ , in LCE from  $11^\circ$  to  $26^\circ$  and in femoral head extrusion index (FHI) from 28% to 11%. Corresponding figures for the control group;  $13^\circ$  to  $4^\circ$ ,  $17^\circ$  to  $28^\circ$  and 27 % to 16 %. Postoperative AIA and LCE did not differ between groups ( $p=0.16$  and  $p=0.23$ ). Both groups achieved significant improvement in pain, EQ5D, activity and HHS but without differences between groups.

**Conclusions:** Despite patients with LCPD in this study was found more dysplastic than patients with DDH, and 50% had combined surgery, PAO resulted in corrections and clinical improvement at the same level as in DDH.

## Forensic finite element simulation of skull fracture

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**Background:** Since the 1970s numerous finite element based human head models have been constructed for investigation of head injury. Most of those models have been concerned with the risk of brain damage while only few have investigated skull fractures.

**Purpose / Aim of Study:** The aim of this study was to construct 3D FE models of human skulls for investigation of skull fractures. The intention of the method is to use it in forensic practice.

**Materials and Methods:** Six person specific FE models of the upper part of the skull bone were created from CT scans, and the skulls were loaded at the vertex.

**Findings / Results:** The models were used to investigate variations in the mechanical responses between the person specific models. Differences between the models were found, including the stiffness of the skulls, the region and severity of the damage, peak forces and maximal displacements. For prediction of fractures in the skulls, the displacement seemed to be a more important issue than the reaction forces. When comparing the results of the analyses to experimental findings, the stiffness of the skulls were realistic, but the skulls were too strong resulting in large forces and displacements. Also, the force-deflection responses of the models were too linear due to simplified material properties. Because the models became unstable as the skull fractured, it was not possible to investigate the pattern of the fracture thoroughly.

**Conclusions:** Differences between the models were found, and it is therefore recommended to use person specific models in later studies. The models showed some agreement with experimental results, but further improvements of the models are needed. This includes adjustment of the material properties, further stabilization and validation of the model with respect to the biomechanical responses and the patterns of the fracture.

## Bispebjerg (Hvolris) Orthopaedic PreSurgery Score (HOPSS)

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**Background:** It is well known that disease score systems exist. ASA and ApacheII are examples, but neither includes surgical trauma as a parameter. TRISS, ISS and GCS are used to evaluate the trauma itself, whereas the orthopaedic intervention itself has no scoring system even though it holds significant physiologic consequences.

**Purpose / Aim of Study:** In order to quantify the orthopaedic intervention a novel scoring system is introduced (HOPSS).

**Materials and Methods:** Our scoring system has 7 different parameters scoring from 1 to 4 points each. The points are added together, and the severity of the intervention can be quickly and precisely estimated preoperatively. The parameters are: Incision size, bleeding, musculature involvement, bone involvement, number of bones, marrow or spongiosa involvement and duration of intervention. The points are allotted according to schematically fixed values expected for the intervention.

**Findings / Results:** By using the total value between 4 and 28 points, the surgeon and anaesthesiologist can prepare accordingly. A smaller hand surgery can expect to score around 10 points whereas a larger intervention, like an amputation or an arthroplastic revision, will score 20+ points, while patients with severe co-morbidity will score even more.

**Conclusions:** It is expected that the new scoring system will be able to assess the required anaesthesia requirement for the operative intervention preoperatively, as well as the severity of the intervention itself. Furthermore the system presents a tool for estimation of length of in-hospital stay.

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## **Twenty-nine ankle arthrodesis with the Calandruccio external compression fixator. Is the rate of bony union affected by preoperative bone stock?**

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**Background:** When we have an ankle with either proven or suspected infection we use an external fixator for arthrodesis. If bone stock is sufficient we use the Calandruccio external fixator, in case of poor bone stock we use the Ilizarow frame. The Calandruccio external fixator is a compact fixator and it is only stable if compression is applied across the arthrodesis.

**Purpose / Aim of Study:** The purpose was to examine if bony union was associated to preoperative bone stock, age and smoking.

**Materials and Methods:** From 1996 to 2011 we have used the Calandruccio on 29 patients. All medical records and radiograph were reviewed. Median age of patients at the time of operation 61 (32-79) years. Median time with Calandruccio applied was 3.1(1.8- 8.9) month and median time with stiff bandage 1.6 (0-16) month. The amount of bone stock was grouped into three groups: 1. none or minimal loss of talar bone 2.moderate loss of talar bone as after a failed ankle replacement 3. nearly total or total loss of the talus.

**Findings / Results:** There was 10 non union and 19 had solid bony union judged on radiograph and clinic. There was no association between bony union, bone stock, smoking and age (Mann-Whitney test). Two of the failures without sign of infection were reoperated with a tibiototalcalcaneal nail and healed. Five with signs of infection were reoperated with an Ilizarow frame, and 4 of them healed and one had a below knee amputation. Three patients with a stable pseudoarthrosis were satisfied with an ankle orthosis.

**Conclusions:** There was a non union rate on 34%, but we were not able to confirm any relation between poor bone stock, smoking, age and non union.

## Parametric study of a drop foot brace

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**Background:** Drop foot (DF) is a significant weakness of ankle and toe dorsiflexors. One treatment for DF is wearing a DF brace. The function of the brace is to stabilize the foot and lift the forefoot. Therefore the materials of the brace should be flexible to withstand compression, but if too flexible it will lose the forefoot lift, more over fatigue strength also has to be considered. Finite element (FE) modelling was used to solve this material optimization problem, thus creating an optimal brace through a FE-based parametric study without the need of creating prototypes of physical braces.

**Purpose / Aim of Study:** The aim of this study was to create a FE-model of a DF brace with optimal material distribution.

**Materials and Methods:** A person-specific drop foot brace was simulated in the commercial FE program, Abaqus. Material parameters were found by tensile testing of the different material types of the brace. Failure criteria for the materials were assigned. The FE-model simulated the stance phase of normal walking. The simulation was compared to strain measurements of the actual brace.

**Findings / Results:** Through the FE-analysis we were able to simulate the physical brace and apply different material properties to it. Strain measurements from the full scale tests were comparable to simulated strains, which makes the model realistic. The strain distribution of the model is dependent on how the model is loaded and the simulations show that the strain is compressive in the frontal parts of the rods and tensile in the back parts of the brace. Therefore the material must be flexible. Applying failure criteria gives an opportunity to select a beneficial material.

**Conclusions:** The FE method is found to be a strong tool improving the material used in a DF brace. Based on simulations, a large number of expensive experimental trial and error iterations can be avoided.

## The Elektra prosthesis for total replacement of the first CMC-Join: Prospective study with follow-up of one to six years.

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**Background:** Soft-tissue arthroplasties of the CMC1- joint is known to have at least 85 percent of good or excellent results. A draw-back of these methods is the rather long recovery time. In recent years a number of new implants have been presented but the results are yet not very well documented.

**Purpose / Aim of Study:** The aim of this study was to evaluate the long term results after joint replacement with the Elektra prosthesis, a non-cemented, HAP-coated 3- component CrCo-implant. The cup is the second generation Elektra cup.

**Materials and Methods:** 54 patients operated were followed prospectively. Diagnosis was idiopathic osteoarthritis in all cases. 40 were women and 14 men. The operated hand was dominant in 31 cases and non dominant in 23 cases. Median age 58,5 years (37,5-74,5).

**Findings / Results:** RESULTS. The follow-up time was one to six years. Pain on VAS was reduced from 6,0 preoperatively to 0 at six years follow- up. Grip-strength increased from 22,5 KgF preoperatively to 26 KgF 3 years postoperatively and then gradually decreased to the preoperatively value at six years. Pinch-strength increased from 2,5 KgF preoperatively to 3,5 KgF at five years. Abduction was 33 degrees preoperatively and 40 at follow-up, volar adduction 33 degrees preoperatively and 38 at six years follow-up. All parameters were better at 6 to 9 weeks postoperatively compared with the preoperative values. COMPLICATIONS Removal of the prostheses occurred in 11 cases. Revision of the cups to cemented polyethylene cups were done in 5 cases. Five prostheses dislocated for one or more times.

**Conclusions:** Arthroplasties with an Electra prostheses have a very fast recovery and a higher ROM, Grip and pinch strength and reduced pain level. These values were almost unchanged during the years. Complication rate were quite high and especially related to the loosening of the cup.

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## **The role of MRI in the diagnosis of wrist fractures**

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**Background:** Patients with suspected clinical scaphoid fractures are primarily referred to x-ray examination. X-ray cannot always detect scaphoid fractures; therefore MRI is an important tool in diagnosing scaphoid fractures. Other fractures than scaphoid fractures are frequently reported.

**Purpose / Aim of Study:** The purpose of this study was to investigate other wrist and carpal fractures but the scaphoid. Fractures other than scaphoid diagnosed by MRI, but not by primary x-ray were recorded.

**Materials and Methods:** Over a two year period 618 consecutive patients with a suspected clinical scaphoid fracture, in spite of negative X- ray, were referred to MRI and examined within 24 hours.

**Findings / Results:** Scaphoid fractures were reported in 133 patients. 11 patients had both a scaphoid fracture and 13 other wrist and carpal fractures. Eleven of these fractures were missed by x-ray. None of the other fractures resulted in change of treatment. In 117 patients, 144 other wrist and carpal fractures were detected. Fifty nine of these fractures resulted in change of treatment (9,5 % of the scanned patients). One patient had surgery, the 58 other patients were cast immobilized.

**Conclusions:** The incidence of scaphoid and other wrist and carpal fractures overlooked by X-ray but detected by MRI, are substantial. These results support frequent use of MRI in diagnosing wrist and carpal fractures.

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## No differences in growth plate zone fractions in a comparative porcine study on 8-plates versus staples

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**Background:** Correcting angulating deformities of the lower limb is a subject of major interest in paediatric orthopaedics. Hemiephysiodesis is the technique by which bone growth is guided. Traditionally this has been performed with staple technique. The 8-plate technique is new and advocated because it is believed to reduce the risk of premature closure of the growth plate compared to stapling.

**Purpose / Aim of Study:** To compare the 8-plate and stapling technique in an experimental large animal setup.

**Materials and Methods:** 10 weeks old domestic pigs in two randomised, paired setups. Right proximal tibia was randomised to medial epiphyseodesis by either stapling or 8- plates (12 mm plate and 24 mm screws). Left side received the opposite treatment. Study A (n=10): 10 weeks treatment. Study B (n=8): implant removal after 10 weeks of treatment. 5 additional weeks of housing. Tissue prepared for histomorphometry. Fractions of the chondrocyte layers (zone of reserve, zone of proliferation and zone of hypertrophy) were determined using quantitative histomorphometry.

**Findings / Results:** No significant changes were observed between fractions of growth plate zones in neither study A or B. Data were normal distributed and analyzed using student's t- test. Areas with disorganisation of chondrocytes and enlargement of the growth plate were noted in samples from study B. No infections or implant failure were observed.

**Conclusions:** Chondrocyte zone fractions did not differ between 8-plate and staple treatment in this randomised, paired animal study. There seems to be similar effect of 8-plates and staples on the growth plate. We cannot rule out that we have a type II error and our studies are underpowered. However, we do not suspect that minor differences found in larger studies will have clinical relevance.



## **Guided growth for the abnormal physis. Experience with the 8-plate technique in non-idiopathic cases**

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**Background:** Guided growth (hemiepiphysiodesis) may avoid the need for corrective osteotomies when treating deformities in skeletally immature patients. Traditionally staples has been used for guided growth but recently the use of 8-plates has been advocated. The efficiency of 8-plates to treat deformities has been the subject of retrospective studies and the technique seems to be safe when treating idiopathic genu valgum. Little is however known about the use of 8-plates in relation to the pathological physis.

**Purpose / Aim of Study:** Retrospective study on the outcome of 18 children (32 physes) treated with 8-plates for deformity correction of non-idiopathic cases.

**Materials and Methods:** Review of lower limb mechanical axis deviations treated in children with conditions including Blount's disease, rickets, nail- patella syndrome, Stickler syndrome, Hereditary Multiple Exostosis, Multiple Epiphyseal Dysplasia and mucopolysaccharidosis (MPS). Other indications included fixed flexion knee deformity (FFKD) in children with cerebral palsy and malunion after supracondylar humerus fracture.

**Findings / Results:** In 11 out of 18 children treated with 8-plates we noted hardware failure, need for revision, need for osteotomy or residual deformity. Overall treatment time with 8-plate hemiepiphysiodesis ranged from 6 - 58 months. In 3 children complete deformity correction was achieved. No wound related infections were observed in any of the cases.

**Conclusions:** In this retrospective study 8-plate hemiepiphysiodesis resulted in a high rate of hardware failure, revision surgery and osteotomies. We advocate caution and close follow-up when treating non-idiopathic lower limb mechanical axis deviations. Treatment of FFKD resulted in a satisfying outcome. In the present study, 8-plates applied to the distal lateral humerus failed to achieve sufficient deformity correction.

## A Retrospective Examination of the Copeland Resurfacing Humeral Head Implant with respect to Overstuffing

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**Background:** Recently, there has been concern that the Copeland resurfacing humeral head implant (RHHI) leaves the shoulder joint overstuffing.

**Purpose / Aim of Study:** The purpose of this study was in a selected cohort of patients operated with a Copeland RHHI 1) to evaluate the Length of the Gleno-Humeral Offset (LGHO), 2) to assess the patient-reported quality of life measured by WOOS, 3) to determine the number of revisions.

**Materials and Methods:** Pre- and postoperative radiographs were retrieved from 71 of 91 possible patients operated with a Copeland RHHI at Silkeborg and Horsens Regional Hospitals from primo 2005 to ultimo 2009. The cohort consisted of 30 males and 41 females at a mean age of 61 (38-89) years. One radiologist measured the LGHO of all radiographs and performed double measurements on the first 15 patients (60 radiographs) to estimate the intra-tester reliability of the method. The WOOS score one year after surgery and the number of revisions from all patients operated with a Copeland RHHI in Denmark in that period was requested from the Danish Shoulder Arthroplasty.

**Findings / Results:** The mean LGHO was 4.99±0.53 cm before surgery and 5.39±0.58 cm after surgery, ( $p < 0.000$ ). 95% limits of agreement for measurements of LGHO were ±0.11 cm. One year after surgery, the WOOS score was 67 for the cohort and 64 for all patients operated with a Copeland RHHI in Denmark. 11 of 71 RHHI in the cohort were revised.

**Conclusions:** The Copeland RHHI causes a significantly increased LGHO in the shoulder joint but does an extra 4 mm offset result in clinical symptoms? The high rate of revisions points to a possible problem with overstuffing associated with this prosthesis design. The WOOS score in the cohort was comparable to that for all other patients operated with a Copeland RHHI in the same time period, indicating that there was nothing unusual about our cohort

## Comparison of Two Humeral Head Resurfacing Implants. 1 year Results of a Randomized Controlled Clinical Trial.

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**Background:** Humeral head resurfacing implants (HHRI) is used to preserve bone stock and restore normal anatomy in the osteoarthritic shoulder joint.

**Purpose / Aim of Study:** The aim of this study was to examine implant migration of the Copeland (C) and Global Cap (GC) HHRI.

**Materials and Methods:** 29 patients (11 females) at a mean age of 62 (39-82) years and with shoulder osteoarthritis were randomly allocated to a Copeland (Biomet) (n=13) or Global Cap (Protosekompagniet) implant (n=16). 4 patients were lost before 12 months follow-up. Both prostheses were cementless and hydroxyapatite coated but had small design differences. Patients were followed at baseline, 6 and 12 weeks, 6 and 12 months with radiostereometry (Model-Based RSA) for implant migration, and clinically with Constant Shoulder Score (CSS) and Western Ontario Osteoarthritis of the Shoulder Index (WOOS). Bonemarkers were inserted in the humerus as the fixed reference for RSA.

**Findings / Results:** At 1 year total translation (TT) ( $p=0.64$ ) was 1.38mm (SD 1.45) for the C implant (n=10) and 0.7mm (SD 0.38) for the GC implant (n=12). Total translation between 6 months and 1 year was 0.62 (SD 1.07) for the C implant (n=10) and 0.21 (SD 0.78) for the GC implant (n=12). Direction of implant migration was on average distal (0.11mm), medial (0.21mm), posterior (0.01mm), and valgus rotation ( $0.17^\circ$ ). 20 patients completed WOOS preoperative, at 3, 6 and 12 months. In the group with a C prosthesis, the WOOS score at the times of measurements was 1020, 622, 237, 295. For the patients with a GC prosthesis, the WOOS score was 1305, 550, 372, 342. There were 4 revisions, 2 in each group.

**Conclusions:** Early implant fixation, as judged by RSA, was good for both HHRI. The functional gain on activities of daily living was only modest for all patients. Rehabilitation should be granted a higher focus in HHRI surgery.

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## Dose optimization of O-arm paediatric 3D spine protocol

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**Background:** Since January 2008, 3D imaging obtained by the Medtronic O-arm has been used intraoperatively at spine surgeries at Aalborg University Hospital, Denmark.

**Purpose / Aim of Study:** Given that the paediatric patient population is the most vulnerable to x-ray radiation, we aimed to optimize 3D imaging protocols that provides sufficient image quality to deliver therapy while at the same time reducing dose to these patients.

**Materials and Methods:** Four cylindrical PMMA phantoms were made with diameters of 10, 16, 24 and 32cm. Samples made of human femoral head bones, 3 of which also contained pedicle screws, were placed and scanned one at a time in the centre of the phantom with the remaining holes filled with solid PMMA rods. Phantom studies were conducted and showed a large potential for reducing dose in 3D spine protocols compared to factory default settings. The optimized new low-dose 3D spine protocol were tested in clinical practice for 10 paediatric patients having severe deformities where it would not have been possible to place the pedicle screws without navigation. The local ethics committee approved the human part of the study. Informed consent has been given by all patients (parents or guardians) after being informed both verbally and in writing.

**Findings / Results:** For children between 0-1 years the dose can be reduced by a factor of 14, for children between 1 and 12 years the dose can be reduced by a factor of 9.

**Conclusions:** The results and the method for optimizing the protocols are generally applicable to any 3D x-ray system what so ever providing manual control of kV and mA.

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## The feasibility of prospective quality of life measurement in metastatic spinal cord compression

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**Background:** An increasing number of patients with metastatic spinal cord compression are undergoing surgical treatment and patient- based outcome evaluation is warranted. MSCC patients may have difficulties filling out extensive questionnaires due to their general condition. The EQ-5D is a brief and easy-to-use instrument for assessing quality of life.

**Purpose / Aim of Study:** To assess the feasibility of routine monitoring of MSCC patients using the EQ- 5D.

**Materials and Methods:** During the first 20 weeks of 2011, all patients with MSCC admitted to Rigshospitalet through the central referral center were asked to fill out the Danish version of the EQ-5D questionnaire. The patients have been EQ-5D scored by the time of admission (W0), 6 weeks follow up (W6) and 3 months (M3) after admission.

**Findings / Results:** A total of 259 patients were admitted during the study period, 148 men and 111 women with an average age of 65 years. 147 patients (57 %) completed the questionnaire. The overall mean EQ-5D score was 0.39 (SD 0.33). Compared to the general population the overall mean EQ-5D score was reduced but completion rate was comparable to results obtained in the general population. At (W0) 164 patients (63%) returned the EQ-5D questionnaire (63%). After 20 weeks at the (W6) follow up 151 patients were alive and 50 patients were dead. 92 patients returned the questionnaire (61%). At (M3) follow up 45 patients were alive, 38 patients were dead and 33 patients answered the EQ-5D questionnaire (73%). EQ5D scores were 0.39 (SD 0.33) at W0, 0.47 (SD 0.35) at W6 and 0.63 (SD 0.25) at M3.

**Conclusions:** These results indicate that EQ-5D can be used satisfactorily in patients with MSCC, supporting that the EQ-5D can be used for health economic analysis in this group of patients.

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## Anterior Distal Femoral Epiphysiodesis for the treatment of fixed knee flexion contractures

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**Background:** Patients with neuromuscular diseases are prone for the development of knee flexion contracture. Distal femoral extension osteotomies provide an acute correction of the deformity but are extensive surgical procedures and complication rate is rather high

**Purpose / Aim of Study:** to evaluate the result of anterior epiphysiodesis of the distal femur in the treatment of fixed flexion contracture of the knee

**Materials and Methods:** 21 patients with a mean age 10 year (5- 15). 12 suffered from MMC, 5 CP, 2 arthrogryposis, 1 with enzyme defect and 1 from Down's syndrome. 13 patients had a bilateral and 8 a unilateral procedure. Two staples or 8- plates were inserted using 2 parapatellar incisions. 9 were operated with staples and 12 with 8-plates. The plates or staples were removed if the desired effect of knee extension was achieved or the patient reached skeletal maturity

**Findings / Results:** Mean contracture was 20° before treatment. Staples or 8 plates were removed after mean 24 months. The result mean contracture was 10°. 2 complications were seen: 1 infection and 1 supracondylar fracture. There were 9 cases treated with Richard staples and 12 treated with the 8- plates. These two groups were comparable regarding the number, age and the diagnosis. We found no significant difference regarding the primary deformity or the correction ( $P = 0,5275$  and  $0,6838$  respectively). The time for correction was significantly lower in the 8-plates group (20 month) compared to the staples group (30 month) ( $P = 0,0283$ ). The mean correction rate per month was  $0,3^\circ$  for the staples group and  $0,5^\circ$  in the 8- plate group.

**Conclusions:** Growth manipulation by means of anterior distal femoral stapling is reasonable, safe, and effective. The use of 8-plate seems to give faster correction than staples

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## Osseointegrated prosthesis for the femoral amputees.

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**Background:** Femoral amputees who have severe problems with conventional socket prosthesis may benefit from an osseointegrated prosthesis (OI).

**Purpose / Aim of Study:** To introduce the technique of OI for femoral amputees and investigate whether it influences the patient's ambulatory activities, life quality and bone density.

**Materials and Methods:** A two stage (S1 and S2) procedure was performed. At S1 a titanium screw is implanted into the bone. Six months later, a rod is inserted into the screw with the other end penetrating through the skin (S2) to be fixed directly into the external prosthesis. After S2, the patients are rehabilitated for six months with increasing weight on the OI implant. Evaluation: Walking ability, DXA-scan, oxygen consumption, SF36 and Q-TFA questionnaires. Supplementary blood test was taken. Four patients, 30-61 y, have been operated with both S1 and S2, two with S1

**Findings / Results:** Three patients having just finished the rehabilitation period, are now ambulatory (one without aids, two using one crutch) and report increased walking and sitting comfort (one rarely used the socket prosthesis before the operation). One is now bicyckling. Energy expenditure during walking has decreased by 15 resp. 20% (n=2). Preop. bone mineral density (BMD) on the amputated side was decreased by 60% (range 56-68) in the proximal femur and 22% (range 16- 28) in the pelvis compared with the normal contra lateral side.. All patients had low lumbar spine T-scores (< 2). Analysis of the BMD following insertion of the OI prosthesis is ongoing.

**Conclusions:** Our preliminary results indicate that OI is a good alternative for femoral amputees with problems of the socket prosthesis. BMD is decreased in both the amputated femur and in the ipsilateral pelvis. Follow- up will provide novel data on the change in BMD following regain of osseous loading of the bones.

## Task shifting in orthopaedic out-patients – an audit of shoulder patients

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**Background:** Task shifting is generally becoming popular. We have been working with task shifting since 2007. Our goals are to be able to see more patients in the clinic, implement team work and increase work satisfaction in the team. There are some articles about task shifting, but surprisingly very few articles about the consequences or the quality.

**Purpose / Aim of Study:** We present an audit based on patient satisfaction of shoulder patients seen by extended scope physiotherapists, ESPs.

**Materials and Methods:** In 2010 our patients were seen by 2 consultant and 2 ESPs according to the Diagnostic Shoulder Package. Approximately 2/3 of the patients referred were examined by the ESPs, who were trained in ultrasonography. All patients seen by ESPs were discussed with or seen by a consultant. 275 consecutive patients seen by ESPs were sent a questionnaire. The benchmark was patient satisfaction in LUP (The National Danish Survey of Patient Experiences). In addition a short- form questionnaire was sent to local GPs.

**Findings / Results:** The response rate was 56% (154 patients) equal to LUP (orthopedic Day Care in DK 2009 53.4%). “What is your overall impression of your visit to the Day Care?” 98% (LUP 92.7%) positive answers (very good + good). “How do you rate the oral information you received?” 98% (LUP 91.9%) positive answers. “Did you feel secure or insecure, when you left the unit to go home?” 99% (LUP 89.6%) positive answers. The response rate from GPs was 42% (16 doctors). They were asked “What is your first impression, that the patients are seen first by a special trained physiotherapist?” 8 good, 3 had concerns and 5 didn’t know. 7 of GPs remembered to have referred a patient, who was seen by ESPs and of them all had a good perception of this examination.

**Conclusions:** The shoulder patients are very satisfied with examination by special physiotherapists.



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## **Nerve injury after hip arthroscopy with labral repair, a prospective cohort study - is there a learning curve?**

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**Background:** Hip arthroscopy requires distraction of the hip joint. Nerve injury is reported to be the most common postoperative complication and occurs in 0,5-10%.

**Purpose / Aim of Study:** The purpose of the present study was to evaluate the influence of surgical experience on the complication rate.

**Materials and Methods:** We performed hip arthroscopy with labral repair, rim trimming and cheilectomy on 49 patients from April 2007 to January 2009 (group A), and on 49 patients operated in the period between March and October 2010 (group B). All patients had follow-up after 8 and 26 weeks. Patients with nerve injury at follow-up examinations received a separate questionnaire by mail at minimum a half year postoperatively. Non-responders were interviewed by phone.

**Findings / Results:** Traction time was reduced by 25% from 137 min. in group A to 103 min. in group B. The number of nerve injuries caused by traction was reduced from 60% in group A to 23% in group B. One patient (2%) in group A had a lesion of the lateral femoral cutaneous nerve. In group B however 7 patients (14%) had nerve injury to the lateral femoral cutaneous nerve. No patient in group A but 1 in group B suffered from transient erectile dysfunction. In group B, the traction time in the subgroup without nerve injuries (107 min.), was longer than traction time in the subgroup with nerve injuries (98 min.) as well as the subgroup with nerve injuries lasting for more than 8 weeks (98 min.).

**Conclusions:** Hip arthroscopy with labral repair has a steep learning curve, but with longer experience the rate of nerve injuries caused by traction decreased. There was no correlation between traction time in subgroups with and without nerve injuries. Because of the proximity of the midanterior portal to the lateral femoral cutaneous nerve or branches of it, there is a risk of nerve injury during portal placement.

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## **The myotendinous junction in humans: A method to study its structure and reaction to exercise and immobilisation.**

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**Background:** The myotendinous junction (MTJ) transmits force from muscle to tendon, and the contact surface between these two tissues is structured with numerous interdigitations and invaginations. The MTJ is a site for painful over-use injuries in humans. The details of the micro- and macroscopic structure of MTJ in humans are widely unknown, as well as the MTJ's reaction to exercise and immobilisation.

**Purpose / Aim of Study:** Establish a model to study MTJ in humans.

**Materials and Methods:** 14 healthy human subjects (age 25+3 years) with an isolated injury of the anterior cruciate ligament, scheduled for reconstruction with a semitendinosus/gracilis graft. The MTJ was cut off the grafts, divided into 3 pieces, that were embedded in mounting medium and frozen in liquid nitrogen cooled isopentane. Serial transverse sections were cut in 10 um slices using a myotome at -20 degrees Celsius and stained for neural cell adhesion molecule (NCAM)(also staining satellite cells), Tenascin C, laminin, fibronectin, collagens, integrins, dystroglycans and fibertypes.

**Findings / Results:** All stainings except for integrins were successful in all patients. Type I collagen was the main component of tendon, except at MTJ, where collagen type III was dominating. NCAM was only found in muscle fibres close to MTJ, indicating that MTJ is undergoing constant remodelling – also indicated by a high density of satellite cells close to MTJ.

**Conclusions:** This model is ideal to study the MTJ in humans. Various types of loading can be applied to the MTJ preoperatively, and large samples of the MTJ can be obtained with no additional invasive procedures and no discomfort for the patients. The findings in this preliminary study indicate, that there is a high rate of remodelling in the MTJ.

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## Experience with surgical skin Closure System within ortopeadic surgery

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**Background:** Delayed closure of wounds can be challenging and may require skin grafting. We present a novel technique for closure of fasciotomy or defects after debridement, which we introduced in 2009.

**Purpose / Aim of Study:** The purpose of this study was to investigate the effect and the complications when using dynamic surgical skin closure system as an aid in delayed wound closure. We describe a technique using a device, which allows for dissipation of the workload across the wound margin allowing for successful delayed primary closure.

**Materials and Methods:** 14 consecutive patients (9 men and 5 women) in the period of 2009-2011, with a mean age of 52 (range 17-92) comprised the population. All patients had undergone treatment with the dynamic surgical skin closure system based on various diagnoses accompanied by a wide soft tissue opening; necrotizing fascia, compartment syndrome, osteomyelitis, abscess and one with decubital ulcer in the back of the head.

**Findings / Results:** The wound closure devices were applied when the wound were considered clean. The average time to closure was 6.8 days (range 5-14). There was a successful closing after applying the device in 13 of the 14 patients (93%), 13 patients could be closed in delayed primary suture.

**Conclusions:** Our early results with the dynamic wound closure method have demonstrated cosmetically acceptable, successful and expedient delayed primary closure of wide soft tissue opening and in some cases loss of substance. The dynamic surgical skin closure system is considered an option as an effective instrument to accomplish closure of difficult wounds.

150.

## High incidence of long term chronic complications after ankle sprain

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**Background:** Ankle sprains are one of the most common injuries treated in the casualty department. Several studies have shown that the injury can result in persistent symptoms for months or even years. The latest study with a follow-up period of more than 10 years was done by Staples et al. 1972. Since then the RICE treatment of ankle distorsions have been introduced

**Purpose / Aim of Study:** The aim of this study was to determine whether the introduction of RICE has resulted in a smaller proportion of patients with persistent symptoms more than 10 years after the injury.

**Materials and Methods:** Patients who were diagnosed with ankle joint distortion (DS934) at Aalborg Hospital between 1-4-1994 to 31-12-1994 was contacted in 2009. Inclusion criteria were age between 18-30 and x-ray imaging at initial assessment. Exclusion criteria were ankle sprain prior to the injury in 1994 and known osteoarthritis. They were questioned by phone about their symptoms and number of recurrent sprains, followed by an interview based on the AOFAS ankle score.

**Findings / Results:** 100 patients were interviewed. When asked 36 % had any symptoms. Additionally 25 % reported symptoms when interviewed about specific symptoms based on the AOFAS ankle score. Recurrent sprains were reported by 40%.

**Conclusions:** Despite the introduction of RICE in treatment of ankle sprains this study shows that the proportion of patients with persistent symptoms is approximately the same as in a similar study done by Staples in et al. in 1972. This highlights the need for further research on treating and preventing ankle sprains.

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## Per-operative fluid challenge in hip fracture patients

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**Background:** For many years, it has been of interest to find easy and reliable ways of monitoring circulation during surgery. It is well known that mortality is significantly increased after hip fracture surgery. Hypovolaemia acts inhibitorily on organ perfusion, delays fracture healing and increases the risk of post-surgery complications – and ultimately increases the mortality rate. Individualized goal- directed fluid therapy guided by stroke volume (SV) monitoring using the Frank- Starling curve, might eventually have a positive effect on mortality.

**Purpose / Aim of Study:** The aim of this project was to optimize the circulation of hip fracture patients per- operatively and register their fluid.

**Materials and Methods:** 20 hip fracture patients undergoing general anaesthesia (GA) were included in the study. An oesophageal doppler monitor (ODM), type CardioQ, was used and placed equivalent to descending aorta. Fluid challenge with boluses of 250 ml and measurements were done by following a preformed scheme, starting quickly after induction of GA. The Starling curve predicts that the circulation is receptive for optimization, when consecutive loads of fluid are followed by a sufficient rise in SV. Fluid deficit is defined as > 10% increase in SV during fluid administration.

**Findings / Results:** 15 women and 5 men. Average age: 82.6 yrs. Average fluid depletion during surgery: 1180 ml. Average bloodloss during surgery: 221 ml. Average %-increase in SV from baseline to max (95% CI); 24.7% (18.2;31.1),  $p < 0.0001$ .

**Conclusions:** Hip fracture patients suffer significant fluid depletion when undergoing surgery. This indicates the need for a more reliable non- invasive method for monitoring circulation at the ward. In time, the goal is to compare the mortality of patients who received goal- directed fluid therapy with patients who didn't.

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## Initial results of treating femoral trochanteric fractures with a double screw nail

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**Background:** Hip fractures are known to cause significant impact on living situation and functional ability of patients. It was reported that 18-33% of hip fracture patients die within 1 year and 25-75 % do not gain pre-fracture function.

**Purpose / Aim of Study:** The present study aims to report the initial experience of using the Veronail nail, a double-axis systems with an alternative configuration of the cephalic screws depending on fracture type.

**Materials and Methods:** 144 consecutive trochanteric fractures in 144 patients (mean 78 years) were treated with the Veronail. Prior to trauma, 75% of patients lived independently or with relatives. ASA classification was III/IV for 31% of patients and 85.4% had 1 or more co-morbidities.

**Findings / Results:** 85.4% of patients received early surgery (24hrs from trauma). Mean surgery time was 74 min. Post-operatively 48.6% of patients required a blood transfusion. At 3 months follow up 12.5% of the patients had died, 3.5% were lost to follow-up, 10% refused to continue the study, 34% of the fractures had healed, for 36% healing was in progress and 4% had a cut-out, 4 requiring hardware removal. Domicile recovery was slightly better in the early surgery group vs. late surgery (83% vs. 79%). Domicile- and functional-recovery was slightly better in the ASA III/IV group vs ASA I/II, respectively 84% vs 81% and 41% vs 39%. Patients with ASA III/IV with late surgery recovered their pre-trauma functionality better: 44% of patients vs 36% after early surgery. Domicile recovery was better in the early surgery group: 86% vs 78%.

**Conclusions:** Initial results with the Veronail system for patients with all types of femoral trochanteric fractures are positive. Continuous follow up of patients is however needed.

153.

## **Benefits and harms of locking plate osteosynthesis in intraarticular (OTA Type C) fractures of the proximal humerus: a systematic review**

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**Background:** Locking plate osteosynthesis of proximal humeral fractures are widely recommended and used, even in complex intraarticular fracture patterns such as OTA Type C fractures.

**Purpose / Aim of Study:** We systematically reviewed clinical studies assessing the benefits and harms of osteosynthesis with angle stable plates in OTA Type C fractures of the proximal humerus.

**Materials and Methods:** We conducted an iterative search in PubMed, Embase, Cochrane Library, Web of Science, Cinahl, and PEDro in all languages from 1999 to November 2010. Eligible studies should study outcome for Type C fractures after primary osteosynthesis with locking plate within two weeks of injury, and a follow-up period of six months or more. Patients should be evaluated with the Constant- Murley Score (CS). Two observers extracted data independently.

**Findings / Results:** Twelve studies and 282 Type C fractures were included. Results were categorised according to study type and synthesized qualitatively. Two comparative, observational studies reported a mean CS of 71 (relative to contralateral shoulder) and 75 (non- adjusted CS) for Type C fractures. For all studies mean non-adjusted CS ranged from 53 to 75. Mean age- and sex-adjusted CS ranged from 60 to 88. Mean CS relative to the contralateral shoulder ranged from 71 to 85. The most common complications were avascular necrosis (range 4-33%), screw perforations (range 5-20%), loss of fixation (range 3-16%), impingement (range 7-11%) and infections range 4- 19%. Reoperation rate ranged from 6 to 44%.

**Conclusions:** Insufficient study designs and unclear reporting preclude safe treatment recommendations. Complication and reoperation rates were unexpected high. Based on the studies included we cannot routinely recommend the use of locking plates in OTA Type C fractures.

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## Self-administrated home intravenous antibiotic therapy using elastomeric infusion pumps in orthopaedic patients

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**Background:** Infections in bone and joints are treated with intravenous antibiotics for weeks and the patients need hospitalization. In order to maintain the patients physical and social skills and to minimize the need for hospitalisation, a number of selected patients were offered self-administering their intravenous antibiotics at home. We present our early experiences.

**Purpose / Aim of Study:**

**Materials and Methods:** In the period from August 2009 to May 2011 twelve patients aged median 37 (1-59) years had 13 periods with self-administrated their intravenous antibiotics due to osteomyelitis (n=10) and septic arthritis (n=3). All patients were given a central venous catheter (CVC) and while awaiting cultivation reply the patients/parents were trained to administrate intravenous antibiotics. The definitive antibiotic solution was delivered in portable elastomeric infusionpumps by the Hospital Pharmacy and the patients were discharged with all needed equipment and a written instruction. Two patients received piperacillin/tazobactam and the rest dicloxacillin. Depending on the stability of the given antibiotic the patients returned to the hospital every three to seven days for new pumps. At the same time the functionality of the CVC was checked and -if needed- blood samples were taken.

**Findings / Results:** All together intravenous antibiotics were administrated for 193 days. The period of self-administrated antibiotics was 133 days, thus decreasing hospital stay by 69%. One patient developed allergic erythema three days after dicloxacillin and was hospitalized and received cefuroxim instead. All other patients fulfilled their treatment without complications. The patients/parents were secured and satisfied with the treatment and preferred the presented treatment over hospitalization.

**Conclusions:** Self-administration of antibiotics intravenously at home for selected patients can reduce hospital stay significantly. The patients/parents preferred the presented treatment over hospitalization.



**Work up of sarcomas in The North Denmark Region before and after implementation of National Integrated Cancer Pathways (“Pakkeforløb for sarkomer i knogle og bløddele”)**

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**Background:** Based on the fact that waiting times for cancer patients in Denmark were unacceptable a political initiative for improvement was taken. The core of this political decision was to develop integrated cancer pathways (ICP) as organizational and clinical standards for the diagnostics and treatment for all cancer types. By January 2009 these integrated cancer pathways were implemented in the Danish health care system.

**Purpose / Aim of Study:** This study aims at describing the actual work up and patient flow in The North Denmark Region after implementing ICP for suspected sarcomas, and to compare the number of patients referred to the Orthopaedic Tumor Centre (OTC) in Aarhus for definite diagnosis and treatment before and after introduction of ICP.

**Materials and Methods:** Number and diagnoses of patients referred in 2008 were retrieved in the hospital's database. Data from 2010 were registered prospectively.

**Findings / Results:** In 2008 235 referrals were registered as tumor-related at our hospital. Of 27 patients referred to Aarhus the diagnoses were 13 lipomas, 4 haemangiomas/vascular malformation, 1 muscle rupture, 1 malignant lymphoma, 1 aggressive fibromatosis, 5 various benign/low malignant diagnoses, 2 bone tumors: 1 benign & 1 osteosarcoma. Median time from receiving the referral from the primary sector to referral to OTC was 37 (0-169) days. In 2010 214 referrals were registered as tumor-related. 42 patients were discharged from Aalborg for treatment in Aarhus within medianly 14 (0-65) days. Another 14 cases had a second opinion at OTC before being operated on at our hospital.

**Conclusions:** Implementation of ICP seems to have lowered number of referrals to us but to have increased number of cases needing further investigation at OTC. Investigational times have been reduced. We have begun operating subfacial lipomas in agreement with OTC.

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