

# DOS Kongressen 2012

Abstracts



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# **DOS BULLETIN**

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## **Udgiver**

Dansk Ortopædisk Selskab  
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## **Ansvarshavende redaktør**

Steen Lund Jensen  
E-mail: editor@ortopaedi.dk

## **Sekretariatsleder**

Gitte Eggers

## **Web-page**

[www.ortopaedi.dk](http://www.ortopaedi.dk)

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Sekretariatsleder  
Gitte Eggers  
Lyngskrænten 17  
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E-mail: office@ortopaedi.dk

## **DTP & Tryk**

Kandrup's Bogtrykkeri  
Århusgade 88  
2100 København Ø  
Tlf. 3543 6000, Fax 3543 6008  
E-mail: tryk@kandrup.dk  
[www.kandrup.dk](http://www.kandrup.dk)

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## **DOS Bestyrelse**

Se hele bestyrelsen side 237.

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### **NÆSTE BULLETIN**

**DEADLINE: uge 33, 16.08.2013**  
**UDKOMMER: uge 39, 27.09.2013**

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# **Session 1: Hip/knee**

**Onsdag 24. oktober**

**09:00 – 10:30**

*lokale: A*

**Chairmen: Kjeld Søballe, Jeannette Ø Penny**

**1. A Scandinavian Survey of Treatment Routines in Prosthetic Joint Infections after Total Hip and Knee Arthroplasty**

*Måns Forsberg, Eric Bekric, Christen Ravn, Søren Overgaard*

**2. Antibodies against Glucosaminidase as a biomarker of protective immunity against Staphylococcus aureus osteomyelitis**

*Nina Gedbjerg, John Daiss, Joshua Hunter, Kirill Gromov, Kjeld Søballe, Edward Schwarz*

**3. Evaluation of ultrasound as a primary diagnostic tool for diagnosing pseudo tumor in THA, with MRI as the gold standard.**

*Martin Schou, Trine Torfing, Søren Overgaard, Jens-Erik Varmarken*

**4. Has body composition any effect on THA-scheduled patients' assessment of their own hip problems? - A preoperative cross-sectional study.**

*Anette Liljensøe, Jens Ole Laursen, Kjeld Søballe, Inger Mechlenburg*

**5. Implementing an early multimodal non-surgical treatment strategy for knee and hip osteoarthritis in clinical practice - a study of feasibility and effectiveness**

*Søren Thorgaard Skou, Anders Odgaard, Jens Ole Rasmussen, Ewa M. Roos*

**6. Does previous periacetabular osteotomy compromise optimal cup positioning and clinical outcome of total hip replacement?**

*Charlotte Hartig-Andreasen, Maiken Stilling, Kjeld Søballe, Theis Muncholm Thillemann, Anders Troelsen*

**7. Increase in Fat Free Mass following Strength Training in Patients Diagnosed with Hip Osteoarthritis Scheduled for Total Hip Arthroplasty - a Randomized Explorative Trial**

*Andreas Hermann, Bo Zerahn, Anders Holsgaard-Larsen, Tine Christensen, Steen Mejdahl, Søren Overgaard*

**8. Increasing risk of revision due to infection after total hip arthroplasty**

*Håvard Dale*

**9. Patient education with or without manual therapy compared to a minimal control intervention in patients with hip osteoarthritis - a proof-of-principle three-arm parallel group randomized clinical trial**

*Erik Poulsen, Jan Hartvigsen, Ewa M Roos, Henrik Wulff Christensen, Werner Vach, Søren Overgaard*

**10. Recovery in horizontal gait after hip resurfacing vs. Total hip arthroplasty at 6-month follow-up – A RCT study**

*Carsten Jensen, Per Aagaard, Søren Overgaard*

**11. The importance of ultra-short telomeres in the development of human hip osteoarthritis (OA)**

*Maria Harbo, Jean-Marie Delaisse, Per Kjærsgaard-Andersen, Flemming Brandt Sørensen, Steen Kølvrå, Laila Bendix*

# **Session 2: Sports medicine/arthroscopy**

**Onsdag 24. oktober**

**09:00 – 10:30**

*lokale: B*

**Chairmen: Peter Faunø, Martin Lind**

**12. Early results after hip arthroscopy with labral repair in children and adolescents**

*Christian Dippmann, Christoffer Hegemann, Otto Kraemer, Søren Winge*

**13. Hip Arthroscopy with labral repair, a prospective evaluation of the clinical outcome within the first year after surgery**

*Christian Dippmann, Kristian Thorborg, Kraemer Otto, Henrik Palm, Søren Winge, Hölmich Per*

**14. Iliotibial band autograft versus Bone-patella-tendon-bone autograft for ACL-reconstruction: A 15-year follow-up of a prospective randomized controlled trial.**

*Frederik Stensbirk, Kristian Thorborg, Lars Konradsen, Per Hölmich*

**15. Increasing laxity after ACL reconstruction with patella tendon is not caused by failure of fixation - a 10-year follow up with RSA**

*Louise Irdal-Jeppesen, Annette Holm Kourakis, Michael Rindom Krosgaard*

**16. Outcome of arthroscopic treatment of hip pain due to femuroacetabular impingement.**

*Torsten Grønbech Nielsen, Lene Lindberg Miller, Bent Lund, Svend Erik Christiansen, Martin Lind*

**17. Outcome of Hip Arthroscopy after Peri-Acetabular Osteotomy**

*Bent Lund, Torsten Nielsen, Svend Erik Christiansen, Martin Lind*

**18. Reconstruction of the medial patellofemoral ligament in patients with recurrent patella instability**

*Ditte Enderlein, Torsten Nielsen, Svend Erik Christiansen, Peter Faunø, Martin Lind*

**19. Rotational stiffness of ACL reconstructed knees measured by 3D-motion analysis.**

*Marie Bagger Bohn, Henrik Sørensen, Martin Lind*

**20. Running-related injuries among novice runners: A one year prospective follow-up study.**

*R.O. Nielsen, I. Buist, H. Sørensen, M. Lind, S. Rasmussen*

**21. The Danish Hip Arthroscopy database. The first National Register for Hip Arthroscopy**

*Bent Lund, Svend Erik Christiansen, Otto Kraemer, Niels Mortensen, Søren Winge*

**22. The impact of free or restricted rehabilitation on healing of meniscus repair. A prospective randomized clinical trial.**

*Martin Lind, Torsten Nielsen, Bent Lund, Peter Faunø, Svend Erik Christiansen*

## **Session 3: Trauma**

**Onsdag 24. oktober**

**09:00 – 10:30**

*lokale: C*

**Chairmen: Anders Troelsen, Frank Damborg**

**23. Completeness and validity of data in Dansk Frakturdatabase”: A novel registry for quality assessment of fracture related surgery.”**

*Kirill Gromov, Michael Brix, Anders Troelsen*

**24. Early results of tibial nailing with Angular Stable Locking Screws (ASLS)**

*Peter Kraglund, Jesper Schønnemann, Søren Kring, Michael Brix*

**25. EFORT12-2819 Microdialysis and Laser Doppler flow measurements in the femoral head in patients with dislocated femoral neck fractures, one year follow up**

*Morten Foged Bøgehøj, Claus Emmeluth, Søren Overgaard*

**26. High Reliability of the Hvidovre Algorithm for Hip Fracture Surgery**

*Henrik Palm, Eva Posner, Hans-Ulrik Ahler-Toftehøj, Silas Gylvin, Tobias Aasvang, Kenneth Brian Holtz*

**27. Intra- and interobserver reliability on Sanders classification system**

*Lonnie Froberg, Nikolaj Sode, Henrik Eckardt*

**28. Introducing a standardized algorithm for managing multitrauma patients in the Trauma Centre, Rigshospitalet**

*Adrina Kalasho, Henrik Eckardt*

### **29. Mortality in Young Hip Fracture Patients**

*Peter Max Jensen, Troels Riis, Susanne van der Mark, Benn Rønnow Duus, Jes Bruun Lauritzen, Ole Birger Vesterager Pedersen*

### **30. Operative versus nonoperative treatment of displaced midshaft clavicle fractures in adults - a systematic review.**

*Martin Kirkegaard, Carl-Henrik Rehn, Bjarke Viberg, Morten Schultz Larsen*

### **31. Reduced reoperation rate of cemented hemiarthroplasty (HA) compared with cementless HA and internal fixation of displaced femoral neck fracture up to 19 years after initial surgery in 75+ year old patients**

*Bjarke Viberg, Søren Overgaard, Jens Lauritsen, Ole Ovesen*

### **32. The physically best-fit hip fracture patients stay hospitalized due to logistic problems**

*Henrik Palm, Pia Iheme Nielsen, Morten Tange Kristensen, Henrik Kehlet*

### **33. The use of intraoperative computer tomography in acetabular and pelvic fractures**

*Dennis Olsson, Eckardt Henrik*



# **Session 4: Hip/knee**

**Torsdag 25. oktober**

**Kl. 13:30 – 15:00**

*lokale: A*

**Chairmen: Anders Odgaard, Anders Lamberg**

**34. The feasibility of early Progressive Resistance Training after Unicompartmental Knee Arthroplasty**

*Peter Bo Jørgensen, Søren Bie Bogh, Kjeld Søballe, Henrik Sørensen, Inger Buur Mechelnburg*

**35. Can patients accurately assess their knee range of motion? Development and validation of a picture based questionnaire**

*Jens Borghjerg, Jens Odgaard*

**36. CASPAR, robot-assisted total knee arthroplasty: 10-12 years results.**

*Tord Salomonsen, Jan Shultz Hansen*

**37. Fibrin sealant has no effect on drain output or functional recovery following total knee arthroplasty. A randomized, double-blind, placebo-controlled study in simultaneous bilateral TKA.**

*Christian Skovgaard Nielsen, Anderes Troelsen, Bente Holm, Troels Lund, Henrik Kehlet, Henrik Husted*

**38. Muscle Damage From The Arterial Tourniquet in Total Knee Arthroplasty Occur Underneath The Cuff**

*Lasse E. Rasmussen, Henriette A. Holm, Per W Kristensen, Per Kjærsgaard-Andersen*

**39. Outcome of allograft reconstruction of the knee extensor mechanism.**

*Bjarne Mygind-Klavsen, Svend Erik Christiansen, Claus Fink Jepsen, Frank Madsen, Anders Odgaard, Martin Lind*

**40. The Oxford® Cementless Partial Knee Tibial Trays Subside Initially but Stabilize at 6 Months: A Randomized Clinical RSA Study**  
*Maiken Stilling, Frank Madsen, Claus Fink Jepsen, Kjeld Søballe, Per Wagner Kristensen, Anders Odgaard*

**41. The Oxford® Partial Knee Femoral Components: Are 2 pegs better than 1?**  
*Maiken Stilling, Frank Madsen, Claus Fink Jepsen, Kjeld Søballe, Per Wagner Kristensen, Anders Odgaard*

**42. Use of Trabecular Metal Cones (TM Cone) for Reconstruction of Severe Bone loss at the Proximal Tibia in Revision Total Knee Arthroplasty. 35 cases followed 5-72 months**  
*Nikolaj Winther, Claus Lindkær, Michael Mørk Petersen, Henrik Schrøder*

**43. Value of tourniquet in TKA surgery**  
*Ashir Ejaz, Mogens, B Laursen, Andreas Kappel, Poul T. Nielsen, Sten Rasmussen*

**44. Work, wellbeing, and sexual life in younger patients after knee replacement**  
*Jakob Klit, Steffen Jacobsen, Stig Sonne-Holm, Signe Rosenlund, Anders Troelsen*

# **Session 5: Experimental/non-clinical**

Torsdag 25. oktober

Kl. 13:30 – 15:00

lokale: B

**Chairmen: Kjeld Søballe, Ming Ding**

**45. A novel nano-structured porous polycaprolactone scaffold improves hyaline cartilage repair in a rabbit model compared to a collagen type I/III scaffold: in vitro and in vivo studies**

*Bjørn Borsøe Christensen, Casper Bindzus Foldager, Ole Møller Hansen, Jens Vinge Nygaard, Cody Erik Bünger, Martin Lind*

**46. A small peptide bone substitute (P-15) significantly improved microarchitecture of concentric gap mass and enhanced implant fixation in sheep**

*Ming Ding, Christina Andreasen, Mads Dencker, Anders Jensen, Søren Overgaard*

**47. Accelerated bone growth, but weaker implant fixation in allograft mixed with nano-hydroxyapatite.**

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

**48. Antibiotic Pre-exposure Reduces the Ability to Detect Heat Production of Bacteria in Biofilm**

*Christen Ravn, Ulrika Furustrand Tafin, Bertrand Betriséy, Søren Overgaard, Andrej Trampuz*

**49. Collagen-Coated Polytetrafluoroethane Membrane Inserts Enhances Chondrogenic Differentiation of Human Cord Blood Multi-Lineage Progenitor Cells**

*Samir Munir, Kjeld Søballe, Michael Ulrich-Vinther, Thomas Gadegaard Koch, Rita A. Kandel, W. David Lee*

**50. Distribution of laminin in early osteochondral repair in a goat model**

*Casper Bindzus Foldager, Hu-Ping Hsu, Martin Lind, Myron Spector*

**51. Evaluating of bone healing around porous coated titanium implant and potential systematic bias of the traditional sampling method**

*Hassan Babiker, Ming Ding, Søren Overgaard*

**52. Incorporation of Raloxifene-impregnated Allograft around Orthopaedic Titanium Implants**

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

**53. Increased Bone Formation in a Porcine Critical Size Defect when using Hyaluronic Acid and TCP Coated Polycaprolactone Scaffolds Seeded with Autologous Dental Pulp Stem Cells**

*Jonas Jensen, Jens Vinge Nygaard, Muwan Chen, David Christian Evar Kraft, Jørgen Baas, Cody Bünger*

**54. Local treatment with zoledronate does not inhibit new bone formation**

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

**55. Mechanically induced osteoclast differentiation is associated with alterations in genes regulating IL-6 signaling, cell death and osteoblast differentiation**

*Rune V. Madsen, Benjamin McArthur, Aleksey Dvorzhinskiy, F. Patrick Ross, Mathias P. Bostrom, Anna Fahlgren*

## **Session 6: Spine - Tumor**

**Torsdag 25. oktober**

**Kl.: 13:30 – 15:00**

*lokale: C*

**Chairmen: Benny Dahl, Johnny Keller**

**56. A comprehensive multimodal pain treatment improves postoperative mobilization after multilevel spine surgery**

*Ole Mathiesen, Benny Dahl, Berit Thomsen, Birgitte Kitter, Jørgen Dahl, Henrik Kehlet*

**57. ALARM SYMPTOMS OF SOFT TISSUE AND BONE SARCOMA AMONG PATIENTS REFERRED TO A SPECIALIST CENTRE**

*Heidi Buvarp Dyrop, Peter Vedsted, Katja Maretty-Nielsen, Bjarne Hauge Hansen, Peter Holmberg Jørgensen, Johnny Keller*

**58. CANCER PATIENT PATHWAYS SHORTENS WAITING TIMES AND ACCELERATES THE DIAGNOSTIC PROCESS OF SUSPECTED SARCOMA PATIENTS IN DENMARK**

*Heidi Buvarp Dyrop, Peter Vedsted, Katja Maretty-Nielsen, Bjarne Hauge Hansen, Peter Holmberg Jørgensen, Johnny Keller*

**59. Changes in cancer survival could affect pre-operative scoring systems in patients with metastatic spinal cord compression (MSCC)**

*Søren Schmidt Morgen, Casper Lund-Andersen, Claus Falck Larsen, Rikke Søgaard, Svend Aage Engelholm, Benny Dahl*

**60. Long-term results of total endoprosthetic knee replacement in patients with primary bone tumors in the lower extremities.**

*Thomas Baad-Hansen, Bjarne Hauge Hansen, Katja Nielsen, Peter Holmberg Jørgensen, Johnny Keller*

**61. Neurological Function and Survival Outcome of Aarhus Algorithm in Patients with Spinal Solitary Plasmacytoma or Multiple Myeloma**

*Miao Wang, Cody Bünger*

**62. Osteosarcoma: 30 Years' Experience from a Single Institution's Population-based Database**

*Ninna Aggerholm-Pedersen, Katja Maretty-Nielsen, Johnny Keller, Henrik Schrøder, Steen Bærentzen, Akmal Safwat*

**63. Prevalence of complications in neuromuscular scoliosis surgery: A literature meta-analysis from the past 15 years**

*Shallu Sharma, Cody Eric Bunger, Thomas Andersen, Ebbe Stender Hansen*

**64. Survival Analysis Of The Breast Cancer Subtypes With Spinal Metastases**

*Miao Wang, Jensen Anders, Ming Sun, Søren Morgen, Benny Dahl, Cody Bünger*

**65. The Aarhus Sarcoma Registry: Validity and Completeness in a Population of Bone and Soft Tissue Sarcomas**

*Katja Maretty-Nielsen, Ninna Aggerholm-Pedersen, Johnny Keller, Akmal Safwat, Alma B. Pedersen*

**66. YKL-40 is expressed in soft tissue sarcomas**

*Mette L. Harving, Lise H. Christensen, Gunnar Lausten, Michael M. Petersen*

# **Session 7: Hip/knee**

**Fredag 26. oktober**

**Kl.: 09:00 – 10:15**

*lokale: A*

**Chairmen: Henrik Malchau, Anders Troelsen**

**67. A novel method for assessment of polyethylene liner wear in radiopaque tantalum acetabular cups: Clinical validation in patients enrolled in a randomized controlled trial**

*Anders Troelsen, Dov Golvasser, Meridith Greene, David Ayers, Charles Bragdon, Henrik Malchau*

**68. Catastrophic result with the metal-on-metal Conserve acetabular cup**

*Thomas Jakobsen, Hardy Christoffersen, Mette Adler Stampe, Anne Bensen, Niels Krarup*

**69. Current fixation usage and registry outcomes in total hip arthroplasty: The uncemented paradox**

*Anders Troelsen, Erik Malchau, Nanna Sillesen, Henrik Malchau*

**70. Feasibility of Early-Initiated Progressive Resistance Training after Total Hip Replacement**

*Lone Ramer Mikkelsen, Inger Mechlenburg, Mette Krintel Petersen, Kjeld Søballe, Søren Mikkelsen, Thomas Bandholm*

**71. The association between use of serotonergic antidepressants and perioperative bleeding during hip replacement**

*Annie Primdahl, Frank Damborg, Michael Dall, Jesper Hallas*

**72. The dislocating hip replacement - revision with a dual mobility cup**

*Thomas Jakobsen, Andreas Kappel, Flemming Hansen, Jørgen Søndergaard, Niels Krarup*

**73. The genetic influence on symptomatic hip and knee osteoarthritis differs by joint site and sex. A nationwide population and register based study in Danish twins.**

*Søren Glud Skousgaard, Lars Peter Brandt, Axel Skytthe, Søren Overgaard*

**74. Validation of physical activity by means of an activity monitor during simulated free living in patients with osteoarthritis of the hip.**

*Andreas Hermann, Mathias Ried-Larsen, Andreas Kryger Jensen, Lars Bo Andersen, Søren Overgaard, Anders Holsgaard-Larsen*

**75. Work, wellbeing, and sexual life in younger patients after hip replacement**

*Jakob Klit, Steffen Jacobsen, Stig Sonne-Holm, Victoria Schmiegelow, Anders Troelsen*



# **Session 8: Sports medicine/arthroscopy**

**Fredag 26. oktober**

**09:00 – 10:30**

*lokale: B*

**Chairmen: Marianne Backer, Lars Konradsen**

## **76. A Stereological Method for the Quantitative Evaluation of Cartilage Repair Tissue**

*Foldager Casper Bindzus, Nyengaard Jens R., Lind Martin, Spector Myron*

## **77. CONTENT VALIDITY IN A CONDITION-SPECIFIC PATIENT-RELATED OUTCOME SCORE FOR PATIENTS WITH ANTERIOR CRUCIATE LIGAMENT INJURIES**

*Jonathan Comins, Michael Krogsgaard, John Brodersen*

## **78. KINETIC ANALYSIS OF KNEE AND HIP JOINT LOADING DURING SIDECUTTING IN HANDBALL - IMPLICATIONS FOR PREVENTION AND REHABILITATION AFTER ACL-INJURIES**

*Jesper Bencke, Jesper Curtis, Hanne Bloch Lauridsen, Thomas Bandholm, Mette Kreutzfeld Zebis*

## **79. Local infiltration analgesia is comparable to femoral nerve block after anterior cruciate ligament reconstruction with hamstring tendon graft - A randomized controlled trial.**

*Pia Kjær Kristensen, Mogens Pfeiffer-Jensen, Jens Ole Storm, Theis Muncholm Thillemann,*

## **80. Mid-terms clinical and functional outcome following multi-ligaments reconstruction**

*Sinan Said, Bjørne Engstrøm, Christina Mikkelsen*

**81. Plantar fasciitis - Correlation between pain and ultrasound findings**

*Morten Torrild Thomsen, Anders Boesen, Morten Boesen, Søren Torp-Pedersen, Henning Langberg*

**82. RASCH ANALYSIS TO CONFIRM THE PSYCHOMETRIC PROPERTIES OF A NEW PATIENT-RELATED OUTCOME SCORE FOR ANTERIOR CRUCIATE LIGAMENT DEFICIENCY**

*Jonathan Comins, Michael Krogsgaard, Svend Kreiner, John Brodersen*

**83. The Copenhagen groin-pain test**

*Kristian Thorborg, Bente Andersen, Mads Langelund, Michael Madsen, Lasse Lundquist, Per Hölmich*

**84. TIBIAL AVULSION FRACTURE OF THE POSTERIOR ROOT OF THE MEDIAL MENISCUS IN CHILDREN AFTER MINOR TRAUMA**

*Jonas Vestergård Iversen, Michael Rindom Krogsgaard*

## **Session 9: Trauma**

**Fredag 26. oktober**

**Kl.: 09:00 – 10:15**

*lokale: C*

**Chairmen: Frank Damborg, Mikael Brix**

**85. Admission to hospital in the months before a fractured hip is associated with increased mortality**

*Christian Medom Madsen, Henrik Løvendahl Jørgensen, Troels Riis, Susanne van der Mark, Jes Bruun Lauritzen, Benn Duus*

**86. Anterior Knee Pain and Limitations in Activity and Participation after Intramedullary Nailing of Tibial Shaft Fracture**

*Peter Larsen, Hans Lund, Uffe Laessoe, Thomas Graven-Nielsen, Juozas Petruskevicius, Sten Rasmussen*

**87. Bone transport of the tibia with a motorized intramedullary nail (Fitbone).**

*Søren Kold, Knud Stenild Christensen*

**88. Case series of first experience with use of the Intertan nail for all types of proximal femoral fractures**

*Ann Jørgensen, Ilija Ban, Thomas Bloch, Thomas Houe, Henrik Palm*

**89. Correlation between fractures and weather specific road conditions in an urban area**

*Morten Torrild Thomsen, Troels Riis, Bo Sommer, Henrik Jørgensen, Lauritzen Jes, Benn Duus*

**90. Equestrian related trauma cases received at Rigshospitalets Traume Center 2011**

*Mads Holm Møller, Henrik Grønborg*

**91. Factors associated with red blood cell transfusion in patients with a fractured hip**

*Christian Medom Madsen, Astrid Norgaard, Troels Riis, Ole Birger Pedersen, Benn Duus, Jes Bruun Lauritzen*

**92. Is mortality after hip fracture associated with surgical delay or admission during weekends and public holidays? - A retrospective study of 38,020 patients**

*Cecilie Laubjerg Daugaard, Henrik L Jørgensen, Troels Riis, Jes B Lauritzen, Susanne van der Mark, Benn R Duus*

**93. The Locking Attachment Plate in surgery of periprosthetic femur fractures in THA patients: A review of reoperations in 89 cases from two centers.**

*Zaid Issa, Ilija Ban, Kim Holck, Lonnie Froberg, Michael Brix, Anders Troelsen*

# **Session 10: Hip/knee**

**Fredag 26. oktober**

**Kl.: 10.45 – 11:34**

*lokale: C*

**Chairmen: Jeannette Ø Penny, Peter Gebuhr**

**94. Bilateral total hip- and knee arthroplasty. A nationwide study.**

*Martin Lindberg-Larsen, Christoffer Joergensen, Henrik Husted, Henrik Kehlet*

**95. Fully Automated Measurement of Radiological Angles in Hip Dysplasia using CT Images**

*Sepp de Raedt, Marleen de Bruijne, Inger Mechlenburg, Maiken Stilling, Lone Rømer, Kjeld Søballe*

**96. Hemicap- and Unicap - miniprosthesis and Hemicap patello-femoral (PF) - and PF-xl ( Wave ) - miniprosthesis.**

*Jens Ole Laursen*

**97. Inter-tester Reliability of the Hand-held dynamometer and the Leg Extensor Power Rig applied on Patients after Total Hip Arthroplasty**

*Lone Ramer Mikkelsen, Mette Krintel Petersen, Søren Mikkelsen, Kjeld Søballe, Inger Mechlenburg*

**98. Outcomes in tobacco and alcohol users after fast-track hip- and knee replacement.**

*Christoffer Calov Joergensen , Kehlet Henrik*

**99. Revision Risk of Total Hip Arthroplasty with Ceramic-on-Ceramic Bearings**

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

**100. Should the knife be discarded after skin incision in arthroplasty surgery?**

*Casper Ottesen, Annette Skovby, Henrik Husted, Alice Friis-Møller, Anders Troelsen*

**101. The role of patient demographics for fast-track hip and knee replacement**

*Christoffer Joergensen, Henrik Kehlet*

# **Session 11: Pediatrics**

**Fredag 26. oktober**

**Kl.: 12:15 – 13:30**

*lokale: A*

**Chairmen: Ivan Hvid, Niels Elitsgaard**

**102. Battered Child Syndrome, is there a sufficient knowledge among emergency room doctors?**

*Ann Buhl Bersang, Jenny Korsgaard Villadsen, Rikke Thorninger, Ole Rahbek, Bjarne Møller-Madsen*

**103. Dennyson-Fulford subtalar extra-articular arthrodesis for severe hindfoot valgus in children. A retrospective study.**

*Polina Martinkevich, Line Kjeldgaard Pedersen, Michel Bach Hellfritsch, Ole Rahbek, Bjarne Møller-Madsen*

**104. Is 8-plates superior to staples in the treatment of idiopathic genu valgus? A randomized clinical study.**

*Martin Gottliebsen, Ole Rahbek, Ivan Hvid, Michael Davidsen, Michel Bach Hellfritsch, Bjarne Møller-Madsen*

**105. Pelvic Osteotomy for Hip Subluxation and Dislocation in Children with Cerebral Palsy**

*Michael Schultz-Larsen, Nikolaj A Sode, Vilhelm Engell, Niels Wisbech Pedersen*

**106. Poor agreement between radiographs and clinical examinations in children with genu valgus**

*Nina Hardgrib Madsen, Martin Gottliebsen, Ole Rahbek, Michel Bach Hellfritsch, Bjarne Møller Madsen*

**107. Slipped Capital Femoral Epiphysis - a case file study in the Danish Patient Insurance Association**

*Mathilde Pihl, Stig Sonne-Holm, Jens Krogh Christoffersen, Christian Wong*

**108. The Effect of Botox Treatment in the Spine Muscles for Cerebral Paresis Scoliosis**

*Christian Wong, Søren-Anker Pedersen, Kasper Gosvig, Billy Kristensen, Stig Sonne-Holm*

**109. Treatment of Congenital hip dysplasia in newborns**

*Roland Knudsen, Vilhelm Engell, Niels Wisbech Pedersen*

**110. Treatment with botulinum toxin-A does not affect ankle joint biomechanics during gait in children with cerebral palsy**

*Jesper Bencke, Derek Curtis, Hanne Bloch Lauridsen, Christian Wong, Søren Anker Pedersen, Stig Sonne-Holm*



# **Session 12: Foot/ankle – Hand/wrist**

Fredag 26. oktober

Kl.: 12:15 – 13:30

lokale: B

**Chairmen: Johnny Frøkjær, Pernille Leicht**

**111. Assessment of precision in adult cadaver foot phantom model using radiostereometric analysis**

*Peter Buxbom, Ragnhild í Skorini, Stig Sonne-Holm, Christian Wong*

**112. Distraction osteogenesis after failed arthrodesis surgery on the first metatarso-phalangeal joint**

*Jens Kurt Johansen, Jens Wester, Tune Ipsen*

**113. Metal on metal articulation in total joint arthroplasty of the trapeziometacarpal joint seems not to represent a major problem**

*Lene Dremstrup, Maiken Stilling, Torben Bæk Hansen*

**114. The Eaton-Glickel classification cannot predict clinical outcome after total joint arthroplasty of the trapeziometacarpal joint**

*Lone Kirkeby, Torben Bæk Hansen*

**115. Ultrasound used as first line examination in the surgeon's office: Diagnostic accuracy of Wrist-to-Forearm Ratio in Carpal Tunnel Syndrome**

*Jeppe Lange*

**116. Validation of the Danish version of the Achilles tendon Total Rupture Score (ATRS).**

*Ann Ganestam, Kristoffer Barfod, Jakob Klit, Anders Troelsen*

**117. What treatment of acute Achilles tendon rupture is offered in the Nordic countries?**

*Kristoffer W. Barfod, Fredrik Nilsen, Katarina Nilsson Helander, Ville M. Mattila, Ola Tingby, Anders Troelsen*

**118. Xiapex® (collagenase clostridium histolyticum) - treatment of patients with Dupuytren's contracture**

*Søren Larsen, Jens Christian Werlinrud, Tune Ipsen, Jens Lauritsen*

**119. Xiapex® (collagenase clostridium histolyticum) - treatment of patients with recurrence Dupuytren's contracture after fasciectomy**

*Søren Larsen, Jens Christian Werlinrud, Tune Ipsen, Jens Lauritsen*

# **Session 13: Shoulder/elbow**

**Fredag 26. oktober**

**Kl.: 12:15 – 13:30**

*lokale: C*

**Chairmen: Lars Henrik Frich, Anne Katrine B Sørensen**

**120. A review of national shoulder and elbow joint replacement registries**

*Jeppe Rasmussen, Bo S. Olsen*

**121. Autologous Osteochondral Mosaicplasty for osteochondritis dissecans of the humeral capitellum in young patients.**

*Janne Ovesen, Hans Viggo Johannsen*

**122. Prevalence of unknown Diabetes Mellitus in Patients with Shoulder Symptoms**

*Per Hviid Gundtoft, Anne Krogh-Andersen, Birthe Anette Gullaksen, Jette Wessel Vobbe, Lilli Sørensen*

**123. Reliability of patient reported outcome in a joint replacement registry: no response bias found in the Danish Shoulder Arthroplasty Registry**

*Anne Polk, Jeppe Vejlgard Rasmussen, Stig Brorson, Bo Sanderhoff Olsen*

**124. Reverse shoulder arthroplasty in acute fractures of the proximal humerus: a systematic review**

*Stig Brorson, Jeppe V. Rasmussen, Bo S. Olsen, Lars H. Frich, Steen L. Jensen, Asbjørn Hróbjartsson*

**125. Suspected impingement syndrome - predictors of early closure of treatment. A prospective study within the framework of the Shoulder Intervention Project**

*Linda Christie Andrea, Poul Frost, Torben Bæk Hansen, Søren Rasmussen Deutch, Susanne Wulff Svendsen*

**126. Total elbow arthroplasty in patients with rheumatoid arthritis.**

*celia møllenborg, lars henrik frich, søren skydt kristensen*

**127. Translation between the Neer classification and the AO/OTA classification: Do we need to be bilingual to interpret the scientific literature?**

*Stig Brorson, Henrik Eckardt, Laurent Audigé, Bernd Rolauffs, Christian Bahrs*

**128. Treatment algorithms for acute, displaced, midshaft clavicle fractures in Denmark.**

*Ilija Ban*

# **Session 14: Foredragskonkurrence**

Fredag 26. oktober

12.15 – 15:30

lokale: A + B

**Chairmen: Per Kjærsgaard-Andersen, Anders Troelsen**

**129. Bone Cement with Initial Slow-Curing Increases Stability of Tibial Trays in TKR**

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

**130. Efficacy of neuromuscular exercise in patients with severe osteoarthritis of the hip or knee: A randomised controlled trial**

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

**131. Equally good fixation of cemented and uncemented cups in total joint trapeziometacarpal prostheses: a randomized clinical RSA study with 2 years follow-up**

*Torben Bæk Hansen, Maiken Stilling*

**132. Increased one year risk of venous thromboembolism following total hip replacement: A nationwide cohort study**

*Alma B Pedersen, Søren P Johnsen, Henrik T Sørensen*

**133. Increased risk of ACL revision after anteromedial compared to transtibial technique for femoral drillhole placement during ACL reconstruction. Result from the Danish registry of Knee ligament reconstruction**

*Lene Rahr Wagner, Theis Thillemann, Alma Becic Pedersen, Marin Carøe Lind*

**134. Patellatendon v. quadricepstendon for anterior cruciate ligament reconstruction - a prospective and randomized study.**

*Bent Lund, Svend Erik Christiansen, Torsten Nielsen, Peter Faunø, Martin Lind*

**135. The Prognostic Value of 18F-FDG PET/CT in the Initial Assessment of High-grade Bone and Soft Tissue Sarcomas**

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

# **Postersession I + udstilling i foyer**

Torsdag 25. oktober

11.30 – 12.30

*lokale: A*

**Chairmen: Jeannette Ø Penny, Michael Mørk Petersen**

**136. Are patient-reported complication rates valid and complete following Total Hip and Knee Arthroplasty?**

*Kiran Anderson*

**137. Clinical and radiological outcome after periacetabular osteotomy operated in the period 1999-2008. - Predictors for good results or conversion to Total Hip Arthroplasty.**

*Dahl Line Borreskov, Dengsø Kristine, Petersen Michael Mørk, Christensen Karl Bang, Stürup Jens*

**138. Clinical outcome for 223 patients after hip revision with positive microbiological cultures**

*Predrag Kokanovic, Poul Torben Nielsen, Juozas Petruskevicius*

**139. Local recurrence rate after surgical excision of highly differentiated liposarcomas**

*Sune Frederik Jauffred, Maj Kornø, Michael Mørk Petersen*

**140. Iliopsoas Abscesses: Signs & Surgery**

*Taj Haubuf, Klaus Kjær Petersen*

**141. Inertia-Sensor based Motion Analysis: Clinical validation as a tool for routine functional outcome assessment**

*Inger Mechlenburg, Kjeld Søballe, I.C. Heyligers, Rachel Senden*

**142. Patient and implant survival following joint replacement because of metastatic bone disease**

*Michala Skovlund Sørensen, Kristine Grubbe Gregersen, Tomas Grum-Schwensen, Dorrit Hovgaard, Michael Mørk Petersen*

**143. Progressive Resistance Training before and after Total Hip and Knee Arthroplasty- a Systematic Review**

*Birgit Skoffler, Inger Mechlenburg, Ulrik Dalgas*

**144. Short-term re-amputation rate following major below knee amputation**

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

**145. Survival of bonelock cemented THA performed at Dpt of Orthopedic Surgery Køge Hospital 1991-1993**

*Mohammed Jafar, Lene Kaavé, Leif Broeng*

**146. Ultrasound guided intra-articular injection in the hip joint - a helpful tool in the outpatient clinic**

*Dhia Khalaf Al-Fadli, Zaid Saadi Al-Saadi, Niels Krarup Jensen*

**147. Validation of the Danish version of the Toronto Extremity Salvage Score (TESS) questionnaire - a measurement of functional outcome for sarcoma patients.**

*Casper Sæbye, Akmal Safwat, Ninna Aggerholm-Pedersen, Anne Kathrine Kaa, Johnny Keller*



## **Postersession II + udstilling i foyer**

Torsdag 25. oktober

Kl. 11.30 – 12.30

lokale: B

**Chairmen: Mikael Brix, Marianne Backer**

**148. A novel technique: Preliminary clinical results of cement augmentation of intertrochanteric fractures stabilized with an intramedullary nail**

*Flemming Hansen, Mette S. Skjaerbaek*

**149. Dual mobility cup reduces the rate of dislocation compared to hemiarthroplasty when used to treat displaced femoral neck fractures.**

*Anne Soon Bensen, Thomas Jakobsen, Mette Adler Stampe, Niels Krarup*

**150. Early independence in basic amputee activities but extremely poor one-leg balance following major non-traumatic lower limb amputation**

*Morten Tange Kristensen, Anni Østergaard Nielsen, Berit Jakobsen, Kirsten Juel Nielsen, Ulla Madsen Topp*

**151. Evaluation of Lower-Limb Asymmetries in Mechanical Muscle Function and Functional Performance of ACL-Patients**

*Anders Holsgaard-Larsen, Tine Iversholt, Carsten Jensen, Niels Mortensen, Per Aagaard*

**152. Feasibility and effect of a progressive strength-training program in older community-dwelling patients commenced shortly after hip fracture surgery.**

*Jan Arnholtz Overgaard, Morten Tange Kristensen*

**153. GENERATING ITEM-CONTENT FOR CONDITION-SPECIFIC QUESTIONNAIRES: Face Validity in Patient-Related Outcome Score**

*Jonathan Comins, Michael Krogsgaard, John Brodersen*

**154. HIP-FLEXION STRENGTH TRAINING IN THE CLINICAL SETTING**

*Kristian Thorborg, Thomas Bandholm, Mette Zebis, Lars Andersen, Jesper Jensen, Per Hölmich*

**155. Long-term survival after severe trauma is not affected by Injury Severity Score (ISS).**

*Morten Wad, Sidsel Fruergaard, Claus Falck Larsen, Benny Dahl*

**156. Low Dislocation Rate of Saturne® Dual-Mobility THA after Medial Femoral Neck Fracture. A Retrospective Study of 205 hips with a minimum 2.5 year follow-up.**

*Steffan Tabori Jensen, Maiken Stilling, Søren Bøvling, Torben Bæk Hansen, Morten Homilius, Christina Frølich*

**157. Stress radiographic evaluation of knee collateral ligament laxity using the Telos-Device correlates with objective examination of knee instability**

*Mads Carlsson, Bent Lund, Peter Faunø, Svend Erik Christiansen, Martin Lind*

**158. The Challenges of Recruiting Patients into a Sham Surgery Trial**

*Kristoffer Hare, Stefan Lohmander, Ewa Roos*

**159. Transfusion of intra-operatively collected autologous blood in spinal surgery. Is it safe?**

*Michael Rud Lassen*

# **Postersession III + udstilling i Foyer**

**Torsdag 25. oktober**

**11.30 – 12.30**

*lokale: C*

**Chairmen: Ivan Hvid, Steen Lund Jensen**

**160. Agreement between two strength devices used in the newly modified Constant score.**

*Morten Tange Kristensen, Signe Hjerrild, Pernille Lund Skov Larsen, Maria Aagesen, Bente Hovmand, Ilija Ban*

**161. Bone Growth Plate Imaging: A Morphological and Functional Magnetic Resonance Study.**

*Juan Manuel Shiguetomi-Medina, Maja Sofie Kristiansen, Steffen Ringgaard, Hans Stødkilde-Jørgensen, Ole Rahbek, Bjarne Møller-Madsen*

**162. Fractures of the knee in children - what can go wrong?**

*Veronica Leeberg, Stig Sonne-Holm, Jens Krogh Christoffersen, Christian Wong*

**163. Instability-Induced Periprosthetic Osteolysis Is Not Dependent on the Fibrous Tissue Interface**

*Rune V. Madsen, Denis Nam, Aleksey Dvorzhinskiy, Mathias P Bostrom, Anna Fahlgren*

**164. Pitfalls in the treatment of pediatric ankle fractures - A partial root core analysis of 43 cases from the Danish Patient Insurance Association**

*Peter Buxbom, Stig Sonne-Holm, Jens Krogh Christoffersen, Christian Wong*

**165. Regeneration of Articular Cartilage in Sheep by Osteochondral Distraction**

*Becker Joachim, Christensen Lise, Blyme Peter, Strange-Vognsen Hans-Henrik, Krogsgaard Michael*

**166. Rinsing allograft bone does not improve implant fixation - A study in 12 dogs**

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

**167. Skeletal age assessment by a modified Sauvegrain method.**

*Camilla Mersø, Wasan Wahid, Kasper Gosvig, Niels Ellitsgaard*

**168. Slipped Capital Femoral Epiphysis in Denmark**

*Mathilde Pihl, Niels Ellitsgaard*

**169. Thermal Epiphysiodesis Made with Radio Frequency Ablation: An Alternative Treatment for Leg Length Discrepancy**

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

**170. Varus Derotation Osteotomy with the LCP-Hip plate for the Treatment of Hip Subluxation and Dislocation in Children with Cerebral Palsy**

*Nikolaj Sode, Michael Schultz-Larsen, Vilhelm Engell, Niels Wisbech Pedersen*

# **Posterudstilling**

**Fra: onsdag d. 24. oktober**

**kl. 10.30**

*lokale: foyer*

**171. Expectations and health-related quality of life - a questionnaire survey of patients undergoing total hip replacements**

*Jane Schwartz Leonhardt, Per Kjærsgaard-Andersen*

**172. 20 years performance of Boneloc cemented primary Exeter hip arthroplasty.**

*Per B. Thomsen, Jesper Dalsgaard, Dovydas Vainorius, Torben B. Hansen,*

**173. 3D imaging of the spine using EOS system, is it reliable? A comparative study using CT imaging.**

*Zaid Al-Aubaidi, David Lebel, Rienhard Zeller, Kamaldine Oudjhane, Benjamin Alman*

**174. A descriptive analysis of reasons for late onset of treatment of developmental hip dysplasia.**

*Elisabeth Busk, Stig Sonne-Holm, Jens Krogh Christoffersen, Christian Wong*

**175. A Review of Pregnant Trauma Patients received at Rigshospitalets TraumeCenter from January 2000 - May 2012**

*Peter Horstmann, Henrik Grønborg*

**176. A standardised test protocol based on the modified Constant Score and translation into Danish.**

*Ilija Ban*

**177. Development and validation of a mathematical model of the femoral bone**

*Tina Lercke Skytte, Stig Sonne-Holm, Lars Pilgaard Mikkelsen, Christian Wong*

**178. Endoscopic-assisted Treatment of Chronic Exertional Compartmental Syndrome (CECS) in the Lower Legs and Forearms**

*Mads Karlsson, Karl Jöhnk, Steffen Skov Jensen*

**179. Infantile Fibrosarcoma - Two case stories and review of the literature.**

*Martin Bille Henriksen, Jørgen Peter Holmberg Jørgensen, Bjarne Hauge Hansen, Henrik Schrøder*

**180. Intra-rater Reliability and Between-leg Asymmetries in Unilateral Jump Performance and Muscle Strength in Healthy Adults**

*Anders Holsgaard-Larsen, Carsten Jensen, Per Aagaard*

**181. Operative treatment of Colles fractures - a radiological study**

*Bekir Ince, Stig Sonne-Holm*

**182. PATIENT SPECIFIC MUSCULOSKELETAL MODEL FOR CLINICAL GAIT ANALYSIS**

*Christian Wong, Sofie Jacobsen, Derek Curtis, Jesper Bencke, Tine Alkjær, Erik Simonsen*

**183. Poor function within 4-months of hip fracture surgery is associated with handgrip strength assessed in the acute orthopaedic ward**

*Louise Lohmann Faber, Morten Tange Kristensen*

**184. Pulsed Electromagnetic Field (PEMF) Therapy in treatment of scaphoid nonunions**

*Predrag Kokanovic, Poul Verner Madsen*

**185. Rotationplasty**

*Marie Anneberg, Thomas Baad-Hansen, Bjarne Hauge Hansen, Peter Holmberg Jørgensen, Johnny Keller*

**186. Snapping scapula in Denmark - Diagnostic strategy and treatment during one year**

*Martin Rathcke, Michael R. Krogsgaard*

**187. THA for femoral neck fractures - Is it worth waiting for?**

*Jeppe Staghøj, Leif Broeng*

**188. The Effect of Adherent Endotoxin on Osseointegration of Un cemented Implants - An Animal Study**

*Andreas West, Jørgen Baas, Joan Bechtold, Edward Greenfield, Kjeld Søballe*

**189. The efficacy of intraoperative Gardner-Wells Skull Tongs -unilateral femoral traction in correction of pelvic obliquity in non-ambulatory cerebral palsy patients; A retrospective comparative study**

*Zaid Al-Aubaidi, David Lebel, Andrew Howard, Benjamin Alman, Reinhard Zeller, Stephan Lewis*

**190. The use of Ultrasound imaging in Diagnosing ruptures of the Distal Biceps tendon.**

*Rasmus Mikkelsen*

**191. Health related quality of life and disability in patients surgically treated for spondylodiscitis**

*Casper Dragsted, Martin Gehrchen, Theis Aagaard, Benny Dahl*

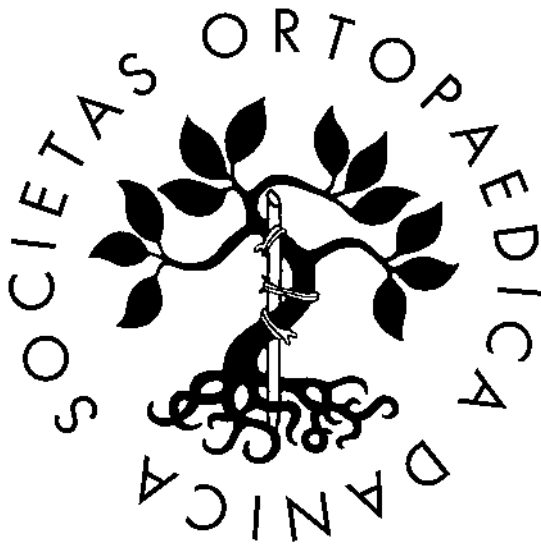
**192. How does isolated changes in hip and pelvis range of motion affect The Gait Deviation Index score (GDI); pathologic simulation form a healthy control**

*Nielsen Dennis Brandborg, Jensen Carsten, Rosenlund Signe, Holsgaard-Larsen Anders*

**193. Barographic Measurement of Seating Position in Children with Cerebral Palsy Undergoing Hip Surgery**

*Line Kjeldgaard Pedersen, Ole Rahbek, Bjarne Møller-Madsen*

# **ABSTRACTS**





# 1.

## **A Scandinavian Survey of Treatment Routines in Prosthetic Joint Infections after Total Hip and Knee Arthroplasty**

*Måns Forsberg, Eric Bekric, Christen Ravn, Søren Overgaard*

Orthopedics and Traumatology Odense University Hospital; Orthopedics and Traumatology, Odense University Hospital; Orthopedics and Traumatology, Odense University Hospital; Orthopedics and Traumatology, Odense University Hospital

**Background:** The number of prosthetic joint infections (PJIs) after total hip arthroplasty (THA) and total knee arthroplasty (TKA) are increasing. PJI is a serious complication due to high related morbidity and substantial health care expenditure. Treatment of PJI remains a controversial subject.

**Purpose / Aim of Study:** Our aim was to investigate the treatment routines for PJI in Scandinavia in a questionnaire survey.

**Materials and Methods:** All clinics performing primary THA and TKA in Scandinavia were contacted. 89 clinics met the inclusion criteria (clinics performing PJI revision in 2011), and were willing to participate in the study, 6 clinics declined to participate. The 89 clinics were divided into a hip and knee survey and due to some clinics had the same leader, 148 anonymous surveys were distributed (74 regarding hip and 74 regarding knee). The surgeons were asked to state their preferred treatment in 7 constructed clinical cases which could be answered exhaustively with the same 8 alternatives. The cases were designed to cover different classes of infection; acute/early, delayed, late, hematogenous spread and positive inter operative culture which is in accordance with the recommendations of both Zimmerli and Gustilo.

**Findings / Results:** 117/148 surveys were completed (response rate: 79%) representing 77 clinics. Widespread diversity in treatment routines were registered among the clinics in Scandinavia. Statistically significant differences were observed among the countries. There was a higher proportion of 2 stage operation reported from Denmark and Norway compared to Sweden in both the hip and knee survey.

**Conclusions:** We found marked differences in treatment routines of PJI among the Scandinavian countries and within countries. This reflects that today's treatment strategy relies on lower evidence level and that there is no consensus in the field.

## 2.

### **Antibodies against Glucosaminidase as a biomarker of protective immunity against Staphylococcus aureus osteomyelitis**

*Nina Gedbjerg, John Daiss, Joshua Hunter, Kirill Gromov, Kjeld Søballe, Edward Schwarz*

The Center for Musculoskeletal Research and Department of Orthopedics University of Rochester, Rochester, New York, USA and Aarhus University Hospital, Aarhus, Denmark; Codevax Inc, Rochester, New York, USA; The Center for Musculoskeletal Research, University of Rochester, Rochester, New York, USA; Department of Orthopedics, Aarhus University Hospital, Aarhus, Denmark; Department of Orthopedics, Aarhus University Hospital, Aarhus, Denmark; The Center for Musculoskeletal Research, University of Rochester, Rochester, New York, USA

**Background:** Methicillin-resistant *Staphylococcus aureus* is now the most deadly pathogen in the USA. This has raised concerns for the millions of people who undergo total joint replacement (TJR) surgery each year, 1-2% of which will contract chronic osteomyelitis. The standard of care is a two-stage exchange arthroplasty with a failure rate as high as 30-50%. The choice and timing of treatment should be based on the patient's immune status, but at the moment there are no available biomarkers to make this possible. Based on preclinical studies that have identified glucosaminidase (Gmd) as an immunodominant antigen, we hypothesize that anti-Gmd antibodies are diagnostic of protective immunity against *S. aureus* osteomyelitis.

**Purpose / Aim of Study:** To evaluate circulating anti-Gmd antibodies in patient sera as a biomarker of protective immunity against *S. aureus* osteomyelitis.

**Materials and Methods:** We developed an ELISA and a Gmd enzyme inhibition assay to quantify the physical and functional titers of anti-Gmd antibodies in patient sera respectively using approved IRB protocols. These titers were determined in sera from 20 healthy controls undergoing primary TJR surgery, and 32 patients infected with *S. aureus* osteomyelitis following TJR surgery.

**Findings / Results:** The osteomyelitis patient group had significant higher titers of anti-Gmd antibodies when compared to the control group (physical titer  $p < 0.02$ ; functional titer  $p < 0.0001$ ). Furthermore, we demonstrated a significant correlation between physical and functional titers ( $p < 0.0001$ ).

**Conclusions:** Protective immunity requires high-titer neutralizing antibodies against several *S. aureus* antigens, including Gmd. We showed that anti-Gmd antibodies have a diagnostic value as a biomarker of immunity against *S. aureus* osteomyelitis and this is the first step towards development of a *S. aureus* vaccine.

*Deltager i konkurrencen om YODA's ungdomsforskerpris*

### 3. **Evaluation of ultrasound as a primary diagnostic tool for diagnosing pseudo tumor in THA, with MRI as the gold standard**

*Martin Schou, Trine Torfing, Søren Overgaard, Jens-Erik Varmarken*

Orthopaedic Research Unit, Odense University Hospital/ Clinical Institute, Faculty of Health sciences, Southern University Denm; Radiographic diagnostic Department, Odense University Hospital, Odense, Denmark.; Orthopaedic Research Unit., Odense University Hospital/ Clinical Institute, Faculty of Health sciences, Southern University Denm; Department of Orthopaedic Surgery, Sygehus syd, Naestved Hospital, Region Sjælland, Denmark.

**Background:** Metal-on-metal (MoM) total hip arthroplasty (THA) seems to have a recognized complication in the formation of a reactive periprosthetic soft tissue mass (pseudotumor), also known to be seen in standard THA. Though magnetic resonance imaging (MRI) has become a major imaging modality of the hip, ultrasound (US), especially when performed based on relevant clinical data is extremely sensitive in detecting small joint and soft tissue effusions.

**Purpose / Aim of Study:** The purpose of this study was to evaluate the specificity and sensitivity, along with positive predictive value (PPV) and negative predictive value (NPV), of US in the diagnosis of pseudotumor, with MRI as the gold standard.

**Materials and Methods:** We studied 205 THA hips in 170 patients. 155 MoM-THA and 50 standard THA hips. MRI was performed using an open scanner T1 weighted, and fore US was performed using a linear 5-10MHz transducer. Findings of pseudotumor were classified using modified Oxford type I-III. During both MRI and US the examiner evaluated the diagnostic overview as poor, fair, good or excellent. Body mass index (BMI) was calculated on all patients. MRI was evaluated by senior specialist in musculoskeletal MRI. US was evaluated by a trained Ph.D.-student with experience from more than 300 diagnostic musculoskeletal US.

**Findings / Results:** Pseudotumors were seen in 48 hips by MRI but were overlooked in 4 hips using US. US found 9 pseudotumors not recognized on MRI. We thus found a sensitivity of US of 0,92 and a specificity of 0,94. Finding a PPV of 0,84 and a NPV of 0,98. MRI verified cases overlooked on US correlates with patients having a high BMI or categorized during US with a poor or fair diagnostic overview. False positive findings seem to be located primarily in the close periprosthetic region where MRI sometimes have its limitations due to metal artifacts.

**Conclusions:** US is a valuable tool for diagnosing pseudotumors, but its sensitivity decreases with the diagnostic overview. The sensitivity of US for finding pseudotumors in the periprosthetic region might be greater than that of MRI due to a lack of metal artifacts when performing US.

#### 4. **Has body composition any effect on THA-scheduled patients' assessment of their own hip problems? - A preoperative cross-sectional study**

*Anette Liljensøe, Jens Ole Laursen, Kjeld Søballe, Inger Mechlenburg*  
Orthopaedic Research Unit Aarhus University Hospital; Department of Orthopaedics, Hospital Southern Jutland; Orthopaedic Research Unit, Aarhus University Hospital; Orthopaedic Research Unit, Aarhus University Hospital

**Background:** The most frequent indication for THA is osteoarthritis (OA). Obesity is a significant factor for the development of OA. However, the association between obesity and outcome following THA is ambiguous.

**Purpose / Aim of Study:** The purpose of this preoperative cross-sectional study was to investigate THA-scheduled patients' demographic characteristics, and to examine whether there was a correlation between body composition and the patients' own assessment of their hip related problems and quality of life.

**Materials and Methods:** Body composition was measured with Dual Energy X-ray Absorptiometry (DXA) on (in?) 102 patients before THA. In addition, patients answered hip-specific questionnaire HOOS and patient reported outcome, SF-36. All examinations were performed from November 2011 to May 2012. The study population consisted of 54% women and mean age was 70 (41-89) years. 40% were unskilled workers; 15% were still employed, 8% disability pensioner and 77% old age pensioner.

**Findings / Results:** The mean percentage of fat was 36 (15 -53)% and mean muscle mass was 48 (31 -73) g/cm<sup>2</sup>. We found no statistically significant relationship between body composition and any of the five HOOS subscales: pain, symptoms, function in daily living, function in sport and recreation, and hip related quality of life.

**Conclusions:** In our preoperative cross-sectional study, we found no association between the patients' body composition and their own assessment of hip problems. This indicates that patients that are overweight and obese do not rate their own health and quality of life lower than lean patients before surgery.

## 5.

### **Implementing an early multimodal non-surgical treatment strategy for knee and hip osteoarthritis in clinical practice – a study of feasibility and effectiveness**

*Søren Thorgaard Skou, Anders Odgaard, Jens Ole Rasmussen, Ewa M. Roos*  
Orthopaedic Surgery Research Unit and Department of Health Science and Technology Aalborg Hospital - Aarhus University Hospital and Centre for Sensory-Motor Interaction, Aalborg Univ; Danish Knee Arthroplasty Register and Division of Knee Surgery, Department of Orthopaedics, Aarhus University Hospital; GIGT og RYG - Clinic For Physiotherapy, Odense, ; Research Unit for Musculoskeletal Function and Physiotherapy, Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark

**Background:** In knee and hip OA an early multimodal non-surgical treatment strategy is recommended in current national and international guidelines. However clinical practice does not reflect the recommendations.

**Purpose / Aim of Study:** The aim of this study was to examine the effectiveness and feasibility of such a treatment strategy (Good Life with osteoArthritis in Denmark – GLA:D) in patients with mild to moderate knee and/or hip OA-related pain.

**Materials and Methods:** Thirty-six patients participated in this pilot study. The treatment strategy consisted of two 1.5 hour sessions of patient education containing information on OA and treatment of the disease and six weeks of individualised neuromuscular exercise according to the NEMEX-TJR program. Primary outcome was pain on a visual analogue scale (0-100) after 3 months. Secondary outcomes were timed 20-meter walk and EQ-5D. Compliance with exercise was measured as number of exercise sessions completed out of the expected 12 sessions while compliance with GLA:D in general was registered using a five-point scale assessing the adherence to the treatment (never, every month, every week, every day, several times a day). Paired samples t- test was applied to evaluate the effect of the treatment strategy.

**Findings / Results:** There were a significant ( $p < 0.05$ ) reduction in pain (-16), in timed 20-meter walk (0.7s.) and a significant increase in EQ-5D (0.053). Compliance was high in relation to both patient education (89% used what they had learned every week) and exercise (87% participated in 10-12 of the sessions).

**Conclusions:** The pilot study showed that GLA:D reduced pain and improved function and quality of life and that it was feasible and possible to implement into clinical care. Introducing GLA:D nationwide would improve the adherence to clinical guidelines and the quality of the treatment of knee and hip OA.

## 6.

### **Does previous periacetabular osteotomy compromise optimal cup positioning and clinical outcome of total hip replacement?**

*Charlotte Hartig-Andreasen, Maiken Stilling, Kjeld Søballe,  
Theis Muncholm Thillemann, Anders Troelsen*

Dept. of Orthopedic Research Aarhus University Hospital;

Dept. of Orthopedic Research, Aarhus University Hospital;

Dept. of Orthopedics, Aarhus University Hospital; Dept. of Orthopedics,  
Horsens Hospital; Dept. of Orthopedics, Hvidovre Hospital

**Background:** Although periacetabular osteotomy (PAO) is a success, some dysplastic hips develop osteoarthritis following PAO. Typically these hips are extreme cases with severe dysplasia before PAO. The conversion of PAO to THR may therefore be associated with technical challenges that could compromise good cup positioning and clinical outcome.

**Purpose / Aim of Study:** To evaluate radiographic, clinical and patient reported outcome of THR in hips with previous PAO.

**Materials and Methods:** 38 hips (34 patients) treated with THR after previous PAO were included in the study at routine follow-up. The mean age at THA was 40.5 years. The follow-up included standardized AP pelvic and lateral hip radiographs that were analyzed for acetabular cup position, 2D linear wear (Polywear), heterotopic calcification, osteolysis or loosening. A clinical hip examination was performed, and alongside, Harris Hip score (HHS), SF36 and WOMAC questionnaires were collected. Any complications and revisions were noted.

**Findings / Results:** 16 patients had remaining dysplasia (CE<25o, range -5o-24o) after PAO. At a mean follow-up of 6.4 years (4.2- 10.1) after THR the cup abduction angle was 43o (range 28o-65o; n=1>60o), cup anteversion was 22o (range 7o-43o; n=2>40o) and polyethylene wear rate (MoM and CoC excluded) was 0.15 mm/year (range 0.05-0.27). There were no component revisions or dislocations. Patients reported VAS satisfaction of 10 (10 the best), a total WOMAC score of 78 (100 the best), and a HHS of 89 (100 the best), all median values. Leg-length discrepancy after THR was confined within 1 cm in 33 hips and within 2 cm in the remaining hips.

**Conclusions:** In general THR after previous PAO can be performed with optimal cup position, high patient satisfaction, good patient reported outcome and few complications. However, cup positioning following PAO may be a technical challenge.

## 7.

### **Increase in Fat Free Mass following Strength Training in Patients Diagnosed with Hip Osteoarthritis Scheduled for Total Hip Arthroplasty – a Randomized Explorative Trial**

*Andreas Hermann, Bo Zerahn, Anders Holsgaard-Larsen,  
Tine Christensen, Steen Mejdahl, Søren Overgaard*

Institute of Clinical Research University of Southern Denmark; Department of Clinical Physiology and Nuclear Medicine, Herlev Hospital; Orthopedic Research Unit, Department of Orthopedics and Traumatology, Odense University Hospital; Department of Clinical Physiology and Nuclear Medicine, Herlev Hospital; Department of Orthopaedic Surgery, Herlev Hospital; Orthopedic Research Unit, Department of Orthopedics and Traumatology, Odense University Hospital

**Background:** Osteoarthritis (OA) of the hip is associated with loss of muscle mass and function. Resistance training (RT) increases muscle mass in healthy elderly adults but the effect of preoperative RT in patients with end stage OA of the hip is not known and could be of importance for postoperative outcome

**Purpose / Aim of Study:** To investigate effects of intervention with preoperative progressive RT on body composition in patients with hip OA scheduled for total hip arthroplasty (THA)

**Materials and Methods:** Patients 50-88 years of age diagnosed with hip OA and scheduled for THA were randomized into two groups: The intervention group (I) received supervised preoperative progressive RT twice a week for 10 weeks. Four exercises focusing on hip and thigh muscles were performed in 3 series each with an intensity corresponding to 80% of 1 repetition maximum. The control group (C) received standard preoperative information which included a home based training program. Body composition regarding fat mass (FM) and fat-free mass (FFM) was measured by dual x-ray absorptiometry (DXA) at baseline (T0) and 1 to 3 days prior to surgery (T1)

**Findings / Results:** There was a significant ( $p=0.017$ ) increase in FFM in group I from T0 to T1 I ( $0.49 \text{ kg} \pm 1.35$ ) compared to group C ( $-0.23 \text{ kg} \pm 0.96$ ) and a trend towards a decrease ( $p=0.08$ ) in FM in group I ( $-0.70 \text{ kg} \pm 1.71$ ) as compared with C ( $-0.14 \text{ kg} \pm 0.68$ ). There were no significant differences between groups regarding changes in body weight or baseline levels of age, height, body weight, and gender distribution

**Conclusions:** Intervention with 10 weeks of preoperative RT induced a significant gain in FFM and trend towards reduction in FM in patients with end stage hip OA compared with controls. This study holds promise to provide objective information on the potential postoperative advantage of progressive preoperative RT.

## 8.

### **Increasing risk of revision due to infection after total hip arthroplasty**

*Håvard Dale*

Norwegian Arthroplasty Register Dep. of Orthopaedic Surgery,  
Haukeland University Hospital

**Background:** The risk of revision due to infection after primary total hip arthroplasty (THA) has been reported to increase in Norway and Denmark.

**Purpose / Aim of Study:** We investigated if this increase was a common feature in the Nordic countries Denmark, Finland, Norway and Sweden.

**Materials and Methods:** The study was based on the Nordic Arthroplasty Register Association's (NARA) dataset. 432,168 primary THAs from 1995 to 2009 were included. Adjusted survival analyses were performed by Cox regression models with revision due to infection as the endpoint. The impact of risk factors such as the year of surgery, age, sex, diagnosis, type of prosthesis and fixation were assessed.

**Findings / Results:** 2,778 (0.6%) of the primary THAs were revised due to infection. Compared to 1995-1999, the relative risk of revision due to infection was 1.1 (1.0-1.2) in 2000-2004 and 1.6 (1.4-1.7) in 2005-2009. Adjusted cumulative 5-year revision rates due to infection were 0.46% (0.42-0.50%) in 1995-1999, 0.54% (0.50-0.58%) in 2000-2004, and 0.71% (0.66-0.76%) in 2005-2009, respectively. The entire increase in risk of revision due to infection was within 1 year of primary surgery, and most notably the first 3 months. The risk of revision due to infection increased in all four countries. Risk factors of revision due to infection were male sex, hybrid fixation, cement without antibiotics and THA performed due to inflammatory disease, hip fracture or femoral head necrosis. None of these risk factors increased in incidence during the study period.

**Conclusions:** We found increased risk of revision due to infection after primary THA during the study period. No single change in risk factors in the NARA dataset could explain this increase. We believe that there has been an actual increase in the incidence of prosthetic joint infections after THA.



## 9.

### **Patient education with or without manual therapy compared to a minimal control intervention in patients with hip osteoarthritis – a proof-of-principle three-arm parallel group randomized clinical trial**

*Erik Poulsen, Jan Hartvigsen, Ewa M Roos, Henrik Wulff Christensen, Werner Vach, Søren Overgaard*

Department of Orthopaedic Surgery and Traumatology Odense University Hospital; Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark; Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark; Research Unit, Nordic Institute of Chiropractic and Clinical Biomechanics; Institute of Medical Biometry and Medical Informatics, University of Freiburg; Department of Orthopaedic Surgery and Traumatology, Odense University Hospital

**Background:** Patient education is recommended as a core intervention for patients with hip osteoarthritis (OA) but is currently not a standard treatment option in Denmark. Manual therapy (MT) is recommended as an adjunct intervention but evidence is limited to a few randomized clinical trials (RCT).

**Purpose / Aim of Study:** To investigate the feasibility of including a patient education (PE) program and manual therapy in an RCT in a Danish health care setting and specifically examine the effectiveness of a PE program alone or in combination with MT when compared to a minimal control intervention.

**Materials and Methods:** Patients with hip OA were randomized into one of three groups: PE, PE plus MT, and a home-based stretching program. PE involved 5 educational sessions and MT involved 12 sessions. Primary outcome was patient-rated pain intensity on an 11-box numerical rating scale and primary end-point was at 6 weeks immediate following interventions. Secondary outcome measures included the Hip disability and Osteoarthritis Outcome Score (HOOS) and numbers having had hip replacement surgery at 12 month follow-up.

**Findings / Results:** Follow-up data was available for 111/118 patients. Baseline-adjusted reduction in pain intensity was -1.9 points (95% CI -2.9 – -0.9) greater for the combined PE/MT group when compared with the home-based stretching group. No difference was found between the PE and home-based stretching group (-1.0 – 1.0). The HOOS scale demonstrated similar results as the primary outcome. At 12 months, 12 patients in the PE group had received hip replacement surgery, 4 in the PE/MT group and 7 in the home-based stretching group ( $p > .05$ ).

**Conclusions:** The chosen trial set-up and selected outcome measures is feasible in a Danish health care setting and a combined patient education and manual therapy intervention is an effective treatment option for patients with hip OA.

## 10. **Recovery in horizontal gait after hip resurfacing vs. Total hip arthroplasty at 6-month follow-up – A RCT study**

*Carsten Jensen, Per Aagaard, Søren Overgaard*

Orthopedic Research Unit Department of Orthopedics and Traumatology, Odense University Hospital, Institute of Clinical Research; , Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark; Orthopedic Research Unit, Department of Orthopedics and Traumatology, Odense University Hospital, Institute of Clinical Research

**Background:** Standard total hip arthroplasty (S-THA) is an established surgical treatment for patients > 65 yrs with severe hip osteoarthritis. However, implant survivorship curves decline more rapidly in patients < 50 yrs and resurfacing total hip arthroplasty (R-THA) has been suggested as alternative treatment for those younger active patients. In addition, improved walking ability and gait kinematics has been suggested after R-THA, although never objectively examined in a RCT

**Purpose / Aim of Study:** The present RCT investigated the hypothesis that (i) gait recovery would be superior following R-THA compared to S-THA and (ii) mechanical hip and knee muscle strength would be positively associated with gait performance in patients with THA

**Materials and Methods:** Forty-three patients were randomized and 3-dimensional gait data were collected pre-operatively, 8 and 26 weeks post-operatively at self-selected normal and maximal speed. Primary outcome was gait speed while spatiotemporal and kinematics was secondary. An explorative analysis was performed on the association between isolated hip and knee muscle strength and gait

**Findings / Results:** No treatment effect was observed for self-selected speed, however at maximal speed S-THA patients walked faster than R-THA (+6.1%,  $P=0.03$ ). Spatiotemporal parameters and kinematics demonstrated no difference in recovery patterns between treatments. Maximal knee and hip muscle strength were positively associated with gait speed, step length and cadence during maximal ( $r= 0.36-0.61$ ,  $P<.05$ ) but not normal walking

**Conclusions:** The study could not provide evidence to support the hypothesis that R-THA leads to superior recovery in gait and hip kinematics compared to S-THA. Lower limb muscle strength was a predictor of gait parameters, hence providing an important and valid functional outcome measure in individuals undergoing THA

## 11.

### The importance of ultra-short telomeres in the development of human hip osteoarthritis (OA)

*Maria Harbo, Jean-Marie Delaisse, Per Kjærsgaard-Andersen, Flemming Brandt Sørensen, Steen Kølvraa, Laila Bendix*

Department of Clinical Genetics Vejle/Lillebaelt Hospital; Department of Clinical Cell Biology, Vejle/Lillebaelt Hospital; Department of Orthopedic Surgery, Vejle/Lillebaelt Hospital; Department of Clinical Pathology, Vejle/Lillebaelt Hospital; Department of Clinical Genetics, Vejle/Lillebaelt Hospital; Department of Social Medicine, Danish Aging Research Center, University of Copenhagen

**Background:** Telomeres, the very end of our DNA, are specialized structures that protect our chromosomes from degradation. Critically short telomeres induce cellular senescence and have recently been suggested to play a role in chondrocyte senescence in OA knees. Ultra-short telomeres are the prevailing product of stress-induced telomere shortening, suggesting that oxidative damage to chondrocytes might initiate OA.

**Purpose / Aim of Study:** To investigate the relationship between short telomeres and OA in human femoral heads, including the possible role of short telomeres in natural aging of cartilage.

**Materials and Methods:** 23 human femoral heads were obtained from 14 patients diagnosed with primary OA and 9 controls having suffered a displaced medial femoral neck fracture. Articular cartilage from zones differing in distance from the lesion site was obtained and split into three parts: one for telomere length measurements, one for OA grading, and one for immunohistochemical staining.

**Findings / Results:** Load of ultra-short telomeres increased closer to the lesion site and correlated with OA severity in both OA samples ( $R = 0.72$ ,  $P = 0.0017$ ) and fracture samples ( $R = 0.62$ ,  $P = 0.0015$ ). Mean telomere length correlated with OA severity in OA samples ( $R = -0.27$ ,  $P = 0.047$ ), but not in fracture samples ( $R = -0.28$ ,  $P = 0.10$ ). Mean telomere length decreased closer to the lesion site, however, unexpectedly increased in the zone nearest the lesion. This increase was associated with findings of cells expressing markers characteristic of progenitor-like cells.

**Conclusions:** These in vivo studies suggest a role of ultra-short telomeres in the pathology of OA and in natural aging of cartilage. Our findings further suggest that progenitor-like cells with long telomeres are recruited to the most damaged cartilage regions possibly in an attempt to repair the OA affected tissue.

## 12.

### Early results after hip arthroscopy with labral repair in children and adolescents

*Christian Dippmann, Christoffer Hegemann, Otto Kraemer, Søren Winge*  
orthopedic department Hvidovre University Hospital; ,  
Copenhagen Private Hospital; orthopedic department,  
Hvidovre University Hospital; , Copenhagen Private Hospital

**Background:** Femero-acetabular impingement (FAI), is also being recognized in the pediatric age group. Although widely accepted in the treatment of such pathologies, hip arthroscopy has a steep learning curve and especially in the pediatric and adolescent patient complications can have serious consequences.

**Purpose / Aim of Study:** The purpose of this study was to report the outcome after hip arthroscopy with labral repair in children and adolescent patients within the first year after surgery.

**Materials and Methods:** From March 2009 to February 2011 8 patients (mean age 15,4 (range 13- 18)), 2M and 6F underwent hip arthroscopy with labral repair at Copenhagen Private Hospital by one of the senior authors (SW). Pre-op. all patients received physiotherapeutic training for at least 6 months. Self-reported questionnaires such as Hip Outcome Score sport (HOS-sport), Hip Outcome Score ADL (HOS-ADL), modified Harris Hip Score (mHHS) and a Visual Analogue Score (VAS) for pain were used as evaluation tool. Patients completed all four instruments pre-op., 6 and 12 months post-op. Postoperatively the patients received non-standardized rehabilitation for at least 3 months. One patient had previously been treated for hip pathologies.

**Findings / Results:** Significant clinical improvements were seen for all outcome measures within the first 6 months ( $p < 0,001$ ), with no significant changes from 6 to 12 months. The VAS pain score improved from mean 52 (range 36-65) to mean 5 (range 0-19) at 6 months, respectively mean 7 (range 0-21) at 12 months.

**Conclusions:** Hip arthroscopy in children and adolescents provide as promising results as described in the literature for active, non-arthritic adults. At 6 months after surgery we could see clinically relevant improvements in all out-come scores. These results are promising, but lacking long term results, further investigation is needed.

### 13.

## **Hip Arthroscopy with labral repair, a prospective evaluation of the clinical outcome within the first year after surgery**

*Christian Dippmann, Kristian Thorborg, Kraemer Otto,  
Henrik Palm, Søren Winge, Hölmich Per*

Arthroscopic Center Amager Copenhagen University Hospital, Hvidovre, Denmark; Arthroscopic Center Amager, Copenhagen University Hospital, Hvidovre, Denmark; Arthroscopic Center Amager, Copenhagen University Hospital, Hvidovre, Denmark; Department of Orthopedic Surgery, Copenhagen University Hospital, Hvidovre, Denmark; , Copenhagen Private Hospital; Arthroscopic Center Amager, Copenhagen University Hospital, Hvidovre, Denmark

**Background:** The clinical outcome after hip arthroscopy for femoro-acetabular impingement (FAI) has been shown to improve substantially after 1 to 2 year. When this observed clinical improvement occurs during the first year has, however, not been evaluated

**Purpose / Aim of Study:** The purpose of this study was to examine the development of clinical outcome after hip arthroscopy with labral repair during the first postoperative year.

**Materials and Methods:** From May 2009 to December 2010, 58 consecutive patients, 37F (mean age 37 (16-59)) and 21M (mean age 43 (range 22-61)), underwent a hip arthroscopy and labral repair, by the same experienced surgeon (OK). Standardised, but unstructured, post- op. mobilisation instructions were provided. Preop. 3, 6 and 12 months post-op., the patients were assessed with the modified Harris Hip Score (mHHS) and pain VAS score. Data was prospectively collected and analysed using non-parametric statistics.

**Findings / Results:** Patient-reported improvements were seen for both outcome measures over time,  $p < 0.001$ . The primary outcome, mHHS (Median (25-75 percentiles)) improved from preoperatively to three months (60 (48-67) to 71 (64-92),  $p < 0.001$ ), and continued to improve from 3 to 6 months 71(63.5-92) to 83.5 (64.5-99),  $p < 0.01$ , with no further improvement. The pain VAS score also improved from preoperatively to 3 months (61(47-73) to 24(9-44),  $p < 0.001$ ), and from 3 to 6 months from 24(9-44) to (14(5-37),  $p < 0.05$ ), with no further improvement.

**Conclusions:** Large clinically relevant improvements in function and pain were seen in patients with FAI after hip arthroscopy, including labral repair, at 3 and 6 months. Interestingly, no further clinical improvement seems to occur after 6 months. A more structured post-op. exercise program may however, further improve the clinical outcome on a longer term.

## 14.

### **Iliotibial band autograft versus Bone-patella-tendon-bone autograft for ACL-reconstruction: A 15-year follow-up of a prospective randomized controlled trial**

*Frederik Stensbirk, Kristian Thorborg, Lars Konradsen, Per Hölmich*  
Artroskopisk Center Amager; Artroskopisk Center, Amager; Idrætsskirurgisk  
Enhed, Bispebjerg; Artroskopisk Center, Amager

**Background:** The long term results after using the iliotibial band autograft (ITB) are not fully known. If equal in quality to conventional methods the ITB graft could be a useful alternative as a primary graft, and in revision surgery or multiligament reconstruction.

**Purpose / Aim of Study:** To assess whether the ITB-autograft is a long term reliable alternative to the BPTB- autograft, using a prospective randomized controlled trial design

**Materials and Methods:** From 1995-1996 sixty subjects scheduled for primary ACL- reconstruction were included in a prospective randomized controlled trial. Three senior knee-surgeons, experienced in both types of ACL- surgery, performed all the operations. A standardized and supervised rehabilitation program was used for both groups for 6 months. 30 patients received the ITB-reconstruction, and 30 received the BPTB-reconstruction. 49 participated at follow-up in 2010 (82%). Primary outcome was the failure-rate. Secondary outcomes were KOOS (pain, symptoms, Sport/Rec, QOL, ADL), Tegner Activity Scale, AKP-score, Lysholm Score, Rolimeter laxity, extension deficit, single-hop and crossover-hop for distance.

**Findings / Results:** At 15-year follow-up no differences existed between the groups. Graft failure occurred in 3 BPTB-subjects (12.5%) and 4 ITB- subjects (16%) ( $P=0.53$ ). KOOS Sport/Rec score for the BPTB-group was 73, and 75 for the ITB-group ( $P=0.82$ ). The KOOS QOL score was 68 and 72 for the BPTB-group and ITB-group, respectively ( $P=0.58$ ).

**Conclusions:** We found similar graft-failure-rates and KOOS-scores when comparing BPTB- and ITB-operated individuals, at 15-year follow-up. The ITB graft had equal long-term results compared to the BPTB graft and is recommended as a reliable alternative autograft for ACL-reconstruction.

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## 15.

### **Increasing laxity after ACL reconstruction with patella tendon is not caused by failure of fixation - a 10-year follow up with RSA**

*Louise Irdal-Jepesen, Annette Holm Kourakis, Michael Rindom Krogsgaard*  
Section for Sportstraumatology M51 Bispebjerg University Hospital; Section for Sportstraumatology M51, Bispebjerg University Hospital; Section for Sportstraumatology M51, Bispebjerg University Hospital

**Background:** Anterior cruciate ligament (ACL) rupture is a common injury, that often leads to symptomatic knee instability, which can be treated with reconstruction. The stability of the knee after reconstruction decreases during the first postoperative year in at least 15 % of cases. Whether this is due to stretching of tendon tissue or failure of the graftfixation to bone is unknown.

**Purpose / Aim of Study:** To investigate if the bone-plugs in patella tendon graft ACL reconstruction move relative to femur/tibia after the operation and if there is any difference in this between metal- and bio-screw fixation.

**Materials and Methods:** Prospective, one-centre, clinical trial, where 38 healthy patients (29,5 $\hat{A}$  $\pm$ 4,2 years) with symptomatic unilateral ACL rupture which required reconstruction were blindly randomised [1:1] to fixation with metal interference screw or bio screw (Bilok) in femur and tibia. During surgery a total of 18 tantalum markers were placed in tibia (6), femur (6) and the bone-plugs (3+3). By using Radio Stereometric Analysis (RSA) the precise positions of the markers were measured. RSA was performed with the knee bent 30 degrees and with 0, 7 $\hat{A}$ ? and 13 kg anterior pull at tibia. The patients were followed 1 week and 1, 2 and 10 years after the operation.

**Findings / Results:** In all patients, independent of increasing laxity, there was no motion of the markers in the boneplugs relative to femur and tibia at any time compared to 1 week.

**Conclusions:** The laxity that developed postoperatively in some patients was not due to failure of fixation.

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## 16. **Outcome of arthroscopic treatment of hip pain due to femuroacetabular impingement**

*Torsten Grønbech Nielsen, Lene Lindberg Miller, Bent Lund, Svend Erik Christiansen, Martin Lind*

Div. Sports Trauma Orthopedic Dept. University Hospital Aarhus, Denmark;  
Div. Sports Trauma Orthopedic Dept., University Hospital Aarhus, Denmark;  
Div. Sports Trauma Orthopedic Dept., University Hospital Aarhus, Denmark;  
Div. Sports Trauma Orthopedic Dept., University Hospital Aarhus, Denmark;  
Div. Sports Trauma Orthopedic Dept., University Hospital Aarhus, Denmark;

**Background:** Recently a new arthroscopic based treatment paradigme for hip related pain with radiological findings of femuroacetabular impingement and labral lesions has evolved.

**Purpose / Aim of Study:** purpose of this prospective study was to present clinical outcome from patients treated arthroscopically for hip related pain suspected to be due to femuroacetabular impingement.

**Materials and Methods:** 123 consecutive patients operated in 2009-2011 are included in this prospective case series (59 % female; mean age 36 years). The indication for arthroscopic treatment of hip related pain was mechanical hip symptoms and radiological findings of femuroacetabular impingement. To evaluate hip function and pain level at 1 year follow-up MHHS (Modified Harris Hip Score), HOS (Hip Outcome Score) and pain score were used.

**Findings / Results:** Labrum tears were seen in 87 % of the hip arthroscopies. Cartilage lesions (ICRS grade 2 and above) were seen at the Acetabulum and Caput in 68 % and 22 % of cases respectively. In 95 % of the arthroscopies cheilectomi and/or acetabular rimtrimming were performed. In 72 % of procedures the labral reattachment was performed. The patient evaluated outcome demonstrated significant increases in MHHS and HOS at 1 year follow up compared to preoperatively. (MHHS: 58,3 to 73,6, HOS: 66,7 to 81,5). Pain levels decreased significantly form pre-operatively to follow up. 5% patients had a total hip replacement within the follow-up period.

**Conclusions:** Arthroscopic treatment of FAI improves patient evaluated outcome. Further studies are needed to determine failure rates and risk factors for failures.



## 17.

### Outcome of Hip Arthroscopy after Peri-Acetabular Osteotomy

*Bent Lund, Torsten Nielsen, Svend Erik Christiansen, Martin Lind*

Div. Sportstrauma, Orthopedic Dept Aarhus University Hospital;

Div. Sportstrauma, Orthopedic Dept, Aarhus University Hospital;

Div. Sportstrauma, Orthopedic Dept, Aarhus University Hospital;

Div. Sportstrauma, Orthopedic Dept, Aarhus University Hospital

**Background:** Patients with Developmental Dysplasia of the Hip (DDH) are frequently treated Peri- Acetabular Osteotomy (PAO). These patients can have pathologic changes of labrum and cartilage in the hip joint, which are not addressed by the PAO procedure. Hip arthroscopy is a possible treatment method for continued symptoms after PAO

**Purpose / Aim of Study:** The purpose of this study was to describe the arthroscopic findings and the short-term clinical outcome of hip arthroscopy in patients with DDH that have continued symptoms after PAO.

**Materials and Methods:** Data is based on a retrospective case series of 17 DDH patients with a previous PAO procedure operated with hip arthroscopy 2008 to 2010. Patients had a mean age of 37 years at time of surgery. 88 % were female. To evaluate hip function and pain level at 1- year follow-up HOS (Hip Outcome Score) and pain scores were used. Total hip arthroplasty (THA) reoperation within one- years follow-up indicated a failure.

**Findings / Results:** Labrum tears were seen in 94 % of patients. Cartilage lesions (ICRS grade 2 and above) were seen at the Acetabulum and Caput in 71 % and 18 % of cases respectively. Pain levels did not decrease form pre- operatively to follow up. The mean preoperative HOS was 60 (40-76) and mean postoperative HOS score was 61 (38- 96). (NS). 24 % (4 patients) had a THA within the follow-up period. It was patients with femoral head deformities and joint space < 3 mm that went on to total hip arthroplasty

**Conclusions:** In the dysplastic hip patient treated with PAO, hip arthroscopy can address labral and cartilage lesions. There was no positive impact on pain and patient evaluated hip function of arthroscopic treatment. A relatively high proportion of patients went on to total hiparthroplasty. Whether hip arthroscopy can be used for treatment of continued symptoms after PAO needs further study.

## 18.

# Reconstruction of the medial patellofemoral ligament in patients with recurrent patella instability

*Ditte Enderlein, Torsten Nielsen, Svend Erik Christiansen,  
Peter Faunø, Martin Lind*

Division of Sportstrauma, Orthopedic Dept Aarhus University Hospital ; Division of Sportstrauma, Orthopedic Dept, Aarhus University Hospital ; Division of Sportstrauma, Orthopedic Dept, Aarhus University Hospital ; Division of Sportstrauma, Orthopedic Dept, Aarhus University Hospital ; Division of Sportstrauma, Orthopedic Dept, Division of Sportstrauma, Orthopedic Dept, Aarhus University Hospital;

**Background:** Surgical treatment of recurrent patella instability has changed from procedures primary addressing patella alignment to reconstruction of the medial patellofemoral ligament (MPFL-R) as the main surgical procedure. However MPFL-R can be supplemented with procedures addressing different aspects of patellofemoral dysplasia. Only patient materials less than 100 patient exist in the literature.

**Purpose / Aim of Study:** This study aims to present clinical outcome in a consecutive single clinic series of patients treated with MPFL reconstruction.

**Materials and Methods:** 261 Patients operated with MPFL-R between 2008 and 2011 are included in this study. Indication for surgery: Patients with 2 or more patella dislocations. Surgery: Isolated Gracilis tendon fixed in drillholes in the medial and proximal 2/3 of the patella. The free tendonstrands are passed to the medial epicondyle and fixed with a screw. Patient outcome were evaluated by one- year follow-up Kujala score and incidence of patella redislocation and subluxations.

**Findings / Results:** 20 % of cases had MPFL-R supplemented with a tuberositas tibia osteotomy. Cartilage injury ICRS grade 2 to 4 was seen in 15 % and 45 % of cases at the femur and patella respectively. Kujala score improved from 61 preoperatively to 81 at 1-year follow-up. ( $p < 0.01$ ). Pain score improved from 3.1 to 1.3 ( $p < 0.01$ ). 2 % of patients experienced a redislocation within one year. 9 % of patients experienced subluxation.

**Conclusions:** The present study presents the largest MPFL-R patient material ever. MPFL-R resulted in consistent patella stability and improved knee function. Patella stability was good with only 2 % redislocations. Residual knee pain was associated with patello- femoral cartilage injury.

## 19. **Rotational stiffness of ACL reconstructed knees measured by 3D- motion analysis**

*Marie Bagger Bohn, Henrik Sørensen, Martin Lind*

Div of Sportstrauma, Dept Orthopedics Aarhus university Hospital;  
Department of Sport Science, Aarhus University; Div of Sportstrauma,  
Dept Orthopedics, Aarhus university Hospital

**Background:** During the last decade there has been a shift towards anatomic Anterior Cruciate Ligament (ACL) reconstruction techniques with the purpose of establishing more normalized knee biomechanics, especially improved rotational stability of the knee. Functional rotational stability of the knee can be investigated by 3D motion analysis.

**Purpose / Aim of Study:** To compare three different ACL reconstruction techniques for their ability to normalize rotational knee stability one year after ACL reconstruction in a prospective randomized study design. Two of the techniques are so-called anatomical techniques.

**Materials and Methods:** 45 ACL-deficient (ACLD) patients were prospectively randomized to Single- bundle transtibial, single-bundle anteromedial and double-bundle ACL reconstruction. The single-bundle anteromedial and double-bundle ACL reconstructions techniques are so-called anatomical techniques due to more anatomical placement of graft position in the femoral ACL footprint. 3D- motion analysis was performed preoperatively and at one-year follow-up. Motion data was captured using 8 cameras and QTM software and analyzed by Visual-3D and Matlab. A pivoting task was conducted to test tibial rotation. Other outcome parameters were; the Lachman test, Pivot shift test, KT-1000 knee laxity measurements.

**Findings / Results:** 3D-motion analysis demonstrated that the maximum tibial internal rotation and rotational stiffness was not significantly different between ACL reconstruction technique groups at one year follow-up ( $p=0.35$ ). Objective clinical tests were not significant different between reconstruction techniques/groups at follow-up.

**Conclusions:** No significant difference in sagittal and rotational stability was seen between anatomic and non-anatomic ACL reconstruction techniques at one-year follow-up using objective clinical tests and 3D-motion analysis.

## 20.

### **Running-related injuries among novice runners: A one year prospective follow-up study**

*R.O. Nielsen, I. Buist, H. Sørensen, M. Lind, S. Rasmussen*

Department of Public Health Aarhus University, Denmark; Center for Sports Medicine, University of Groningen, the Netherlands; Department of Public Health, Aarhus University, Denmark; Department of Orthopaedics, Aarhus University Hospital, THG, Denmark; Orthopaedic Research Unit., Aalborg Hospital, Aarhus University, Denmark

**Background:** The most frequent running-related injuries (RRI) among recreational runners are patella femoral pain syndrome (PFPS), iliotibial band syndrome (ITBS), plantar fasciitis, meniscal injuries, and medial tibial stress syndrome (MTSS). However, no studies have investigated the frequency of RRI among novice runners in a prospective study.

**Purpose / Aim of Study:** The purpose of this study was to describe the most prevalent musculoskeletal RRI among inactive persons taking up a one year running regime.

**Materials and Methods:** Healthy participants between 18 and 65 years of age, who have not been running on a regular basis in the previous twelve months, were eligible for inclusion. During the follow-up period participants had to take up running with a minimum of 52 training sessions. GPS was used to quantify training patterns in each session. In case of RRI, the participant attended a clinical examination and diagnose was registered.

**Findings / Results:** A total of 933 inactive persons were included. Among women (n = 465) mean age and BMI were  $36.8 \pm 10.0$  and  $25.4 \pm 4.2$ , while age and BMI for males were  $37.6 \pm 10.6$  and  $26.6 \pm 3.8$ , respectively. Two hundred and sixteen participants sustained at least one RRI during follow-up. The cumulative risk of sustaining an injury after 500 kilometers of running was approximately 55 %. MTSS was the most common diagnosis (n = 31, 14.4 %), followed by PFPS (n = 21, 9.7 %), meniscal injuries (n = 19, 8.8 %), achillestendinopathy (n = 14, 6.5 %), and ITBS (n = 12, 5.6 %). Median duration per recovered injury was 54.5 days (interquartile range 45.5).

**Conclusions:** The risk of injury after 500 kilometers of running among novice runners is 55 %. MTSS and PFPS were the two most frequently diagnosed injuries.

## 21.

### **The Danish Hip Arthroscopy database. The first National Register for Hip Arthroscopy**

*Bent Lund, Svend Erik Christiansen, Otto Kraemer,  
Niels Mortensen, Søren Winge*

Sportstraumatology Aarhus University Hospital; Sportstraumatology, Aarhus University Hospital; Arthroscopic Center Amager, Amager Hospital; Orthopedic, Odense University Hospital; , Copenhagen Private Hospital

**Background:** Arthroscopy of the hip joint is the fastest growing treatment modality in orthopedic surgery and has become an accepted therapeutic modality in selected patients. As hip arthroscopy is becoming increasingly common, the span of indications is also growing. There is a need for more documentation of the treatment and outcomes of hip arthroscopy. A national clinical database will be able to track treatment strategies and the related clinical outcomes

**Purpose / Aim of Study:** To present the first data from the national clinical database for hip arthroscopy. Including patient demographics, arthroscopic findings and therapeutic measures.

**Materials and Methods:** The register is a webbased register and was initiated and funded by the Danish Society for Arthroscopy and Sportstraumatology. Inclusion started February 2012. The surgeon is including the patient at the time of surgery and the operative and radiographic data are recorded. The patients are entering PROMS preoperatively and at 1, 2 and 5 years follow-up.

**Findings / Results:** From February to June 2012 155 patients were registered by seven hospitals. 61 % were females. 99 % of patients recieved prophylactic antibiotic treatment and 31 % had antitrombotic treatment. Mean operating time 95 minutes and mean leg traction time was 57 minutes. 85 % of the patients had labral tears and 84 % of the patients had cartilage injury mainly located at the acetabular side. 75 % of the patients with labral tear had a refixation af the labrum with a mean of 2,8 suture anchors. 86 % of the patients had cheilectomy performed, and 79 % of the patients acetabular rim trimming. 20 % of the patients had a psoastenotomy performed.

**Conclusions:** This is the first data from a national register for hip arthroscopy and describes the arthroscopic findings and therapeutic measures for hip arthroscopies performed in Denmark.

## 22.

### **The impact of free or restricted rehabilitation on healing of meniscus repair. A prospective randomized clinical trial**

*Martin Lind, Torsten Nielsen, Bent Lund, Faunø Peter,  
Svend Erik Christiansen*

Div of Sportstrauma, Orthopedic Dept. Århus University Hospital ;  
Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital;  
Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital;  
Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital;  
Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital

**Background:** The optimal rehabilitation after meniscus repair has not been established. No controlled trials exist in the literature and numerous regimes have been suggested.

**Purpose / Aim of Study:** The purpose of this study was to investigate the outcome of meniscus repair with an either free or restricted rehabilitation regimen in a prospective randomized controlled clinical trial.

**Materials and Methods:** 60 patients were included in the trial. Patients were randomized within 4 days after all-inside meniscus repair. 33 patients and 27 patients were randomized to free and restricted rehabilitation respectively. Free rehabilitation consisted of 2 weeks in brace and touch weight bearing, followed by unrestricted activity. Restricted rehabilitation consisted of 6 weeks of brace usage with gradually increased range of motion and touch weight bearing. Patients were seen for follow-up at 3, 12, 24 months. Any patients with joint line pain after 3 months had MRI to evaluate meniscus healing. A subsequent arthroscopy was performed for final evaluation meniscus healing if MRI indicated lack of healing. At follow-up, KOOS, Tegner Score, and patient satisfaction were used to evaluate outcome.

**Findings / Results:** Six patients were lost to follow-up. Re- arthroscopy in patients with continuous symptoms demonstrated partial healing or lack of healing in 41 % and 33 % of patients in the restricted and free rehabilitation groups respectively. KOOS, Tegner score, and satisfaction was similar between groups.

**Conclusions:** Free rehabilitation after meniscus repair is safe with a tendency to better meniscus healing compared to restricted rehabilitation. Subjective and functional outcome at one and two year's follow-up was not affected by rehabilitation regimen. An overall lack of healing of 35 % for isolated meniscus lesions repaired with all-inside technique is a concern.

## 23.

### **Completeness and validity of data in “Dansk Frakturdatabase”: A novel registry for quality assessment of fracture related surgery.**

*Kirill Gromov, Michael Brix, Anders Troelsen*

Orthopedic Hvidovre Hospital; Orthopedic,  
Odense University Hospital; Orthopedic, Hvidovre Hospital

**Background:** Fracture-related surgeries are some of the most common orthopaedic procedures performed. Whereas register-based quality assessment is known from other orthopaedic specialties it has not previously been conducted for fracture-related surgeries. “Dansk Frakturdatabase – DFDB” has been developed for the purpose of web based quality assessment, but its properties as a valid data source remains to be explored.

**Purpose / Aim of Study:** To investigate: 1) the completeness of data in DFDB, and 2) if entered data are valid data sources for future quality assessment.

**Materials and Methods:** We have developed an internet-based fracture surgery database (DFDB), with data being entered by the surgeon. The data collection includes primary fracture surgeries, secondary surgeries and reoperations. Recorded parameters include patient, trauma and surgery-related data. One month after full implementation of the database we assessed the completeness of data and the validity of the entered parameters for 200 patients operated during a 1 month period.

**Findings / Results:** We have achieved a completeness of 85% for all types of data entries, with 87% and 83% completeness for primary fracture surgery and reoperations, respectively. Patient-related data was valid in 82-100%. Trauma-related data, such as neurovascular status and Gustillo classification, was 100% valid. Surgery-related data included method of osteosynthesis as well as reduction and surgical technique and was valid in 89-99%.

**Conclusions:** “Dansk Frakturdatabase - DFDB” is an easy to use web based database for registration of fracture-related surgery. Shortly after implementation at our institution, it achieved acceptable completeness and we found entered data to be valid for all registered parameters, thus making it a valuable tool, with potential for nationwide quality assessment of fracture related surgery.

## 24. Early results of tibial nailing with Angular Stable Locking Screws (ASLS)

*Peter Kraglund, Jesper Schønnemann, Søren Kring, Michael Brix*  
Orthopaedic Odense University Hospital; Orthopaedic, Odense University Hospital; Orthopaedic, Odense University Hospital; Orthopaedic, Odense University Hospital

### **Background:** -

**Purpose / Aim of Study:** To present experiences and early results of tibial nailing combined with angular stable locking screws (ASLS) in distal tibial fractures (AO 42 and AO 43). And whether this provides stable conditions, as shown in biomechanical studies.

**Materials and Methods:** From September 2009 to May 2011, a consecutive series of 51 patients were treated with Synthes Expert nail including distal ASLS. All fractures but 11 were preoperatively CT scanned analysing fracture patterns, and preoperative planning. The patients were followed every 6 weeks until healing. All 51 were followed for minimum 1 year. 39 patients were available for 1 year postoperative control with clinical examination, x-ray and functionality scores (EQ5D, pain score and Olerud Molander).

**Findings / Results:** In average, all 51 healed in 4,8 months. None had secondary loss of reduction. 4 ppt. were reoperated because of complications: One had dynamisation (healed in 8 months), one had implant removal because of anterior knee pain, one had autologous bone grafting because of bone defect occurring during the primary reaming, and one had implant removed because of suspicion of infection (not found). Two patients had malunion (6 and 18 degrees valgus). 23 fractures were intraarticular. 37% altered AO classification after CT scan. Mean EQ5D was 12.8 and Olerud Molander was 78.3. Self reported health state after one year was 8,4 (VAS 0- 10). After 1 year resting and walking pain score were 0.7 and 1.0, respectively.

**Conclusions:** Tibial nailing combined with ASLS in AO 42 and AO 43 seems to be a safe method with few complications. 100% union and a low rate of reoperation, indicate that this could be a possible treatment in the future for the distally placed fractures, where traditional methods (plating and ex-fix) have shown high rates of reoperations and complications.



## 25.

### **EFORT12-2819 Microdialysis and Laser Doppler flow measurements in the femoral head in patients with dislocated femoral neck fractures, one year follow up**

*Morten Foged Bøgehøj, Claus Emmeluth, Søren Overgaard*  
Ortopædkirurgisk afd O Odense Universitets Hopsital;  
Ortopædkirurgisk afd O, Odense Universitets Hopsital;  
Ortopædkirurgisk afd O, Odense Universitets Hopsital

**Background:** We state that preserving the hip might be optimum in treatment of patients with dislocated femoral neck fractures presuming that the fractures unite. We hypothesized that lack of blood flow and development of ischemia might influence the outcome of the osteosynthesis. In this study we established microdialysis and laser Doppler measurements in patients with a dislocated femoral neck fractures.

**Purpose / Aim of Study:** To establish microdialysis measurements and laser Doppler measurements in the femoral head of patients with a dislocated femoral neck fracture and to follow the patients one year after operation.

**Materials and Methods:** 20 patients with dislocated fractures of the femoral neck were osteosynthesized by using 2 cannulated screws. During surgery blood flow was measured with laser Doppler in order to detect pulsatile flow, and microdialysis was performed to detect ischemia. Both measurements were performed in the femoral head and with the greater trochanter as control. The parameters measured by microdialysis were lactate, pyruvate, glycerol, and glucose concentrations. Measurements were done after the fracture was reduced, and during osteosynthesis. The patients were followed for one year after operation.

**Findings / Results:** In all but one patient laser Doppler showed pulsatile flow in the greater trochanter, whereas only 11 patients had flow in the femoral head. The values for glucose in the trochanter and the femoral head were 3.8 mM(1.3) and 2.5 mM(1.4) ( $p < 0.001$ ) respectively, and for glycerol 0.17 mM(0.08) and 0.36 mM(0.20) ( $p < 0.001$ ). During the observation period 7 of 20 patients were re operated, all with hemiarthroplasty. The association between laser Doppler measurements and the Microdialysis measurements was poor. The association between reoperation and ischemia or laser Doppler was also poor.

**Conclusions:** This is the first time that laser Doppler and microdialysis has been established in patients with dislocated femoral neck fractures. We showed reduced flow and ischemia in the femoral head. The poor associations between high lactate/pyruvate ration and failure might explain that failure after osteosynthesis of the femoral neck fracture is multifactorial. Further studies will have to evaluate whether laser Doppler and microdialysis in combination with fracture related parameters can predict failure of the osteosynthesis. This might enable us to establish a treatment algorithm to be used in the daily clinic.

## 26.

### High Reliability of the Hvidovre Algorithm for Hip Fracture Surgery

*Henrik Palm, Eva Posner, Hans-Ulrik Ahler-Toftehøj, Silas Gylvin, Tobias Aasvang, Kenneth Brian Holtz*

Department of Orthopaedic Surgery Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; Department of Orthopaedic Surgery, Herlev University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; Department of Orthopaedic Surgery, Herlev University Hospital; Department of Orthopaedic Surgery, Herlev University Hospital

**Background:** Hip fracture treatment is controversial with high complication rates. The Hvidovre Algorithm for choice of surgery has proven to be easy to implement and has reduced the reoperation rate. The algorithm is however based on the commonly used fracture classifications known to be unreliable, which could result in different choice of implant between surgeons/hospitals.

**Purpose / Aim of Study:** To investigate the reliability of the Hvidovre Algorithm.

**Materials and Methods:** 4+4 (consultant, fellow, resident, intern) observers from two different hospitals used the algorithm to classify into 15 hip fracture types (Garden 1-4 collum femoris incl. posterior tilt, Vertical collum femoris, Basocervical and AO31 A1.1 to A3.3 trochanteric fractures) and choose between 5 surgical procedures (Parallel implants, Prosthesis, 2 or 4 hole SHS and IM nail). After individual assessment, the 4 observers made a hospital decision for each patient. Observations were performed twice 10 weeks apart, on pelvic, AP and axial x-rays from 100 consecutive hip fracture patients (F73/M27, mean age 80,) admitted Sept - Nov 2011 to Hvidovre Hospital.

**Findings / Results:** Fracture type intra-reader agreement was 0.56-0.81 and the inter-reader was 0.63-0.72, with 0.70 between the two hospitals. Posterior tilt intraclass coefficient was 0.92-0.94 and the interclass coefficient was 0.90-0.97. Choice of implant intra-reader was 0.83- 0.94, including 0.90 and 0.92 for the two hospital decisions; inter-reader was 0.88-0.94, with 0.91 between the two hospitals. Younger surgeons had the lowest agreement. Basocervical and vertical collum femoris fractures were most difficult to classify.

**Conclusions:** Al though fracture classification confirmed to be unreliable, posterior tilt measurement and the Hvidovre Algorithm appears to be very reliable with treatment agreement above 90% between hospitals.

## 27.

### Intra- and interobserver reliability on Sanders classification system

*Lonnie Froberg, Nikolaj Sode, Henrik Eckardt*

Department of Orthopaedic Surgery Rigshospitalet, Copenhagen University Hospital, Blegdamsvej 9, 2100 Copenhagen, Denmark; Department of Orthopaedic Surgery, Bispebjerg Hospital, Copenhagen University Hospital, Bispebjerg Bakke 23, 2400 Copenhagen, Denmark; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital, Blegdamsvej 9, 2100 Copenhagen, Denmark

**Background:** Sanders Classification System is widely accepted for evaluation of calcaneus fractures. Previous studies have shown a poor inter- and intraobserver reliability. This may cause inconsistency in choice of treatment.

**Purpose / Aim of Study:** The purpose of this study was to assess inter- and intraobserver reliability of Sanders classification and explore whether optimization of the preoperative computer tomographies improved these values.

**Materials and Methods:** The preoperative CT of 30 arbitrarily chosen calcaneus fractures, treated at Rigshospitalet in 2011, were included in the study. In the first and second trial, we used CT-scans with the coronal plane parallel to the tibial axis. The angle of the foot relative to the tibia is thus not taken into consideration. In the third and fourth trial, we oriented the coronal plane perpendicular to the posterior facet of the subtalar joint before classifying fractures. Inter- and intraobserver reliabilities were assessed using kappa coefficient.

**Findings / Results:** With the coronal plane parallel to the tibia axis, kappa for interobserver agreement was 0.41 and intraobserver agreement 0.61. With the true coronal plane perpendicular to the subtalar joint, kappa for interobserver agreement was 0.43 and intraobserver agreement 0.67.

**Conclusions:** The inter- and intraobserver agreement of Sanders Classification System is low, and correspond to previous studies. We demonstrated an improvement when high quality CT-scans were used, and we suggest that classification of calcaneal fractures should be based on CT-scans with a well defined coronal plane.

## 28.

### **Introducing a standardized algorithm for managing multitrauma patients in the Trauma Centre, Rigshospitalet**

*Adrina Kalasho, Henrik Eckardt*

Faculty of Medicine University of Copenhagen;  
Department of Orthopaedic Surgery, Rigshospitalet

**Background:** Pape has suggested an algorithm for identifying multitrauma patients in need of Damage Control Orthopaedics (DCO). A combination of anatomic and physiological parameters defines the patients as either stable, borderline, unstable or in extremis. Stable patients receive Early Total Care (ETC), borderline and unstable patients undergo DCO, and those in extremis are resuscitated. This algorithm was introduced in the Trauma Centre, Rigshospitalet, in 2011.

**Purpose / Aim of Study:** The purpose is to describe the triage patterns before and after implementation of the Pape algorithm and elucidate potential differences for further investigations in the future.

**Materials and Methods:** The algorithm was applied on patients with Injury Severity Score > 15 and orthopaedic injuries at admission time (P+). Patients were categorized and managed accordingly. The visitation, number of DCO and ETC, Pape classification, mortality, ventilator days, ICU and total hospital stay were extracted retrospectively and compared to a corresponding group from a similar period last year when visitation was carried out without any defined criteria (P-). This is thus a retrospective descriptive study.

**Findings / Results:** 33 patients were included in group P+ and 35 in P-. DCO was performed 4 times and ETC 3 times in P+, compared to 1 DCO and 7 ETC in P-. There were otherwise similar visitation patterns. More patients were classified as being unstable or in extremis in group P+. 278 days were spent in the ICU in total and 205 on ventilator in the same group, compared to 403 and 400 days in group P-. Hospital stay was 591 (P+) and 792 (P-) days. 3 patients died in P+, compared to 2 in P-.

**Conclusions:** The results are not conclusive. There could however be a trend towards performing more DCO and assessing patients differently with the algorithm, besides fewer days in ICU and hospital.

## 29.

### Mortality in Young Hip Fracture Patients

*Peter Max Jensen, Troels Riis, Susanne van der Mark, Benn Rønnow Duus,  
Jes Bruun Lauritzen, Ole Birger Vesterager Pedersen*

Orthopedic Surgery Bispebjerg; Orthopedic Surgery, Bispebjerg; Orthopedic Surgery, Bispebjerg; Orthopedic Surgery, Bispebjerg; Orthopedic Surgery, Bispebjerg; Orthopedic Surgery, Bispebjerg; Clinical Immunology, Naestved Hospital

**Background:** Hip fracture patients are mostly elderly and fragile. It is generally known that patients with hip fractures have a severely increased mortality in this population. Approximately 10 % of patients with hip fractures are 65 years or below. However it is not known whether this group has the same increased mortality and the same need for special attention as the elderly group.

**Purpose / Aim of Study:** To study if there is increased mortality in the hip fracture patients aged 65 years or below.

**Materials and Methods:** Medical data on all hip fracture patients admitted to our department from September 2008 to December 2011 were collected and registered in the hip fracture database at Bispebjerg Hospital. A total of 210 patients out of 1,645 were 65 years or below. Scrutiny of medical records was performed to determine severity of trauma and cause of death.

**Findings / Results:** Total number of deaths within the observation period was 19/210 (9%), with a mean age of 57.6 years and a male/female ratio of 1:3. In-hospital mortality was zero, mortality within the first month after the fracture was 2.9 %, between one and three months it was 1.4 %, and between three and nine months it was 0.5 %. Thus, it seemed that most deaths occurred close to time of fracture. None of the deaths were related to trauma. In 2011, the yearly mortality for men and women between 50 and 65 years of age in the general Danish population was 0.5 %.

**Conclusions:** Just as in older hip fracture patients, we found a substantial increase in mortality in the months following the fracture among patients aged 65 years or below. Consequently, we recommend that this group of patients receives special attention and that further studies be conducted to determine the exact causes of death.

## 30.

### **Operative versus nonoperative treatment of displaced midshaft clavicle fractures in adults – a systematic review**

*Martin Kirkegaard, Carl-Henrik Rehn, Bjarke Viberg, Morten Schultz Larsen*  
Dept. of Orthopaedic Surgery and Traumatology Odense University Hospital;  
Dept. of Orthopaedic Surgery and Traumatology, Odense University Hospital;  
Dept. of Orthopaedic Surgery and Traumatology, Odense University Hospital;  
Dept. of Orthopaedic Surgery and Traumatology, Odense University Hospital

**Background:** Intervention studies regarding clavicle fractures treatment are numerous, but few high quality studies prospectively compare operative and nonoperative treatment.

**Purpose / Aim of Study:** Evidence from randomized controlled trials (RCT) and cohort studies on operative versus nonoperative treatment of displaced midshaft clavicle fractures in adults were reviewed with focus on fracture healing, complications and functional outcome.

**Materials and Methods:** A search term was designed with aid of a research librarian and the search through February 2012 on PubMed, Embase and Cochrane Databases revealed 490 articles. These were assessed for relevance by two reviewers independently regarding title, abstract, and full text. Extraction of data was done by both reviewers in collaboration and sorted regarding study aims. Complications were grouped according to additional surgery required. The quality of studies was assessed by both reviewers in unison using CASP 2010 checklists.

**Findings / Results:** The search provided five randomized controlled trials and a cohort study totaling 494 patients. Time to union (fracture healing) was shorter in the operative groups. Major surgeries due to complication were 3 % in the operative group and 14 % in the nonoperative group. Minor complications, e.g. hardware removal, were recorded solely in the operative group. Functional outcomes (Constant Shoulder Scores) were statistically better for the operative groups compared with the nonoperative groups at all time points ( $p < 0.05$ ). The clinical significance of these scores, however, could not be confirmed in this systematic review.

**Conclusions:** High quality evidence is currently sparse supporting either operative or nonoperative treatment on displaced midshaft clavicle fractures in adults.

### 31.

## **Reduced reoperation rate of cemented hemiarthroplasty (HA) compared with cementless HA and internal fixation of displaced femoral neck fracture up to 19 years after initial surgery in 75+ year old patients**

*Bjarke Viberg, Søren Overgaard, Jens Lauritsen, Ole Ovesen*

Orthopaedic Surgery and Traumatology Institute of Clinical Research / Odense University Hospital; Orthopaedic Surgery and Traumatology, Institute of Clinical Research / Odense University Hospital; Orthopaedic Surgery and Traumatology, Institute of Public Health / Odense University Hospital; Orthopaedic Surgery and Traumatology, Institute of Clinical Research / Odense University Hospital

**Background:** Elderly patients with displaced femoral neck fractures are commonly treated with a hemiarthroplasty (HA) but little is known about long-term failure.

**Purpose / Aim of Study:** Compare reoperation rates for 75+ year old patients with displaced femoral neck fractures for three different HA's and internal fixation (IF) after 19 years.

**Materials and Methods:** Four different hospitals with clearly defined guidelines for treatment of 75+ year old patients with a displaced femoral neck fracture were consecutively included. Odense University Hospital (1991-1993): n=180, IF; Svendborg Sygehus (1991-1995): n=203, uncemented bipolar Ultima HA; Århus Kommune Hospital (1991-1995): n=209, cemented unipolar Hastings HA; Hillerød Hospital (1991-1998): n=158, uncemented hydroxyapatite-coated bipolar Furlong HA. Failure was defined as any procedure that led to reoperation with loss/change of hip implant (simple screw removal excluded) or periprosthetic fracture. Data was retrieved from patient files, region based Patient Administrative System, and The National Registry of Patients at the end of 2010. Survival analysis was applied with adjustment for co-morbidity (Charlson index), sex and age. Patients at risk at entry were 750, at 5 years 200, at 10 years 57, and at 15 years 11; attrition mostly due to high mortality.

**Findings / Results:** There was a significant reduced hazard ratio (HR) for the Hasting HA (HR=0.27 (0.13;0.53),  $p < 0.000$ , absolute failure rate (AFR) 5.6 %) but not for the Ultima HA (HR=0.58 (0.34;1.00),  $p = 0.051$ , AFR 10.8 %) and the Furlong HA (HR=0.98 (0.58;1.65),  $p = 0.788$ , AFR 15.8 %) compared with IF (reference HR=1, AFR 18.3 %).

**Conclusions:** Cemented HA has superior long-term hip survival rate compared to IF and cementless HA for patients above 75 years with a displaced femoral neck fracture.

## 32.

### **The physically best-fit hip fracture patients stay hospitalized due to logistic problems**

*Henrik Palm, Pia Iheme Nielsen, Morten Tange Kristensen, Henrik Kehlet*  
Department of Orthopaedic Surgery Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; Department of Physiotherapy, Hvidovre University Hospital; Section of Surgical Pathophysiology, Rigshospitalet

**Background:** Length of hospital stay following hip fracture surgery has, depending on discharge destinations, been reduced to 1-2 weeks in fast-track setups with standardized treatment and functional discharge criteria. Little is however known about the specific reasons for why hip fracture patients are not discharged earlier.

**Purpose / Aim of Study:** To investigate the reasons for continued hospitalization after 5 days in our standardized fast track hip fracture unit.

**Materials and Methods:** 125 consecutive patients (mean age: 79, gender: 86F/39M) admitted from their own home with a hip fracture from Dec 2011 to April 2012 and hospitalized 5 days after surgery, were included. Discharge criteria were medically stable with mobilization ability to independently get in/out of bed and a chair, go to the toilet and walk with/without walking aid. Staff members prospectively assessed reasons for continued hospitalization once a day.

**Findings / Results:** The mean length of stay was 12 days (range 5-27), with 61% discharged back to own home, 5% to nursery home, 18% to other departments and 14% to rehabilitation facilities. 2% died before discharge. 96% fulfilled the mobilization discharge criteria prior to admission and 59% achieved this again during hospitalization. Among these best-fit patients, the mean length of stay after achievement was 3 days, with 32% of time used for medical treatment, 6% for wound problems, 2% for staircase training and 7% on patients unmotivated or afraid to go home, 30% on hospital delay, 4% on community delay and 19% due to the fact that patients are seldom discharged in weekends.

**Conclusions:** The physically best-fit hip fracture patients, who are admitted from their own home and achieve the discharge criteria of independent mobilization during hospitalization, could be discharged earlier, if logistic problems are taken care of.



### 33.

## The use of intraoperative computer tomography in acetabular and pelvic fractures

*Dennis Olsson, Eckardt Henrik*

Orthopaedic Bispebjerg; Trauma, Rigshospitalet

**Background:** Malreduced acetabulum fractures cause severe postoperative coxarthrosis, and intraoperative evaluation of the reduction and osteosynthesis of acetabulum fractures is important. Two-dimensional fluoroscopy shows only tangential views of the acetabulum roof. The new 3- dimensional fluoroscopy could potentially revolutionize acetabular fracture surgery.

**Purpose / Aim of Study:** We have used intraoperative imaging with an O-arm to evaluate the reduction and questioned whether the intraoperative CT- like images improve reduction after acetabulum fracture.

**Materials and Methods:** We used intraoperative imaging with the O- arm in 24 patients who suffered an acetabulum fracture between October 2010 and Mars 2012. The radiographic operative end-result was evaluated with the Matta-score, and the functional result at 3 month postoperative was evaluated with the score of Merle d' Aubigné. The control group consisted of 41 consecutive acetabulum fractures operated the previous year. Chi2 tests were used for comparison between groups.

**Findings / Results:** In the O-arm group 13/24 (54,2%) had anatomic reduction of their fracture and 2/24 (8,3%) had a poor result. In the control group 17/41 (41%) had anatomic reduction and 12/41 (29%) had a poor result. The differences were not significant. In complex fracture types (t-type and two- column) the reduction with the o-arm was significantly better than in the control group. Operation time and functional outcome was not different between groups.

**Conclusions:** Intraoperative imaging with the O-arm produces CT-like reconstructed three- dimensional images, which facilitates intraoperative evaluation of reduction, and offers a possibility to correct malreduced fractures before closing the wound. Our results showed a tendency towards better results when the O-arm is used for intraoperative evaluation of acetabulum fractures.

## 34.

### The feasibility of early Progressive Resistance Training after Unicompartmental Knee Arthroplasty

*Peter Bo Jørgensen, Søren Bie Bogh, Kjeld Søballe,*

*Henrik Sørensen, Inger Buur Mechelburg*

Orthopaedic Research Unit Aarhus University Hospital, Denmark;

Orthopaedic Research Unit, Aarhus University Hospital, Denmark;

Orthopaedic Research Unit, Aarhus University Hospital, Denmark;

The Section of Sport Science, Public Health, Aarhus University;

Orthopaedic Research Unit, Aarhus University Hospital, Denmark

**Background:** Muscle atrophy and decreases in muscle strength is documented in early stages of knee osteoarthritis and increases with progression. Within the first weeks after Unicompartmental Knee Arthroplasty (UKA) an additional decrease in muscle strength is found.

**Purpose / Aim of Study:** To investigate the feasibility of early progressive resistance training (PRT) after UKA.

**Materials and Methods:** 27 patients scheduled for UKA were randomized for either early PRT (n=15) or standard home exercise program (n=12). The PRT was initiated within the first week after UKA and performed twice a week for eight weeks in training machines. Before and two month after UKA, leg power and inertia-sensor motion analysis (20 m walk and 6 Min walk) was performed.

**Findings / Results:** Mean pain increase during exercise was 0.17 (-3 to 3.5) measured on VAS. Compliance for the intervention group was 85 % participation. We found an increase in load in leg press, knee extension and knee flexion of 460 %, 453 % and 39 % respectively and a decrease in number of repetitions by 5.7, 2.0 and 4.3. Leg power in operated leg increased 14.26 Watt (p=0.13) with a difference of 9.7 Watt in favor of intervention group (p=0.54). At two months follow-up leg power in operated leg was closer to leg power in non-operated leg for both groups. Self- selected walking speed increased by 0.4 km/h (p=0.009), with a non- significant difference of 0.26 km/h (p=0.38) in favor of the intervention group. Asymmetry of walking pattern was equal to preoperative values (p=0.80), and equal between groups (p=0.77).

**Conclusions:** UKA patients are able to perform early PRT without experiencing increasing pain while the training load increased progressively. We found no indication of negative effects of PRT.

35.

## Can patients accurately assess their knee range of motion? Development and validation of a picture based questionnaire

*Jens Borghjerg, Jens Odgaard*

Department of Orthopaedic Surgery Aarhus University Hospital, Aarhus, Denmark; Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark

**Background:** The current practice for assessment of knee range of motion (ROM) implies involvement of trained personnel.

**Purpose / Aim of Study:** The purpose of this study was to investigate whether patients can accurately assess their knee passive ROM.

**Materials and Methods:** A picture based questionnaire for patient assessment of passive ROM was developed. The accuracy of patient assessed ROM was compared to goniometric assessment by a health professional. The questionnaire was posted to patients who completed the questionnaire at home and subsequently had their knee ROM measured by a health professional with a short arm goniometer. A total of 58 patients were evaluated. Agreement between the measurement methods was calculated with the Bland-Altman method. We calculated the sensitivity and specificity of patient assessed ROM in dichotomously distinguishing between different ranges of motion.

**Findings / Results:** The agreement between goniometric assessment and patient assessment of knee flexion showed a mean difference of  $1.9^\circ$  (limits of agreement  $-32.3^\circ$  to  $35.9^\circ$ ) for flexion and  $5.8^\circ$  (limits of agreement  $-26.5^\circ$  to  $14.8^\circ$ ) for extension. The sensitivity of patient assessment in identifying knee flexion less than or equal to  $100^\circ$  was 92%. Specificity was 85%. The sensitivity of patient assessment in identifying a knee flexion contracture greater than  $10^\circ$  was 100%. Specificity was 48%.

**Conclusions:** Although the results of the study show wide limits of agreement between goniometric assessment and patient assessment of knee ROM, the picture based questionnaire for patient assessment of knee ROM was found to be a valid tool for dichotomously distinguishing between different ranges of motion.

## 36.

### **CASPAR, robot-assisted total knee arthroplasty: 10-12 years results**

*Tord Salomonsen, Jan Shultz Hansen*  
Orthopaedic Surgery Svendborg Hospital;  
Orthopaedic Surgery, Svendborg Hospital

**Background:** Total Knee Arthroplasty (TKA) is today a standard procedure in the operative treatment of osteoarthritis in the knees. Various authors has described that malalignment may lead to early loosening.

**Purpose / Aim of Study:** For this reason the CASPAR robot- assisted total knee replacement was introduced. This studie is a 10-12 year follow up, on the total Knee Arthroplastys, made with CASPAR from 2000–2002, at Faaborg Hospital, Denmark.

**Materials and Methods:** Forty consecutive TKAs were performed between 2000 and 2002. Patients were followed up retrospective 10-12 years post surgery. Outcome measures included Oxford Knee Scores (OKS) and EQ-5D scores. Survival analysis was performed using the life table method.

**Findings / Results:** Of 40 CASPAR knees, 34 were alive at 10-12 years. 4 patients were lost to follow up. 1 knee (3,3%) were revised, for aseptic loosening. The 10 year survival was 96,6%. The mean Oxford Knee Score was 21 and for the EQ-5D mean VAS score was 69,0.

**Conclusions:** These results compared to the Danish knee arthroplasty register and other studies suggest that the CASPAR TKA method gives equal, excellent clinical results up to 10-years compared to the conventional method.

### 37.

## **Fibrin sealant has no effect on drain output or functional recovery following total knee arthroplasty. A randomized, double-blind, placebo-controlled study in simultaneous bilateral TKA**

*Christian Skovgaard Nielsen, Anderes Troelsen, Bente Holm,  
Troels Lund, Henrik Kehlet, Henrik Husted*

Ortopædkirurgisk Afdeling Hvidovre Hospital; Ortopædkirurgisk Afdeling, Hvidovre Hospital; Lundbeck center for fast-track hip and knee arthroplasty, Hvidovre Hospital; Anæstesiologisk Afdeling, Hvidovre Hospital; Section for surgical pathophysiology, Rigshospitalet; Ortopædkirurgisk Afdeling, Hvidover Hospital

**Background:** Blood loss after total knee arthroplasty (TKA) may lead to anaemia, blood transfusion(s) and increased total cost. Also, bleeding into the periarticular tissue may cause swelling and a reduction in quadriceps strength to impair early functional recovery

**Purpose / Aim of Study:** In this study, a prospective, randomized, double-blind, placebo-controlled study, the potential effect of fibrin sealant on blood loss and early functional recovery in a fast-track setting was evaluated.

**Materials and Methods:** 24 consecutive patients undergoing bilateral simultaneous total knee arthroplasty (BSTKA) were included. 10 ml of fibrin sealant (Evicel) was sprayed on one knee whereas the contra-lateral knee had saline. Drain output, the primary outcome, was measured from applied knee drains exactly 24 h after surgery. Secondary outcomes (knee swelling, pain, strength of knee extension and range of movement (ROM)) were evaluated up to 21 days post surgery.

**Findings / Results:** Analysing the results showed no significant difference in the drain output between knees treated with fibrin sealant (582 mL, SD 328) versus placebo (576 mL, SD 289), ( $p=0.95$ ). Likewise no significant differences were found between groups regarding swelling, pain, strength of knee extension or ROM (all  $p>0.32$ ).

**Conclusions:** Fibrin sealant as a local haemostatic in TKA showed no benefit in reducing drain output or facilitating early functional recovery.

## 38.

### **Muscle Damage From The Arterial Tourniquet in Total Knee Arthroplasty Occur Underneath The Cuff**

*Lasse E. Rasmussen, Henriette A. Holm, Per W Kristensen,  
Per Kjærsgaard-Andersen*

Ortopedic Surgery Sygehus Lillebælt, Vejle; Ortopedic Surgery, Sygehus Lillebælt, Vejle; Ortopedic Surgery, Sygehus Lillebælt, Vejle; Ortopedic Surgery, Sygehus Lillebælt, Vejle

**Background:** It is currently debated whether it is safe to use an arterial tourniquet in total knee arthroplasty (TKA).

**Purpose / Aim of Study:** The ischemic response in the quadriceps muscle was investigated by direct measurement of ischemia underneath the tourniquet and distally in ischemic tissue and correlated to the muscular function 14 days postoperatively.

**Materials and Methods:** Measurements were performed in 12 patients (Mean age (years) 59.2. Range: 39 – 77). Using the microdialysis technique (CMA63 catheter, 0,5 µl/min, CMA Microdialysis, Solna, Sweden), metabolism (Lactate, Pyroate, Glucose, Glycerol) was measured in skeletal muscle underneath the arterial tourniquet (pressure: 350 mmHg), in the ischemic muscle distally to the tourniquet and in the opposite muscular tissue (reference). Creatine Kinase (CK), Asparagine Aminotransferase (ASAT) and Lactate Dehydrogenase (LDH) were measured before, during and after the surgical procedure. Quadriceps function was measured as an isolated isometric leg- extension test 14 days postoperatively.

**Findings / Results:** Lactate/ pyruvate (L/P) ratio increased faster underneath the tourniquet compared to ischemic tissue distally to the tourniquet. Glycerol levels underneath the tourniquet were significantly elevated compared to ischemic tissue distally to the tourniquet. A negative correlation was found between the individual ischemic response measured as the L/P ratio underneath the tourniquet after 45 minutes of ischemia and isolated quadriceps function 14 days postop.

**Conclusions:** The skeletal muscle underneath the tourniquet suffered to a larger extent from ischemia than the ischemic tissue distally to the tourniquet. The ischemia under the tourniquet may relate to the level of muscle injury and the individual ischemic response may determine the muscular function during the first 14 days postoperatively.

## 39.

### Outcome of allograft reconstruction of the knee extensor mechanism

*Bjarne Mygind-Klavsen, Svend Erik Christiansen, Claus Fink Jepsen, Frank Madsen, Anders Odgaard, Martin Lind*

Division of Sports Trauma, Department of Orthoped Aarhus University Hospital; Division of Sports Trauma, Department of Orthopedic Surgery, Aarhus University Hospital; Division of Knee Surgery, Department of Orthopedic Surgery, Aarhus University Hospital; Division of Knee Surgery, Department of Orthopedic Surgery, Aarhus University Hospital; Division of Knee Surgery, Department of Orthopedic Surgery, Aarhus University Hospital; Division of Sports Trauma, Department of Orthoped, Aarhus University Hospital

**Background:** Knee extensor mechanism defects are seen as a complication after TKA, Quadriceps tendon ruptures and comminuted patella fractures. Knee extensor mechanism defects treatment options are limited. One method is allogenic transplantation of quadriceps tendon, patella, patella tendon and tibial tubercle.

**Purpose / Aim of Study:** The purpose of this study is to describe clinical outcome in a cohort of patients treated with reconstruction of the knee extensor mechanism using allograft tissue.

**Materials and Methods:** Nine patients treated with reconstruction of the knee extensor mechanism using allograft tissue from 2008 to 2012 at our department comprised our study cohort. At project follow-up in 2012, clinical outcome was evaluated using knee specific scores, objective evaluation of range of motion and extension force. Function was evaluated by walking and stair climbing ability.

**Findings / Results:** All patients were female and aged from 23 to 89 years. The average follow up time was 24 months (3-46 months). Five patients had extensor mechanism defects as a complication to total knee arthroplasty. Three patients due to comminuted patella fractures. One patient due to other reasons. The mean extension deficit was < 10° and mean extension force was 4 (3-5). There were no major complications. The reported walking distance varied from below 1000m to 3000m without the use of walking aids. The average KOOS ADL was 52 (35-85). The patients were overall very satisfied with the procedure.

**Conclusions:** The clinical outcome in the present case series of patients treated with reconstruction of the knee extensor mechanism using allograft tissue indicate that extensor mechanism transplantation in most case result in acceptable walking function and knee range of motion. The procedure appears safe with no major complications.

40.

## **The Oxford® Cementless Partial Knee Tibial Trays Subside Initially but Stabilize at 6 Months: A Randomized Clinical RSA Study**

*Maiken Stilling, Frank Madsen, Claus Fink Jepsen, Kjeld Soballe,  
Per Wagner Kristensen, Anders Odgaard*

Department of Orthopaedics Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Vejle Regional Hospital; Department of Orthopaedics, Aarhus University Hospital

**Background:** The meniscal bearing Oxford® Cementless Partial Knee Replacement for anteromedial osteoarthritis was introduced to reduce the incidence of radiolucent lines observed on screened radiographs under cemented Tibial Trays.

**Purpose / Aim of Study:** To compare implant fixation of cementless and cemented Oxford® Partial Knee Tibial Trays up to 1 years follow-up.

**Materials and Methods:** 79 patients (48 men) were randomly allocated to surgery with cementless hydroxyapatite-coated or cemented Oxford® Partial Knee Tibial Trays (Biomet Inc) at 2 hospital sites. Femoral components were either single-pegged or double-pegged in the cemented group and double-pegged in the cementless group. Refobacin bone cement (Biomet Inc) was used. Evaluation of implant migration, radiolucent lines (RLL), and clinical outcomes (AKSS and OKS) was performed at 6 weeks, 3 and 6 months, and 1 year.

**Findings / Results:** The cementless Tibial Trays (n=25) migrated more than the cemented Tibial Trays (n=55) at all follow-ups ( $p < 0.01$ ). Significant segment motion of the cementless Tibial Trays occurred mainly in the first 6 weeks with subsidence of 0.3mm (SD 0.06mm), posterior tilt of  $0.61^\circ$  (SD  $0.55^\circ$ ) and medial tilt of  $0.77^\circ$  (SD  $0.84^\circ$ ), however migration stabilized between 6 months and 1 year. Between 6 months and 1 year 20% of cemented Tibial Trays while 0% of cementless Tibial Trays ( $p = 0.02$ ) migrated more than 0.2mm (total translation). Analysis of radiolucent lines is ongoing. At 1 year clinical scores was similar between groups ( $p > 0.17$ ) with similar improvement ( $p > 0.40$ ). Satisfaction was high.

**Conclusions:** The cementless Oxford® Partial Knee Tibial Tray migrate initially but stabilize at 6 months probably because of achieved bony anchorage. Cementless fixation is even better than cemented fixation between 6 months and 1 year. At 1 year functional results were similar between the groups.



## 41. The Oxford® Partial Knee Femoral Components: Are 2 pegs better than 1?

*Maiken Stilling, Frank Madsen, Claus Fink Jepsen, Kjeld Søballe,  
Per Wagner Kristensen, Anders Odgaard*

Department of Orthopaedics Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Vejle Regional Hospital; Department of Orthopaedics, Aarhus University Hospital

**Background:** Traditionally, the femoral component (FC) of the Oxford® Partial Knee Replacement had a single-peg (SP). Recently, a double-pegged (DP) FC has been developed to better resist rotational torques.

**Purpose / Aim of Study:** to compare fixation of SP and DP cemented Oxford® Partial Knee FC, and further, to compare fixation of cemented and cementless DP FC up to 1 years.

**Materials and Methods:** 79 patients (48 men) randomly were allocated to surgery with cementless hydroxylapatite-coated or cemented Oxford® Partial Knee (Biomet Inc) at two hospitals. Refobacin bone cement (Biomet Inc) was used. There were 3 groups: A) SP cemented FC, B) DP cemented FC, and C) DP cementless FC. Evaluation of implant migration, radiolucent lines (RLL), and clinical outcomes (AKSS and OKS) was performed at 6 weeks, 3 months, 6 months and 1 year.

**Findings / Results:** At 1 year maximum total point motion (MTPM) for A (0.41mm, SD 0.35) and B (0.40mm, SD 0.20) was similar ( $p=0.59$ ). The MTPM for C (0.53mm, SD 0.18) was higher than for A ( $p<0.01$ ) and B ( $p=0.02$ ). Fixation was similar between the 3 FCs until 6 months. Between 6 months and 1 year posterior rotation ( $0.37^\circ$ , SD 0.40) and internal rotation ( $0.27^\circ$ , SD 0.32) for C was larger ( $p=0.01$ ) compared with A and B. Between 6 months and 1 year 12% (3/25) of A, 25% (6/26) of B, and 17% (4/24) of C migrated more than 0.2mm (MTPM), but there was no statistical difference between the groups ( $p>0.24$ ). Analysis of RLL is ongoing. At 1 year the clinical results was similar between groups ( $p>0.17$ ). Satisfaction was high.

**Conclusions:** Double-pegs does not improve fixation of cemented Oxford® Partial Knee femoral components as compared with a single-peg. Cementless fixation with double-pegs is stable until 6 months, but after 6 months these components rotate internally and posteriorly as compared with cemented fixation. Longer follow-up is needed.

## 42.

### **Use of Trabecular Metal Cones (TM Cone) for Reconstruction of Severe Bone loss at the Proximal Tibia in Revision Total Knee Arthroplasty. 35 cases followed 5-72 months**

*nikolaj winther , claus lindkær, michael mørk petersen, henrik Schrøder*  
orthopedic Righospitalet; orthopedics, bispebjerg hospital; orthopedic,  
Rigshospitalet; orthopedic, Rigshospitalet

**Background:** Management of bone loss at the proximal tibia at the time of revision total knee arthroplasty (rTKA) can be challenging. The use of a porous tantalum TM cones is a relatively new option for treatment of severe bone loss.

**Purpose / Aim of Study:** To evaluate the results of rTKA with the use of TM cones performed during a 6- year period.

**Materials and Methods:** From October 2005 to May 2011, 310 patients had a rTKA in our hospital. 35 patients (11%) received a TM Cone for reconstruction of severe bone loss at the proximal tibia. All patients were evaluated by the Knee Society Score (KSS). Bone loss at the proximal tibia was classified according to the Anderson Orthopaedic Research Institute (AORI) score from the pre- and postoperative x-rays. In addition bone loss was classified as contained/non-contained, and as +/- "ice cream cone" defect. The prostheses used were 15 RHK, 14 LCCK , and 6 LPS (Nexgen, Zimmer), and in all cases, press-fit stems and hybrid cementation were used. Totally, 13/35 defects were non- contained, and 8/35 had ice cream cone defects.

**Findings / Results:** Preoperative x-rays showed 9 knees with T1 bone defect, 19 knees with T2 defect and 8 knees were classified as T3 bone defects. Knee and function scores improved. Two patients had re- revision because of infection. During re- revision the TM cones were well-fixed. None of the remaining patients (n = 32) have been revised. All follow-up x-rays showed no signs of radiologically loosening.

**Conclusions:** 35 total knee revision arthroplasties with a tibial TM Cone were followed for 5- 72 months. No loosening was found, and we consider the TM Cone to be a reliable tool in dealing with large bone loss.

## 43.

### Value of tourniquet in TKA surgery

*Ashir Ejaz, Mogens, B Laursen, Andreas Kappel,  
Poul T. Nielsen, Sten Rasmussen*

Ortopædkirurgisk afd. Aalborg Sygehus; Ortopædkirurgisk afd., Aalborg Sygehus; Ortopædkirurgisk afd., Aalborg Sygehus; Ortopædkirurgisk afd., Aalborg Sygehus; Ortopædkirurgisk afd., Aalborg Sygehus

**Background:** The pneumatic tourniquet is widely used during TKA. Use of the tourniquet is associated with increased risk of complications, specifically DVT/PE, nerve palsy, tourniquet compartment syndrome. Other common harmful effects are thigh swelling and pain. All these affect postoperative recovery.

**Purpose / Aim of Study:** To evaluate benefits and disadvantages of tourniquet use during TKA surgery by quantifying effects such as postoperative pain, swelling and knee range of motion.

**Materials and Methods:** A prospective RCT with 70 consecutive patients aged 50-85 (mean= 68) underwent primary unilateral TKA. All operations were performed in spinal anesthesia and by the same surgeon. Patients were randomly allocated to one of two groups: operation with tourniquet (Group A) and operation without tourniquet (Group B). The operative procedure, cuff pressure and postoperative pain treatment was standardized. All patients were evaluated at day 1, 2, and 3 and on outpatient basis in 8th week and 6th month. Pain was assessed by VAS and analgesia requirement. Thigh swelling was measured as circumference and ROM was registered goniometric. Furthermore all patients filled out questionnaires ED-Q5, KOOS and OKS.

**Findings / Results:** Using a tourniquet during TKA did increase postoperative pain significantly on day 1,2 and 3 at discharge and on the 8th postoperative week, also a trend for better ROM. Thigh swelling was increased significantly in group A, by day 3 and by week 8 there was no difference. Throughout first 8 weeks Group B main complaint was thigh pain and slower mobilisation. Results will be presented.

**Conclusions:** We have determined that performing TKA without tourniquet is safe, beneficial and provides faster recovery for patients. We suggest not using tourniquet in TKA surgery, to avoid potential adverse effect of tourniquet.

#### 44.

### **Work, wellbeing, and sexual life in younger patients after knee replacement**

*Jakob Klit, Steffen Jacobsen , Stig Sonne-Holm,  
Signe Rosenlund, Anders Troelsen*

Ortopædkirurgisk afdeling Hvidovre Hospital; Ortopædkirurgisk afdeling, Hvidovre Hospital; Ortopædkirurgisk afdeling , Hvidovre Hospital; Ortopædkirurgisk afdeling, Køge Sygehus; Ortopædkirurgisk afdeling , Hvidovre Hospital

**Background:** Survivorship of implants and knee function has been traditional endpoints in the evaluation of the outcome of total knee arthroplasty (TKA). Other endpoints, such as the influence on personal welfare and sex life may be of crucial importance to the patients, but little is known about what patients can expect following TKA.

**Purpose / Aim of Study:** To investigate how the relation to work, income and sexual activity is affected in younger patients after TKA.

**Materials and Methods:** In a prospective cohort study performed at 3 arthroplasty units in a 1 year period we included patients  $\geq$  60 years of age scheduled for primary TKA. Questionnaires including oxford knee score (OKS), SF-36, questions regarding relation to work, income and sex-life, were collected preop. and at, 3, 6, and 12 months postop. The 12 month follow-up was returned by 81 patients. Median age at surgery was 54 years (33-60).

**Findings / Results:** At 12 months the OKS and SF-36 showed impressive improvements. Ten of 69 patients in work preop. lost their job and four went from part-time to full- time employment. Patients that were sexually active before TKA surgery remained active. Of 68 sexually active patients, 16 experienced a decrease in sexual activity postop. due to increased pain and decreased range of motion, and 26 patients had to change their normal pattern of intercourse positions. Two males developed erectile dysfunction postop.

**Conclusions:** This study shows that there are considerable negative effects on younger patients' sex life following TKA. This information is important to patients and should be included in preoperative patient information.

45.

## **A novel nano-structured porous polycaprolactone scaffold improves hyaline cartilage repair in a rabbit model compared to a collagen type I/III scaffold: in vitro and in vivo studies**

*Bjørn Borsøe Christensen, Casper Bindzus Foldager, Ole Møller Hansen, Jens Vinge Nygaard, Cody Erik Bünger, Martin Lind*

Ortopædisk forskningslaboratorium Aarhus sygehus Nørrebrogade;  
Ortopædisk forskningslaboratorium, Aarhus sygehus Nørrebrogade;  
Ortopædisk forskningslaboratorium, Aarhus sygehus Nørrebrogade; Institut for ingeniørvidenskab, Aarhus universitet; Ortopædisk forskningslaboratorium, Aarhus sygehus Nørrebrogade;  
Idrætssektoren, Aarhus sygehus Tage Hansens gade

**Background:** Injuries to articular cartilage have shown a limited potential to regenerate. No current treatment option has shown the ability to consistently provide hyaline repair tissue.

**Purpose / Aim of Study:** To develop a nano-structured porous polycaprolactone (NSP-PCL) scaffold and compare the osteochondral repair potential with that of a commercially available collagen type I/III scaffold.

**Materials and Methods:** The NSP-PCL scaffold was produced by combining rapid prototyping and thermally induced phase separation. In vitro: The scaffolds were seeded with rabbit chondrocytes and cultured in hypoxia for 6 days. qRT-PCR on primers for sox9, aggrecan, collagen type 1 and 2. In vivo: 15 New Zealand White Rabbits received osteochondral defects in the femoral intercondylar grooves. Cartilage was harvested 4 weeks prior to surgery. 3 treatment groups: (1) NSP-PCL scaffold without cells. (2) The collagen I/III scaffold with autologous chondrocytes and (3) NSP-PCL scaffold with autologous chondrocytes. 13 weeks observation. Evaluation using the O'Driscoll score.

**Findings / Results:** In vitro: The expressions of sox9 and aggrecan were higher in the NSP-PCL scaffold, while expression of collagen 1 was lower compared to the collagen I/III scaffold. In vivo: Both NSP-PCL scaffolds with and without cells scored significantly higher than the collagen I/III scaffold when looking at the structural integrity and the surface regularity. No differences were found between the NSP-PCL scaffold with and without cells.

**Conclusions:** The NSP-PCL scaffold had higher expression of chondrogenic markers and had higher histological scores than the collagen I/III scaffold. The chondrocytic differentiation could improve clinical cartilage repair. It appears to be a suitable cell-free implant for hyaline cartilage repair and could be a less costly and more effective treatment option.

46.

## **A small peptide bone substitute (P-15) significantly improved microarchitecture of concentric gap mass and enhanced implant fixation in sheep**

*Ming Ding, Christina Andreassen, Mads Dencker, Anders Jensen, Søren Overgaard*

Department of Orthopaedics and Traumatology Odense University Hospital, Institute of Clinical Research, University of Southern Denmark; Department of Orthopaedics and Traumatology, Odense University Hospital, Institute of Clinical Research, University of Southern Denmark; Department of Orthopaedics and Traumatology, Odense University Hospital, Institute of Clinical Research, University of Southern Denmark

**Background:** Today 2.2 million bone-graft surgeries are performed annually on world basis. A variety of biomaterials have been tried out for tissue engineering of bone healing and repair.

**Purpose / Aim of Study:** The aim of this study was to evaluate the effects of a small peptide (P-15-BGS), a synthetic 15-amino acid residue, on implant fixation in sheep model. We further assessed whether P-15-BGS combined with hydroxyapatite+ ?tricalciumphosphate+Poly- Lactic-Acid (HA/?TCP-PDLLA) could enhance implant fixation.

**Materials and Methods:** Eight female adult sheep were used. Cylindrical critical size defects were created at distal femoral condyles bilaterally. Titanium implants with 2 mm concentric gaps were inserted and the gaps were filled with one of the four materials: allograft as gold standard (control), P-15-BGS, P-15-BGS with HA/ ?TCP-PDLLA, or HA/?TCP-PDLLA. After nine weeks, the sheep were sacrificed. Bone-implant blocks were harvested and sectioned into two parts: one for micro- CT scanning and push-out test, and one for histomorphometry. The data were evaluated statistically.

**Findings / Results:** Interestingly, the microarchitecture of the P-15-BGS group was significantly different from the control group. Significantly greater tissue volume fraction and thicker trabeculae were seen in the P-15-BGS group compared with the allograft group. Despite these differences, the bone formation and bone ingrowth to porous titanium implant assessed were not significantly different among the four groups. The P-15-BGS group had similar shear mechanical properties on implant fixation as the allograft group. Adding HA/?TCP-PDLLA to P-15-BGS did not significantly change these parameters.

**Conclusions:** The P-15-BGS significantly improved microarchitecture of concentric gap mass, and its enhancements of bone formation and implant fixation were at least as good as allograft.

## 47.

### **Accelerated bone growth, but weaker implant fixation in allograft mixed with nano-hydroxyapatite**

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

Orthopaedic Research Laboratory Aarhus University Hospital; Department of Orthopaedic Surgery, Aarhus University Hospital; Department of Orthopaedic Surgery, Aarhus University Hospital; Department of Orthopaedic Surgery, Aarhus University Hospital;

Minneapolis Medical Research Foundation, University of Minnesota;  
Department of Orthopaedic Surgery, Aarhus University Hospital

**Background:** Impaction grafting is a well-established method for optimizing inadequate bone- stock seen in hip revision surgery. However, joint replacement surgeons are still challenged in achieving early implant fixation, which is crucial to prosthesis longevity. Nano-Hydroxyapatite (nHA) has been shown to be a highly osteoconductive mineral and is widely used in many kinds of bone replacement surgery.

**Purpose / Aim of Study:** We hypothesized that augmenting allograft bone by adding nHA would improve osteoconductivity of the allograft bone and thereby improve implant fixation.

**Materials and Methods:** We conducted a double, paired study including 12 dogs. Each animal received 4 implants surrounded by a 2.5mm gap in the distal femur. The gaps were impacted with allograft with or without Ostim® (nHA paste) from one of the 4 groups: Control 1 vs. nHA Low (5% Ostim®) in the lateral side and Control 2 vs. nHA High (20% Ostim®) in the medial side. Observation time was 4 weeks. Upon euthanasia, mechanical and histomorphometric analyses were made.

**Findings / Results:** There were no statistical differences in any of the mechanical parameters except for 9% less stiffness ( $p=0.012$ ) in High-dose nHA group compared to the control. In the nHA High group there was 8% more new bone in the gap ( $p=0.0008$ ) and on the surface of the implant ( $p = 0.011$ ).

**Conclusions:** Within the limits of this model, we show that nHA mixed with allograft has inferior mechanical stability, but has a higher proportion of new, woven bone.

## 48. Antibiotic Pre-exposure Reduces the Ability to Detect Heat Production of Bacteria in Biofilm

*Christen Ravn, Ulrika Furustrand Tafin, Bertrand Betriséy,  
Søren Overgaard, Andrej Trampuz*

Infectious Disease Service Lausanne University Hospital; Infectious Disease Service, Lausanne University Hospital; Infectious Disease Service, Lausanne University Hospital; Department of Orthopaedic Surgery and Traumatology, Odense University Hospital;  
Infectious Disease Service, Lausanne University Hospital

**Background:** Antibiotic treatment before collection of culture specimens might reduce the ability to detect bacteria in prosthetic joint infections (PJI) which can hamper specific antibiotic treatment.

**Purpose / Aim of Study:** To investigate the suppressive effect of different antibiotics in a well-established biofilm model of typical bacteria in PJI.

**Materials and Methods:** Biofilms of *Staphylococcus aureus* (MSSA), *S. epidermidis* (MRSE), *Escherichia coli* and *Propionibacterium acnes* were formed on porous glass beads (Tafin, UF, 2012. Antimicrob Agents Chemother 56(4):p.1885-91). After 24 hour incubation (72 hours for *P. acnes*) of beads with bacteria, beads were exposed to vancomycin, flucloxacillin, daptomycin or ciprofloxacin at increasing concentrations from 1-1024 times the minimal inhibitory concentration (MIC). After 24 h of antibiotic exposure, beads were sonicated to dislodge biofilm. The sonicate was investigated by microcalorimetry to detect heat production as an indication of bacterial presence in triplicate. The minimal heat inhibitory concentration (MHIC) was defined as the lowest antibiotic concentration inhibiting heat production over 24 hours (72 hours for *P. acnes*).

**Findings / Results:** Vancomycin clearly affected, but did not totally inhibit heat production of staphylococci or *P. acnes* at any concentration up to 1024 mg/l. Flucloxacillin inhibited *S. aureus* only at 128 mg/l (512x MIC). In contrast, daptomycin inhibited heat production of both *S. aureus*, *S. epidermidis* and *P. acnes* at 128x, 64x and 32x MIC, respectively. *E. coli* was inhibited by ciprofloxacin at 0.063 mg/l (8x MIC).

**Conclusions:** With sonication and microcalorimetry we saw heterogeneous effects of antibiotic exposure on the ability to detect heat production as an expression of bacterial presence.



49.

## **Collagen-Coated Polytetrafluoroethane Membrane Inserts Enhances Chondrogenic Differentiation of Human Cord Blood Multi-Lineage Progenitor Cells**

*Samir Munir, Kjeld Søballe, Michael Ulrich-Vinther,  
Thomas Gadegaard Koch, Rita A. Kandel, W. David Lee*

Orthopedic Research Laboratory Aarhus University Hospital; Orthopedic Research Laboratory, Aarhus University Hospital; Orthopedic Research Laboratory, Aarhus University Hospital; Department of Biomedical Sciences, Ontario Veterinary College, Guelph, Canada; Department of Pathology and Laboratory Medicine, Mount Sinai Hospital, Toronto, Canada; Department of Pathology and Laboratory Medicine, Mount Sinai Hospital, Toronto, Canada

**Background:** Articular chondrocytes and bone marrow-derived multipotent mesenchymal stromal cells (MSCs) are the favoured cells for cartilage tissue engineering. Umbilical cord blood has proven an alternative source of MSCs and moreover they may be more potent chondroprogenitor cells than bone-marrow MSCs.

**Purpose / Aim of Study:** Multilineage progenitor cells (MLPCs) are clonal cord blood-derived MSCs and may therefore provide a cell source with more reproducible outcomes compared to heterogeneous primary MSC cultures.

**Materials and Methods:** We evaluated the chondrogenic potency of MLPCs in standard micromass pellet system, layered on calcium polyphosphate (CPP), and on semi-permeable polytetrafluoroethane membranes with and without collagen type I, II or IV pre-coating.

**Findings / Results:** The MPLC cell line used in this study possessed poor chondrogenic potency overall, but membrane culturing resulted in a multicellular layer tissue with formation of more cartilaginous tissue compared to micromass or CPP culture. In the membrane system MLPCs produced pellucid discs, 12 mm in diameter by 1 mm in thickness from  $2 \times 10^6$  cells. The discs had hyaline-like cartilage extracellular matrix, with 4-fold greater proteoglycan content compared to MLPCs differentiated in standard micromass pellet cultures. The expression of cartilage specific genes for aggrecan, collagen II and SOX9 was significantly increased in uncoated as well as collagen type I and IV coated membrane cultures compared with micromass or CPP cultures.

**Conclusions:** In conclusion, we demonstrate that MLPCs possess' chondrogenic potency, which increased when cultured scaffold-free on membrane inserts resulting in multicellular-layered hyaline-like cartilage tissue. Evaluating the effect of culturing pre-differentiated MLPCs on CPP is an obvious next step since direct seeding of MLPCs on CPP did not yield satisfactory biphasic constructs.

50.

## Distribution of laminin in early osteochondral repair in a goat model

*Casper Bindzus Foldager, Hu-Ping Hsu, Martin Lind, Myron Spector*  
Orthopaedic Research Brigham & Women's Hospital, Harvard Medical School, Boston, MA & Aarhus University Hospital, Aarhus,; Orthopaedic Research & Tissue Engineering, Brigham & Women's Hospital, Harvard Medical School & VA Boston Health Care System, Boston, MA; Sports Trauma Clinic, Aarhus University Hospital; Orthopaedic Research & Tissue Engineering, Brigham & Women's Hospital, Harvard Medical School & VA Boston Health Care System, Boston, MA

**Background:** The limited ability of articular cartilage for spontaneous regeneration after injury may be explained by early events in the reparative area.

**Purpose / Aim of Study:** To investigate the distribution of the basement membrane molecule, laminin, in nonvascular cells and extracellular matrix (ECM) in the early reparative tissue in osteochondral defects as the basis for determining its role in the cartilage repair process.

**Materials and Methods:** Five skeletally mature goats received an osteochondral defect in the trochlear groove of the right hind leg (1x1cm). A collagen I scaffold was implanted onto the bleeding bone surface and sutured to the surrounding cartilage. The goats were euthanized 8 days (n=1), 2 weeks (n=2), and 4 weeks (n=2) postoperative. Histological sections were stained with H&E, and immunohistochemistry was performed using a polyclonal laminin antibody.

**Findings / Results:** Eight days postoperative the scaffold was still present and was infiltrated with laminin+ cells, which were not comprising a vascular network. After two weeks, laminin+ cells were predominant throughout the reparative tissue, and laminin staining was found throughout the ECM. The majority of the laminin+ cells were lining the vessels associated with the proliferative vascular response. At four weeks, the number of laminin+ cells had declined, and the abundant vascular network observed at 2 weeks had regressed. However, laminin+ cells were still present throughout the ECM, often distant from blood vessels.

**Conclusions:** We demonstrate the widespread presence of laminin in cartilage repair tissue in nonvascular cells and in ECM distant from vascularity. While laminin is critical for the attachment, differentiation, migration, and survival of certain cell types. However, laminin-332 has been shown to inhibit the chondrogenic differentiation of mesenchymal stem cells.

## 51.

### **Evaluating of bone healing around porous coated titanium implant and potential systematic bias of the traditional sampling method**

*Hassan Babiker, Ming Ding, Soeren Overgaard*

Orthopedic Research Laboratory, Orthopedic Research Unit, Department of Orthopaedic Surgery and Trau Odense University Hospital, Institute of Clinical Research - University of Southern Denmark, Odense,; Orthopedic Research Laboratory, Orthopedic Research Unit, Department of Orthopaedic Surgery and Trau, Odense University Hospital, Institute of Clinical Research - University of Southern Denmark, Odense,; Orthopedic Research Laboratory, Orthopedic Research Unit, Department of Orthopaedic Surgery and Trau, Odense University Hospital, Institute of Clinical Research - University of Southern Denmark, Odense,

**Background:** Introduction: The mechanical properties of bone can largely be explained by bone density, ingrowth to the implant surface and orientation of the bone. Gap-healing and implant fixation could be affected by the various quality and quantity of bone in the local environment. Thus, implant fixation in one part might differ to the other part of the implant.

**Purpose / Aim of Study:** This study aimed to investigate the influence of the sampling method on histological and mechanical data.

**Materials and Methods:** Material and Methods: Titanium alloy implants (Biomet Inc.) of 10 mm in length and 10 mm in diameter were inserted bilaterally into the proximal humerus of 8 skeletally mature sheep. Thus two implants with a concentric gap of 2 mm were implanted in each sheep. The gap was filled with allograft. Standardised surgical procedure was used. At sacrifice, 6 weeks after surgery, both proximal humeri were harvested. The specimens were randomized to superficial or profound groups. In the superficial group, mechanical testing or histological analysis was carried out at one side and vice versa on the contralateral side. Through this design we were able to study variation between the profound and superficial part by using the assumption that there was no side difference.

**Findings / Results:** Result: The mechanical fixation, bone volume and bone ongrowth showed no statistically significant differences. By mechanical testing, a slight tendency to increased strength, and failure energy were observed in the superficial group. By the histomorphometry, bone ongrowth was slightly increased and volume fraction was decreased in the profound group.

**Conclusions:** Conclusion: No major difference between the profound and superficial part of the implant was shown suggesting that no bias is introduced by systematically sampling from either part.

## 52.

### **Incorporation of Raloxifene-impregnated Allograft around Orthopaedic Titanium Implants**

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

Ortopædkirurgisk Forskningslaboratorium Aarhus Universitetshospital, Nørrebrogade 44, Bygn. 1A, 8000 Aarhus C; Ortopædkirurgisk Forskningslaboratorium, Aarhus Universitetshospital, Nørrebrogade 44, Bygn. 1A, 8000 Aarhus C; Ortopædkirurgisk Forskningslaboratorium, Aarhus Universitetshospital, Nørrebrogade 44, Bygn. 1A, 8000 Aarhus C; Ortopædkirurgisk Forskningslaboratorium, Aarhus Universitetshospital, Nørrebrogade 44, Bygn. 1A, 8000 Aarhus C; Orthopaedic Biomechanics Laboratory, Minneapolis Medical Research Foundation, University of Minnesota and Excelen Center for Bone & Joint Research and Education, Minneapolis, Mi; Ortopædkirurgisk Forskningslaboratorium, Aarhus Universitetshospital, Nørrebrogade 44, Bygn. 1A, 8000 Aarhus C

**Background:** Due to peri-implant osteolysis, hip revisions are a more complex procedure compared to primary hip arthroplasties. Early fixation of revision prosthesis is crucial to its long-term survival. The anti-osteoporotic drug Raloxifene decreases the risk of vertebral fractures by maintaining bone mass density. The mechanism of action by Raloxifene is purportedly by inhibition of the recruitment and activation of osteoclasts.

**Purpose / Aim of Study:** We investigated whether Raloxifene offers any benefits in augmenting early fixation of orthopaedic implants in the setting of impaction bone grafting. Our hypothesis was that Raloxifene-impregnated morselized cancellous allograft bone would increase early implant fixation compared to normal, untreated morselized cancellous allograft.

**Materials and Methods:** We used a non-weight-bearing gap model in 12 dogs. The 2.5-mm peri-implant gap was filled with either Raloxifene-impregnated or untreated bone allograft. The implants were harvested after an observation period of 28 days. Implant fixation was assessed by mechanical testing and histomorphometrical evaluation.

**Findings / Results:** Raloxifene-treated allograft significantly decreased early implant fixation compared to untreated allograft illustrated by inferior maximum shear strength ( $p < 0,01$ ) and apparent shear stiffness ( $p < 0,01$ ). This result was explained by a significantly higher amount of new bone formation ( $p < 0,02$ ) accompanied with accelerated allograft resorption ( $p < 0,03$ ) in the Raloxifene-treated group.

**Conclusions:** A similar trend has earlier been demonstrated when treating bone grafts with BMPs in spite of an apparently dissimilar mechanism of action. Our finding entails a need of redefining the theory of how Raloxifene exert its actions on bone tissue by extending its repertoire from solely anti-catabolic to including anabolic properties dose-dependently.

53.

## **Increased Bone Formation in a Porcine Critical Size Defect when using Hyaluronic Acid and TCP Coated Polycaprolactone Scaffolds Seeded with Autologous Dental Pulp Stem Cells**

*Jonas Jensen, Jens Vinge Nygaard, Muwan Chen, David Christian Evar Kraft, Jørgen Baas, Cody Bünger*

Orthopaedic Research Lab Aarhus University Hospital; Interdisciplinary Nano Science Center (iNANO), Aarhus University; Orthopaedic Research Lab, Aarhus University Hospital; Department of Orthodontics, School of Dentistry, Aarhus University; Orthopaedic Research Lab, Aarhus University Hospital; Orthopaedic Research Lab, Aarhus University Hospital

**Background:** Dental pulp tissue has been hypothesized as an alternative source of autologous adult mesenchymal stem cells for use in bone tissue engineering.

**Purpose / Aim of Study:** To assess the bone healing potential of dental pulp stem cells as well as a new scaffold in a large animal critical size defect.

**Materials and Methods:** The scaffolds for cell seeding were comprised of the polymer PCL, bioplotting into a three-dimensional grid structure (bioplotting scaffold). Afterwards, a new scaffold was created by infusing the bioplotting scaffold with hyaluronic acid + TCP to create a micro-porous (HT scaffold). A total of 14 skeletally mature pigs were used with termination 5 weeks post surgery. One month prior to surgery, bone marrow and one molar tooth was extracted from each individual pig. Mononuclear cells were isolated and differentiated into osteogenic lineage. A total of six 10 mm in depth and 15 mm in diameter non-penetrating holes were drilled in the calvaria. Three paired studies were chosen; 1.) empty defect and HT scaffold, 2.) HT scaffold and bioplotting scaffold 3.) HT scaffolds seeded with dental pulp stem cells (DPSCs) and HT scaffold seeded with bone mesenchymal stem cells (BMSCs). After termination, bone volume to total volume (BV/TV) was determined by  $\mu$ CT.

**Findings / Results:**  $\mu$ CT data showed significant more bone formation in the defect containing the HT scaffold compared to the empty defect ( $p=0,0203$ ). HT scaffolds showed larger BV/TV compared to bioplotting only ( $p=0,0001$ ). When comparing the HT scaffolds seeded with autologous stem cells, the defect containing scaffolds seeded with DPSCs had a significantly higher BV/TV (0,009)

**Conclusions:** This study shows an osteogenic potential of the DPSCs superior to BMSCs. The Hyaluronic acid and TCP coating on the bioplotting scaffold results in higher BV/TV compared to the pure PCL scaffold.

## 54.

### **Local treatment with zoledronate does not inhibit new bone formation**

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

Orthopaedic Research Laboratory, Department of Orthopaedic Surgery Aarhus University Hospital; Orthopaedic Research Laboratory, Department of Orthopaedic Surgery, Aarhus University Hospital; Orthopaedic Research Laboratory, Department of Orthopaedic Surgery, Aarhus University Hospital; Minneapolis Medical Research Foundations, University of Minnesota; Orthopaedic Research Laboratory, Department of Orthopaedic Surgery, Aarhus University Hospital

**Background:** Bone allograft is often used to restore bone stock in revision surgery. The allograft serves as a scaffold for new bone formation but is subject to resorption, which can jeopardize initial fixation. Local treatment with bisphosphonate has been used to reduce graft resorption, but the treatment may block new bone formation.

**Purpose / Aim of Study:** In this study we investigated the effect of low-dose zoledronate treatment on bone allograft and its effect on new bone formation in an experimental revision implant setting.

**Materials and Methods:** We conducted a paired study with 12 canines. 24 pistoning micromotion implants were inserted bilaterally into the knees according to our revision protocol, allowing formation of a standardized revision cavity. After 8 weeks implants were revised. This left a 1.1-mm gap around the non-motioning, plasma-sprayed titanium revision-implant, which was impacted with morselized allograft. On the intervention side the allograft was soaked in zoledronate (0.005mg/ml) for 3 minutes and rinsed. Control allograft was soaked in saline following the same procedure. Observation after revision was four weeks. Data was evaluated by paired t-test. P-values <0.05 were considered statistically significant.

**Findings / Results:** Histomorphometrical analysis showed a 3-fold increase in bone allograft volume ( $p < 0.001$ ) compared to the control side. Furthermore, the zoledronate treatment did not impair new bone formation ( $p = 0.311$ ).

**Conclusions:** We found increased preservation of bone allograft on the intervention side without impairment of new bone formation. In the clinical setting, allograft impregnation with low-dose zoledronate may be a practical method of retaining bone allograft without impairing new bone formation. We did not examine long-term effects, and protocolled trials are needed before implementing this as a standard regimen.

55.

## **Mechanically induced osteoclast differentiation is associated with alterations in genes regulating IL-6 signaling, cell death and osteoblast differentiation**

*Rune V. Madsen, Benjamin McArthur, Aleksey Dvorzhinskiy,*

*F. Patrick Ross, Mathias P. Bostrom, Anna Fahlgren*

University of Copenhagen; , Hospital for Special Surgery, New York, USA; , Hospital for Special Surgery, New York, USA; , Hospital for Special Surgery, New York, USA; , Hospital for Special Surgery, New York, USA; , Linköping University, Linköping, Sweden

**Background:** Mechanical loading of bone is anabolic, while aseptic loosening of implants is catabolic. In a rat model of mechanically induced aseptic loosening, osteoclast differentiation is increased dramatically, but the mechanisms are unknown.

**Purpose / Aim of Study:** The aim was to profile molecular pathways in peri-implant bone resorption.

**Materials and Methods:** We used 42 male rats in a validated model for mechanically induced implant loosening. A titanium plate with a central screw was inserted on the proximal tibia. These were allowed to osseointegrate for 5 weeks. Thereafter, the screw was replaced with a piston that moved perpendicular to the bone surface/plate. We performed microarrays after 3, 6, 12, 24 and 36 hours on cortical bone samples exposed to pressurized fluid flow, using time 0 as controls.

**Findings / Results:** Of a total of 4093 genes that underwent a 1.25-fold change ( $p < 0.05$ ) due to fluid flow, only 21 were common for all time points. Signals linked to inflammation and apoptosis were regulated in a biphasic manner at 3 and 12 and/or 24 hrs. The acute response at 3 hrs was associated with increases in the cytokines IL-6, IL-11, LIF and STAT3. Levels of the pro-apoptotic factor TWEAK were higher while those of BOK, a second pro-survival molecule, were lower. There is an early and late rise in RIPK3, which stimulates a form of programmed necrosis. Osteoblast-related genes were clearly suppressed (osteocalcin, Col1a, PTHr1), while those regulating macrophage and osteoclast differentiation (CSF-1, Bach1, HO-1, RANKL, RANK, OPG) were enhanced.

**Conclusions:** The data suggests that mechanical loading of cortical bone stimulates time-dependent expression of genes regulating the survival, necrosis and differentiation of both the myeloid and mesenchymal cell lineages, resulting in an integrated response leading to a rapid increase in osteoclast numbers.

56.

## **A comprehensive multimodal pain treatment improves postoperative mobilization after multilevel spine surgery**

*Ole Mathiesen, Benny Dahl, Berit Thomsen, Birgitte Kitter,  
Jørgen Dahl, Henrik Kehlet*

Section of Acute Pain Management and Palliative Medicine Rigshospitalet; Department of Orthopaedic Surgery, Rigshospitalet; Section of Acute Pain Management and Palliative Medicine , Rigshospitalet; Section of Acute Pain Management and Palliative Medicine , Rigshospitalet; Department of Anaesthesia , Rigshospitalet; Section for Surgical Pathophysiology, Rigshospitalet

**Background:** Major spine surgery with posterior instrumentation is often followed by significant pain, large amount of opioid consumption and difficult mobilization. The introduction of a comprehensive pain and postoperative nausea and vomiting (PONV) treatment protocol in other areas of surgery has reduced these problems.

**Purpose / Aim of Study:** To investigate if a multimodal postoperative pain and nausea treatment protocol would improve pain treatment and mobilization following major spine surgery

**Materials and Methods:** A new standardized regimen with acetaminophen, NSAIDs, gabapentin, S- ketamine, dexamethasone, ondansetron and epidural local anesthetic infusion or patient controlled analgesia with morphine, was introduced in a post-intervention group of 41 consecutive patients undergoing posterior multilevel instrumented spinal fusions and compared with 44 patients in a pre-intervention group.

**Findings / Results:** Compared to the pre-intervention group, patients following the new treatment protocol were mobilized earlier ( $P=0.003$ ). Patients treated according to the new protocol experienced less pain ( $P=0.03$ ), consumed less opioid ( $P=0.02$ ) and had reduced length of stay ( $P=0.007$ ) in the postanesthesia care unit (PACU). Furthermore, they consumed less opioid on postoperative day (POD) 1 ( $P=0.024$ ) and 2 ( $P=0.048$ ) compared to those in the pre-intervention group. Finally, patients following the new protocol experienced low intensities of nausea, sedation and dizziness on POD 1 to 6.

**Conclusions:** A standardized comprehensive multimodal pain and PONV protocol significantly improved mobilization and reduced opioid consumption with concomitant low levels of nausea, sedation and dizziness. Furthermore, pain scores, morphine consumption and length of stay were reduced at the PACU.



57.

## ALARM SYMPTOMS OF SOFT TISSUE AND BONE SARCOMA AMONG PATIENTS REFERRED TO A SPECIALIST CENTRE

*Heidi Buvarp Dyrop, Peter Vedsted, Katja Maretty-Nielsen,  
Bjarne Hauge Hansen, Peter Holmberg Jørgensen, Johnny Keller*

Department of Experimental Clinical Oncology Aarhus University Hospital; The Research Unit for General Practice, Aarhus University; Department of Experimental Clinical Oncology, Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital

**Background:** Clinical symptoms are important in the diagnosis of sarcoma. In the Cancer Patient Pathways implemented in Denmark, a set of alarm symptoms indicative of sarcoma have been defined as criteria for referral to a sarcoma centre. This initiative may exclude cancer patients without symptoms.

**Purpose / Aim of Study:** To investigate symptoms at time of referral among patients referred to the Aarhus Sarcoma Centre, and examine whether defined alarm symptoms were seen among sarcoma patients.

**Materials and Methods:** An observational population-based study. Medical records of all patients (n=1126) referred with suspected sarcoma from other hospitals to the Aarhus Sarcoma Centre in the period 2007-10 were reviewed for data on symptoms, clinical findings and diagnosis. The defined alarm symptoms were analyzed for predictive values in diagnosing sarcoma.

**Findings / Results:** A total of 258 sarcomas were diagnosed (22,9 %). Of these, 179 patients (69,4 %) were referred with one or more of the alarm symptoms. Symptoms with the highest sensitivity and positive predictive value (PPV) were “size over 5 cm” for soft tissue tumours, and “deep persisting bone pains” for bone tumours. Presence of more than one symptom did not increase the sensitivity or PPV. 79 of the 258 sarcoma patients were not referred due to defined alarm symptoms. 7 were found accidentally on imaging, 5 were referred with suspected recurrence of a previously treated sarcoma, 64 were referred with a confirmed histological sarcoma diagnosis, and 3 did not have any alarm symptoms and were not referred for the above reasons. The proportion of sarcoma patients did not change over the years.

**Conclusions:** Only 2/3 of referred sarcoma patients were referred due to well defined alarm symptoms, whereas most of the remaining were found accidentally. Further studies on presenting symptoms in primary care are needed.

58.

## **CANCER PATIENT PATHWAYS SHORTENS WAITING TIMES AND ACCELERATES THE DIAGNOSTIC PROCESS OF SUSPECTED SARCOMA PATIENTS IN DENMARK**

*Heidi Buvarp Dyrop, Peter Vedsted, Katja Maretty-Nielsen,  
Bjarne Hauge Hansen, Peter Holmberg Jørgensen, Johnny Keller*

Department of Experimental Clinical Oncology Aarhus University Hospital; The Research Unit for General Practice, Aarhus University; Department of Experimental Clinical Oncology, Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital

**Background:** Waiting times delaying the diagnosis of cancer can cause frustration and anxiety among patients and may also affect the prognosis. In Denmark, Cancer Patient Pathways (CPPs) have been implemented to address this problem.

**Purpose / Aim of Study:** To investigate the development in time intervals and tumour size at diagnosis after implementation of CPPs, and describe reasons for waiting time among sarcoma patients.

**Materials and Methods:** An observational population-based study with before-after comparison. Medical files of patients (n=1126) referred with suspected sarcoma from other hospitals to the Aarhus Sarcoma Centre two years before (2007-08) and two years after (2009-10) the implementation were reviewed for data on processing times, performed diagnostics, symptom duration and tumour size at diagnosis. Intervals were measured as medians with interquartile intervals and tested for trend over the years.

**Findings / Results:** There was a trend of reduced median time intervals in all diagnostic phases in the centre. Reduction in the phase “referral to first appointment” was significant for all patients. For bone sarcomas we found significant reduction in median from 11 to 5 work days in the phase “first appointment to decision of treatment”, and for soft tissue sarcomas a significantly reduced median from 28 to 18 work days in the phase “referral to start of treatment”. At referral, median tumour size of soft tissue sarcomas was significantly reduced from 7 to 5 cm., but symptom duration was unchanged. Delays were caused mostly by supplementary diagnostics, and passive waiting time was rare.

**Conclusions:** CPPs have been successful in accelerating the diagnostic process of suspected sarcoma patients, and the reduced tumour size may indicate an earlier diagnosis. However, more efforts are needed in the area of public awareness to reduce patient interval.

## 59.

### **Changes in cancer survival could affect pre-operative scoring systems in patients with metastatic spinal cord compression (MSCC)**

*Søren Schmidt Morgen, Casper Lund-Andersen, Claus Falck Larsen,  
Rikke Søgaard, Svend Aage Engelholm, Benny Dahl*

Spine Section, Department of Orthopaedic Surgery Rigshospitalet ; Spine Section, Department of Orthopaedic Surgery, Rigshospitalet ; Trauma Center, Rigshospitalet ; Centre for Applied Health Services Research and Technology Assessment, University of Southern Denmark; Department of Radiation Therapy, Rigshospitalet ; Spine Section, Department of Orthopaedic Surgery, Rigshospitalet

**Background:** An increasing number of patients are being surgically treated for MSCC. Among the reasons for this development is high evidence clinical studies, improved surgical techniques and the increasing number of patients being treated for an oncologic condition. Combined with improvements in oncologic treatment this development will most likely continue. Pre-operative scoring systems are routinely used in the evaluation of these patients, and the primary oncologic diagnosis is an important variable in all these systems. Until now, the calculation and impact of this diagnosis have been assessed in smaller groups of patients included in older studies.

**Purpose / Aim of Study:** To estimate whether one-year survival in MSCC patients referred for surgical evaluation is associated with the oncologic diagnosis.

**Materials and Methods:** All patients referred to Rigshospitalet suspected of acute symptoms caused by spinal metastases from January 1st 2005 to December 31st, 2010. For all patients primary tumor, conservative vs. surgical treatment and one-year survival was registered.

**Findings / Results:** A total of 2380 patients were referred in the study period. The overall one-year survival did not change significantly from 2005 to 2010, but for patients with pulmonary cancer there was a significant increase in one-year survival in the study period ( $p < 0.05$ ). The finding was identical in patients undergoing surgical treatment.

**Conclusions:** Patients with MSCC from pulmonary cancer experienced improved survival in the study period, compared to patients with other oncologic diagnosis. This corresponds to reports from oncological studies and could affect the pre-operative scoring systems, where assignment of point based on primary tumor is an important variable in the prognostic evaluation.

60.

## Long-term results of total endoprosthetic knee replacement in patients with primary bone tumors in the lower extremities

*Thomas Baad-Hansen, Bjarne Hauge Hansen, Katja Nielsen,  
Peter Holmberg Jørgensen, Johnny Keller*

Center for Bone and Soft Tissue Sarcomas Aarhus University Hospital, Denmark; Center for Bone and Soft Tissue Sarcomas, Aarhus University Hospital, Denmark; Department of Experimental Clinical Oncology, Aarhus University Hospital, Denmark; Center for Bone and Soft Tissue Sarcomas, Aarhus University Hospital, Denmark; Center for Bone and Soft Tissue Sarcomas, Aarhus University Hospital, Denmark

**Background:** Until the late 1970s, the majority of high- grade musculoskeletal tumors in close relation to the knee joint were treated with transfemoral amputation. With the introduction of neo adjuvant chemotherapy, advances in surgical technique and improved prosthesis designs most sarcoma centers today consider limb salvage surgery the standard procedure for patients with bone tumors involving the lower extremity.

**Purpose / Aim of Study:** The aim of the study was to identify causes of complications and risk factors for failure of segmental knee prostheses.

**Materials and Methods:** We retrospectively reviewed 52 patients who underwent modular knee replacement due to primary bone tumors between March 1987 and March 1999. Survival data were compiled using Kaplan-Meier survival analysis. We excluded two patients with expandable prostheses, two patients treated with conventional total knee replacements. This left 52 patients; 33 with a tumor in the distal femur and 19 in the proximal tibia. Median observation time was 57 months (range 1- 300 months). Median patient age at the time of total knee replacement was 36 years (range 15-82 years)

**Findings / Results:** Kaplan-Meier analysis showed overall 5 and 10-year implant survival rates of 71%, and 53% respectively. Aseptic loosening(12%) and breakage of the implant(21%) were identified as the main course of failure. Implant infections leading to revision surgery was seen in three cases (6%). 6 patients were treated with transfemoral amputation due to local recurrence, pain, and infection, respectively.

**Conclusions:** Compared to conventional TKR, survival rates of modular knee replacements are clearly less favorable, however improvement of prosthetics design indicates an increase in implant survival. Patients with no relapse of their malignancy, and treated with segmental knee prostheses must expect to outlive the implant.

## 61.

# Neurological Function and Survival Outcome of Aarhus Algorithm in Patients with Spinal Solitary Plasmacytoma or Multiple Myeloma

*Miao Wang, Cody Bünger*

Department of Orthopaedic E Aarhus University Hospital NBG; Department of Orthopaedic E, Aarhus University Hospital NBG

**Background:** We conducted a prospective cohort study of 33 patients with Solitary plasmacytoma or myeloma in spine from Aarhus Spinal Tumor Database. Solitary plasmacytoma and multiple myeloma are the most frequent malignant spinal tumors, and they are most frequently localized in the spinal vertebral body. Patients often suffered from severe back pain, pathological fracture, and cord compression.

**Purpose / Aim of Study:** The aim of this study was to describe the neurological status and survival outcome after surgical intervention in patients with spinal solitary plasmacytoma and multiple myeloma based on Aarhus Algorithm.

**Materials and Methods:** This study included 33 patients. The solitary plasmacytoma group contained 12 patients; multiple myeloma group contained 21 patients. All the patients underwent surgical treatments from December 1994 to November 2009 at the Aarhus University Hospital. All the information was prospectively collected into the Aarhus Spinal Tumor Database. We use survival analysis and created the Kaplan- Meier curve. The Log-rank test was used to compare the survival outcomes.

**Findings / Results:** Thirty patients (91%) had local symptoms before operation with mean duration of  $129 \pm 182$  days. Twenty-one of the cases (64%) were identified as Tomita Type 7. Ten patients (30%) were located between Tomita Type 4 to 6. Thirteen of the cases (39%) had chemotherapy, and 5 Patients (15%) had radiotherapy prior to surgery. The neurological status was improved in 14 Patients out of 24 patients (58%), maintained in 16 cases and decreased in 3 patients. At the end of study, 29 patients died. The mean survival duration was  $25 \pm 20$  months.

**Conclusions:** The surgical treatment of spinal solitary plasmacytoma and multiple myeloma based on Aarhus Algorithm is an effective method of treatment with respect to neurological function.

62.

## **Osteosarcoma: 30 Years' Experience from a Single Institution's Population-based Database**

*Ninna Aggerholm-Pedersen, Katja Maretty-Nielsen, Johnny Keller,  
Henrik Schröder, Steen Bærentzen, Akmal Safwat*

Department of Experimental Clinical Oncology Sarcoma Centre of Aarhus University Hospital; Department of Experimental Clinical Oncology, Sarcoma Centre of Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital; Department of Paediatrics, Sarcoma Centre of Aarhus University Hospital; Department of Pathology, Sarcoma Centre of Aarhus University Hospital; Department of Oncology, Sarcoma Centre of Aarhus University Hospital

**Background:** Treatment of osteosarcoma remains a major challenge in orthopedic oncology.

**Purpose / Aim of Study:** The aim of the study was to assess the incidence, survival rates and prognostic factors of osteosarcoma from a single institution in a population-based database.

**Materials and Methods:** For the present study, data of patients diagnosed with osteosarcoma in Denmark from 1979-2009 were extracted from the Aarhus Sarcoma Registry (ASR) and compared to the population-based Danish Cancer Registry.

**Findings / Results:** 188 patients with osteosarcoma were registered, corresponding to 97% of all patients diagnosed with osteosarcoma in Jutland. In the following analysis, only patients with high-grade osteosarcoma were included. From 1979 to 1988, most patients were treated with primary amputation. The 5-years overall survival (OS) for patients with localized disease in this period was 41.1%, compared to 58.5% for patients treated in the second time period, 1989-1998. The OS for patients aged 40 or older was significantly poorer than for patients under the age of 40, with median survival of 11 months and 45 months respectively. The median OS for patients with localized disease was 40 months compared to 15 months for patients with only lung metastases at the time of diagnosis, and further reduced to 6.6 months for patients who presented with metastasis to other sites +/- lung metastasis. The OS for patients with late relapse (2 years and more after primary diagnosis) was significantly better compared to patients with early relapse, with a 5-year OS of 59.2% and 11.4%, respectively.

**Conclusions:** The crude incidence was 0.23/100.000/year. The 5-year OS of patients with high-grade osteosarcoma was dependent on the year of diagnosis, age, stage at the time of diagnosis and soft tissue extension. Time to relapse was a strong prognostic factor for OS after recurrence.

63.

## **Prevalence of complications in neuromuscular scoliosis surgery: A literature meta-analysis from the past 15 years**

*Shallu SHARMA, Cody Eric BUNGER, Thomas ANDERSEN,  
Ebbe Stender HANSEN*

Department of Orthopedics, Aarhus University Hospital, Noerrebrogade 44;  
Department of Orthopedics, Aarhus University Hospital, Noerrebrogade 44;  
Department of Orthopedics, Aarhus University Hospital, Noerrebrogade 44;  
Department of Orthopedics, Aarhus University Hospital, Noerrebrogade 44

**Background:** Neuromuscular scoliosis amplifies the complexity of surgical intervention. While scoliosis surgery promises improvement in function, cosmesis, and overall quality of life, it is also affiliated with high risk of peri- and postoperative complications. This raises concerns about the certainty of benefits of scoliosis surgery. For a better understanding of complexities in benefit vs. complications, a meta-analytic of complications literature was performed.

**Purpose / Aim of Study:** To review the published literature on complications in neuromuscular scoliosis (NMS) surgery and, to determine the overall pooled rates (PR) of various complications associated with NMS surgery by a meta-analysis

**Materials and Methods:** PubMed and Embase databases were searched for publications (1997 -May 2011) reporting the outcomes and complications of NMS surgery. PR's were measured using a random effects meta-analytic model.

**Findings / Results:** Systematic review and Meta-analysis was performed for 68 studies and 5218 NMS patients. Pulmonary complications were the most reported (PR=22.71%) followed by implant complications (PR=12.51%), infections and neurological complications. Revision, removal and extension of implant had highest PR (7.87%) followed by malplacement of pedicle screws (4.81%). Sensitivity analysis( age at surgery, publication year and diagnosis) partly explain the variability in PR's. In regard to surgical complications with various surgical techniques in NMS, the level of evidence ranges between 2+ to 2-; the subsequent recommendations are level C

**Conclusions:** High PR's warrant attention from the surgical community. Although the PR of all complications are affected by heterogeneity, they nevertheless provide valuable insights on the impact methodological settings, patient characteristics, and advances in patient care have on complication rates.

## 64. Survival Analysis Of The Breast Cancer Subtypes With Spinal Metastases

*Miao Wang, Jensen Anders, Ming Sun, Søren Morgen,  
Benny Dahl, Cody Büniger*

Department of Orthopaedic E Aarhus University Hospital NBG; Department of Oncology, Aarhus University Hospital; Department of Orthopaedic E, Aarhus University Hospital NBG; Spine Unit, Rigshospitalet Copenhagen; Spine Unit, Rigshospitalet Copenhagen; Department of Orthopaedic E, Aarhus University Hospital NBG

**Background:** Preoperative prognosis of the spinal metastases patients is a challenge for the spine surgeon to choose optimal treatments. Now the popular scoring systems (such as Tokuhashi score) are only focusing on the primary site. Breast cancer is one of the most common tumors that involve the spine. The subtypes could significantly influence the survival period of the breast cancer patients. Estrogen receptor (ER) and Progesterone receptor (PR) status are the key factors of the subtypes.

**Purpose / Aim of Study:** The aim was to investigate the influence of breast cancer subtypes for the survival of the breast cancer spinal metastases patients

**Materials and Methods:** Eighty-four patients with breast cancer spinal metastases underwent surgical treatments since 1997 to 2011 were analyzed. The ER and PR status data were retrieved from the Danish Breast Cancer Group. We used survival analysis, created the Kaplan-Meier curves and run Log-rank test to compare the survival outcomes. The P value less than 0.05 was considered significant.

**Findings / Results:** In the ER subtypes, 72 patients were positive, 12 patients were negative. Fifty-two patients were dead, and 32 patients were alive. The result from the Log-rank test showed that the difference of survival rates between the ER+ and ER- was not significant ( $p=0.44$ ). Forty-seven patients had PR results. In the PR subtypes, 28 patients were positive, 19 patients were negative. Twenty-three patients were dead, and 24 patients were alive. The mortality rates had no significant difference ( $p=0.22$ ) between PR+ and PR- subtypes.

**Conclusions:** The mortality rate between each subtype did not show any significant differences. The subtypes of the breast cancer do not influence the prognosis of the spinal metastases patients. Spine surgeons do not need to distinguish the breast cancer subtypes to predict the spinal metastases.



## 65.

### **The Aarhus Sarcoma Registry: Validity and Completeness in a Population of Bone and Soft Tissue Sarcomas**

*Katja Maretty-Nielsen, Ninna Aggerholm-Pedersen,  
Johnny Keller, Akmal Safwat, Alma B. Pedersen*

Department of Experimental Clinical Oncology Sarcoma Centre of Aarhus University Hospital; Department of Experimental Clinical Oncology, Sarcoma Centre of Aarhus University Hospital; Department of Orthopaedics, Sarcoma Centre of Aarhus University Hospital; Department of Oncology, Sarcoma Centre of Aarhus University Hospital; Department of Epidemiology, Sarcoma Centre of Aarhus University Hospital

**Background:** Clinical databases are important sources for clinical studies, but data incompleteness and incorrect data are major problems.

**Purpose / Aim of Study:** The aim of this study was to validate the data in the Aarhus Sarcoma Registry (ASR).

**Materials and Methods:** The Aarhus Sarcoma Centre serves a population of 2.5 million. All patients diagnosed with a bone and soft tissue sarcoma during the period 1979-2008 have been prospectively registered in the ASR. Medical files on all ASR patients were reviewed by an independent medical doctor and a medical student and used as gold standard to assess the completeness and accuracy of key variables in the ASR. Missing patients were identified through the local pathology department and registered in the ASR. The completeness of registration of patients in the ASR was compared to the Danish Cancer Registry (CR).

**Findings / Results:** There were 1474 non-visceral sarcoma patients in the ASR before, compared to 1829 after validation. In the same time period 1853 patients were registered in the CR with non-visceral sarcoma. 357 patients were registered in ASR, but not CR. The completeness of the ASR compared to CR was 79.2% (1467/1853). Important dates (e.g. admission, operation) were missing in 339 patients before validation and in 216 patients, the dates were incoherent (i.e. admission before operation). After validation, all dates were correctly registered. A number of other variables in the ASR had missing values. After validation, missing values in each of 39 variables registered in the ASR was reduced to less than 4.4%.

**Conclusions:** The validation process substantially improved completeness as well as accuracy of all variables included in the ASR. After validation the ASR is an important source for the studies answering a number of clinical and research questions on patients with bone and soft tissue sarcoma.

66.

## YKL-40 is expressed in soft tissue sarcomas

*Mette L. Harving, Lise H. Christensen, Gunnar Lausten, Michael M. Petersen*  
Department of Radiology Roskilde Hospital; Department of Pathology, Bispebjerg Hospital; Department of Orthopaedics, Rigshospitalet; Department of Ortopaedics, Rigshospitalet

**Background:** YKL-40 is a glycoprotein that is expressed in many types of cancer cells and plasma concentration has been shown to be elevated in various types of cancer. In some cancers high serum-YKL-40 level is correlated to a more aggressive disease and early death. YKL40 has never been studied in patients with soft tissue sarcomas (STS).

**Purpose / Aim of Study:** To determine if YKL40 is expressed in STS tissue, and ascertain if the degree of expression is related to survival or the histological malignancy grade (Trojani).

**Materials and Methods:** Archived STS tissue from 49 patients (F/M=20/29, mean age 58(range 4-89) years), surgically treated with tumour resection in 2004 or 2005 at the Department of Orthopaedics, Rigshospitalet, were included in the study. Minimum follow-up with respect to survival was 5 years. Immunohisto-chemical analysis with YKL-40 antibody using tissue microarray was performed on tissue from all resected tumours, and a semi quantitative measure of the YKL- 40 staining intensity was performed. Statistics: non-parametric tests (Mann- Whitney U and Kruskal-Wallis test).

**Findings / Results:** 42 (86%) of the 49 tumours tested positive for YKL40 and of these 36 (73%) had a moderate to intense staining. 24 (49%) of the patients died within the follow up period, and the YKL-40 staining intensity was higher ( $p=0.01$ ) in tumours from patients, who had died within the follow up period than those who survived. The YKL-40 staining intensity was different in the 3 malignancy grades ( $p=0.004$ ); higher in high-malignant tumours (Trojani grade 2 and 3) compared to low malignant (Trojani grade 1).

**Conclusions:** YKL40 is expressed in soft tissue sarcomas. Expression of YKL40 in STS is correlated the histological malignancy grade and survival. In order to estimate if YKL-40 can be used as a prognostic marker larger studies are needed.

67.

**A novel method for assessment of polyethylene liner wear in radiopaque tantalum acetabular cups: Clinical validation in patients enrolled in a randomized controlled trial**

*Anders Troelsen, Dov Golvasser, Meridith Greene, David Ayers, Charles Bragdon, Henrik Malchau*

Clinical Orthopaedic Research Hvidovre Hvidovre University Hospital; Harris Orthopaedic Laboratory, Massachusetts General Hospital, Boston; Harris Orthopaedic Laboratory, Massachusetts General Hospital, Boston; Dept. of Orthopaedics, University of Massachusetts Medical School; Harris Orthopaedic Laboratory, Massachusetts General Hospital, Boston; Harris Orthopaedic Laboratory, Massachusetts General Hospital, Boston

**Background:** Radiostereometric analysis (RSA) is the gold standard for assessment of wear in polyethylene (PE) liners in total hip replacement (THR). When PE liners are used in conjunction with tantalum cups, conventional RSA analysis of wear is not possible due to the radiopaque characteristics of tantalum. Thus, clinical performance of PE liners can not be assessed.

**Purpose / Aim of Study:** We propose a novel method for wear analysis and evaluate it for clinical purposes.

**Materials and Methods:** The study cohort consisted of 43 THR patients previously enrolled in a randomized controlled trial receiving either titanium or a tantalum cup with either a conventional or a highly cross- linked PE liner. Femoral head penetration was assessed by gold standard RSA and the novel method. Radiographs were taken postoperatively, at 6 months, and every year up to 5 years. The novel “fictive head” method can estimate the center of the femoral head. We assessed the accuracy and variation of the novel method, and its ability to assess femoral head penetration.

**Findings / Results:** Assessment of femoral head penetration by the novel method was able to demonstrate a pattern of wear that was similar to that of gold standard RSA in both conventional and highly cross- linked PE liners in titanium cups. Little systematic error was introduced by the novel method (mean difference: 0.011 mm), however, it showed significantly ( $p=0.0006$ ) greater standard deviations for penetration measures compared with gold standard RSA.

**Conclusions:** The novel “fictive head” method offers accurate assessment and can be a viable solution for assessment of femoral head penetration in prospective studies on conventional and highly cross-linked PE liners, in which the implantation of tantalum cups would otherwise make wear assessment, and thus quality control of implants, impossible.

68.

## Catastrophic result with the metal-on-metal Conserve acetabular cup

*Thomas Jakobsen, Hardy Christoffersen, Mette Adler Stampe,  
Anne Bensen, Niels Krarup*

Ortopædkirurgisk afdeling Regionshospitalet Viborg; Ortopædkirurgisk afdeling, Sygehus Thy-Mors; Ortopædkirurgisk afdeling, Regionshospitalet Viborg; Ortopædkirurgisk afdeling, Regionshospitalet Viborg; Ortopædkirurgisk afdeling, Regionshospitalet Viborg

**Background:** The metal-on-metal (MoM) bearing has previously been an attractive option for young patients with the need of a total hip replacement. Previous studies have shown promising results using the MoM articulation. However, current reports strongly indicate that the use of MoM is associated with high failure rates, formation of pseudotumores, and elevated blood levels of metal ions.

**Purpose / Aim of Study:** The aim of the study was to retrospective investigate the survival of the MoM Conserve acetabular cup (Wright Medical Technology (WMT), Arlington, Tennessee).

**Materials and Methods:** 102 large diameter MoM Conserve cups were implanted into 92 consecutive patients in the period November 2005 to April 2010. 60 patients (67 hips) and 32 patients (35 hips) were operated at Thisted Hospital and Viborg Hospital, respectively. The primary choice of femoral implant was the Profemur stem at Thisted Hospital and the ANCA-Fit stem at Viborg Hospital (WMT). Mean age at time of surgery was 51.3 years (sd, 12; range, 14-73) and mean followup period was 51 months (sd, 11.7; range, 14-73). All patients were seen by a surgeon in the beginning of 2012. Blood levels of chrome and cobalt are measured.

**Findings / Results:** 13 hips (12,7%, SE 3.3) had been revised. Leaving an overall survival rate of 87.3% after a mean followup of 51 months . The main reason for revision was aseptic loosening of the acetabular cup. The median level of chrome and cobalt was 51.3 nM (IQR, 30.3-75.4) and 51.2 nM (IQR, 32.1-125.5), respectively. No pseudotumores were found.

**Conclusions:** The survival rate of the Conserve acetabular cup in this study is unacceptable low. Continued use cannot be recommended before further controlled prospective trails have been conducted and shown an acceptable survival rate without adverse reactions.

69.

## **Current fixation usage and registry outcomes in total hip arthroplasty: The uncemented paradox**

*Anders Troelsen, Erik Malchau, Nanna Sillesen, Henrik Malchau*

Clinical Orthopaedic Research Hvidovre Hvidovre University Hospital; Harris Orthopaedic Laboratory, Massachusetts General Hospital, Boston; Harris Orthopaedic Laboratory, Massachusetts General Hospital, Boston; Harris Orthopaedic Laboratory, Massachusetts General Hospital, Boston

**Background:** A high 86 % of total hip replacements (THR) performed in the US are uncemented. This could be worrying for the future revision burden if uncemented fixation is not associated with the lowest risk of revision considering nationwide use of THR.

**Purpose / Aim of Study:** To investigate trends for usage of uncemented fixation and to analyze age stratified risk of revision comparing cemented, hybrid, and uncemented fixation by inquiry to national hip arthroplasty registries.

**Materials and Methods:** Data were extracted from annual reports of national hip arthroplasty registries if these were available in English or a Scandinavian language and if the registry had a history of more than 5 years of data collection.

**Findings / Results:** Current usage of uncemented fixation varies between 15 % in Sweden and 82 % in Canada for primary THR. From 2006 to 2010 the registries of all countries reports overall increases in uncemented fixation usage with Sweden reporting the least increase (10 % to 15 %) and Denmark the greatest increase (47 % to 68 %). There is a clear pattern that risk of revision is statistically significant lower using cemented compared with uncemented fixation for the oldest age group (>75 years).

**Conclusions:** Increasing use of uncemented fixation in THR is a worldwide phenomenon. This trend is paradox to data from registries, representing nationwide THR outcomes, suggesting that use of cemented fixation in patients above 75 years provides the lowest risk of revision.

## 70.

### **Feasibility of Early-Initiated Progressive Resistance Training after Total Hip Replacement**

*Lone Ramer Mikkelsen, Inger Mechlenburg, Mette Krintel Petersen,  
Kjeld Søballe, Søren Mikkelsen, Thomas Bandholm*

Department of Orthopaedics Silkeborg Regional Hospital ; Department of Orthopaedics, Aarhus University Hospital ; Department of Physiotherapy , Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital ; Department of Orthopaedics , Silkeborg Regional Hospital ; Department of Orthopaedics and Physical Therapy , Copenhagen University Hospital, Hvidovre

**Background:** Muscle atrophy, reduced hip muscle strength and function are documented within the first weeks after Total Hip Replacement (THR).

**Purpose / Aim of Study:** The purpose of this study was to evaluate the feasibility of early-initiated progressive resistance training (PRT) after THR.

**Materials and Methods:** 10 patients were followed 4 weeks post THR. The PRT was initiated 2-5 days after surgery, and performed twice a week for 4 weeks. Unilateral exercises were performed in 4 training machines applying 3 sets of 10 repetitions at 10 RM (repetition maximum). Absolute loading (kg) and pain during the exercises were measured at each training session. Isometric muscle strength was measured before and 4 weeks after the THR.

**Findings / Results:** Pain during exercises and resting pain before and after each training session was unchanged or decreased during the 4 weeks of training. Averaged across exercises pain during training decreased from 3.6 (sd: 2.8) at the first session to 1.52 (sd: 1.8) VAS-mm at the last session,  $p < 0.001$ . The absolute training load increased progressively for all 4 exercises during the 4 weeks of training. For example: 2nd, 5th and 8th training session. Hip extension, mean (sd): 28.9 (8.5), 36.3 (7.5), 39.4 (8.4), kg,  $p = 0.02$ . Hip flexion, mean (sd): 32.4 (9.7), 43.8 (11.5), 53.6 (12.9), kg,  $p = 0.001$ . Isometric strength in Nm/kg: Preoperative, 4 weeks postoperative, p- value (diff): Hip abduction, mean (sd): 0.86 (0.28), 0.85 (0.16) Nm/kg,  $p = 0.94$ . Hip flexion, mean (sd): 0.98 (0.26), 1.03 (0.29) Nm/kg,  $p = 0.52$ .

**Conclusions:** It seems feasible to commence PRT within the first week after THR, as hip pain remained the same or decreased, while the training load increased progressively. The included patients reached their preoperative hip-strength levels after 4 weeks of training.

## 71.

### **The association between use of serotonergic antidepressants and perioperative bleeding during hip replacement**

*Annie Primdahl, Frank Damborg, Michael Dall, Jesper Hallas*

Department of Orthopaedic Surgery Esbjerg; Department of Orthopaedic Surgery, Kolding; Research Unit of Clinical Pharmacology, University of Southern Denmark, Odense; Research Unit of Clinical Pharmacology, University of Southern Denmark, Odense

**Background:** In vitro studies have shown that selective serotonin reuptake inhibitors (SSRIs) inhibit platelet aggregation. It is controversial whether use of SSRIs can cause clinically important bleedings; results from observational studies have been equivocal.

**Purpose / Aim of Study:** Our objective was to determine a possible association between use of serotonergic antidepressants and intraoperative bleeding during hip replacements.

**Materials and Methods:** We conducted a retrospective study among patients that underwent a primary unilateral uncemented total hip arthroplasty (THA) in the Region of Southern Denmark between 1 January 2007 and 28 February 2011. Information was collected on blood loss and the need for transfusions in this group. We compared the blood loss between users of serotonergic antidepressants, users of nonserotonergic antidepressants and non-users. Data on drug exposure were retrieved from the Odense Pharmacoepidemiological Database (OPED). Adjustment for drug-related confounders was carried out by linear regression.

**Findings / Results:** We identified 638 patients that underwent a THA in the study period. The adjusted difference in blood loss among respectively, users of serotonergic antidepressants and non-serotonergic antidepressants were 62.2 ml (95% CI, -10.1 – 147.5) and 22.9 ml (95% CI, -101.6 – 147.5) compared with non-use.

**Conclusions:** Use of serotonergic antidepressants was associated with a non-significant increased blood loss compared to non-users.

72.

## The dislocating hip replacement – revision with a dual mobility cup

*Thomas Jakobsen, Andreas Kappel, Flemming Hansen,  
Jørgen Søndergaard, Niels Krarup*

Ortopædkirurgisk afdeling Regionshospitalet Viborg; Ortopædkirurgisk afdeling, Aalborg Universitets Hospital; Ortopædkirurgisk afdeling, Regionshospitalet Viborg; Ortopædkirurgisk afdeling, Regionshospitalet Viborg; Ortopædkirurgisk afdeling, Regionshospitalet Viborg

**Background:** Recurrent dislocations of hip replacements is a difficult challenge. In 2010, 20% of all revisions were performed because of dislocation. One treatment option for recurrent dislocations are the use of a dual mobility cups. However, only few studies have investigated the effect of dual mobility cups on recurrent dislocations.

**Purpose / Aim of Study:** The aim of this study was to retrospectively investigate the effect of dual mobility cups as a treatment for recurrent dislocations in a consecutive series.

**Materials and Methods:** 56 consecutive patients were revised in the period November 2000 to December 2010. The mean age at revision was 72 years (SD 11, range 37-92) and median number of dislocations before revision surgery were 4 (IQR, 2-11). In all cases, revision was made with a Saturne dual mobility cup (Amplitude, Neyron, France). The uncemented Saturn cup consists of two parts. An outer shell with a large inside-diameter. The outer shell is made of stainless steel and on the outside coated with titanium and hydroxy-apatite and highly polished on the inside. The outer shell articulates with an inner shell made of polyethylene. The inner shell articulates with a 28 mm femoral head that is locked into the inner shell. The mean followup period was 44 months (SD 30, range 0.1-119).

**Findings / Results:** Three patients (3.7%; SE 2.5) experienced a redislocation. Four patients (7.1%; SE 3.4) had to be revised. One due to disintegration between the femoral head and inner shell, one due to continued dislocations, and two due to infection. Leaving an overall survival rate of 92.9% after a mean of 44 months.

**Conclusions:** This study advocates the use of a dual mobility cup for treatment of recurrent dislocations of THR. However, studies with a longer follow up are needed in order to evaluate implant survival.



73.

### **The genetic influence on symptomatic hip and knee osteoarthritis differs by joint site and sex. A nationwide population and register based study in Danish twins**

*Søren Glud Skousgaard, Lars Peter Brandt, Axel Skytthe, Søren Overgaard*  
Orthopedic Research Unit & Reseach Unit for Occupational and Environmental Medicine Odense University Hospital; Occupational and Environmental Medicine, Odense University Hospital; The Danish Twin Register, University of Southern Denmark; Orthopedic Research Unit, Odense University Hospital

**Background:** Little is known about the genetic influence on symptomatic hip and knee osteoarthritis or if genetic risk factors affects men and women differently.

**Purpose / Aim of Study:** To examine the genetic influence on symptomatic hip and knee osteoarthritis in men and women.

**Materials and Methods:** Twins from The Danish Hip and Knee Arthroplasty Registers were identified by merging the two registers with The Danish Twin Register and all twins with a diagnosis of primary hip or knee OA were sampled and analysed. Tetrachoric correlations and probandwise concordance rates were calculated. We examined our twin data in the ACE, AE, CE and E models separately by joint site and sex.

**Findings / Results:** The twin hip population comprised 93.228 non-cases and 835 cases with 428 female cases and 407 male cases,  $p=0.37$ . The twin knee population comprised 95.956 non-cases and 733 cases with 425 female cases and 308 male cases,  $p<0.001$ . Tetrachoric correlations and probandwise concordant rates in hip twin pairs were significantly higher in MZ males and MZ females compared to DZ males and DZ females indicating a substantial genetic influence on hip OA in both sexes. In knee OA no difference between MZ and DZ males in either tetrachoric correlations nor probandwise concordance rates were observed, but in female MZ and DZ twin pairs the differences were significant indicating a substantial genetic influence in women but not in men. In hip OA the best fitting model was the AE model in both sexes. In males A accounted for 0.70 and E for 0.30; in women A accounted for 0.67 and E for 0.33. In males knee OA the best model fit was in the CE model, C accounting for 0.47 and E for 0.53; in women the AE model had the best fit, A accounting for 0.74 and E for 0.26.

**Conclusions:** The genetic influence on hip and knee osteoarthritis differs significantly by sex and joint site.

## 74.

### **Validation of physical activity by means of an activity monitor during simulated free living in patients with osteoarthritis of the hip.**

*Andreas Hermann, Mathias Ried-Larsen, Andreas Kryger Jensen, Lars Bo Andersen, Søren Overgaard, Anders Holsgaard-Larsen*

Institute of Clinical Research University of Southern Denmark; Institute for Sport Sciences and Clinical Biomechanics , University of Southern Denmark; Department of biostatistics Institute of Public Health , University of Southern Denmark; Institute for Sport Sciences and Clinical Biomechanics , University of Southern Denmark; Orthopedic Research Unit, Department of Orthopedics and Traumatology , Odense University Hospital; Orthopedic Research Unit, Department of Orthopedics and Traumatology , Odense University Hospital

**Background:** The use of activity monitors (AM) as a surrogate measure for physical activity has been applied in several clinical studies. However few studies have validated the AM against the gold standard, indirect calorimetry (IC)

**Purpose / Aim of Study:** To validate physical activity by means of AM compared with IC during a simulated free living scenario in patients with osteoarthritis (OA) of the hip pre or post total hip arthroplasty (THA)

**Materials and Methods:** 20 patients diagnosed with hip OA (10 pre- 10 post THA). 40% female, Age:  $63.3 \pm 9.0$ , BMI:  $23.7 \pm 3.7$ . All patients completed a 2 hour scenario of simulated free living containing 8 different physical activity types. Energy expenditure (EE) (Kcal/min) was estimated by a AM (Sense Wear pro3 Armband (Body media Inc, Pittsburgh, PA, USA ) (SWA)) and validated against indirect calorimetry by means of a portable unit (Cosmed K4b?, Rome, Italy). Analysis of bias and variance was carried out using functional ANOVA

**Findings / Results:** SWA overestimated EE during all activities by 72 % (1.54 Kcal/min, 95%CI [1.27; 1.80]). Split by activity significant differences in bias was observed. Overestimation of EE was observed during several activities: Chair rest 88% (0.65 Kcal/min, 95%CI [0.46; 0.81]), normal gait speed 93% (2.78 Kcal/min, 95%CI [2.29; 3.32]) and in household activities dominated by upper body movements (gardening) 170% (4.37 Kcal/min, 95%CI [3.77; 5.06]). Underestimation of EE by -25% (-1.06 Kcal/min, 95%CI [-1.81;-0.27]) was recorded during stair climb

**Conclusions:** The tested AM generally overestimated the EE during most common activities of low to medium intensity in the observed patient group. However, the size and direction of the bias was dependent on the activity mode which indicates limitations in the validity of the SWA among patients with hip OA

## 75.

### **Work, wellbeing, and sexual life in younger patients after hip replacement**

*Jakob Klit, Steffen Jacobsen, Stig Sonne-Holm,  
Victoria Schmiegelow, Anders Troelsen*

Ortopædkirurgisk afdeling Hvidovre Hospital; Ortopædkirurgisk afdeling, Hvidovre Hospital; Ortopædkirurgisk afdeling, Hvidovre Hospital; Ortopædkirurgisk afdeling, Frederiksberg Hospital; Ortopædkirurgisk afdeling, Hvidovre Hospital

**Background:** The positive effects of total hip arthroplasty (THA) on joint function and pain are well documented. In contemporary literature other outcomes affecting the everyday life of patients have been neglected.

**Purpose / Aim of Study:** To improve preoperative patient information we wished to investigate the effect of THA in relation to work, income and sexual activity in younger patients.

**Materials and Methods:** In a prospective cohort study performed at 3 arthroplasty units during a 1 year period we included patients  $\geq$  60 years scheduled for primary THA. Questionnaires including oxford hip score (OHS), SF-36, questions regarding relation to work, income and sexual activity were collected preop, and at 3, 6 and 12 months postop. The 12 month follow-up questionnaire was returned by 106 of the 135 initially included patients. Median age at surgery was 53 years (range: 31-60).

**Findings / Results:** At 12 month follow-up the OHS and SF- 36 scores showed significant improvements. Of 90 patients in work preop. 6 patients lost their jobs, and 3 patients changed from part-time to full- time employment. The income level for the cohort did not change, despite eight patients expecting a decreased lifetime income. Increased frequency of intercourse or better abilities in intercourse positions were experienced by 18 of 39 females due to reduced pain and increased range of motion. Males did not experience improvements. Erectile dysfunction was experienced by 3 males postop. Patients sexually active before THA surgery remained active.

**Conclusions:** There is little affection of relation to work and income following THA surgery in patients  $\geq$  60 years. Patients remained sexually active, and one third of females experience improved sexual activity. This study supplies surgeons with patient information about factors crucial to the everyday life of younger THA patients.

76.

## A Stereological Method for the Quantitative Evaluation of Cartilage Repair Tissue

*Foldager Casper Bindzus, Nyengaard Jens R., Lind Martin, Spector Myron*  
Orthopaedic Research Aarhus University Hospital, Denmark & Brigham & Women's Hospital, Harvard Medical School, Boston, MA; Stereology and EM Laboratory, CSGB, Aarhus University, Denmark; Sports Trauma Clinic, Aarhus University Hospital, Denmark; Orthopaedic Research & Tissue Engineering, Brigham & Women's Hospital, Harvard Medical School & VA Boston Health Care System, Boston, MA

**Background:** No quantitative methods for evaluation of cartilage repair currently exists.

**Purpose / Aim of Study:** The aim was to implement stereology into an easily and quickly applied algorithm for the quantitative evaluation of the volumes of various tissue types comprising cartilage repair.

**Materials and Methods:** Repair tissue in a cylindrical chondral goat defect ( $\text{Ø}=4\text{mm}$ ) was used as an example for application. Seven sections per defect, with a  $600\text{ }\mu\text{m}$  spacing were stained with H&E. The tissue types in the repair area were assigned to categories based on well-accepted criteria: hyaline cartilage (HC-rounded cells in lacunae, in hyaline matrix); fibrocartilage (FC-rounded cells in lacunae, in fibrous matrix); fibrous tissue (FT- elongated cells not in lacunae, fibrous matrix); bone; scaffold/implant material; and "others." Stereological point counting was performed using the STEPanizer freeware. Using "Cavalieri's principle," the design-based total defect volume and coefficient of error (CE) was calculated. At higher magnification the various tissue types were counted and the tissue type fractions were calculated.

**Findings / Results:** The volumes of specific tissue types were readily determined by the assignment into well-defined categories. In our defect example, the volume was estimated to be  $4.35\text{mm}^3$  ( $\text{CE}=0.0105$ ). The specific tissue type fractions were:  $\text{HC}=1.23\text{mm}^3$  (28.1%),  $\text{FC}=2.46\text{mm}^3$  (55.5%),  $\text{FT}=0.60\text{mm}^3$  (13.9%). The total evaluation time was 1-2 hours per defect.

**Conclusions:** We have developed a simple and unbiased tool for quantitative evaluation of cartilage repair, which allows precise estimations with low CE of volumes of tissue types in a defect. A stereologically valid, quantitative and easily applied histomorphometric method could be a meaningful supplement to existing semi-quantitative and descriptive methods for evaluating the outcome in cartilage repair.

77.

## **CONTENT VALIDITY IN A CONDITION-SPECIFIC PATIENT-RELATED OUTCOME SCORE FOR PATIENTS WITH ANTERIOR CRUCIATE LIGAMENT INJURIES**

*Jonathan Comins, Michael Krogsgaard, John Brodersen*

Section for Sports Traumatology, M51, Bispebjerg University Hospital, and Research Unit and Section University of Copenhagen; Section for Sports Traumatology, M51, Bispebjerg University Hospital, University of Copenhagen; Research Unit and Section of General Practice, Department of Public Health, University of Copenhagen

**Background:** Item content in Patient-reported Outcome Scores (PROs) must be confirmed to be meaningful for the targeted patient population, in order to validly measure treatment effect. While the items that make up these scales can be generated from clinicians or from patients, item relevancy and comprehensiveness can only be confirmed through qualitative interviews with the targeted patient group. Instruments used to assess patients with anterior cruciate ligament (ACL) deficiency have not been rigorously developed using these methods.

**Purpose / Aim of Study:** To develop a condition-specific PRO questionnaire for patients with ACL deficiency.

**Materials and Methods:** Using a pool of 157 items with unique content assembled from 31 knee-specific PROs, focus group and individual cognitive interviews with patients before and after ACL-reconstruction were conducted to confirm relevant and irrelevant items, and if necessary to generate new item content.

**Findings / Results:** Fifty-five items were endorsed by the respondents and grouped into six constructs. Twelve items were original, five items were modified in content or response structure, and 38 items remained unchanged. The six constructs, which were endorsed by the respondents were: Activities of Daily Living (10 items), Psychosocial Impact (5 items), “Looseness” (5 items), “Slackness” (6 items), Symptoms (13 items), and Sport/Recreational Function (16 items). The construct Slackness had not been described previously.

**Conclusions:** This study resulted in the creation of a condition-specific PRO for patients with ACL deficiency called the Knee Numeric Entity Evaluation Score (KNEES-ACL).

78.

## **KINETIC ANALYSIS OF KNEE AND HIP JOINT LOADING DURING SIDECUTTING IN HANDBALL – IMPLICATIONS FOR PREVENTION AND REHABILITATION AFTER ACL-INJURIES**

*Jesper Bencke, Jesper Curtis, Hanne Bloch Lauridsen, Thomas Bandholm,  
Mette Kreutzfeld Zebis*

Gait analysis lab, dept. of Orthopaedic Surgery Hvidovre Hospital; Gait analysis lab, dept. of Orthopaedic Surgery, Hvidovre Hospital; Gait analysis lab, dept. of Orthopaedic Surgery, Hvidovre Hospital; Clinical Research Center, Hvidovre Hospital; Gait analysis lab, dept. of Orthopaedic Surgery, Hvidovre Hospital

**Background:** Injuries to the anterior cruciate ligament (ACL) are frequent among young female athletes in handball and football, especially during the sidecutting manoeuvre. The biomechanics of this movement may thus yield information useful for prevention and rehabilitation, and potentially also surgery procedure in this group of patients.

**Purpose / Aim of Study:** The aim was to determine which muscle groups would potentially be the most important for prevention and rehabilitation, using the 3D measurements on the biomechanics of the hip and knee joint during sidecutting.

**Materials and Methods:** Twenty-four young female handball players (age 15-18yrs) agreed, with their parent's consent, to participate. Five repetitions of each player's individual sidecut manoeuvre were investigated using 3D movement analysis. Net moments in three planes around the knee and hip joints were calculated, and the net moments during the first 30% of the contact phase was selected as outcome measures.

**Findings / Results:** The results showed a peak external knee valgus moment, coinciding with a peak external outward rotating and a peak internal knee extensor moment at 10-20% of the contact phase. Internal extensor moments, adductor moments, and outward rotator moments were dominant around the hip joint in this time period.

**Conclusions:** The present results show a dependency on the medial hamstrings to counteract the external valgus and outward rotating moments occurring around the knee joint during the sidecut manoeuvre, and that hip outward rotators, and hip adductors are the most loaded muscle groups during this crucial early part of the sidecut. Attention to these muscle groups may be important in prevention programs and rehabilitation regimes involving female handball players. Furthermore, the results may yield further information to the graft selection decision before ACL – surgery.

## 79.

### **Local infiltration analgesia is comparable to femoral nerve block after anterior cruciate ligament reconstruction with hamstring tendon graft - A randomized controlled trial**

*Pia Kjær Kristensen, Mogens Pfeiffer-Jensen, Jens Ole Storm,  
Theis Muncholm Thillemann*

Ortopædkirurgisk afd Regions Hospitalet Horsens; Reumatologisk afd., Århus Universitets hospital; Ortopædkirurgisk afd., Regions Hospitalet Horsens; Ortopædkirurgisk afd., Regions Hospitalet Horsens

**Background:** Arthroscopic anterior cruciate ligament (ACL) reconstruction is a painful procedure requiring intensive postoperative pain management. Femoral nerve block (FNB) is widely used in ACL surgery. However, FNB does not cover the donor site of the hamstring tendons. Local infiltration analgesia (LIA) is a simple technique that has proven to be effective in the treatment of postoperative pain after total knee arthroplasty. Further, LIA covers the donor site and is associated with few complications.

**Purpose / Aim of Study:** We hypothesized that LIA at the donorsite and wounds would decrease pain and opioid consumption.

**Materials and Methods:** 60 patients undergoing primary ACL surgery with hamstring tendon graft were randomized to either LIA or FNB. Pain score on the NRS scale, use of opioid, range of motion and adverse effects were assessed at the post anesthesia care unit (0 hours), 3 hours, 24 hours and 48 hours, post-operatively.

**Findings / Results:** We found no significant differences between the groups in pain intensity or total opioid consumption at any of the follow-up points. We observed no differences between groups concerning side effects and range of motion.

**Conclusions:** LIA and FNB are comparable in the management of postoperative pain after ACL reconstruction with hamstring tendon graft. Until randomized studies have investigated FNB combined with infiltration at the donor site we will use LIA in ACL reconstruction with hamstring tendon graft.

## 80.

### Mid-terms clinical and functional outcome following multi-ligaments reconstruction

*Sinan Said, Bjarne Engström, Christina Mikkelsen*

Orthopaedic Capio Årtro Clinic / Karloniska Institute stockholm; , Capio Årtro Clinic / Karloniska Institute stockholm; , Capio Årtro Clinic / Karloniska Institute stockholm

**Background:** Multi-ligament lesions are rare and sometimes associated with high morbidity. Making decision of how to treat these lesions is challenging.

**Purpose / Aim of Study:** The aim of the study is to evaluate the midterm clinical and functional outcome in different groups of patients treated for ligaments injuries following knee dislocation.

**Materials and Methods:** 113 Patients with multi-ligament injuries were reviewed in the period January 2000 to December 2010. Eleven were excluded and 75 patients were present to follow up (20 by questionnaire). The knee joint laxity was evaluated by using, Lachman, pivot and reversed pivot shift, the anterior/posterior drawer, step off sign, dial and valgus-varus tests, KT-1000 and ultra-sound. Knee function was evaluated by using one leg hop, side hop, square hop tests, Lysholm, Tegner, IKDC2000, KOOS, VAS and SANE scores.

**Findings / Results:** There were 52 males and 23 females. Average follow up was 78 months and age at that time was 40 yrs. Mean Lysholm was 78, tegner was 5, objective IKDC 2000 score was 76% nearly normal and 24% abnormal (subjective in 20 patients was 37), VAS in rest was 1 and in activity was 3, SANE was 82 KOOS for pain, symptoms, ADL, sport, QOL was 85,75,87,60,71 respectively. Average knee function (one leg hop, side hop, and square test) compared to non- injured knee was 95%, 91% and 94% respectively, the average side to side difference of valgus/varus translation test in 30° flexion (tested by ultra- sound) was 1,3 mm. Total anterior/ posterior translation side to side difference (KT-1000,134N) was 3,4 mm.

**Conclusions:** The clinical outcome following multi- ligaments reconstruction show nearly normal results and the operated knees restored more than 90% of their function compared to non-injured knees at midterm follow-up.



## 81.

### **Plantar fasciitis – Correlation between pain and ultrasound findings**

*Morten Torrild Thomsen, Anders Boesen, Morten Boesen,  
Søren Torp-Pedersen, Henning Langberg*

Orthopedic Surgery Bispebjerg Hospital; Institute of Sports Medicin, Bispebjerg Hospital; Orthopedic Surgery, Parken Private Hospital; Parker Institute, Frederiksberg Hospital; Institute of Public Health, University of Copenhagen

**Background:** Pain is a well known symptom, when athletes suffer from over-used fascia plantaris (FP). A thickening of the fascia, determined by grey scale ultrasound, has previously been suggested as a diagnostic marker for such over-use injuries, but at present little or no consensus exists on the specific deviation in width between healthy and sick FP. For clinicians it is therefore often a challenge to uncover the existence of FP when there is no conclusive way of diagnosing it.

**Purpose / Aim of Study:** To determine whether there is a connection between the thickness of FP, determined by ultrasound, and the pain symptoms in a group of badminton players.

**Materials and Methods:** Ninety players were examined with ultrasound, and the width of the FP was measured on both sides (n=180). Each patient was interviewed concerning previous and existing occurrence of pain in the FP. Pain was assessed using VAS.

**Findings / Results:** Five players had existing symptoms in one FP (mean=VAS 1.4), and the mean thickness of these FPs was 0.4cm +/-0.05. This was significantly thicker than the mean thickness of the FP in players which had never experienced symptoms in their FP (n=159) 0.34cm +/-0.06 (p<0.005). The FP in both groups was significantly thicker than FP in players which previously had symptoms (n=14) 0.30cm +/-0.04 (p<0.005).

**Conclusions:** Based on ultrasound findings in a group of badminton players, there seems to be a correspondence between existing FP symptoms and the thickness of FP. Additional data is however needed, before a cut-off value between healthy and sick FP can be defined and used as conclusive diagnosis.

## **RASCH ANALYSIS TO CONFIRM THE PSYCHOMETRIC PROPERTIES OF A NEW PATIENT-RELATED OUTCOME SCORE FOR ANTERIOR CRUCIATE LIGAMENT DEFICIENCY**

*Jonathan Comins, Michael Krosgaard, Svend Kreiner, John Brodersen*  
Section for Sportstraumatology M51, Bispebjerg University Hospital, and The Research Unit and Sectio University of Copenhagen ; Section for Sportstraumatology M51, Bispebjerg University Hospital , University of Copenhagen ; Department of Biostatistics, Institute of Public Health, University of Copenhagen ; Research Unit and Section of General Practice, Department of Public Health, University of Copenhagen

**Background:** Patient reported outcome (PRO) questionnaires are increasingly used to measure treatment effects in orthopedic surgery. Confirmation of content coverage and relevancy using patient interviews is essential to ensure content validity. Construct validity can be assessed using Modern Test Theory and Rasch models. No instruments used to assess outcome in patients with ACL deficiency have been developed using patient interviews and Rasch analysis.

**Purpose / Aim of Study:** The objective of this study was to investigate the psychometric properties of the KNEES-ACL, a newly developed 55-item PRO for patients with deficiency of the ACL, using Rasch analysis.

**Materials and Methods:** The psychometric properties of the KNEES-ACL were assessed using the Partial Credit Rasch Model and confirmed using Graphical Log-linear Rasch Modeling. Unidimensionality of the reported domains, local response dependency, and differential item functioning (DIF) was scrutinized across three groups of patients: group I were pre ACL reconstruction; group II were 4 to 16 months after isolated ACL-reconstructive surgery; and group III were at least 28 months after isolated ACL-reconstruction. Other covariates for DIF analyses were gender and age group.

**Findings / Results:** The pilot questionnaire was completed by 242 patients: group I (n=62); group II (n=87); and group III (n=93). Forty-one of the 55 items distributed in seven scales fit the Rasch model and exhibited unidimensionality. The Rasch scales were ADL, Psychosocial Consequences, Looseness, Slackness, Sports Behavior, and Sports Physical Performance. Thus, the pilot questionnaire was modified based on these results.

**Conclusions:** The KNEES-ACL is the first PRO instrument specifically constructed and validated for patients with ACL-deficiency using Rasch analysis.

83.

## The Copenhagen groin-pain test

*Kristian Thorborg, Bente Andersen, Mads Langelund, Michael Madsen,  
Lasse Lundquist, Per Hölmich*

Arthroscopic Centre Amager Hvidovre Hospital; Metropol, University College Copenhagen; Metropol, University College Copenhagen; Metropol, University College Copenhagen; Metropol, University College Copenhagen; Arthroscopic Centre Amager, Hvidovre Hospital

**Background:** Groin pain is one of the most frequent complaints in sport, especially in soccer, leading to reduced sporting function and frustration among athletes.

**Purpose / Aim of Study:** To investigate whether a simple groin-pain test is related to self-reported hip- and groin-related sporting function in soccer players.

**Materials and Methods:** 668 male soccer players, from 40 clubs (Division 1-5), in Eastern Denmark, mean age (SD) 23.4(4), training soccer 3.4(1) per week, were included in the study. All players answered the HAGOS, and underwent the Copenhagen groin-pain test, a standardized 5-second isometric hip adduction contraction with extended legs in the supine position. The players were asked to rate groin-pain intensity associated with this procedure on a numerical rating scale (NRS) ranging from 0-10. HAGOS and the groin-pain test were conducted following standardized, valid and reliable procedures.

**Findings / Results:** Groin-pain intensity during maximal hip-adduction contraction correlated significantly with lesser HAGOS score (Sports-scale) ( $r = -0.61$ ,  $P < 0.01$ ). Age and playing level was not related to sporting function. Furthermore, large clinically-relevant between-group differences ( $\geq 20$  points) existed for HAGOS (Sport-scale) scores presented as median (25th & 75th percentiles), for players reporting groin-pain intensity at the three different pain-levels proposed by Thomee (1997): NRS(0-2), HAGOS (Sports-scale) 97(86-100), compared to players reporting NRS (3-5), HAGOS (Sports-scale) 69(56-84), again compared to players reporting NRS(6-10), HAGOS (Sport-scale), median 47 (31-61) ( $p < 0.0001$ ).

**Conclusions:** The Copenhagen groin-pain test is strongly related to hip- and groin-related sporting function. When minimal groin-pain intensity is experienced by a soccer-player during this test, optimal hip- and groin-related sporting function exists.

84.

## TIBIAL AVULSION FRACTURE OF THE POSTERIOR ROOT OF THE MEDIAL MENISCUS IN CHILDREN AFTER MINOR TRAUMA

*Jonas Vestergård Iversen, Michael Rindom Krogsgaard*

Section for Sportstraumatology, M51. Department of Orthopaedic Surgery  
Bispebjerg University Hospital; Section for Sportstraumatology, M51.

Department of Orthopaedic Surgery, Bispebjerg University Hospital

**Background:** Background: The circular collagen fibers, which are crucial for the load absorption, that is one of the important functions of the meniscus, are rooted onto tibia anteriorly and posteriorly. If one of these roots is detached from tibia, the circular fibers loosen, leading to meniscus extrusion and reduction of the load absorptive properties of the meniscus, which may increase the risk of degenerative osteoarthritis. Therefore, avulsion fractures of the meniscal roots are important to diagnose, even though they are rare. They can be part of larger injuries to the knee or isolated ruptures after minor trauma.

**Purpose / Aim of Study:** Purpose/aim: To report two cases of a displaced avulsion fracture of the posterior root of the medial meniscus (AFMMPR) in children, treated at the same institution during a one year period.

**Materials and Methods:** Material and methods: The patients were a 12 year-old boy and a 13 year-old girl. They were diagnosed with AFMMPR after minor traumatic events during sports. X-rays, MRI-scans, operative documentation and post-operative follow-up was available.

**Findings / Results:** Results: The root avulsion was overlooked on x-rays in one case, and was not acknowledged on a following MRI and was diagnosed during arthroscopy for knee locking. In the other case, the avulsion was not obvious on x-rays but was diagnosed on MRI. After arthroscopic confirmation the avulsions were reattached in both cases with internal fixation by trans-tibial pull-out sutures. At six weeks the boy had locking after a new trauma and was re-scoped – the avulsion had healed. Both patients had no complaints at follow-up.

**Conclusions:** Conclusion: It is not always easy to diagnose root avulsions. The typical presentations on x-rays and MRI are discussed. Few reports have described AFMMPR in skeletally immature patients, but our cases were treated successfully with arthroscopic reattachment. As stability of the circular fibers of the menisci are essential for load absorption, it is important not to overlook root avulsions.

## 85.

### **Admission to hospital in the months before a fractured hip is associated with increased mortality**

*Christian Medom Madsen, Henrik Løvendahl Jørgensen, Troels Riis,  
Susanne van der Mark, Jes Bruun Lauritzen, Benn Duus*

Department of Orthopaedic Surgery Bispebjerg University Hospital; Department of Clinical Biochemistry, Bispebjerg University Hospital; Department of Orthopaedic Surgery, Bispebjerg University Hospital; Department of Orthopaedic Surgery, Bispebjerg University Hospital; Department of Orthopaedic Surgery, Bispebjerg University Hospital; Department of Orthopaedic Surgery, Bispebjerg University Hospital

**Background:** In elderly and frail hip fracture patients it is reasonable to view the fracture not only as a cause of poor outcome, but in some also as a symptom of declining health. Several factors have been associated with poor outcomes in this group of patients. We hypothesized that hospital admissions in the period leading up to the fracture could be as well.

**Purpose / Aim of Study:** To investigate the relationship between hospital admissions in the 6 months prior to the hip fracture and the outcome following the fracture.

**Materials and Methods:** The study population consisted of 522 consecutive patients (>75 years) from our hip fracture database. Information in the database has been gathered using a standardized hip fracture chart and through chart review. Information on hospital admissions was retrieved from the discharge registries of Bispebjerg and Frederiksberg Hospital.

**Findings / Results:** 25.1% (131/522) of the patients had one or more admissions to the hospitals listed above in the 6 months preceding their fracture. In the univariate analyses, hospital admission prior to the fracture was significantly associated with increased mortality at 90 days (21.5% vs 33.6%,  $p=0.005$ ) and at 1 year (33.5% vs 45.8%,  $p=0.011$ ), but not at 30 days (13.0% vs 15.3%,  $p=0.5$ ). In the multivariate analyses including the variables age, gender, residence, ASA-score and type of fracture, hospital admission prior to the fracture was still significantly associated with mortality after 90 days (HR 1.57 [1.06-2.33]) and 1 year (HR 1.46 [1.05-2.02]), but not after 30 days (HR 1.14 [0.66-2.00]).

**Conclusions:** Admissions to hospital in the six months prior to a hip fracture is associated with poor outcomes following the fracture in the form of increased rates of mortality after 90 days and at 1-year. Thus the pre- fracture health status is associated with post-fracture mortality.

## **Anterior Knee Pain and Limitations in Activity and Participation after Intramedullary Nailing of Tibial Shaft Fracture**

*Peter Larsen, Hans Lund, Uffe Laessoe, Thomas Graven-Nielsen, Juozas Petruskevicius, Sten Rasmussen*

Department of Occupational Therapy and Physiotherapy Aalborg Hospital, Aarhus University, Denmark; Research Unit for Musculoskeletal Function and Physiotherapy, Institute for Sports Science and Clinical Biomechanics, University of Southern Denmark; Physiotherapy Department & Laboratory for Musculoskeletal Pain and Motor Control, Center for Sensory, UCN, Denmark & Faculty of Medicine, Aalborg University, Denmark; Laboratory for Musculoskeletal Pain and Motor Control, Center for Sensory-Motor Interaction (SMI), D, Faculty of Medicine, Aalborg University, Denmark; Department of Orthopaedic Surgery, Aalborg Hospital, Aarhus University, Denmark; Orthopaedic Surgery Research Unit, Research and Innovation Center, Faculty of Medicine, Aarhus University, Aalborg Hospital

**Background:** Anterior knee pain is commonly reported after intramedullary nailing of a tibial shaft fracture. Complications such as limitations in activity and participation, and restriction in quality of life are often ignored.

**Purpose / Aim of Study:** The objective of the present study was to evaluate long-term outcome of anterior knee pain, limitations in activity and participation, and quality of life for patients treated with intramedullary nailing of tibial shaft fracture.

**Materials and Methods:** This retrospective follow-up study included patients treated with intramedullary nailing after tibia shaft fracture from 1998-2008 at Aalborg Hospital, University of Aarhus (N=294). Participants completed the Knee Injury and Osteoarthritis Outcome Score (KOOS) questionnaire and these data were compared with published reference data. The KOOS data were analyzed in 5 subscales (Pain, Symptoms, ADL, Sport, QOL) and 4 age-groups.

**Findings / Results:** A total of 223 agreed to participate (76%) and mean time for follow-up was  $7.9 \pm 3.2$  years. The mean KOOS within subscales was: Pain  $82.9 \pm 20.5$ , ADL  $83.3 \pm 20.9$ , Symptoms  $84.1 \pm 17.3$  QOL  $66.3 \pm 28.4$  and Sport  $59.1 \pm 32.7$ . Compared with reference data the scores within Pain, Sport, QOL and ADL were worse. In study population ANOVA test between KOOS subscales and age groups showed difference between groups for Pain ( $P < 0.019$ ), ADL ( $P < 0.032$ ), QOL ( $P < 0.032$ ), and Sport ( $P < 0.047$ ). The age group between 18-34 years reported worse KOOS-scores than all older age groups.

**Conclusions:** Approximately 8 years after intramedullary nailing of tibial shaft fracture the majority of patients experienced anterior knee pain, impairments, limitation in activity, and restrictions in QOL compared with a reference population. Moreover this was mainly expressed in the young patients.

87.

## **Bone transport of the tibia with a motorized intramedullary nail (Fitbone)**

*Søren Kold, Knud Stenild Christensen*

Orthopaedics Aalborg Sygehus; Orthopaedics, Aalborg Sygehus

**Background:** So far bone transport in the tibia has only been performed in combination with external fixation.

**Purpose / Aim of Study:** To our knowledge we report the first case in the world of bone transport in the tibia only by use of an intramedullary nail.

**Materials and Methods:** 53 years old male treated with locking plates for an AO-type 42-B1 closed fracture of the distal tibia and fibula. Developed an atrophic non-union. Was reoperated with bone graft and exchange of the locking plates. Developed again an atrophic non-union with a varus deformity of 18 degrees and 2 cm shortening of the tibia. Broken locking plate and screws were removed. The atrophic non-union (3.1 cm bone segment) was resected until vital bone. The proximal tibia and the fibula were osteotomized. A custom-made tibial nail with the ability to do initial bone transport and subsequent bone lengthening was inserted. 4 weeks postoperative BMP-7 was administered to the docking site.

**Findings / Results:** Partial weight-bearing was allowed after 2 months when the proximal tibia had been lengthened 5.1 cm (3.1 cm bone transport plus 2 cm leg lengthening). Full weight-bearing was allowed after 29 days/cm bone lengthening. The docking-site was united 4 months postoperative. Healing time for the regenerate was 45 days/cm bone lengthening. There was no leg length discrepancy and the tibia had a 3 degrees varus deformity. Range of motion of knee and ankle on the operated side was equal to the healthy side. Complications: A locking screw was exchanged and a tibiofibular transfixing screw was removed. Posterior proximal tibial angle went from preoperative 80 degrees to postoperative 71 degrees.

**Conclusions:** It is possible to obtain a good result when only an intramedullary lengthening nail is used for tibial bone transport. A blocking screw is recommended to prevent procurvatum of the proximal tibia.

## 88.

### **Case series of first experience with use of the Intertan nail for all types of proximal femoral fractures**

*Ann Jørgensen, Ilija Ban, Thomas Bloch, Thomas Houe, Henrik Palm*  
Orthopaedic Slagelse; Orthopaedic, Slagelse; Orthopaedic, Slagelse;  
Orthopaedic, Slagelse; Orthopaedic, Hvidovre

**Background:** Intertan is an antegrade intertrochanteric nail, designed with two collum screws integrated with one- another. Beyond the fixed shaft-collum angle given by all trochanteric nails this design also theoretically allows linear intraoperative compression and rotation stability over the fracture sight. The Intertan was introduced to our hospital in 2008 and in time used for all types of proximal femoral fractures. Such a variety of use has to our knowledge not been examined before.

**Purpose / Aim of Study:** To evaluate the reoperation rate following Intertan procedures performed on all types of proximal femoral fractures.

**Materials and Methods:** 401 hip fracture nailing procedures during 2008-11 were retrospectively identified through the booking system, of which 101 were Intertan procedures. The surgeon on duty decided the choice of implant. Demographic data and reoperations within 6 months were assessed from patient records and radiographs.

**Findings / Results:** Mean patient age was 71, gender rate 57F/44M and side rate 50L/51R. 8 implants were inserted by unsupervised, 39 by supervised junior, and 54 by senior surgeons. All but 5 patients were allowed immediate full weight bearing. Reasons for reoperation were 8 fracture collapses, 4 hardware discomforts after healing, 2 new fractures following new traumas, 1 infection, and 2 due to suboptimal implant insertion. The overall 17% reoperation rate was distributed on 9/60 trochanteric, 0/5 basocervical and 8/36 femoral neck fractures, among which the Garden 4 fractures had the highest rate at 5/12.

**Conclusions:** In this cohort of selected cases, our first experience indicates that although the new Intertan features with some difficulties could be used for all proximal femoral fractures, it does not seem to improve the reoperation rates, except maybe for the few rotationally unstable basocervical fractures.



89.

## Correlation between fractures and weather specific road conditions in an urban area

*Morten Torrild Thomsen, Troels Riis, Bo Sommer, Henrik Jørgensen, Lauritzen Jes, Benn Duus*

Orthopedic Surgery Bispebjerg Hospital; Orthopedic Surgery, Bispebjerg Hospital; Danish Road Directorate, ; Orthopedic Surgery, Bispebjerg Hospital; Orthopedic Surgery, Bispebjerg Hospital; Orthopedic Surgery, Bispebjerg Hospital

**Background:** Weather conditions have been shown to have an impact on orthopedic referrals. The literature shows differing results when comparing patient flow with types of winter weather. The present study is based on data of road conditions.

**Purpose / Aim of Study:** To examine the correlation between defined road conditions and frequency in fractures admitted to an ER in an urban area for a period of two winters (09/10-10/11).

**Materials and Methods:** Data was collected on all patients with fractures (except fractures of the head) admitted to the ER at Bispebjerg Hospital. Subgroups were defined based on type of fracture (humerus, malleoli, Colles and hip) and age (age groups: <14; 15-29; 30-44; 45-59; >60 ). Data on road conditions in the catchment area was obtained from The Danish Road Directorate. The following conditions were identified: Temperature (T) < 0°C, T<-5°C; ice or snow on the road; and ice alert (IA) triggered by a combination of low temperature and presence of moisture. The association between number of fractures and presence of one of the defined road conditions on the same day was analyzed using T-tests.

**Findings / Results:** Mean number of fractures per day varied significantly depending on the presence of T<0°C = 12.7 compared to T >0°C = 10.2\*; T<-5°C=14.3 compared to T >-5°C= 10.6\*; and IA = 14.7 compared to no IA = 10.8\*. Presence of IA was significantly different in the fracture types with the largest impact on malleoli IA=1.5 vs. no IA=0.7\*. The impact of IA increased with age: mean by age 45-59 IA=2.9 vs. no IA=1.8\*, age >60 IA=3.1 vs. no IA=1.9\* (\*P<0.001).

**Conclusions:** Trauma admissions and number of fractures increased when wintery road conditions were present. This may have implications in prevention and in planning of staff in the ER and orthopedic wards.

## 90.

### **Equestrian related trauma cases received at Rigshospitalets TraumeCenter 2011**

*Mads Holm Møller, Henrik Grønborg*

Department of Orthopedic Surgery & Rigshospitalets TraumeCenter Rigshospitalet; Department of Orthopedic Surgery & Rigshospitalets TraumeCenter, Rigshospitalet

**Background:** In 2011 a surprisingly high number of traumas due to horse-related activities presented at Rigshospitalets TraumeCenter (RH-TC).

**Purpose / Aim of Study:** The purpose of this study was to elucidate the patterns of these horse-related injuries and investigate any possible connection between use of protective devices and severity of injury.

**Materials and Methods:** A retrospective study of trauma patients (both primary and secondary referrals) with equine-related injuries received at RH-TC in 2011 was performed. Data such as age, gender, type and mechanism of injury, Injury Severity Score (ISS), surgical interventions and duration of stay at Rigshospitalet were collected from hospital files. A follow-up interview (n=30) with focus on use of protective gear, sick leave and disability was performed.

**Findings / Results:** 32 patients (27 females) were received at RH-TC after horse-related injury. Median age was 25,5 years [7-64]. Most were injured by falling from a horse (26/32) during recreational activity (27/32). The median equine experience was 17 years [0-50] and only 5/30 did not wear protective gear. Median sick leave was 14 days [0-300] and 16/30 still complain about various disabilities. Most injuries were located to the head, neck & face (11/40), spine, extremities (9/40 each) and chest (7/40). Median ISS was 4 [1-25]. Ten patients had surgery (5 ORIF of fractures, 2 neurosurgical interventions, 2 chest tubes, 1 splenectomy). Three patients had intracranial hemorrhage (2 of them wore helmet). None with severe injury to the spine used a vest for spinal protection.

**Conclusions:** Despite common use of helmets severe injury to the head is still frequent. Protective vests are rarely used and lesions to the spine are frequent amongst non-users. Horse riding is dangerous and continuous information regarding preventive use of protective gear is necessary.

## 91.

### **Factors associated with red blood cell transfusion in patients with a fractured hip**

*Christian Medom Madsen, Astrid Norgaard, Troels Riis,  
Ole Birger Pedersen, Benn Duus, Jes Bruun Lauritzen*

Department of Orthopaedic Surgery Bispebjerg University Hospital; Sections for Transfusion Medicine, Rigshospitalet Copenhagen University Hospital; Department of Orthopaedic Surgery, Bispebjerg University Hospital; Department of Clinical Immunology, Naestved Hospital; Department of Orthopaedic Surgery, Bispebjerg University Hospital; Department of Orthopaedic Surgery, Bispebjerg University Hospital

**Background:** Red blood cell (RBC) transfusion in patients admitted with hip fractures remains an area of debate, with a recent large-scale multicenter RCT failing to demonstrate the benefit of liberal transfusion (Carson JL et al, 2011).

**Purpose / Aim of Study:** To determine the factors associated with transfusion in hip fracture patients.

**Materials and Methods:** 817 consecutive hip fracture patients (>75years) admitted from 01.09.2008 to 30.11.2010 were included in this study. Data was retrieved from our hip fracture database. Data on transfusion was retrieved from the Capital Region Blood Bank database. Comparison between groups was done by univariable and multivariable analyses in SAS.

**Findings / Results:** 533 patients (65.2%) received one or more RBC transfusions. The transfused group included significantly more women (80.7% vs. 69.4%,  $p=0.0003$ ) and had a higher mean age (87.4 years vs. 84.7 years,  $p<0.0001$ ) than the non-transfused group. The multivariable analysis including the variables age, gender, residence, ASA score, alcohol and type of fracture, showed that increasing age (OR 1.08 [1.05-1.11]), female sex (OR 1.55 [1.05-2.29]), own home (OR 1.56 [1.03- 2.36]), ASA >2 (OR 1.41 [1.07-1.86]), and extracapsular fractures (OR 2.04 [1.46-2.84]) were all associated with transfusion following hip fracture. Alcohol consumption was not (OR 0.86 [0.44-1.67]).

**Conclusions:** Age, gender, ASA score, residence and fracture type were all independently associated with transfusion. The transfusion rate was high in this group of patients.

92.

## **Is mortality after hip fracture associated with surgical delay or admission during weekends and public holidays? - A retrospective study of 38,020 patients**

*Cecilie Laubjerg Daugaard, Henrik L Jørgensen, Troels Riis,  
Jes B Lauritzen, Susanne van der Mark, Benn R Duus*  
Orthopedic department Bispebjerg Hospital

**Background:** Hip fractures are associated with high mortality, the cause of which is not entirely clear. Surgical delay and admission during weekends and holidays have been the subject of several studies, but there are discrepancies among study findings.

**Purpose / Aim of Study:** In this study, we investigated the effect of surgical delay, weekends, holidays and time of admission on mortality in hip fracture patients.

**Materials and Methods:** Using data from the Danish National Indicator Project, we identified 38,020 patients admitted from 2003 to 2010. Logistic regression analysis was used to study the association of gender, age, weekend- or holiday-admission, time to surgery and ASA-score with mortality.

**Findings / Results:** The risk of death in hospital increased with surgical delay, (odds ratio (OR) = 1.32, CI: 1.25-1.39,  $P < 0.0001$ ) per 24 hours delay. There was a significant change in in-hospital mortality for ASA score (OR per point added: 2.28, CI: 2.13 – 2.45,  $P < 0.0001$ ), gender (OR for men: 2.23, CI: 2.0 – 2.47,  $P < 0.0001$ ) and age (OR per 5 years: 1.43, CI: 1.38 – 1.48,  $P < 0.0001$ ). Patients admitted during weekends or public holidays did not have an increased mortality rate (weekends:  $P = 0.49$ , public holidays:  $P = 0.48$ ).

**Conclusions:** Minimizing surgical delay is the most important factor in reducing mortality in hip fracture patients. ASA-score, gender and age are also significant factors. We found no increase in the mortality rate for admission during weekend or holiday

93.

## **The Locking Attachment Plate in surgery of periprosthetic femur fractures in THA patients: A review of reoperations in 89 cases from two centers**

*Zaid Issa, Ilija Ban, Kim Holck, Lonnie Froberg, Michael Brix,  
Anders Troelsen*

Dept. of Orthopaedics Hvidovre University Hospital; Dept. of Orthopaedics, Hvidovre University Hospital; Dept. of Orthopaedics, Hvidovre University Hospital; Dept. of Orthopaedics, Odense University Hospital; Dept. of Orthopaedics, Odense University Hospital;  
Dept. of Orthopaedics, Hvidovre University Hospital

**Background:** Stable fixation with plate osteosynthesis of periprosthetic femur fractures in THA patients can be challenging. Insufficient primary fixation may lead to failure of osteosynthesis. Locking attachment plates (LAP) used in conjunction with long locking compression plates has been introduced to enhance fixation. The potential benefits of the LAP remain unexplored.

**Purpose / Aim of Study:** To investigate the rate of intraoperative complications and reoperations following plate osteosynthesis of periprosthetic femur fractures with and without LAP's.

**Materials and Methods:** At two centers we identified patients with THA's operated for Vancouver type B and C periprosthetic fractures either with utilization of the LAP in the period 08-12 (n=29) or without the LAP in the period 04-07 (n=60). Age and gender distribution were comparable between groups. Patient files and radiographic material were used to assess complications and reoperations. Fracture types were: B1=11, B2=5, B3=3, C=10 in the LAP group, and B1=13, B2=2, B3=8, C=37 in non-LAP group.

**Findings / Results:** There were no intraoperative complications. Reoperations within one year were performed in 8 of 29 cases in the LAP group (28%), and in 19 of 60 cases in the non-LAP group (30%). Failure of osteosynthesis was the reason for reoperation in 1 case in the LAP group, and 12 cases in the non-LAP group. Infection accounted for 7 cases of reoperation in the LAP group, and 4 cases of reoperation in the non-LAP group. New periprosthetic fractures were the reason for reoperation in 3 cases in the non-LAP group.

**Conclusions:** It seems that the LAP can facilitate improved fracture fixation. However, the total rate of reoperations is only marginally reduced with infection still representing a major cause of revision.

94.

## **Bilateral total hip- and knee arthroplasty. A nationwide study**

*Martin Lindberg-Larsen, Christoffer Joergensen, Henrik Husted,  
Henrik Kehlet*

Section of Surgical Pathophysiology, Rigshospitalet. 2. The Lundbeck Centre for Fast-track Hip and K; , Section of Surgical Pathophysiology, Rigshospitalet. 2. The Lundbeck Centre for Fast-track Hip and K; , 3. Department of Orthopedic Surgery, Hvidovre University. 2. The Lundbeck Centre for Fast-track Hip ; , Section of Surgical Pathophysiology, Rigshospitalet. 2. The Lundbeck Centre for Fast-track Hip and K

**Background:** Bilateral simultaneous total hip arthroplasty (BSTHA) and bilateral simultaneous total knee arthroplasty (BSTKA) are controversial procedures, since some studies report a higher incidence of medical and surgical complications after these procedures compared with unilateral or staged bilateral total hip- and knee arthroplasty (BTHA, BTKA).

**Purpose / Aim of Study:** To investigate length of stay (LOS), readmissions and mortality after bilateral total hip- and knee arthroplasty in Denmark and to compare outcome after simultaneous and staged procedures.

**Materials and Methods:** All patients who underwent bilateral total knee- or hip arthroplasty in Denmark in a period from 01.07.2009 to 31.06.2011 were found using data from the national health registry. We distinguished between simultaneous bilateral and staged bilateral procedures. The staged bilateral procedure was defined as bilateral THA/TKA done in 2 stages within 6 months. Data were analyzed using SPSS 20 and are presented as mean (SD) or Median (IQR) where appropriate. Length of stay (LOS) for the staged processes (BTKA and BTHA) was added to provide a total LOS.

**Findings / Results:** BSTKA (n=158): Mean age was 64.0 (0.65) years, 53% females, median LOS was 4(3) days and 90 days mortality was 0%. BTKA (n=640): Mean age was 66.7 (0.37) years, 57% females, median LOS was 6(3) days and 90 days mortality was 0.94%. BSTHA (n=104): Mean age was 55.8 (1.37) years, 43% females, median LOS was 4(3) and 90 days mortality was 0%. BTHA (n=597): Mean age was 66.6 (0.44) years, 60% females, median LOS was 6(3) and 90 days mortality was 0.33%.

**Conclusions:** Preliminary results show that LOS is significantly higher after bilateral staged hip and knee arthroplasty compared with simultaneous bilateral procedures. Data regarding outcome will be included in the final analysis.

95.

## Fully Automated Measurement of Radiological Angles in Hip Dysplasia using CT Images

*Sepp de Raedt, Marleen de Bruijne, Inger Mechlenburg, Maiken Stilling, Lone Rømer, Kjeld Søballe*

Orthopaedic Research Unit Aarhus University Hospital; Department of Computer Science, University of Copenhagen; Orthopaedic Research Unit, Aarhus University Hospital; Orthopaedic Research Unit, Holstebro Regional Hospital; Department of Radiology, Aarhus University Hospital; Orthopaedic Research Unit, Aarhus University Hospital

**Background:** Developmental hip dysplasia is a debilitating condition that is commonly diagnosed by manual measurements performed on x-rays or CT slices. However, manual measurements are subjective and time consuming.

**Purpose / Aim of Study:** To develop a fully automated method to measure the angles used in the diagnosis of hip dysplasia using CT images.

**Materials and Methods:** Using the automatically segmented hip, the center point of the femoral head was determined by fitting a sphere to the surface of the femoral head. The local axis was determined and corrected for the tilt of the pelvis. Starting from the center point, the necessary reference points were identified by automatically rotating a line until the edge of the acetabulum was reached in the respective directions. Using the reference points, the CE-angle (CE), acetabular-anteversion (AcAV) angle, posterior sector (PS) angle and anterior sector (AS) angle were calculated. The method was validated against manual measurements as performed in daily practice on 52 hips. We report mean, average difference with 95% limits of agreement, and concordance correlation coefficient (CCC) between the two methods.

**Findings / Results:** The mean CE angle was  $21.2^\circ$  (Avg. diff.  $0.0 \pm 5.4$ , CCC: 0.93). The mean AcAV angle was  $19.8^\circ$  (Avg. diff.  $-0.9 \pm 3.6$ , CCC: 0.95). The mean PS angle was  $86.5^\circ$  (Avg. diff.  $1.8 \pm 6.2$ , CCC: 0.87). The mean AS angle was  $49.0^\circ$  (Avg. diff.  $0.8 \pm 5.6$ , CCC: 0.95). Three patients (6 hips) were excluded from analysis due to outlying measurements ( $>2SD$ ) due to osteophytes.

**Conclusions:** The new automated method achieves acceptable accuracy as validated against manual measurements. In the future, the method will be improved to correct for osteophytes and can be further developed to pre-operatively determine the optimal rotation of the acetabulum before periacetabular osteotomy.

96.

## **Hemicap- and Unicap – miniprosthesis and Hemicap patellofemoral (PF) - and PF-xI ( Wave ) – miniprosthesis**

*Jens Ole Laursen*

Orthopedic Sygehus Sønderjylland, Sønderborg

**Background:** I introduced these implants in 2007 and 2009 respectively, and have so far implanted 69 Hemicaps and 80 Unicaps.

**Purpose / Aim of Study:** To present up to 5 years follow-up from a cohort of 149 ptt's. operated with miniprosthesis.

**Materials and Methods:** There was a protocol for the operations: all patients had preoperative x-rays and MRI taken and all operations started with arthroscopy to confirm if the cartilage damage was suitable for further CAP-surgery and to deal with other damages to meniscus or cartilage.

**Findings / Results:** Unicaps( fig.7): 35 ptt's in 2009, 27 in 2010 and 18 in 2011 (only on the femoral condyle). 9 ptt's revised to TKA because of too extensive osteoarthritis in more than one chamber! 2 ptt's revised to TKA after postop. infection ( second to re- arthroscopy ), and 5 ptt's revised to TKA because of aseptic loosening. 69 patients operated with the Hemicap(fig.5) and 4 revised, 3 due to more extensive lesions and arthrosis and one aseptic loosening. Total caps: 149 in 5 years and 20 revised ( 13 % ), and cumulative Survival rate(fig.6) at 93,5 % at 5 years for Hemicaps and 82% at 3,5 years for Unicaps. PF- prosthesis:(fig.3) 2007: 1, 2008: 3, 2009: 3, 2010: 9, 2011: 9 = 25 TOTAL, 10 men and 15 women – mean age 49 years ( 31 – 84 ), BMI average 28, – 18 working and 7 at pension.

**Conclusions:** So far I have found the HEMICAP promising for restoration of focal cartilage lesions in the knee in the “millennium patient” with isolated cartilage lesions. The UNICAP addressing bigger cartilage lesions or minor arthrosis is more problematic and indication must be quite narrow. Further studies of both unicap and hemicap follow-ups are necessary to confirm the continuing use, and RCT – studies against Steadman's micro-fracturing or cartilage transplantation would be of great clinical interest.



97.

## **Inter-tester Reliability of the Hand-held dynamometer and the Leg Extensor Power Rig applied on Patients after Total Hip Arthroplasty**

*Lone Ramer Mikkelsen, Mette Krintel Petersen, Søren Mikkelsen,  
Kjeld Søballe, Inger Mechlenburg*

Department of Orthopaedics Silkeborg Regional Hospital ; Department of Physiotherapy , Aarhus University Hospital; Department of Orthopaedics, Silkeborg Regional Hospital ; Department of Orthopaedics , Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital

**Background:** Rehabilitation has an increasing focus on intensive resistance training early after joint replacement. This increases the requests for measuring changes in the muscle strength and muscle power over time. Hand-held dynamometer (HHD) is a device used to measure isometric muscle strength and Leg Extensor Power Rig (LEPR) is a tool for measuring muscle power.

**Purpose / Aim of Study:** To test the inter-tester reliability of the HHD and the LEPR in Total Hip Arthroplasty (THA) patients.

**Materials and Methods:** Two groups each consisting 20 subjects were included. Mean age was 68.4 years. All subjects had THA surgery three months prior to testing. The subjects conducted two test sessions with HHD and LEPR, with two different testers, separated by a break of 1? hour. We assessed the relative inter-tester reliability with Intraclass Correlation Coefficient (ICC) and the absolute reliability with Limits of Agreement (LOA).

**Findings / Results:** Inter-tester reliability for the HHD: There was no significant difference between the two testers ( $p=0.66$ ) and the two tests ( $0.41$ );  $ICC=0.94$  (95% CI:  $0.86;0.97$ ) ;  $LOA=\pm 18$  Newton. Inter-tester reliability for the LEPR: There was no significant difference between the two testers ( $p=0.62$ ) and the two tests ( $0.14$ );  $ICC=0.91$  (95% CI:  $0.79;0.96$ );  $LOA=\pm 34$  Watt.

**Conclusions:** The relative reliability was acceptable for both HHD and LEPR. The absolute reliability showed that a change in the muscle strength/power above 18 Newton or 34 Watt can be counted as a real change for this population.

98.

## Outcomes in tobacco and alcohol users after fast-track hip- and knee replacement

*Calov Joergensen Christoffer , Kehlet Henrik*

Section for Surgical Pathophysiology 4074 Rigshospitalet 2200 Copenhagen Ø; Section for Surgical Pathophysiology 4074, Rigshospitalet 2200 Copenhagen Ø

**Background:** Several studies have shown smoking and alcohol use to impair postoperative outcome, including after total hip- (THA) and kneearthroplasty (TKA). However, no studies are on fast-track surgery, which has been demonstrated to improve postoperative outcome

**Purpose / Aim of Study:** To evaluate the risk of prolonged length of hospital stay (LOS) and readmissions in smokers/alcohol users receiving fast track primary elective THA/TKA.

**Materials and Methods:** Patients from 5 wards of the Lundbeck Foundation Centre for fast-track THA and TKA, prospectively completed questionnaires on co-morbidity and smoking/alcohol use. These were cross-referenced with the Danish National Health registry, medical charts and the Central Office of Civil Registration on LOS, readmissions and mortality.

**Findings / Results:** In 3041 patients, 608 reported to be smoking (n=458) or having more than 2 drinks a day (n=216). Smokers/alcohol users were generally male, younger (mean age 64.2 vs. 68.0 yrs), had lower Body Mass Index (mean 27.9 vs 28.5) and shorter LOS (median 2 vs 3 days) than non-users. Multiple regression showed a non-significant increased risk of LOS >4 days when smoking (OR: 1.34 95%CI:[0.74-1.95] p=0.13) but not when using alcohol (OR: 0.59 95%CI: [0.30-1.16] p=0.13). Readmissionrate was 6.6% and 9.4% in 30 and 90 days. Smoking was related to readmissions in 30 (OR: 1.60 95%CI:[1.05-2.44] p<0.05) but not 90 days (OR: 1.17 95%CI:[0.80- 1.73] p=0.42). Alcohol use was unrelated to readmissions in 30 (OR:0.94 95%CI:[0.50-1.76] p=0.84) and 90 days (OR: 0.85 95%CI:[0.47-1.52] p=0.58).

**Conclusions:** There was no increase in LOS with smoking/alcohol use. Smokers had increased risk of readmission in 30 but not 90 days. The influence of smoking or alcohol use may be less pronounced in patients undergoing fast-track surgery compared to previously shown in conventional care programs.

99.

## Revision Risk of Total Hip Arthroplasty with Ceramic-on-Ceramic Bearings

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

**Background:** In general, the prognosis after total hip arthroplasty (THA) is good with a 10 year overall survival rate around 90% in national registry studies.

**Purpose / Aim of Study:** We wanted to investigate revision risk of ceramic-on-ceramic (CoC) THA after a maximum of 8.7 years follow-up.

**Materials and Methods:** From Danish Hip Arthroplasty Registry 47,155 primary THAs operated from 2002 to 2009 were included into the study. Since 2,384 THAs were registered with a missing value for type of bearings, multiple imputation was used. Cox regression analysis was performed to estimate the relative risk (RR) of any revision with 95% confidence intervals (CI)

**Findings / Results:** The RR for any revision was 0.97 (95% CI, 0.76-1.24) for CoC THA, 0.84 (95% CI, 0.72-0.97) for ceramic-on-polyethylene (CoP) THA, and 0.99 (95% CI, 0.68-1.44) for metal-on-metal (MoM) THA compared to metal-on-polyethylene (MoP) THA. Stratified analyses for gender, age, comorbidity, osteoarthritis of the hip, head size, uncemented THA, follow-up shorter or longer than 2 years, revision for aseptic loosening, dislocation, and other revision causes, showed no difference in RR for revision for CoC THA compared to MoP THA. For CoP compared to MoP bearings a lower RR for any revision was found for females (RR 0.75, 95% CI 0.61-0.92), patients older than 60 years (RR 0.82, 95% CI 0.68-0.98), patients with any comorbidity (RR 0.70, 95% CI 0.54-0.89), and patients with 28 mm or smaller heads (RR 0.84, 95% CI 0.70-0.99). For MoM THA the RR of revision due to aseptic loosening was higher compared to MoP THA (RR 2.33, 95% CI: 1.14-4.76).

**Conclusions:** We found no difference in RR for any revision of CoC THA compared to MoP THA. CoP THA had reduced risk for any revision in general and among certain groups of patients and MoM THA had higher RR for revision due to aseptic loosening compared to MoP THA.

100.

## Should the knife be discarded after skin incision in arthroplasty surgery?

*Casper Ottesen, Annette Skovby, Henrik Husted, Alice Friis-Møller,  
Anders Troelsen*

Dept. Of Orthopaedic Surgery Hvidovre University Hospital; Dept. of Clinical Microbiology, Hvidovre University Hospital; Dept. Of Orthopaedic Surgery, Hvidovre University Hospital; Dept. of Clinical Microbiology, Hvidovre University Hospital ; Dept. Of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** Postoperative infection following hip or knee arthroplasty surgery is a serious complication with major economic and personal consequences. Bacterial contamination from the skin to the deeper tissues is a potential risk factor for postoperative infections. Traditionally, the knife has been discarded after skin incision because of its possible role as a vector for bacteria.

**Purpose / Aim of Study:** To evaluate the level of contamination of a skin knife and a knife used separately for incision of the deeper layers in hip and knee arthroplasty surgery, to re-assess whether or not a separate skin knife should be used to prevent deep contamination and potential infection.

**Materials and Methods:** We collected three knives from every primary knee and hip arthroplasty surgery in non-laminar airflow operating rooms: The knife used for the skin incision, the one used for the rest of the operation and one control knife (placed on the operating table), were all sent in sterile BHI media for bacteriological examination.

**Findings / Results:** A total of 831 knife blades from 277 patients were cultured. We found growth from the skin knife from eight patients (2.8%), growth from the "deep" knife from five patients (1.8%) and growth from the control knife from five patients (1.8%). In one case both the skin knife and the "deep" knife grew the same microorganism.

**Conclusions:** Our findings suggest a very low rate of skin contamination. All three types of knives showed contamination which underlines that total surgical sterility is impossible to achieve. To this date (> 3 months post-operative), none of the patients, who had contamination of one or more knives, have shown signs of postoperative infection. Our findings do not support discarding the knife after the skin incision in order to prevent postoperative infection in elective orthopedic arthroplasty surgery.

*Deltager i konkurrencen om YODA's ungdomsforskerpris*

**101.**

**The role of patient demographics for fast-track hip and knee replacement.  
(NB se bort fra submission ID 1775)**

*Christoffer Joergensen, Henrik Kehlet*

Section for Surgical Pathophysiology 4074 Rigshospitalet; Section for Surgical Pathophysiology 4074, Rigshospitalet Cph.

**Background:** Age and co-morbidity have been found to be predictors of prolonged length of hospital stay (LOS), readmissions and mortality also in elective primary total hip-(THA) and kneearthroplasty (TKA). In this context the question remains to be answered whether the same applies in fast-track THA and TKA where LOS is 2- 4 days.

**Purpose / Aim of Study:** To evaluate LOS, mortality and readmissions 90 days after fast-track THA and TKA in relation to age and common demographics.

**Materials and Methods:** In 5 wards of the Lundbeck Foundation centre for fast-track THA and TKA, patients have completed a questionnaire on demographics and co-morbidity prior to surgery. Data was cross-referenced with the Danish National Health Registry and medical charts on LOS and readmissions. Mortality was acquired through The Central Office of Civil Registration.

**Findings / Results:** 3112 THA/TKAs were performed in 3020 consecutive patients. Mean age was 67.3 years (18-97). Median LOS was 3 days and 90.6% had LOS  $\leq$  4 days. Predictors of LOS >4 days were: Age 76-80 (OR:1.57; CI: 0.99-2.47), 81- 85 (OR: 2.40; CI: 1.45-4.00) and >85 years (OR: 4.10; CI: 2.15-7.82), CPD(OR: 1.40; CI: 1.03-1.91), preoperative use of mobility aid (OR: 1.95; CI: 1.46-2.54) and living conditions(OR: 1.92; CI:1.44-2.54) However, > 80% with these conditions and >75% >80 years had LOS  $\leq$  4days. Mortality and readmission rate was 0.42% and 9.3% in 90 days. Readmissions were related to age >85 years (OR: 2.16; CI: 1.13-2.10), CPD (OR: 1.93; CI: 1.42-2.61) and use of mobility aids (OR: 1.59; CI: 1.17-2.15).

**Conclusions:** Fast-track THA and TKA with LOS of  $\leq$  4 days is feasible and safe, also in elderly patients with co-morbidities. Further improvement mostly focus on surgical technique and perioperative care, especially in patients with age >85yrs, CPD, using a mobility aid and living alone

## 102.

### **Battered Child Syndrome, is there a sufficient knowledge among emergency room doctors?**

*Ann Buhl Bersang, Jenny Korsgaard Villadsen , Rikke Thorninger,  
Ole Rahbek, Bjarne Møller-Madsen*

Medicin Aarhus Universitet; Medicin, Aarhus Universitet; Ortopædkirurgisk afdeling, Odense Universitets Hospital; Børneortopædisk afdeling, Aarhus Universitets Hospital; Børneortopædisk afdeling, Aarhus Universitets Hospital

**Background:** The incidens of Battered Child Syndrom,BCS is 16 times lower in Denmark compared to USA and UK.(1,2,3) Femur fractures, corner fractures and posterior costae fractures are some of the most common fractures caused by child abuse.

**Purpose / Aim of Study:** To determine the present knowledge about BCS among doctors in the Emergency Room (ER).

**Materials and Methods:** In the period from April to June 2012 nineteen doctors from seven hospitals in Denmark with different educational competences working in the ER, were asked 52 questions about their knowledge with reference to BCS, and how they would act accordingly.

**Findings / Results:** 68 % of participants related femur fractures in children aged below eighteen months to BCS. For posterior costae fractures 65% answered positively for children less than 2 years and 42 % for the group of children below 5 years. Regarding corner fractures 25 % relate this fracture to BCS for children below eighteen months.

**Conclusions:** More than one third of the nineteen doctors did not know which fractures to look for in the ER when suspecting BCS. Hence, it may be of significant value to improve the knowledge in relation to BCS among the medical staff in ER`s in Denmark in order to improve the treatment of children suffering from BCS. Referencer: 1. Christoffersen, M.N. ”Børnemishandling i hjemmet, delrapport 1”. SFI 2010. 2.CORR vol. 469, no. 3, pp. 790-797 3. Barter et al, Millard and Flatley, ”Child abuse and neglect in the UK today”. 2010, England and Wales.

**103.**

**Dennyson-Fulford subtalar extra-articular  
arthrodesis for severe hindfoot valgus in children.  
A retrospective study**

*Polina Martinkevich, Line Kjeldgaard Pedersen, Michel Bach Hellfritzsch,  
Ole Rahbek, Bjarne Møller-Madsen*

Department of Children's Orthopaedics Aarhus University Hospital

**Background:** The Dennyson-Fulford subtalar extra-articular arthrodesis is an acknowledged method for correction of severe valgus hindfoot deformities in children. The literature reports no consensus on an acknowledged treatment regime for patients submitted to the procedure.

**Purpose / Aim of Study:** The method is surgically demanding and there is no standardized treatment regime at Aarhus University Hospital. We evaluate our experience with the technique.

**Materials and Methods:** During 1996-2010, 51 arthrodeses were performed in 33 children with severe, flexible hindfoot valgus deformities. We performed a review of the medical records, identifying indications for surgery, complications to the procedure and clinical outcome. Radiographs taken at 6 weeks after surgery and at a mean time of 3 years were reviewed, in order to assess healing. The Gross Motor Function Classification System (GMFCS) was used to assess the gross motor function in patients with cerebral palsy before and after surgery. We defined a successful result as clinical healing at 3 months, correction of the deformity, improved mobility, radiographic healing and no revision surgery.

**Findings / Results:** The mean age at the time of surgery was 11,7 years (range 4,7; 16,9). Clinical healing was achieved in all 51 feet at 10 weeks after surgery. Revision surgery was performed in 10 feet primary due to complications related to hardware failure, such as malpositioning of the screw, screw size and breakage. Satisfactory clinical outcome was obtained in 41 out of 51 feet. Healing was difficult to assess from conventional radiographs.

**Conclusions:** Successful results in 41 out of 51 feet based on clinical healing, improved mobility, absence of pain and no revision surgery. Bony union could not be assessed adequately from conventional radiographs. Careful attention must be paid to screw insertion.

## 104.

### Is 8-plates superior to staples in the treatment of idiopathic genu valgus? A randomized clinical study

*Martin Gottliebsen, Ole Rahbek, Ivan Hvid, Michael Davidsen,  
Michel Bach Hellfritzsch, Bjarne Møller-Madsen*

Department of Children's Orthopaedics Aarhus University Hospital; Department of Radiology, Aarhus University Hospital; Department of Children's Orthopaedics, Aarhus University Hospital

**Background:** In children with excessive angulating deformities of the lower limbs guided growth can be used to achieve better alignment before skeletal maturity. Traditionally hemiepiphysiodesis has been performed with staple technique. The 8-plate technique was introduced in 2007 and has theoretical advantages compared to stapling. The benefit of the 8-plate technique has not yet been proven in randomised clinical studies.

**Purpose / Aim of Study:** To compare the clinical and radiological effects of stapling with those of 8-plates in a group of children with idiopathic genu valgus.

**Materials and Methods:** Children with bilateral idiopathic genu valgus were randomized to staple or 8-plate hemiepiphysiodesis (n=26). Time needed to correct deformity was recorded and changes in lower limb mechanical axis on long standing x-rays were measured. Pain score using visual analog scale (VAS) was performed for 72 hours postoperatively as well as registration of analgesics taken.

**Findings / Results:** 20 children were eligible for analysis (10 in each group). Mean treatment time between staples (349 days) and 8-plates (340 days) did not differ. No difference in changes in mechanical axis was found between staples (14.4 dgr) and 8-plates (13.9 dgr). VAS score and consumption of analgesics postoperatively did not differ between groups. No hardware failure or wound related infections were observed.

**Conclusions:** There seem to be similar effect of 8-plates and staples in relation to correction of genu valgus. We cannot rule out that we have made a type II error and that our study is underpowered. However, we do not believe that smaller differences found in larger studies will be of clinical significance.



105.

## **Pelvic Osteotomy for Hip Subluxation and Dislocation in Children with Cerebral Palsy**

*Michael Schultz-Larsen, Nikolaj A Sode, Vilhelm Engell,  
Niels Wisbech Pedersen*

Health Care Unit Danish National Defence; Department of Orthopedics, Division, Odense University Hospital, Denmark; Department of Orthopedics, Division, Odense University Hospital, Denmark; Department of Orthopedics, Division, Odense University Hospital, Denmark

**Background:** Children with cerebral palsy (CP) are known to have a high risk of hip displacement. The development of hip deformity in spastic patients is thought to be secondary to asymmetric muscle forces produced across the hip adductors, iliopsoas, and hamstrings. Uncorrected hip subluxation or dislocation may lead to later problems with pain, perineal care, and sitting balance.

**Purpose / Aim of Study:** The purpose of this paper is to review the results of pelvic osteotomy with or without varus derotational femoral osteotomy and soft tissue release, in a group of cerebral palsy patients with uni- or bilateral hip subluxation or dislocation

**Materials and Methods:** A retrospective chart and radiograph review was carried out for all cases of severely involved CP patients followed at Odense University Hospital during the period 2009 to 2011 and undergoing pelvic osteotomy with or without intertrochanteric varus, rotation and shortening osteotomy and soft tissue release. Surgical procedures carried out were gathered through chart and radiograph review. Clinical information and follow-up data were obtained from medical records. We determined the effect of the pelvic osteotomy by measuring the acetabular index (AI), centre edge angle (CEA) pre- and postoperatively and when appropriate the line of shenton.

**Findings / Results:** 35 children with CP met the inclusion criteria. The male:female ratio was 24:11. None of the patients suffered postoperative infection. The AI improved in 27 hips while 5 hips had the same angle and 1 hip had a 2-degree increase postop. In all patients, despite one, the CEA improved from 2 to 44 degrees.

**Conclusions:** The results of this study demonstrate that good clinical and radiological result can be achieved with varus derotation osteotomy combined with soft tissue release as treatment for subluxated or luxated hips in cerebral palsy children.

106.

## Poor agreement between radiographs and clinical examinations in children with genu valgus

*Nina Hardgrib Madsen, Martin Gottliebsen, Ole Rahbek, Michel Bach Hellfritsch, Bjarne Møller Madsen*

Department of Children's Orthopaedics Aarhus University Hospital, Denmark; Department of Children's Orthopaedics, Aarhus University Hospital, Denmark; Department of Children's Orthopaedics, Aarhus University Hospital, Denmark; Department of Radiology, Aarhus University Hospital, Denmark; Department of Children's Orthopaedics, Aarhus University Hospital, Denmark

**Background:** Genu valgus is a condition characterized by a lateral shift of the knee mechanical axis. The deformity can be characterized using clinical examinations and long hip-knee-ankle (HKA) x-rays. It is unclear how these investigations correlate with each other

**Purpose / Aim of Study:** To a) examine the interobserver and intraobserver reliabilities in clinical measurements and b) examine the agreement between clinical and radiographic measurements in children

**Materials and Methods:** a) 11 children had Intermalleolar (IM) double measurements performed, both standing and lying down, by two different examiners to determine interobserver and intraobserver reliabilities for IM measurements. Intra Class Correlations (ICC) coefficients were calculated. b) 49 children referred with genu valgus deformity. Criteria for inclusion: IM distance measured and a standardized AP radiograph of the lower extremities taken. We calculated Spearman's rank correlation coefficient to study the reliability between radiographs and clinical examinations

**Findings / Results:** The overall ICCs for intraobserver reliability for standing and lying clinical IM measurements was 0.84–0.98. We examined the reliability between standing and lying examinations within observers with ICCs ranging from 0.53–0.94. When comparing standing and lying examinations between observers we found ICCs between 0.84–0.99. Spearman's rho for comparison between clinical IM distance measurements and HKA angles was found to be 0.19 indicating no relationship

**Conclusions:** We report good reliability with ICC coefficients  $>0.80$  for clinical examinations of IM distance except for the reliability between standing and lying examinations. We found no convincing correlation between clinical examinations and radiographic angles, so it seems useful to consider if both measurements should be used to follow children with genu valgus

## 107.

### **Slipped Capital Femoral Epiphysis - a case file study in the Danish Patient Insurance Association**

*Mathilde Pihl, Stig Sonne-Holm, Jens Krogh Christoffersen, Christian Wong*  
Pediatric Orthopaedic Surgery Hvidovre University Hospital; Pediatric Orthopaedic Surgery, Hvidovre University Hospital; The Danish Patient Insurance Association, ; Pediatric Orthopaedic Surgery, Hvidovre University Hospital

**Background:** Slipped Capital Femoral Epiphysis (SCFE) is the most common hip disorder in adolescents. Primary treatment is acute epiphysodesis, since delayed treatment may initiate destruction of the hip. The Patient Insurance Association (DPIA) receives requests for compensation due to damage from potential maltreatment or misdiagnosis.

**Purpose / Aim of Study:** To find causalities or similarities in cases of SCFE in order to understand the background for the complaints and the potential effect on treatment.

**Materials and Methods:** A screening of the DPIA case files from the period 1996 to 2011 was done (diagnose code DM930). A total of 44 SCFE cases were extracted, but 2 cases were excluded since hip disease originated from other disorders.

**Findings / Results:** The mean age of the patients was 12.4 years. Only one case of SCFE was traumatic induced. Doctors delay because of misdiagnosis was on average 4.5 months in 27 cases. The correct diagnosis was set in 25 cases. The following complications was found in 16 case files: 4 avascular necrosis, 1 fracture, 9 cases of ongoing pain and 4 deformations impairing movement. The doctor responsible was a GP in 7 cases, a resident in 20 cases, a trained orthopaedic surgeon in 13. In 5 cases complaints were about treatment in hospitals now highly specialized in treating SCFE, the remaining due to treatment at other hospitals. In 16 cases the DPIA categorized the outcome as ‘severe disability’, and 22 patients got economic compensation.

**Conclusions:** The doctors delay might affect the outcome of treatment and seems to be the reason for many of the complaints to the DPIA. Competence level of the hospitals and doctors in these selected cases could have an impact on the treatment as well. By further studying these aspects of SCFE treatment we might be able to enhance treatment outcome.

108.

## The Effect of Botox Treatment in the Spine Muscles for Cerebral Paresis Scoliosis

*Christian Wong, Søren-Anker Pedersen, Kasper Gosvig,  
Billy Kristensen, Stig Sonne-Holm*

Department of Orthopaedic Surgery Hvidovre University Hospital; Department of Paediatrics, Hvidovre University Hospital; Hvidovre University Hospital, Department of Radiology; Department of Anaesthesiology, Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** Intramuscular injection of Botox has been used off label to reduce muscle spasticity of the lower and upper extremities in cerebral palsy (CP) with only a few prospective, randomized double-blinded studies documenting the effect - especially in the CP spine, where only one study has been published.

**Purpose / Aim of Study:** We wanted to examine the effects of intramuscular injection of Botox in the CP scoliotic spine in a prospective, randomized triple-blinded cross-over design using NaCl and Botox.

**Materials and Methods:** 10 CP children using a brace for scoliosis met the inclusion criteria and were injected in the M. Iliopsoas, M. Quadratus Lumborum and M. Erector Spinae with either NaCl or Botox targeted by ultrasonic guidance every 6 months. Standardized relaxed and lateral-flexion X-rays of the spine were performed before and 6 weeks after for every injection. Changes in Cobb's angle and Nash and Moe's classification were evaluated by 3 experienced doctors separately and together; a change in Cobb's angle of both 5 and 10 degrees was cut-off level of effect. Clinical results were evaluated by the pediatric quality of life (PQL) score and open questioning of the parents about the child's wellbeing. One serious adverse, but unrelated event of pneumonia resulting in death was recorded.

**Findings / Results:** Using both cut-off levels 2 test subjects had positive radiological outcome in Cobb's angle of botox treatment and 8 had negative or no effect of treatment. 8 out of 10 parents of the children indicated better stability in standing or when sitting in a wheel chair and 2 indicated no change. No changes in PQL were detected.

**Conclusions:** In spite of positive subjective clinical evaluation by parents radiological outcomes and results from questionnaires showed no effect of the treatment. Based on these findings treatment cannot be recommended.

## 109.

### Treatment of Congenital hip dysplasia in newborns

*Roland Knudsen, Vilhelm Engell, Niels Wisbech Pedersen*

Ortopedic Kolding Hospital; Ortopedic, Odense University Hospital; Ortopedic, Odense University Hospital

**Background:** It is controversial whether congenital hip dysplasia (CHD) in a stable hip should receive treatment. New studies indicate that treating CHD in a non- dislocated/dislocatable hip without an abduction brace is the best treatment. For many years the standard treatment has been an abduction brace. Nevertheless, this treatment might even be harmful causing avascular necrosis of the caput.

**Purpose / Aim of Study:** The purpose is to document what the outcome was in newborn patients' stable hips who suffered from CHD when treated with "watchful waiting" alone. Our Hypothesis is that CHD in stable newborn hips will normalize despite no treatment.

**Materials and Methods:** Prospective cohort study of newborn patients referred to Kolding or Odense paediatric orthopaedic department having the tentative diagnosis "Dysplasia of the hip" since January 2010 until August 2011. We have documented the outcome of our treatment and also registered certain risk factors. We exclude all instable hips and children having secondary CHD (eg. cerebral paralysis)

**Findings / Results:** 181 children did not have CHD. 11 were excluded because of instability. 27 children (40 hips) were included. All hips became normal despite no treatment after 3-20 weeks (median 6 weeks). 39/40 hips were "immature" (acetabular angle of 50-59°) and one hip was dysplastic (43°).

**Conclusions:** Using our treatment protocol, all stable hips diagnosed with CDH became normal despite no active treatment. None of the children referred with "asymmetrical skinfold" had any CDH or signs of other diseases around the hips. This was true for both immature hips and dysplasia of any degree. Hips with a "dry click" were associated with CHD, even when the hip was stable: (16% had CDH). This study is among other recent studies, which concludes that stable immature hips will normalize without treatment.

## 110.

### **Treatment with botulinum toxin-A does not affect ankle joint biomechanics during gait in children with cerebral palsy**

*Jesper Bencke, Derek Curtis, Hanne Bloch Lauridsen, Christian Wong, Søren Anker Pedersen, Stig Sonne-Holm*

Gait analysis lab, dept. of Orthopaedic Surgery Hvidovre Hospital; Gait analysis lab, dept. of Orthopaedic Surgery, Hvidovre Hospital; Gait analysis lab, dept. of Orthopaedic Surgery, Hvidovre Hospital; Dept. of Orthopaedic Surgery, Hvidovre Hospital; Dept. of Pediatrics, Hvidovre Hospital; Dept. of Orthopaedic Surgery, Hvidovre Hospital

**Background:** In clinical practice, injections with botulinum toxin-A (BoNT-A) are used to reduce the spasticity of the calf muscles in children with cerebral palsy (CP), and thereby reduce equinus and improve function of the ankle joint.

**Purpose / Aim of Study:** The aim of the study was to investigate the effect of BoNT-A injections in m.triceps surae on the kinematics and kinetics of the ankle joint during gait in children with CP.

**Materials and Methods:** The inclusion criteria were diagnosed unilateral or bilateral CP, clinically measured spasticity treated with BoNT-A in m.triceps surae of the affected leg(s) and pre- and post treatment clinical gait analysis. Twenty-six children (mean age (SD) of 8.0 (2.8) yrs) with a total of 37 affected legs were included. The mean dose was 97.0 (50.7) units of botox (Allergan) giving a relative mean of 4.0 (2.0) units per kg bodymass (BM), administered in 1 ml. dilutions injected in m.triceps surae as recommended by the manufacturer. The biomechanical parameters A) dorsiflexion angle at initial contact, B) peak dorsiflexion during stance and C) mean plantarflexor moment during the initial 50 % of the stance phase were selected, as they would hypothetically be associated with spasticity during gait.

**Findings / Results:** No significant improvements were observed (A: 12.6(7.9) to 11.4(8.9) degrees plantarflexion (P=0.24); B: 5.6(7.2) to 6.9(6.7) degrees dorsiflexion (P=0.15); C: 0.52(0.18) to 0.50(0.19) Nm/kg.BM (P=0.30)). Several factors that influence the clinical effects of BoNT-A have been suggested. In the present study, the doses were administered in relatively small dilutions and the injections were given without ultrasound guidance; this may have influenced the clinical effects.

**Conclusions:** No effect on ankle joint biomechanics could be found after treatment with BoNT-A according to standard procedures.

## 111.

### **Assessment of precision in adult cadaver foot phantom model using radiostereometric analysis**

*Peter Buxbom, Ragnhild i Skorini, Stig Sonne-Holm, Christian Wong*

Department of Orthopaedic Surgery Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** Radiostereometric analysis (RSA) has been used for years particularly for identifying migration of prostheses. Its advantage is the ability to identify complex movements with high accuracy. Prior to commencing a new type of study a phantom validation of method is necessary assuring accurate results.

**Purpose / Aim of Study:** The aim of this study was to perform a phantom study using standardized procedures on an adult cadaver foot after corrective surgery.

**Materials and Methods:** Surgery of calcaneus lengthening and subtaloarthrodesis a.m. Grice was performed on an adult cadaver foot. 8 markers were inserted in calcaneus and 6 in talus. 3 RSA experiments with 10 examinations were then conducted: where neither phantom nor setup were touched between examinations, where the phantom was repositioned in between and where both setup and phantom were repositioned in between. The translations and rotations (TR) were assessed with RSA as the precision in each experiment; mean error of rigid body fitting (ME) was accepted if below 0.35 mm and mean condition numbers (MC) if below 150. As other RSA studies, P-value was set at 0.01.

**Findings / Results:** All markers were visible on each radiograph. ME were in all 3 experiments below 0.09 mm and MC were all below 54. Comparisons of TR of talus showed significant difference in 2 of 6 in the 3 axis. Precisions of translation were all below 0.235 mm and rotation below 0.533 degrees. Precision was not decreased when repositioning the phantom.

**Conclusions:** ME values of this study were below those typically obtained in clinical settings, indicating an acceptable setup. Comparisons of TR mimick movement of patients. Significant differences in two axis indicate the importance of marker placement and procedure standardization, but since our results were within limits in clinical settings, it seems reasonable to commence our study.

## 112.

### **Distraction osteogenesis after failed arthrodesis surgery on the first metatarso-phalangeal joint**

*Jens Kurt Johansen, Jens Wester, Tune Ipsen*

Section of foot and ankle surgery Odense University Hospital; Section of foot and ankle surgery, Odense University Hospital; Section of hand surgery, Odense University Hospital

**Background:** Very little literature have been published regarding the salvage of shortening and dorsalflexion of the 1. ray after failed arthrodesis surgery. Significant shortening of the first metatarsal disrupts the normal weight transfer mechanism, and can result in overload of the adjacent metatarsals with metatarsalgia and forefoot pain

**Purpose / Aim of Study:** To investigate the use of distraction osteogenesis after failed arthrodesis surgery on the first metatarsophalangeal joint.

**Materials and Methods:** The patient is a 50 year old woman who had prior surgery on the FMPJ. The patient had had both sesamoids removed, and an arthrodesis of the FMPJ was performed on her left foot. The patient had developed metatarsalgia under the second ray, and a cock-up deformity of the 1. toe. The arthrodesis line was cut and supplemented with the removal of a plantar based wedge thus correcting the alignment of the first toe. Two pins was inserted in the first metatarsal bone and 2 pins was inserted in the first proximal phalanx. A mini Orthofix apparatus was mounted. A 1,6 mm K-wire was placed transfixing the FMTP and IP joints, in order to gain extension of the extensor tendon. Twelve days after the mounting of the external fixator the distraction fase was begun. The distraction rate was 4 times 0,25 mm/daily. A distraction of approximately 13 mm was achieved, with uneventfull healing at the osteotomy sites.

**Findings / Results:** Pre-operative AOFAS hallux metatarsophalangeal-interphalangeal Score was 17. Postoperative score was 82. The patient was able to wear conventional footwear, and had only mild restrictions regarding running activities. The toe was painfree doing everyday activities.

**Conclusions:** Distraction Osteogenesis after failed arthrodesis surgery on the FMPJ can be a satisfactory way of dealing with the shortening of the first ray and metatarsalgia.



## 113.

### **Metal on metal articulation in total joint arthroplasty of the trapeziometacarpal joint seems not to represent a major problem**

*Lene Dremstrup, Maiken Stilling, Torben Bæk Hansen*

Department of Orthopaedics, Section of Hand Surgery, and The Orthopaedic Research Unit Regional Hospital Holstebro, Denmark; Department of Orthopaedics, Section of Hand Surgery, and The Orthopaedic Research Unit, Regional Hospital Holstebro, Denmark.; Department of Orthopaedics, Section of Hand Surgery, and The Orthopaedic Research Unit, Regional Hospital Holstebro, Denmark.

**Background:** Metal on metal articulation in hip resurfacing has led to problems with elevated chrome and cobalt blood levels and local reaction to metal wear particles. Metal on metal articulation is also used in total joint arthroplasty of the trapeziometacarpal (TMC) joint and in theory this could also lead to wear problems with elevated serum chrome and cobalt and local reaction to wear particles.

**Purpose / Aim of Study:** We wanted to investigate serum chrome and cobalt in patients with metal on metal articulation in total joint arthroplasty of the TMC joint.

**Materials and Methods:** Serum chrome and cobalt was measured in 26 patients with total joint arthroplasty of the TMC joint (15 Elektra prosthesis and 11 Motec prosthesis) at a minimum of two years (mean 44 months (range 25-94)) after the operation and without clinical symptoms of metallosis.

**Findings / Results:** In one Elektra patient we found slightly elevated values (chrome 10.9 nmol/l and cobalt 25.1 nmol/l). In three Motec patients we also found slightly elevated values (chrome 25.4 nmol/l and cobalt 25.5 nmol/l; chrome 13.0 nmol/l and cobalt 27.0 nmol/l; chrome 43.7 nmol/l and 27.0 nmol/l). In three of the four patients with elevated values the values were at a level previously described in well functioning metal on polyethylene hip articulation and may be caused by other factors than the implant. The last patient with the highest values was exposed to metal dust almost daily, which may be part of the explanation. In the remaining 14 Elektra patients and 7 Motec patients the chrome and cobalt values were normal.

**Conclusions:** Metal on metal articulation in total joint arthroplasty of the TMC joint seems not to represent a major problem. Local reaction to metal wear particles cannot be excluded based on this study and the patients will be followed to exclude long-term problems.

## 114.

### **The Eaton-Glickel classification cannot predict clinical outcome after total joint arthroplasty of the trapeziometacarpal joint**

*Lone Kirkeby, Torben Bæk Hansen*

Department of Orthopaedics, Section of Hand Surgery, and The Orthopaedic Research Unit Regional Hospital Holstebro, Denmark; Department of Orthopaedics, Section of Hand Surgery, and The Orthopaedic Research Unit, Regional Hospital Holstebro, Denmark.

**Background:** The Eaton-Glickel classification is widely accepted for evaluation of degenerative changes in the trapeziometacarpal (TMC) joint including evaluation of subluxation and degenerative changes in the scaphoid- trapezium (ST) joint. In total joint arthroplasty of the TMC joint the clinical result may depend on the preoperative degenerative changes with subluxation of the TMC joint and degenerative changes in the ST joint, and so far the influence of these changes on clinical outcome is unknown.

**Purpose / Aim of Study:** We wanted to investigate if the clinical result after total joint arthroplasty of the trapeziometacarpal joint could be predicted from preoperative degenerative changes evaluated using the Eaton-Glickel classification.

**Materials and Methods:** In a prospective study we included a total of 68 patients (14 males) mean age 59 years (range 41-77). All patients were operated with total joint arthroplasty of the trapeziometarpal joint and clinical follow-up was done after 3, 6 and 12 months. The preoperative degenerative changes were classified according to the Eaton-Glickel classification based on plain radiographs and CT scans. Eaton IV was defined as having discrete but clear degenerative changes in the ST-joint. Patients with severe degenerative changes in the ST joint were however excluded and treated with trapeziectomy.

**Findings / Results:** We found 26 patients with Eaton II, 29 with Eaton III and 12 patients with Eaton IV degenerative changes. All three groups had a good clinical effect of the operation regarding pain, grip strength and DASH score, and we found no significant difference between the three groups at any measure point in the study. Also we found no difference between different implant types.

**Conclusions:** Classification of degenerative changes in the trapeziometacarpal joint using the Eaton-Glickel classification cannot predict the clinical outcome after total joint arthroplasty, and discrete but clear degenerative changes in the ST-joint does not predict an inferior clinical outcome. Further research in better preoperative evaluation methods is needed.

## 115.

### **Ultrasound used as first line examination in the surgeon's office: Diagnostic accuracy of Wrist-to-Forearm Ratio in Carpal Tunnel Syndrome**

*Jeppe Lange*

Orthopaedic Research Unit – Department of Orthopaedic surgery, Aarhus University Hospital & Center f

**Background:** Attention has recently been brought to the possibility of utilizing ultrasound for diagnosing carpal tunnel syndrome

**Purpose / Aim of Study:** This study evaluates the diagnostic accuracy of ultrasound used in the surgeon's office as a first-line exam in carpal tunnel syndrome. The primary outcome parameter was to assess whether a wrist-forearm ratio cut-off value of 1.5 is diagnostic of carpal tunnel syndrome.

**Materials and Methods:** The study was performed as a prospective controlled study in 16 carpal tunnel syndrome patients diagnosed with positive nerve conduction study and 32 controls case- matched by gender, age and hand. Ultrasound exam of the median nerve was performed at the level of the distal flexor wrist crease (wrist level) and 10 cm proximal of the distal flexor wrist crease (forearm level) with calculation of cross sectional area.

**Findings / Results:** Statistically significant differences were found between patients and controls by both the cross sectional area and wrist-forearm ratio. Both showed high specificity and positive predictive values at optimal cut-off values. Optimal cut-off values were identified by receiver operator characteristic at a 14 mm<sup>2</sup> cross sectional area and a 1.6 wrist-forearm ratio. The accuracy of the wrist-forearm ratio using a cut-off value of 1.5 and disease prevalence of 33% gave a sensitivity of 94% (95% CI: 70% -100%), specificity of 63% (95% CI: 44% -79%), a NPV of 95% (95% CI: 76% -100%) and a PPV of 56% (95% CI: 35% -75%).

**Conclusions:** This study shows that ultrasound evaluation of the median nerve is a valuable and easily applied tool as a first-line diagnostic test used by the hand surgeon for examination of patients with presumed carpal tunnel syndrome. Owing to the high positive predictive value of ultrasound, the need for referral to nerve conduction study may be limited.

116.

## Validation of the Danish version of the Achilles tendon Total Rupture Score (ATRS)

*Ann Ganestam, Kristoffer Barfod, Jakob Klit, Anders Troelsen*

Orthopaedics Hvidovre Hospital, Denmark ; Orthopaedics, Hvidovre Hospital, Denmark ; Orthopaedics, Hvidovre Hospital, Denmark ; Orthopaedics, Hvidovre Hospital, Denmark

**Background:** The best treatment of acute Achilles tendon ruptures remains debated. Patient reported outcome measures (PROM's) have become cornerstones in evaluation of treatments, and The Achilles tendon Total Rupture Score (ATRS) has been developed for this purpose. The ATRS seemingly facilitates easy assessment of outcome, but it requires further validation and translation to be used in a Danish context.

**Purpose / Aim of Study:** To validate a Danish translation of the ATRS against existing Achilles tendon specific and quality of life related PROM's.

**Materials and Methods:** The ATRS consists of 10 items reflecting symptoms and physical activity related to the Achilles tendon with answers given on an 11-grade Likert-scale (0-10 points). A score of 100 is the best possible score. The ATRS was translated into Danish according to internationally adopted standards . The ATRS, VISA-A, and SF-36 scores were returned by 86 patients with previous rupture of the Achilles tendon. 61 patients returned a re-test of the ATRS after 1-3 weeks.

**Findings / Results:** The ATRS showed moderately strong correlations with the physical sub scores of SF-36 ( $r= 0.67 - 0.73$ ;  $P<0.0001$ ) and VISA-A ( $r= 0.71$ ;  $P<0.0001$ ), assessed by Spearman's rank correlation. The internal consistency measured with Cronbach's alpha was 0.96. Test-retest showed significantly ( $P=0.009$ ) higher scores on the second test day (mean difference: - 3.5; 95% limits of agreement: +/- 19.8).

**Conclusions:** The Danish version of the ATRS showed good internal consistency and moderately strong correlation with the SF-36 and VISA-A. Thus, the ATRS seems to be a relevant PROM for evaluation of treatment outcome. However, attention should be drawn towards the potential instability of the ATRS suggested by the test-retest results.

## 117.

### What treatment of acute Achilles tendon rupture is offered in the Nordic countries?

*Kristoffer W. Barfod, Fredrik Nilsen, Katarina Nilsson Helander,  
Ville M. Mattila, Ola Tingby, Anders Troelsen*

Ortopaedics Hvidovre Hospital, Denmark; Ortopaedics, Varberg Hospital, Sweden; Ortopaedics, Kungsbacka Hospital, Sweden; Ortopaedics, Tampere University hospital, Finland; Ortopaedics, Notodden Hospital, Norway; Ortopaedics, Hvidovre Hospital, Denmark

**Background:** The best treatment of acute Achilles tendon rupture has been discussed for decades, but no consensus has been reached. During the past half decade a number of randomised controlled trials have generally favored non-surgical treatment and dynamic rehabilitation. Uniform adherence to evidence based treatment algorithms would be desirable, but it is our hypothesis that the offered treatments shows great variation across departments in the Nordic countries.

**Purpose / Aim of Study:** To investigate how acute Achilles tendon rupture is treated in the Nordic countries and identify possible regional differences.

**Materials and Methods:** A questionnaire was distributed to all orthopaedic departments treating acute traumatology in Denmark (DK), Sweden (S), Norway (N) and Finland (F). The questionnaire was returned by 122 of 155 departments (response rate:81%). Two-way tables with Fisher's exact test was used.

**Findings / Results:** In DK, N and S significantly more hospitals recommend surgical treatment compared to F ( $P < 0.0001$ ). DK 83% (19/23), N 93% (28/30), S 65% (26/40) and F 30% (8/27). Dynamic rehabilitation is used significantly less in DK and S ( $P = 0.006$ ). DK 27% (6/22), N 58% (15/26), S 30% (12/40) and F 65% (17/26). There is significant difference between countries in the educational level of performing surgeons ( $P < 0.0001$ ). Hospitals where surgery is performed by a specialist: DK 22% (5/23), N 26% (8/31), S 73% (29/40) and F 41% (11/27).

**Conclusions:** Surgical treatment seems to be the treatment of choice in Danish, Norwegian and Swedish hospitals regardless of increasing evidence favoring non-surgical treatment. Despite clinical evidence of superiority of dynamic rehabilitation it is used in less than half of hospitals in DK and S. As hypothesized treatment algorithms shows considerable variation and do not adhere to clinical evidence.

## 118.

### **Xiapex® (collagenase clostridium histolyticum) – treatment of patients with Dupuytren’s contracture**

*Søren Larsen, Jens Christian Werlinrud, Tune Ipsen, Jens Lauritsen*  
Department of Orthopaedic Surgery Odense University Hospital; Department of Orthopaedic Surgery, Odense University Hospital; Department of Orthopaedic Surgery, Odense University Hospital; Department of Orthopaedic Surgery, Odense University Hospital

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

**Purpose / Aim of Study:** The aim of this study was to evaluate the efficacy and safety of Xiapex® in the treatment of DC. The study was initiated following a Minimal Health Technology Assessment.

**Materials and Methods:** The study was a prospective study on consecutive series of patients with DC and flexion deformities of the metacarpophalangeal and/or proximal interphalangeal joint of >200 . Primary end point was reduction in contracture and improving hand function. All patients gave informed consent.

**Findings / Results:** 74 patients were enrolled, 62 men and 12 women, mean age 64 years [22-85]. 91% of the treated fingers are the 4. and 5. finger. At manipulation cord disruption succeed in 97% of the patients at the first attempt. Despite 31 % had skindisruption no infections were seen. Mean DASH pre-injection was 17 [0- 52] and at 3 months follow-up 10 [0-61]. There was a mean reduction in contracture of 47° [-10-80°] At 3 months patient satisfaction was high, 1 joint had recurrence of contracture.

**Conclusions:** Our preliminary results are promising and we find Xiapex® a good treatment option for DC-patients with a palpable cord. The treatment is effective, well tolerated and with acceptable recurrence at 3 months.

## 119.

### **Xiapex® (collagenase clostridium histolyticum) – treatment of patients with recurrence Dupuytren’s contracture after fasciectomy**

*Søren Larsen , Jens Christian Werlinrud, Tine Ipsen, Jens Lauritsen*  
Department of Orthopaedic Surgery Odense University Hospital; Department of Orthopaedic Surgery, Odense University Hospital; Department of Orthopaedic Surgery, Odense University Hospital; tment of Orthopaedic Surgery, Odense University Hospital

**Background:** Dupuytren’s contracture (DC) is a disorder that affect the palmar fascia where a pretendinous cord with time causes the finger to flex resulting in impaired hand function. After surgical fasciectomy recurrence is well known. Surgical re-fasciectomy is demanding and has a high complication rate.

**Purpose / Aim of Study:** The aim of this study was to evaluate the efficacy and safety of Xiapex® in the treatment of recurrent DC after fasciectomy in the same finger. The study was initiated following a Minimal Health Technology Assessment.

**Materials and Methods:** The study was a prospective study on consecutive series of patients with recurrent DC following fasciectomy and flexion deformities of the metacarpophalangeal and/or proximal interphalangeal joint of >200 and a palpable cord. Primary end point was reduction in contracture and improving hand function. All patients gave informed consent.

**Findings / Results:** 21 patients were enrolled, 17 men and 4 women, mean age 66 years [46-85]. 95 % of the treated fingers are the 4. and 5. finger. In the series two patients denied injection in favour of surgery. At manipulation cord disruption succeed in 95 % of the patients at the first attempt. Despite 76% had skindisruption no infections were seen. Mean DASH pre-injection was 16 [0-50] and at 3 months follow-up 8 [0-43]. There was a mean reduction in contracture of 36° [0-65°] At 3 months no joint had recurrence of contracture and patient satisfaction was high.

**Conclusions:** Our preliminary results are promising and we find Xiapex® a good treatment option for recurrent DC-patients with a palpable cord. The treatment is effective, well tolerated and without recurrence at 3 months.

## 120.

### **A review of national shoulder and elbow joint replacement registries**

*Jepe Rasmussen Rasmussen, Bo S. Olsen*

Department of Orthopedic Surgery Herlev Hospital; Department of Orthopedic Surgery, Herlev Hospital

**Background:** There are few shoulder and elbow replacements compared to the hip and knee and even in national registries the number of reported replacements is often limited. It would be desirable to pool data from the separate registries.

**Purpose / Aim of Study:** To review the funding, data handling, outcome measurements and findings from existing national shoulder and elbow joint replacement registries; to consider the possibility of pooling data between registries; and to consider whether or not a Pan European Registry might be feasible.

**Materials and Methods:** Annual reports, and publications from ongoing national registries were searched using Google, PubMed, and links from other registries. Representatives from each registry were contacted.

**Findings / Results:** Six shoulder registries and five elbow registries were established between 1994 and 2004. The shoulder registries have included between 2498 and 7113 replacements and the elbow registries between 267 and 1457 replacements by the end of 2009. The registries were initiated by orthopedic societies and funded by the government or by levies on the implant manufacturers. In some countries data reporting and patient consent is required. Completeness is assessed by comparing data with the national health authority. All registries use implant survival as the primary outcome. Some registries use patient reported outcomes as a secondary outcome.

**Conclusions:** A registry offers many advantages; however, adequate long term funding and completeness remains a challenge. It is unlikely that international registries can be implemented but more countries should be encouraged to establish registries and by adopting compatible processes data could be pooled between national registries adding considerably to their power and usefulness.



**121.**

## **Autologous Osteochondral Mosaicplasty for osteochondritis dissecans of the humeral capitellum in young patients**

*Janne Ovesen, Hans Viggo Johannsen*

Shoulder and Elbow Unit, Department of Orthopaedic Surgery Aarhus University Hospital; Shoulder and Elbow Unit, Department of Orthopaedic Surgery, Aarhus University Hospital

**Background:** Autologous osteochondral mosaicplasty is a relatively new technique to promote hyaline repair for articular cartilage defects.

**Purpose / Aim of Study:** To report the clinical outcomes of mosaicplasty in the treatment of advanced stages of osteochondritis dissecans of the distal humeral capitellum

**Materials and Methods:** Between 2003 and 2010, 13 patients with advanced lesions of capitellar osteochondritis dissecans underwent mosaicplasty. The average age was 18 years (13 to 27). The surgical technique involved obtaining small-sized cylindrical osteochondral grafts from the lateral margin of the femoral condyle at the level of the patellofemoral joint and transplanting them to the defect of the capitellum. At a mean follow-up of 27 months, all patients were evaluated clinically and radiographically. All elbows were assessed using the Mayo elbow performance score and a modified functional elbow score.

**Findings / Results:** Radiographical evaluations at follow-up included standard AP and lateral x-rays and MRI or CT. In all cases incorporation of the grafts, a normal contour of the subchondral cortex covered by a normally appearing cartilage layer was demonstrated. All patients except two were completely pain free after surgery. 11 patients (85%) had no reduction in ROM. 2 patients had loss of extension preoperatively, although ROM was better after surgery, they still had an extension deficit. Using the Mayo elbow performance score the non-operated elbows had a mean score of 100 points whereas the operated elbows had a mean score of 93.5 points. The functional elbow score showed a mean difference of 7.5 points between the operated and non-operated elbow. There were no complications and no donor site morbidity at follow-up

**Conclusions:** Autologous osteochondral mosaicplasty for advanced stages of capitellar osteochondritis dissecans can provide good clinical and radiographic results in young patients.

## 122.

### Prevalence of unknown Diabetes Mellitus in Patients with Shoulder Symptoms

*Per Hviid Gundtoft, Anne Krogh-Andersen, Birthe Anette Gullaksen,  
Jette Wessel Vobbe, Lilli Sørensen*

Orthopedic Sygehus Lillebaelt; Orthopedic, Sygehus Lillebaelt, Vejle;  
Orthopedic, Sygehus Lillebaelt, Vejle; Orthopedic, Sygehus Lillebaelt, Vejle;  
Orthopedic, Sygehus Lillebaelt, Vejle

**Background:** Musculoskeletal disorders of the upper extremity occur 2 to 4 times as often among patients with diabetes than in the general population. The pathogenic mechanisms have not yet been elucidated. The general accepted theory is that high blood glucose levels in diabetic patients cause an excessive glycosylation of connective tissue and that the delay in diagnosing diabetes mellitus - and therefore long period of high blood glucose level - may have an influence on the risk of acquiring a musculoskeletal disorder of the shoulder. Studies of the Danish population have shown that prevalence of diabetes mellitus is high and that a majority of the patients are undiagnosed.

**Purpose / Aim of Study:** To investigate whether there is a larger percentage of undiagnosed diabetes mellitus in a population of patients referred to an orthopedic department with shoulder symptoms when compared to a group of patients with knee symptoms.

**Materials and Methods:** The study population was all patients who were referred by their GP to the hospital with either shoulder or knee symptoms. HbA1c was measured in all patients and Body Mass Index, sex, age and diagnosed Diabetes Mellitus were registered. 300 patients were included.

**Findings / Results:** There was a significant higher HbA1c in the group of patients with shoulder symptoms than in the group with knee symptoms. There was no significant difference in the number of patients with an undiagnosed diabetes mellitus between the two groups.

**Conclusions:** Diabetes Mellitus is a risk factor of acquiring a disorder from the upper extremity (Frozen shoulder e.g.), but patients with an unknown diabetes mellitus may not have endured a high level of blood glucose for a period long enough to enforce an excessive glycosylation.

## 123.

### **Reliability of patient reported outcome in a joint replacement registry: no response bias found in the Danish Shoulder Arthroplasty Registry**

*Anne Polk, Jeppe Vejlgard Rasmussen, Stig Brorson, Bo Sanderhoff Olsen*  
Orthopaedic Surgery Herlev hospital; Orthopaedic Surgery, Herlev hospital;  
Orthopaedic Surgery, Herlev hospital; Orthopaedic Surgery, Herlev hospital

**Background:** Patient-reported outcome measures (PROMs) are used by some arthroplasty registries to evaluate results after surgery, but non-response may bias the results.

**Purpose / Aim of Study:** The aim was to identify a potential bias in a cohort of patients from the Danish Shoulder Arthroplasty Registry (DSR) and to characterize non-responders.

**Materials and Methods:** Patient reported outcome of 787 patients operated in 2008 was assessed 12 months postoperatively using the Western Ontario Osteoarthritis of the Shoulder index (WOOS). In January 2012 non-responders and incomplete responders were sent a postal reminder. Non-responders of the postal reminder were contacted by telephone. Total WOOS-score and WOOS-subscores were compared for initial responders, responders of the postal reminder and responders after telephone contact. Predefined variables age, gender, diagnosis, geographical region and reoperation rate were compared for responding and non-responding cohorts.

**Findings / Results:** A postal reminder increased the response rate from 64,7 % (5,7% incomplete) to 80,3 % (3,0 % incomplete) and telephone contact resulted in further increase to 82,4 % (2,1 % incomplete). No clinically or statistically significant differences in total WOOS-score or any WOOS- subscores were found between responders of the first questionnaire, responders of the postal reminder and responders after telephone contact. The response rate was statistically significantly lower for younger patients.

**Conclusions:** Non-responders did not seem to bias the overall results after shoulder replacement. As response rates rose markedly by implementation of postal reminders, we recommend the implementation of reminders in arthroplasty registries using PROMs.

## 124.

### Reverse shoulder arthroplasty in acute fractures of the proximal humerus: a systematic review

*Stig Brorson, Jeppe V. Rasmussen, Bo S. Olsen, Lars H. Frich,  
Steen L. Jensen, Asbjørn Hróbjartsson*

Department of Orthopaedic Surgery Herlev University Hospital; Department of Orthopaedic Surgery, Herlev University Hospital; Department of Orthopaedic Surgery, Herlev University Hospital; Department of Orthopaedic Surgery, Odense University Hospital; Department of Orthopaedic Surgery, Aalborg University Hospital; The Nordic Cochrane Centre, Rigshospitalet

**Background:** The indications for surgical intervention in complex fractures of the proximal humerus are disputed. In elderly patients with poor bone stock it may be impossible to obtain satisfactory fixation of the tuberosities to a hemiarthroplasty (HA). In such cases primary insertion of a reverse shoulder arthroplasty (RSA) has been suggested.

**Purpose / Aim of Study:** To review clinical studies reporting benefits and harms of RSA in acute fractures.

**Materials and Methods:** A systematic review.

**Findings / Results:** We included 18 studies containing 430 RSA in acute fractures. We found no randomized clinical trials. Four studies compared outcome after RSA with a historical control group of HA. The median Constant Score was 58 (range 44-68) which is comparable to previous reviews of HA in 4-part fractures. Complications included dislocation, infection, hematoma, instability, neurological injury, reflex sympathetic dystrophy, intraoperative fractures, periprosthetic fractures, and baseplate failure. Scapular notching was reported in 11 studies with a median value of 25 percent (range 0 to 94). Heterogeneity of study designs and lack of primary data precluded statistical pooling of data.

**Conclusions:** No high quality evidence was identified. Based on the available evidence the use of RSA in acute fractures is questionable. The complication rate is high and the clinical implications of long term scapular notching are worrying. Randomized studies with long term follow up using the latest techniques of tubercular reinsertion in RSA towards HA should be encouraged.

## 125.

### **Suspected impingement syndrome – predictors of early closure of treatment. A prospective study within the framework of the ShoulderInterventionProject**

*Linda Christie Andrea, Poul Frost, Torben Bæk Hansen,  
Søren Rasmussen Deutch, Susanne Wulff Svendsen*

Danish Ramazzini Centre, Department of Occupational Medicine Herning Regional Hospital; Danish Ramazzini Centre, Department of Occupational Medicine, Aarhus University Hospital; Department of Orthopaedic Surgery, Holstebro Regional Hospital; Department of Orthopaedic Surgery, Randers Regional Hospital; Danish Ramazzini Centre, Department of Occupational Medicine, Herning Regional Hospital

**Background:** A large number of patients suspected of impingement syndrome, are referred to an orthopaedic department for evaluation

**Purpose / Aim of Study:** We hypothesised, that predictors of early closure of an episode of care (EOC) after first consultation are: Oxford Shoulder Score (OSS), the diagnosis made by the orthopaedic surgeon, younger age, female sex, co morbidity, self-reported depression, language difficulties, unemployment, and ongoing (workers') insurance claim

**Materials and Methods:** We included all patients aged 18-63, suspected of impingement syndrome based on referral letter, who provided questionnaire information and were seen at one of six orthopaedic departments in Central Denmark Region during 14 months. The departments registered diagnosis, language difficulties, co morbidity, and closure of the EOC. Remaining risk factors and Oxford Shoulder Score (OSS) were obtained from the questionnaire. Logistic regression was used for analysis

**Findings / Results:** 1750 persons were included, 66.2% completed the questionnaire. 30% (14- 38%) of the EOC were closed after first consultation. Patients with 'good' shoulder function (OSS>32) without impingement syndrome diagnosed had OR 3,7 (95% CI 2.2-6.2) for early closure of the EOC - compared to patients who had both impingement syndrome and 'poor' shoulder function (OSS≤32). The percentages with early closure of EOC were 43% and 18%, respectively. None of the other risk factors considered were significant predictors

**Conclusions:** 30% of patients, referred with suspected impingement syndrome, had their EOC closed after the first consultation. The probability of early closure depended on diagnosis and shoulder status. All other tested predictors showed no evidence. The perspective of general practitioners determining OSS before referring patients for orthopaedic evaluation, could be considered in the future.

126.

## Total elbow arthroplasty in patients with rheumatoid arthritis

*celia møllenborg, lars henrik frich, søren skydt kristensen*

orthopaedic dept. Odense University Hospital; Orthopaedic dept, Odense University Hospital; Orthopaedic dept, Odense University Hospital

**Background:** Total elbow arthroplasty (TEA) is considered a suitable surgical option in cases of advanced rheumatoid arthritis of the. TEA is, however associated with a higher occurrence of complications than is usual for large-joint replacements. We present our results with the semi- constrained Discovery R prosthesis

**Purpose / Aim of Study:** To control the quality of a highly specialized function at ouh, inserting TEA in patients with rheumatoid arthritis

**Materials and Methods:** 29 elbows in 26 patients were evaluated of these 6 men and 20 women. The mean age of the patients at the time of surgery was 60 years (30-80 years) We used the Mayo Elbow Performance Score (MEPS) and the Oxford Elbow Score (OES) to evaluate the outcome of surgery. All patients had recent x-rays to monitor radiolucencies and placement of the TEA. Mean follow-up was 49 months.

**Findings / Results:** All patients experienced pain relief after surgery. 28 elbows were free from pain , The range of motion improved after arthroplasty. Flexion of more than 115° was achieved in 28 elbows. MEPS values after surgery improved to 70-100 points Shallow radiolucent lines were detected in only a few cases. We had no revisions in this group and no permanent affection of the ulnar nerve.

**Conclusions:** The Discovery total elbow replacement is at present considered the method of choice at OUH. The prosthesis provides good functional outcomes. Complication rate remained low during the follow-up period

## 127.

### **Translation between the Neer classification and the AO/OTA classification: Do we need to be bilingual to interpret the scientific literature?**

*Stig Brorson, Henrik Eckardt, Laurent Audigé, Bernd Rolauffs,  
Christian Bahrs*

Department of Orthopaedic Surgery Herlev University Hospital, Denmark; Department of Orthopaedic Surgery, Rigshospitalet, Denmark; AO Clinical Investigation and Documentation, Dübendorf, Switzerland; Hospital for Traumatology and Reconstructive Surgery, BG Trauma Center, Tübingen, Germany; Hospital for Traumatology and Reconstructive Surgery, BG Trauma Center, Tübingen, Germany

**Background:** High quality evidence on outcome after interventions for fractures of the proximal humerus is sparse. The conduct of randomised clinical trials and the extrapolation of data are facilitated by a rigorous approach to classification. However, two partly incommensurable fracture classification systems are widely used in the scientific literature, the Neer classification and the AO/OTA classification. It remains difficult to obtain consensus on treatment recommendations when clear definitions and a common ‘fracture language’ are lacking.

**Purpose / Aim of Study:** To systematically search and analyse classification data from studies classifying proximal humeral fractures according to both classification systems.

**Materials and Methods:** We ‘mapped’ patterns of translation between the two classification systems as they appeared in the scientific literature. Problematic or implausible combinations were identified and discussed.

**Findings / Results:** Authors from seven studies provided classification data within both classification systems (n=2530). Thirty- five percent (151 out of 432) of the combinations were considered ‘not plausible’. Clinically important information was lost within both classification systems. Most importantly, the varus/valgus distinction is not found in the Neer classification, and a clear definition of displacement is lacking in the AO/OTA classification.

**Conclusions:** Ideally, classification data from both systems should be reported. We propose a cross-table covering all combinations of Neer categories and AO/OTA subgroups for quality control of studies reporting data from both classification systems.

## 128.

### Treatment algorithms for acute, displaced, midshaft clavicle fractures in Denmark

*Ilija Ban*

of Orthopaedics, Hvidovre University Hospital

**Background:** Despite being a frequent injury, the optimal treatment of clavicle fractures remains debated. As a result of this, variation in treatment strategies can be expected

**Purpose / Aim of Study:** To explore what diagnostic approaches and primary treatment modalities for acute, displaced, midshaft clavicle fractures are used in orthopedic departments in Denmark.

**Materials and Methods:** A questionnaire was sent to 22 orthopaedic departments in Denmark. The questionnaire addressed the diagnostic approaches and primary treatment modalities used at the departments. The surgeon responsible for treatment of clavicle fractures was asked to fill in the questionnaire. 21 of 22 questionnaires were returned.

**Findings / Results:** In 18 of 21 cases the department had a valid treatment guideline for acute clavicle fractures. At 1 department all patients were treated operatively whereas 6 departments treated patients non-operatively. At the remaining 14 departments surgery was offered if specific criteria were present. At 13 of these 14 departments the combination of displacement (> 1 bone width) and shortening of the clavicle, with or without comminution, were the indication to offer surgical treatment. A simple sling was preferred at 14 of 21 departments. 2 of 21 departments preferred the figure of 8 bandage. 20 of 21 departments used locking plates. Follow-up regimens after non-operative as well as operative treatment differed greatly.

**Conclusions:** Acute, displaced, midshaft clavicle fractures are predominantly treated operatively. Shortening of the clavicle, with and without comminution, is the most used indication to trigger surgical treatment. Supported by literature findings it could be speculated that these fractures are currently being overtreated by surgery in Denmark.



129.

## **Bone Cement with Initial Slow-Curing Increases Stability of Tibial Trays in TKR**

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

Department of Orthopaedics Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital; Department of Orthopaedics, Aarhus University Hospital

**Background:** Viscosity of Refobacin Plus Bone Cement (RP) is slightly reduced during the initial working-phase, as compared with Refobacin Bone Cement R (RR), which may reduce porosity of the cement during vacuum mixing and enhance durability and life-time of cemented prostheses.

**Purpose / Aim of Study:** to compare fixation of tibial trays fixed with two different curing bone cements.

**Materials and Methods:** 54 patients (21 men) at a mean age of 67 years (range 44-83) with knee osteoarthritis (but no osteoporosis) were operated with the Vanguard® Complete Knee System (Biomet Inc) and were randomly allocated to implant fixation with either RP or RR. Both cements contained gentamycin and were mixed with the closed Optipac® mixing system. At 3 and 6 months, 1 and 2 years we evaluated implant migration, periprosthetic bone mineral density (BMD) in 3 regions, and clinical outcomes (AKSS and OKS).

**Findings / Results:** At 2 years follow-up Maximum Total Point Motion was lower ( $p=0.04$ ) for tibial trays fixed with RP (0.76 mm, SD 0.65,  $n=27$ ) compared to fixation with RR (0.97 mm, SD 0.51,  $n=27$ ). The periprosthetic BMD loss up to 2 years was similar between the groups in 3 regions and in total on AP ( $p>0.70$ ) and LA DXA scans ( $p>0.30$ ). The bone loss was 3.5% (SD 13%) medial to the stem, 2% (SD 9%) lateral to the stem, 4% (SD 19%) anterior to the stem, 7% (SD 19%) posterior to the stem and 2% (SD 6%) below the stem. Mean knee-score (88, SD 10), function-score (84, SD 13), OKS (39, SD 5) and improvement (pre-op to 2 years) was similar ( $p>0.18$ ). Mean flexion was 117° (range 85-145). Satisfaction was high.

**Conclusions:** Fixation of tibial trays inserted with the initial slow-curing Refobacin Plus Bone Cement is superior to fixation with standard-curing Refobacin Bone Cement R at 2 years follow-up. Loss of periprosthetic BMD was small and functional results were good.

## 130.

### **Efficacy of neuromuscular exercise in patients with severe osteoarthritis of the hip or knee: A randomised controlled trial**

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

Research Unit for Musculoskeletal Function and Physiotherapy, Inst. of Sports Sciences and Clinical University of Southern Denmark; Orthopaedic Research Unit, Dept. of Orthopaedics and Traumatology, Odense University Hospital ; Orthopaedic Research Unit, Dept. of Orthopaedics and Traumatology, Odense University Hospital; Musculoskeletal Statistics Unit, The Parker Institute, Department of Rheumatology, Copenhagen University Hospital Frederiksberg; Research Unit for Musculoskeletal Function and Physiotherapy, Inst. of Sports Sciences and Clinical , University of Southern Denmark

**Background:** Knowledge about the effects of exercise in severe and end-stage osteoarthritis (OA) is sparse.

**Purpose / Aim of Study:** The aim was to evaluate the efficacy of a neuromuscular exercise programme in patients with severe hip or knee OA.

**Materials and Methods:** Design. Randomised controlled assessor-blinded trial. Intervention. Educational package (care-as-usual) only, or care-as-usual plus an 8-week neuromuscular exercise intervention (NEMEX-TJR). NEMEX-TJR was supervised by a physiotherapist, twice weekly for one hour. Primary outcome. HOOS/KOOS questionnaire subscale ADL. Secondary outcomes. HOOS/KOOS subscales Pain, Symptoms, Sport & Recreation and Joint- Related Quality of Life.

**Findings / Results:** 165 patients, 56% females, average age 67 (SD 8) years and a body mass index of 30 (SD 5), scheduled for primary hip or knee arthroplasty, were included. The post-intervention difference between mean changes in ADL was 7.2 points (95% CI 3.5 to 10.9,  $p = .0002$ ) in favour of NEMEX-TJR compared with control. Secondly, there were statistically significant differences between groups in favour of NEMEX-TJR on all self-reported outcomes. Stratified analyses according to joint revealed moderate effect size for ADL for hip patients (0.63, 95% CI .26 to 1.00). Corresponding effect size for knee patients was small (0.23 95% CI -.14 to .60).

**Conclusions:** Neuromuscular exercise improves self-reported activities of daily living and reduces pain. It constitutes a viable treatment option for patients with severe hip or knee OA assigned for total hip or knee arthroplasty. Clinical trial identifier: NCT01003756

## 131.

### **Equally good fixation of cemented and uncemented cups in total joint trapeziometacarpal prostheses: a randomized clinical RSA study with 2 years follow-up**

*Torben Bæk Hansen, Maiken Stilling*

Department of Orthopaedics, Section of Hand Surgery, and The Orthopaedic Research Unit Regional Hospital Holstebro, Denmark; Department of Orthopaedics, Section of Hand Surgery, and The Orthopaedic Research Unit, Regional Hospital Holstebro, Denmark.

**Background:** Cup failure is a recognized problem in total trapeziometacarpal (TM) joint prosthesis. In theory this may be related to poor initial fixation in uncemented implants, which may be predicted by radiostereometry (RSA).

**Purpose / Aim of Study:** We investigated the early implant migration of cemented trapezium cups in comparison with uncemented screw cups inserted with a new insertion technique.

**Materials and Methods:** In a prospective, parallel-group, randomized patient-blinded clinical trial, we compared 32 hands in 28 patients (5 males) at a mean age of 58 years (40-77) with Eaton stage 2 and 3 osteoarthritis of the TM joint. Patients were randomised to surgery with A) a cemented DLC all- polyethylene cup (PC) (n=16) or B) an uncemented hydroxyapatite-coated chrome-cobalt Elektra screw cup (SC) (n=16) that was inserted without threading of the bone. Stereo radiographs for evaluation of cup migration (primary effect size), and alongside DASH and pain scores were obtained during 2 years follow-up.

**Findings / Results:** The 2 year total translation (TT) was similar ( $p=0.19$ ) with 0.24mm (SD 0.10) for the PC (n=10) and 0.22mm (SD 0.20) for the SC (n=13). Judged by RSA one cup in each group turned loose, and one SC was revised after 2 years. Grip strength, pain, and DASH scores were similar between the two groups at all measure points.

**Conclusions:** Early implant fixation and clinical outcome was equally good with both cemented and uncemented cups by using a new cup insertion technique of the uncemented cups. This is the first clinical RSA study on trapezium cups and, although larger studies with longer follow-up are needed, the method appears clinically useful as it detected the loose implants.

132.

## **Increased one year risk of venous thromboembolism following total hip replacement: A nationwide cohort study**

*Alma B Pedersen, Søren P Johnsen, Henrik T Sørensen*

Department of Clinical Epidemiology Aarhus Universityhospital Aarhus ;

Department of Clinical Epidemiology, Aarhus Universityhospital Aarhus ;

Department of Clinical Epidemiology, Aarhus Universityhospital Aarhus

**Background:** Comparing persons with total hip replacement (THR) and those without THR is important in order to understand the excess venous thromboembolism (VTE) risk conferred by the THR surgery itself in addition to VTE risk in general. To our knowledge, only one study among middle aged women has compared VTE risk in THR patients with the VTE risk of the general population within 12 weeks after surgery

**Purpose / Aim of Study:** We examined the one year risk of VTE following primary THR surgery among Danish patients and comparison cohort from the general population.

**Materials and Methods:** From the Danish Hip Arthroplasty Registry, we identified all primary THR performed in Denmark from 1995 to 2006 (n=85,965). 97% of THR patients received low molecular weight heparin products during hospitalization. Through the Danish Civil Registration System we sampled a comparison cohort without THR from the general population (n=257,895). We used the National Registry of Patients to obtain information on all THR patients and comparison cohort members, who were treated for VTE (including deep venous thrombosis and pulmonary embolism) at an outpatient clinic or hospitalized with VTE, after the index date.

**Findings / Results:** Among THR patients, the risk of symptomatic VTE was 0.79% 0-90 days after surgery and 0.29% 91-365 days after surgery. In the comparison cohort, the corresponding risks were 0.05% and 0.12%, respectively. The adjusted relative risks of symptomatic VTE among THR patients were 15.84 (95% confidence interval (95% CI): 13.12-19.12) during the first 90 days after surgery and 2.41 (95% CI: 2.04- 2.85) during 91-365 days after surgery, compared with the comparison cohort. The relative VTE risk was elevated irrespective of the THR patients' gender, age and comorbidity level at the time of surgery.

**Conclusions:** THR surgery was associated with an increased risk of symptomatic VTE up to one year after surgery compared to the general population, although the absolute risk is small.

### 133.

## **Increased risk of ACL revision after anteromedial compared to transtibial technique for femoral drillhole placement during ACL reconstruction. Result from the Danish registry of Knee ligament reconstruction**

*Lene Rahr Wagner, Theis Thillemann, Alma Becic Pedersen, Marin Carøe Lind*  
Sportstrauma Division, Department of Orthopedics and Department of Clinical Epidemiology Aarhus University Hospital; Sportstrauma Division, Department of Orthopedics, Aarhus University Hospital; Department of Clinical Epidemiology, Aarhus University Hospital; Sportstrauma Division, Department of Orthopedics, Aarhus University Hospital

**Background:** The concept of anatomical ACL reconstruction has led to an increasing use of the anteromedial (AM) portal for femoral drill hole placement due to better ability to reach the anatomical ACL footprint. The AM drilling technique is more challenging due to lack of guides for femoral drill hole placement and necessity of hyperflexion. The Danish registry of Knee ligament reconstruction (DKRR) has monitored ACL reconstruction since 2005 and has registered femoral drilling technique since 2007

**Purpose / Aim of Study:** The objective of this study is to report revision rates and clinical outcome with the transtibial (TT) and AM approach during ACL reconstruction.

**Materials and Methods:** Our prospective cohort investigated was 9,279 primary ACL reconstruction procedures from the DKRR in the period from 2007 to 2010. The survival of the two different techniques was determined using revision ACL reconstruction as primary endpoint. For statistical analysis Kaplan Meier and cox regression analysis were used. KOOS and Tegner scores were used as patient reported outcome measures.

**Findings / Results:** The use of AM approach in Denmark increased from 13% in 2007 to 40% in 2010. The 3 year revision rate using AM and TT femoral drilling was 4,7% and 2,6%, respectively. AM technique was associated with an increased risk of revision of 2.01 (CI: 1.38-2.93). KOOS and Tegner was identical for the two groups.

**Conclusions:** The introduction of AM technique for femoral drilling for ACL reconstruction has resulted in an increased risk of revision compared to TT technique. The risk of revision is generally low and a slight increase in technical failures due to the introduction of a new and more complex technique may explain the presented findings. Ongoing monitoring of the results with the AM approach is therefore necessary and exemplifies the importance of a national registry.

134.

## **Patellatendon v. quadricepstendon for anterior cruciate ligament reconstruction - a prospective and randomized study**

*Bent Lund, Svend Erik Christiansen, Torsten Nielsen,  
Peter Faunø, Martin Lind*

Div of Sportstrauma, Orthopedic Dept. Aarhus University Hospital; Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital; Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital; Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital; Div of Sportstrauma, Orthopedic Dept. , Aarhus University Hospital

**Background:** Anterior Cruciate Ligament reconstruction (ACLR) with Bone-Patella-Bone (BPB) had previously been shown to be associated with post-operative anterior knee pain. ACLR with Quadriceps-Tendon-Bone (QTB) could potentially reduce the anterior knee pain due to reduced bone harvest.

**Purpose / Aim of Study:** The purpose of this study was to compare outcome of ACLR using BTB or QTB graft in a prospective randomized study. We hypothesized more anterior knee pain for patients reconstructed with BTB grafts compared to QTB grafts.

**Materials and Methods:** From 2005 to 2009, a total of 60 patients were included in the present study. Inclusion criteria were isolated ACL injuries in adults. 51 patients were available for follow-up. Of the patients available for follow-up 25 patients were randomized to BPTB grafts and 26 to QTB grafts. Follow-up evaluations were performed by an independent examiner at 1 and 2 years post-operatively. Antero- posterior knee laxity measured with a KT-1000 arthrometer. Patient evaluated outcome was performed by KOOS, and subjective IKDC score. Anterior knee pain was assessed with Knee walking ability test in which a 2 meters of knee walk is graded by the patients

**Findings / Results:** The knee walking ability test demonstrated significantly less anterior knee pain in the QTB group, with only 7% of patients grading knee walking difficult or impossible compared to 34 % in the BPTB group. At one and two years follow-up there was no difference the two groups in patient evaluated outcome. Anterior knee laxity was equal between the two groups.

**Conclusions:** The use of the Quadriceps Tendon Bone graft results in less anterior pain than BTB grafts but has similar subjective and knee stability outcome. The QTB graft could be a better graft alternative for ACLR than BTB grafts in patients not suitable for hamstring grafts and with kneeling activities.

135.

## The Prognostic Value of 18F-FDG PET/CT in the Initial Assessment of High-grade Bone and Soft Tissue Sarcomas

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

Department of Orthopaedic Surgery Rigshospitalet, Copenhagen University Hospital; Department of Clinical Physiology, Nuclear Medicine & PET, Rigshospitalet, Copenhagen University Hospital; Department of Clinical Physiology, Nuclear Medicine & PET, Rigshospitalet, Copenhagen University Hospital; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital

**Background:** Today the histological malignancy grade is the best predictor for survival in most patients with soft tissue (STS) and bone sarcomas (BS).

**Purpose / Aim of Study:** Evaluate if the degree of FDG uptake which indicates the degree of tumour metabolism in the primary tumour is of prognostic value in STS and BS.

**Materials and Methods:** During the years 2001-2010, 68 patients (mean age 44 (11-86) years, F/M=35/33) with a high-grade sarcoma (BS/STS=28/40) had a preoperative PET/CT performed for staging purpose. From the original scan data the maximal standardized uptake value (SUV<sub>max</sub>) of the primary tumour was calculated and the material divided into respectively two (10 ;?SUV<sub>max</sub>>10) and three groups (SUV<sub>max</sub>: 0-7; 7.1-14 ; >14). Data for patient survival was obtained from the Danish Centralised Civil Register on June 8th 2011. Statistics: Kaplan-Meier survival analysis.

**Findings / Results:** 22 patients (32 %) died during follow-up (average survival was 6.2 years). In the group with SUV<sub>max</sub> ≤10 5 patients died, whereas in the group with SUV<sub>max</sub> >10 17 patients died. The probability of 5- year survival in the group with SUV<sub>max</sub> ≤10 was 81 % and in the other group (>10) 33 %. The average survival within the groups were 8.1 years (95 % CI: 6.9- 9.2 years) and 2.3 years (95 % CI: 1.7- 3.0 years) for SUV<sub>max</sub> ≤10 and >10, respectively. In the group with SUV<sub>max</sub> 0-7 (n=24) two patients died, in the group 7.1-14 (n=20) 7 patients died and in the group with SUV<sub>max</sub> >14 (n=24) 13 patients died during follow-up. The probability of 5-year survival was 89%, 57%, 27% and the average survival 8.7 years (95% CI: 7.8-9.8 years); 4.6 years (95 % CI: 3.2-6.0 years) and 2.2 years (95% 1.4-2.9 years) for SUV<sub>max</sub> levels of 0-7, 7.1-14 and >14, respectively.

**Conclusions:** The SUV<sub>max</sub> of the primary tumour was a strong prognostic factor for survival in patients with high-malignant STS and BS.

## 136.

### **Are patient-reported complication rates valid and complete following Total Hip and Knee Arthroplasty?**

*Kiran Anderson*

Ortopaedic Surgery Gentofte Hospital

**Background:** Outcome in patients treated with a total hip replacement (THR) or a total knee replacement (TKR) for osteoarthritis is well documented in the literature. However, uncollected patient knowledge might improve outcome information. Ryge et al. (2008) suggested that patients treated with a THR are a reliable source of information regarding complications occurring in the first three post operative months. We therefore wanted to develop a questionnaire to be filled out by the surgeon at the out-patient follow-up visit at three months to get information about all occurring complications.

**Purpose / Aim of Study:** The aim of the study was to validate if the questionnaire reflects the established clinical data or might even improve the quality and quantity of this data.

**Materials and Methods:** We developed a patient questionnaire concerning postoperative complications following THR and TKR occurring in the first three post operative months. After exclusion we ended up with 100 patients. The validity of the questionnaire was assessed by comparing the complication rates of the questionnaires to the clinical data, found in patient records, the Danish Hip Register (DHR), the Danish Knee Register (DKR), the National Patient Register (NPR) and information obtained by contact to the patients general practitioner. Correlation between the individual patient statements in the questionnaire and respective clinical data was analysed using Kappa statistics separately for each complication type.

**Findings / Results:** The results showed that for most complications there was a perfect correlation. Only for the complications wound infection and paresthesia in the affected leg was a poorer correlation less than 0,7.

**Conclusions:** The data collected from these validated questionnaires could be a reliable source of information about all the well known post operative complications.



## **137.**

### **Clinical and radiological outcome after periacetabular osteotomy operated in the period 1999-2008.**

#### **- Predictors for good results or conversion to Total Hip Arthroplasty**

*Dahl Line Borreskov, Dengsø Kristine , Petersen Michael Mørk, Christensen Karl Bang, Stürup Jens*

Department of Orthopaedic Surgery Rigshospitalet, University of Copenhagen, Denmark; Department of Orthopaedic Surgery, Rigshospitalet, University of Copenhagen, Denmark; Department of Orthopaedic Surgery, Rigshospitalet, University of Copenhagen, Denmark; Biostatistic Department, Institut for Folkesundhedsvidenskab; Department of Orthopaedic Surgery, Rigshospitalet, University of Copenhagen, Denmark

**Background:** Few papers have described results after periacetabular osteotomy (PAO) and predictors for conversion to total hip arthroplasty (THA).

**Purpose / Aim of Study:** To analyse clinical and radiographic outcome, survival of the hip joint and predictors of poor outcome in patients with PAO performed at the department of orthopaedics at Rigshospitalet.

**Materials and Methods:** In the period of 1999 – 2008, 127 hips (median age 31, range 13-49 years) were operated on with PAO. Median follow up was 6.8 (range 0.7-11.6) years. Analyses of clinical and radiographic examinations were performed including WOMAC and EQ-5D. Survival was assessed by Kaplan-Meier and predictors of conversion to THA were calculated using Cox regression analysis with THA and WOMAC – pain score > 10 as defined endpoints. Osteoarthritis was assessed using Tönnis grade.

**Findings / Results:** Center Edge Angle (CE Angle) and Acetabular roof obliquity angle (AA angle) improved significantly with a mean of 8.7 (95%CI: 7.1; 10.3) preoperatively to 24.6 (95%CI: 22.6; 26.6) at follow up, and a mean of 26.1 (95%CI: 19.7; 22.6) preoperatively to 8.7 (95%CI: 7.1; 10.4) at follow-up. Eleven out of 127 hips had conversion to THA. The 10.6 years cumulated hip joint survival rate was 84.9%. Significant predictors of converting to THA were preoperative high grade of OA, postoperative high degree of AA angle and joint space width at follow-up. An improvement was found in HHS pain score after receiving a PAO ( $p=0.007$ ). EQ-5D was roughly at the same level as in the Danish population without hip dysplasia.

**Conclusions:** Our results with 10 years survival are comparable with the literature. PAO is considered as an effective treatment for young adults with painful hip dysplasia. Especially when preoperative criteria for conversion to THA are illuminated.

**138.**

## **Clinical outcome for 223 patients after hip revision with positive microbiological cultures**

*Predrag Kokanovic, Poul Torben Nielsen, Juozas Petruskevicius*

Orthopedic surgery department Aalborg Hospital, University of Aarhus;

Orthopedic surgery department, Aalborg Hospital, University of Aarhus;

Orthopedic surgery department, Aalborg Hospital, University of Aarhus

**Background:** Harvesting tissue ad modum Kamme & Lindberg for microbiological analysis has become a standard procedure for patients who undergo hip revision in Denmark. Bacterial identification plays a key role in management of both patients with obvious hip infection and those in which positive microbiological specimens are detected unexpectedly.

**Purpose / Aim of Study:** Aim of study is to analyse the microbiological profile of positive cultures detected during hip operation and evaluate the impact of the infecting agent on clinical outcome.

**Materials and Methods:** The positive microbiological specimens obtained during hip surgery from 1995 to 2005 at Aalborg Hospital were analysed retrospectively. We identified 223 patients (92 males and 131 female; mean age 72 y.) with 266 positive Kamme biopsies. 203 patients had previous surgery. We defined hips as infected if  $\geq 3$  specimens in Kamme biopsy were positive.  $\leq 2$  positive results were regarded as probable contamination. The outcome was defined when one of the following stationary conditions was achieved: eradicated infection in hip with implant, chronic infection in hip with implant, Girdlestone's hip resection arthroplasty, exarticulation, death due to infection or to other reasons, patient lost at follow-up.

**Findings / Results:** Hip infection was revealed in 88% of patients. These patients had worse outcome compared with those with probably contamination - infection eradicated in hip with implant: 61% vs 82%, Girdlestone's hip 23.5% vs 15%, chronic infection: 2.5% vs 0, dead 13% vs 4%. *Staphylococcus aureus* was found in 36 % of all cultures.

**Conclusions:** Our study confirms that  $\geq 3$  positive specimens in Kamme biopsy had prognostic value and the treatment course for these patients is usually prolonged with a high failure rate.

**139.**

## **Local recurrence rate after surgical excision of highly differentiated liposarcomas**

*Sune Frederik Jauffred, Maj Kornø, Michael Mørk Petersen*

Tumorsektionen, Ortopædkirurgisk klinik Rigshospitalet; Urologisk klinik, Rigshospitalet; Tumorsektionen, Ortopædkirurgisk klinik, Rigshospitalet

**Background:** Highly differentiated liposarcomas (HDL) is a rare low-malignant tumour that predominantly arises in the extremities, retroperitoneum or thorax. These tumours have a relatively high rate of local recurrence after surgical resection and can in rare cases dedifferentiate into a high-malignant sarcoma.

**Purpose / Aim of Study:** The purpose of this study was to determine the local recurrence rate among surgically excised HDL and to determine the rate of dedifferentiation.

**Materials and Methods:** We retrospectively assessed all HDL surgically excised at our clinic between 1997 and 2006; 35 patients (F/M=17/18, mean age 59 (34-85) years). Patients with local recurrence of previously (before the start of the inclusion period) excised lipomatous tumours, were excluded. The length of local recurrence-free time, and appearance of local recurrence, metastases or histological dedifferentiation was estimated from the patient files, and beyond the last follow-up in our clinic assessed from the National Pathology Registry (NPP). Survival data were extracted from the Danish Centralised Civil Registry.

**Findings / Results:** The surgical margins obtained at the initial surgery were intralesional (n=5), marginal (n=22), wide (n=3) or inconclusive (n=5). The median clinical follow-up for patients without recurrences was 49 (5-126) months, and they were recurrence free in 116 (69-167) months according to NPP. 6 had local recurrence 41 (6-73) months after the initial tumour resection and the histological examination showed that three tumours had dedifferentiated. We did not record any cases of distant metastasis. 11 patients have died during the follow-up period.

**Conclusions:** Despite (intended) marginal or intralesional surgery in most cases the treatment strategy seemed reasonable with relatively few local recurrences, few dedifferentiated tumours and no metastases.

## 140.

### Iliopsoas Abscesses: Signs & Surgery

*Taj Haubuf, Klaus Kjær Petersen*

Department of Orthopedic Surgery Aarhus University Hospital;  
Department of Orthopedic Surgery, Aarhus University Hospital

**Background:** Abscesses in the iliopsoas muscles have occult clinical characteristics that may cause diagnostic delay, resulting in mortality and morbidity

**Purpose / Aim of Study:** To describe our experience with treating iliopsoas abscesses.

**Materials and Methods:** Between 2008 and 2012 17 patients with iliopsoas abscesses (one bilateral) were treated. Retrospectively, the records and radiological examinations were reviewed to explore clinical features, microbiology and treatment.

**Findings / Results:** Median age was 44(8-85) years. Eleven patients had comorbidities: rheumatic- /dermato-/hemato-/neurologic disorders, addiction, hepatitis, COPD, uremia, c. recti and ischemic heart failure. In fifteen patients blood cultures were taken and 14 were positive: Staph aureus (MRSA in 1 patient) were cultured in 12 patients, salmonella in one patient and enterococcus in another patient. Thirteen patients had sacroiliitis. Other infectious foci included endocarditis, abscesses in lung, labia and extremities, osteomyelitis and arthritis in hip and knee. Radiological elucidation included MR scan solely in 10 cases, CT scan solely in 4 cases. In 3 cases CT scans were supplemented with MR scans. Median time from admission to operation was 6 (1-33) days. All patients were operated in lateral position with an incision along the iliac crest. After drainage pulse lavage, local antibiotic fleece and suction drain were used. One patient died from the infection. Three other patients died from deterioration of their general condition due to co-morbidity. So far no patient had recurrence.

**Conclusions:** Patients with iliopsoas abscesses represent a complex clinical and diagnostic challenge and may benefit from a multidisciplinary approach. However, surgical drainage is simple.

**141.**

## **Inertia-Sensor based Motion Analysis: Clinical validation as a tool for routine functional outcome assessment**

*Inger Mechlenburg, Kjeld Søballe, I.C. Heyligers, Rachel Senden*  
Orthopaedic Research Unit Aarhus University Hospital, Denmark;  
Orthopaedic Research Unit, Aarhus University Hospital, Denmark; AHORSE  
Foundation, Atrium Medical Center Heerlen, The Netherlands; AHORSE  
Foundation, , Atrium Medical Center Heerlen, The Netherlands

**Background:** Several questionnaires used for outcome assessment suffer from ceiling effects, subjectivity and poor reproducibility masking functional improvements. Inertia-sensor based motion analysis (IMA) applied in various motion tests have been shown to be suitable as an objective outcome measure providing additional information beyond the clinical outcome scales.

**Purpose / Aim of Study:** To investigate the feasibility of IMA for objective functional outcome assessment in clinical practice.

**Materials and Methods:** Three age matched groups (range 53- 60 yrs) were included consisting of 20 healthy subjects, 14 patients suffering meniscal tear and 16 patients scheduled for total knee arthroplasty (TKA). The participants performed the sit-stand-sit test (STS), a stair climbing test and the 20cm block step test. During testing, a 3D inertia-sensor was attached at level of the sacrum and self designed algorithms were used to derive motion parameters from the inertia signal. The sensor technology, motion test protocols and analysis algorithms were evaluated by differentiating healthy subjects from patients with different pathologies.

**Findings / Results:** Patients performed significantly worse than healthy controls in all tests, e.g. TKA-patients walked with shorter steps ( $0.60 \pm 0.08$  vs.  $0.69 \pm 0.08$ m,  $p < 0.05$ ) and higher vertical displacement ( $4.9 \pm 1.4$ cm vs.  $4.1 \pm 0.8$ cm,  $p < 0.05$ ). Meniscal tear patients needed more time ( $6.47 \pm 2.59$ s vs.  $4.7 \pm 0.69$ s,  $p < 0.05$ ) and had more front/back sway (down:  $12.8 \pm 5.8^\circ$  vs.  $9.3 \pm 2.7^\circ$ ,  $p < 0.05$ ) managing stairs. The power to distinguish healthy from pathological (TKA) motion was high, e.g. the STS showed a sensitivity (specificity) of 90% (94%).

**Conclusions:** IMA show high discriminative power and is a simple and fast procedure making it suitability for clinical use.

## 142.

### Patient and implant survival following joint replacement because of metastatic bone disease

*Michala Skovlund Sørensen, Kristine Grubbe Gregersen,*

*Tomas Grum-Schwensen, Dorrit Hovgaard, Michael Mørk Petersen*

Department of Orthopaedic Surgery Rigshospitalet, Copenhagen University Hospital ; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital ; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital ; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital ; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital ; Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen University Hospital

**Background:** Patients suffering from a pathological fracture or pain-full bony lesion because of metastatic bone disease (MBD) often can benefit from a total joint replacement. However, these are large operations and the patients often have a weak health.

**Purpose / Aim of Study:** Examine patient and implant survival following joint replacement because of MBD.

**Materials and Methods:** 130 patients (mean age 64(30-85) years, F/M=76/54) received 140 joint replacements due to skeletal metastases (n=114) or haematological disease (n=16) during the period January 2003 to December 2008. The replaced joints were located in either the upper extremity (n=21) or lower extremity (n=119) and major bone resection was performed in 103 operations. Clinical and survival data was extracted from the Danish National Registry of Patients and the Danish Centralised Civil Register 29.03.2011 and from the patient files, giving of mean follow-up of 17 (0- 96) months. Statistics: Kaplan-Meier survival analysis.

**Findings / Results:** The calculated probability of patient survival was 51%, 39%, and 29% at 0, 1, and 2 years of follow-up. The following surgical complications, some of them leading to additional surgery (n=8), was seen: 2-5 hip dislocations (n=8), deep infection (n=3), peroneal palsy (n=2), a shoulder prosthesis penetrating the skin (n=1), and disassembly of an elbow prosthesis (n=1). The probability of avoiding all kinds of surgery related to the implanted prosthesis was 94% and 92% after respectively 1 and 2 years, but if only removal or replacement of components anchored to the bone was considered an event in the survival analysis it was 98% and 95% respectively.

**Conclusions:** Joint replacement operations because of MBD did not seem to induce a poorer patient survival rate compared to other types of surgical treatment and the reoperation rate was low.

143.

## **Progressive Resistance Training before and after Total Hip and Knee Arthroplasty – a Systematic Review**

*Birgit Skoffler, Inger Mechlenburg, Ulrik Dalgas*

Orthopaedic Research Unit Aarhus University Hospital, Denmark;  
Orthopaedic Research Unit , Aarhus University Hospital, Denmark; Section of  
Sport Science, Department of Public Health , Aarhus University, Denmark

**Background:** Recently, intensive Progressive Resistance Training (PRT) has been introduced in the preoperative and in the early postoperative rehabilitation after Total Hip Arthroplasty (THA) and Total Knee Arthroplasty (TKA).

**Purpose / Aim of Study:** To systematically review the literature of PRT studies for patients requiring THA or TKA.

**Materials and Methods:** A comprehensive literature search (PubMed, SveMed+, Embase, Cochrane, PEDro, SPORTDiscus and Bibliotek.dk) on studies applying PRT was conducted. The identified studies were rated independently by three assessors according to the PEDro- scale.

**Findings / Results:** Seven PRT studies were indentified representing a total of 467 patients requiring THA or TKA with 323 patients enrolled in the intervention groups. The duration of the PRT intervention in the studies ranged from 3-20 weeks and the training frequency ranged from 2-5 days/week with most studies applying 2-3 days/week. The studies scored between 7 and 9 of 11 total points on the PEDroscale displaying a general lack of blinding. Evidence of beneficial effect on muscle strength in postoperative as well as preoperative PRT was observed after THA surgery. Regarding functional capacity there was also evidence for a positive effect. Less definite evidence for PRT after TKA was found because of heterogeneity of the studies. No study on PRT before TKA was identified. Self reported quality of life for was determined in two studies, but no differences were found between PRT group and control groups.

**Conclusions:** PRT has a positive effect on muscle strength in THA patients and to a lesser degree in TKA patients after surgery. PRT results in clinically relevant improvements in functional capacity in THA patients, and probably also in TKA patients.

## 144.

### Short-term re-amputation rate following major below knee amputation

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

Department of Orthopaedic surgery Hvidovre Hospital; Department of Physiotherapy, Hvidovre Hospital; Department of Orthopaedic surgery, Hvidovre Hospital; Department of Orthopaedic surgery, Hvidovre Hospital; Department of Orthopaedic surgery, Hvidovre Hospital

**Background:** We noticed a high short-term re- amputation rate among patients following non-traumatic major below knee amputation (BKA) in an acute orthopaedic ward.

**Purpose / Aim of Study:** To examine possible factors influencing the indication for re-amputation within 30 days.

**Materials and Methods:** Forty-four consecutive patients with a BKA, 17 women and 27 men, with a mean (SD) age of 71.4 (12.7) years, admitted from their own home (n=39, 89%) or a nursing home (n=5) during one year (June 2010 to May 2011). The primary diagnosis was diabetes (n=22) and arteriosclerosis (n=21). There were 27 (61%) with an ASA-score >2. A review of their medical records showed that 18 patients had a skin perfusion test (<40mmHg, n=1; >40 - <50mmHg, n=7 and >50mmHg, n=9) and 26 had a distal pressure test (10 at the toe and 16 at the ankle level (range, 0-120 mmHG) before their amputation. Amputations were performed by House Officer (n=18), Specialist registrar (n=17), and Consultant (n=9).

**Findings / Results:** Ten (23%) patients (seven men) were re-amputated (nine at the femoral level) within 30-days, divided equally between patients with diabetes and arteriosclerosis and caused by necrosis (n=7) and infection (n=3). Four patients died. Re-amputations were not significantly related to any of the variables examined, including patient characteristics.

**Conclusions:** Twenty-five percent of surviving patients had a re-amputation within 30- days of their primary BKA. No conclusion regarding the association between pre-examinations and re- amputations can be made, partly due to incomplete and non-systematic data collection. Necrosis seems to be the major reason for re-amputation, but factors not included in this study may contribute to this. There is an urgent need for standardised and valid pre- amputation examinations to allow surgeons to choose the correct level for the primary amputation.



## 145.

### **Survival of bonelock cemented THA performed at Dpt of Orthopedic Surgery Køge Hospital 1991-1993**

*Mohammed Jafar, Lene Kaavé, Leif Broeng*

Dpt of orthopedic surgery Koege Hospital; Dpt of orthopedic surgery, Koege Hospital; Dpt of orthopedic surgery, Koege Hospital

**Background:** Bonelock cement was a Danish invention introduced before sufficient clinical testing was completed. It was later known for its inferior qualities causing the cement to be withdrawn from the market. At Dpt of Orthopedic surgery Køge Hospital 114 THA were performed between 1991 and 1993 using bonelock cement and Exeter prostheses. The patients have afterwards been followed as outpatients with yearly controls.

**Purpose / Aim of Study:** To better understand the impact of using bonelock cement in the early 90'es. To produce a Caplan-Meier Graph for the cup and stem visualizing time from surgery until time of revision or death of patient. To radiographically assess the state of THA components not revised in living patient.

**Materials and Methods:** Patients who has undergone surgery was already identified due to the task of following all patients yearly as outpatients. 120 THA's in 111 patients were on the list, however 6 not included, 4 cases had revision surgery performed, 1 case had a different prostheses and in 1 case the type of cement used was uncertain, hence 114 THA's We collected patient files and available x-rays from local archives. We identified the date of primary surgery and date of revision of components or date of death. We examined x-rays and made an assessment concerning looseness.

**Findings / Results:** 10 year survival of cup: 82 % 10 year survival of stem: 94 % 20 patients alive with 22 THA, of these 17 stem and 11 cups are not revised.

**Conclusions:** 10 year survival better than could be expected due to the inferior cement. Stem performed better than cup which was not surprising due to the polished double tapered stem of Exeter.

**146.**

## **Ultrasound guided intra-articular injection in the hip joint – a helpful tool in the outpatient clinic**

*Dhia Khalaf Al-Fadli, Zaid Saadi Al-Saadi, Niels Krarup Jensen*  
Orthopaedic Regional Hospital Viborg; Orthopaedic, Regional Hospital  
Viborg; Orthopaedic, Regional Hospital Viborg

**Background:** Intra-articular injections can be used in the evaluation and treatment of hip disorders. These injections are typically performed with fluoroscopic guidance. Ultrasound guided injection is a viable alternative for intra-articular needle placement, and can be done in the outpatient clinic in an easy and safe manner.

**Purpose / Aim of Study:** The aim of this study is to evaluate the effect of an ultrasound guided injection in the hip joint performed by an orthopaedic surgeon in the orthopaedic outpatient clinic.

**Materials and Methods:** Patients in the orthopaedic outpatient clinic with hip pain, but without convincing clinical and radiological signs of osteoarthritis. The ultrasound guided intra-articular injection with local anaesthetic and steroid, was used as a tool to determine the origin of the patients hip pain. The patients were seen at a clinical follow-up and further treatment was based on effect of the intra-articular injection.

**Findings / Results:** 43 patients received ultrasound guided intra-articular injection with local anaesthetic and steroid. At the follow-up 32 responded with convincing pain relief. 20 patients proceeded to a hip replacement. 4 patients were referred to hip arthroscopy, 8 patients were satisfied with the injection and did not want further treatment. All 20 patients who received a hip replacement were seen at a 6 months follow-up. 19 had good pain relief, and 1 moderate. No infection or other adverse effects were seen.

**Conclusions:** Our results suggest that ultrasound guided intra-articular hip injections can be a safe and helpful tool to evaluate hip disorders in the orthopaedic outpatient clinic.

147.

## **Validation of the Danish version of the Toronto Extremity Salvage Score (TESS) questionnaire – a measurement of functional outcome for sarcoma patients**

*Casper Sæbye, Akmal Safwat, Ninna Aggerholm-Pedersen,  
Anne Kathrine Kaa, Johnny Keller*

Experimental Clinical Oncology Sarcoma Centre of Aarhus University Hospital, Denmark; Oncology, Sarcoma Centre of Aarhus University Hospital, Denmark; Experimental Clinical Oncology, Sarcoma Centre of Aarhus University Hospital, Denmark; Orthopaedics, Sarcoma Centre of Aarhus University Hospital, Denmark; Orthopaedics, Sarcoma Centre of Aarhus University Hospital, Denmark

**Background:** The Toronto Extremity Salvage Score (TESS) questionnaire is a self administered questionnaire designed to assess physical disability for patients with sarcoma of the extremities and thereby allowing comparison of different possible outcomes. The use of a questionnaire developed and validated in one country needs to be revalidated if it is translated and used in another country in order to overcome cultural and linguistic bias.

**Purpose / Aim of Study:** To validate the Danish translation of the TESS questionnaire.

**Materials and Methods:** The TESS was translated according to the previously published guidelines made by Guillemin et. al. This includes two independent translations into Danish. These translations was combined and then translated back to English. Twenty-two consecutive patients following the regular outpatient control program were recruited for the study. The patients were asked to describe the meaning of five randomly picked questions from the TESS. Patients also completed the QLQ-C30 questionnaire. To assess the test- retest reliability the patients were asked to fill in an extra TESS questionnaire one week after they completed the first one. Psychometric properties of the Danish version of TESS were tested in terms of validity and reliability. Spearman's rank coefficient was used to compare TESS and QLQ-C30.

**Findings / Results:** The validity expressed as Spearman's rank coefficient comparing the TESS with QLQ-C30 functional score was 0,935. The test-retest reliability expressed by Spearman's rank correlation coefficient was 0,97. The average completion time of the Danish TESS was 5 min and 34 seconds. The understanding of the five randomized questions was generally good.

**Conclusions:** The psychometric properties have shown good validity and reliability of the Danish TESS version. The questionnaire was easy to complete and was well understood.

**148.**

**A novel technique: Preliminary clinical results of cement augmentation of intertrochanteric fractures stabilized with an intramedullary nail**

*Flemming Hansen, Mette S. Skjaerbaek*

Department of Orthopedic Surgery The Regional Hospital of Viborg; Department of Orthopedic Surgery, The Regional Hospital of Viborg

**Background:** Osteosynthesis of intertrochanteric fractures in patients with poor bone quality is a challenge for orthopedic surgeons, implant failure and especially cut-out are well known complications.

**Purpose / Aim of Study:** The aim of this study is to investigate effects and complications when using augmentation of intertrochanteric fractures stabilized with an intramedullary nail.

**Materials and Methods:** 6 (5 female) patients with a mean age of 88 years (range 68-98) comprised the population. All patients had an intratrochanteric fracture and were pre- or peroperative considered having a high risk for cut-out. In the period of November 2011- April 2012 all patients underwent osteosynthesis with a Proximal Femoral Nail Antirotation (PFNA) with perforated blade cement augmentation. In all cases high-viscosity cement was used, which was injected through the perforated blade to enlarge the load-bearing surface and to diminish the stresses on the trabecular bone. Cement augmentation was in these cases considered being a salvage procedure. The mean time of postoperative observation was 92 days (range 10-178).

**Findings / Results:** No postoperative complications have been observed. For this short period of observation no cut-out or migration of the blade has been observed in the population.

**Conclusions:** Cement augmentation of intertrochanteric fractures stabilized with an intramedullary nail in patients with a high risk for cut-out seems to be a serviceable technique. Studies are needed to determine when this technique is advisable.

149.

## **Dual mobility cup reduces the rate of dislocation compared to hemiarthroplasty when used to treat displaced femoral neck fractures**

*Anne Soon Bensen, Thomas Jakobsen, Mette Adler Stampe, Niels Krarup*

Department of Orthopedic Surgery Regional Hospital Viborg;

Department of Orthopedic Surgery, Regional Hospital Viborg;

Department of Orthopedic Surgery, Regional Hospital Viborg;

Department of Orthopedic Surgery, Regional Hospital Viborg

**Background:** Hemiarthroplasty (HA) is a well accepted treatment for displaced femoral neck fractures. However dislocations are a frequent complication. Total hip arthroplasty (THA) with a dual mobility cup (DMC) are reported to lower the rate of dislocation in elective surgery but little is known about the effect of THA with DMC when used to treat patients with femoral neck fractures.

**Purpose / Aim of Study:** The aim of this study is to compare rates of dislocation and reoperation following treatment of displaced femoral neck fractures with either a bipolar HA or a THA with DMC.

**Materials and Methods:** The population of this study consists of 2 consecutive groups of patients who were treated for a displaced femoral neck fracture with either a HA (171 patients) or a THA with DMC (177 patients) at the Regional Hospital Viborg in the period from 01.01.2007 to 31.12.2010. In 2007-2008 the standard treatment at the Regional Hospital Viborg was HA. In 2009-2010 it was THA with DMC. Data regarding rates of dislocation and reoperation were obtained by retrospective review of medical records.

**Findings / Results:** We found a statistical significant difference regarding rates of dislocation and reoperation in favor of THA. Rates of dislocation within the first year were 14,6% (95%CI 9,3-19,9) for HA and 4,5% (95%CI 1,5-7,6) for THA ( $p=0,0013$ ). Rates of reoperation were 19,3% (95%CI 13-25) for HA and 8,5% (95%CI 4,4-13) for THA ( $p=0,0034$ ).

**Conclusions:** Our results indicate that THA with DMC are superior to HA when rates of dislocation and reoperation are compared. However further RCT's are necessary to determine the optimal treatment for displaced femoral neck fractures.

150.

## **Early independence in basic amputee activities but extremely poor one-leg balance following major non-traumatic lower limb amputation**

*Morten Tange Kristensen, Anni Østergaard Nielsen, Berit Jakobsen,  
Kirsten Juel Nielsen, Ulla Madsen Topp*

Department of Physiotherapy and Orthopaedic Surgery Hvidovre University Hospital; Department of Physiotherapy, Hvidovre University Hospital; Department of Physiotherapy, Hvidovre University Hospital; Department of Physiotherapy, Hvidovre University Hospital; Department of Physiotherapy, Hvidovre University Hospital

**Background:** Knowledge of the postoperative one-leg balance level and time to independence in basic activities is sparse in patients following major lower limb amputation.

**Purpose / Aim of Study:** To examine the in-hospital association between one-leg balance performance and time to independence in basic amputee activities following major non-traumatic unilateral lower limb amputation.

**Materials and Methods:** Thirty-six patients (23 men) with a mean (SD) age of 67.4 (10.6) years, admitted to an acute orthopaedic ward and able to stand on the intact leg two weeks post-amputation. Amputations were related to arteriosclerosis (n=17), diabetes (n=15), and other causes (n=4), while 58% had an ASA-score >2. Patients were evaluated for their ability to perform basic amputee transfer activities from lying in bed to sitting on bedside, bed to wheelchair, indoor wheelchair manoeuvring, and sitting to standing with support. Each patient performed five one-leg timed balance trials without support with a 30-second seated rest interval.

**Findings / Results:** The 19 below-knee and 17 above-knee amputee patients performed the balance test at a mean of 14.5 (4.5) days following amputation, with a median (25-75% quartile) best standing time of 2.9 (1.7-8.2) seconds with only seven patients able to stand for more than 10 seconds. All patients (except one) reached independence in the four basic activities at a mean of 7.9 (4.3) days post-amputation. Performances were not significantly related to age, gender, diagnosis, or the amputation level.

**Conclusions:** Non-traumatic lower limb amputee patients present extremely poor one-leg standing balance, but regain independence in basic amputee activities shortly after surgery. There is an urgent need for well-designed in-hospital physiotherapy studies, evaluating whether e.g. specific balance or strength training improves balance.

151.

## Evaluation of Lower-Limb Asymmetries in Mechanical Muscle Function and Functional Performance of ACL-Patients

*Anders Holsgaard-Larsen, Tine Iversholt, Carsten Jensen,  
Niels Mortensen, Per Aagaard*

Orthopaedic Research Unit, Institute of Clinical Research Odense University Hospital, University of Southern Denmark; Institute of Sports Science and Clinical Biomechanic, University of Southern Denmark; Orthopaedic Research Unit, Institute of Clinical Research, Odense University Hospital, University of Southern Denmark; Orthopaedic Research Unit, Institute of Clinical Research, Odense University Hospital, University of Southern Denmark; Institute of Sports Science and Clinical Biomechanic, Odense University Hospital, University of Southern Denmark

**Background:** Between-limb asymmetry is commonly investigated in orthopedic patients by use of functional tests. However, mechanistic outcomes related to mechanical muscle function may provide further insight.

**Purpose / Aim of Study:** To investigate limb asymmetry in unilateral jump performance by means of kinetic and kinematic analysis and mechanical muscle function in ACL- patients and healthy controls.

**Materials and Methods:** The study comprised 23 ACL- reconstructed (hamstring-graft) men (ACL, mean age:  $27.2 \pm 7.5$  years, BMI:  $25.4 \pm 3.2$  kg m<sup>-2</sup>)  $27 \pm 7$  month post- surgery and 25 healthy matched controls (CON,  $27.2 \pm 5.4$  years,  $24.1 \pm 1.8$  kg m<sup>-2</sup>). Subjects performed (i) bilateral counter movement jumps (CMJ) and (ii) unilateral single-leg CMJs (6- camera ViconMX system, 2 AMTI force plates) where maximal jump height, knee joint range of motion (ROM), peak and mean sagittal knee moments were analyzed, (iii) one-leg maximal hop for distance, and (iv) maximal unilateral isometric knee extensor and flexor strength. Asymmetry ratios were calculated as operated/non-operated leg in ACL-patients, and non- dominant/dominant leg in controls.

**Findings / Results:** CMJ: Asymmetry ratios for ROM differed ( $p < 0.01$ ) between ACL and CON with both types of CMJ (96.1% vs. 102.6% and 87.0% vs. 99.9% in bilateral and single-leg CMJs, respectively). Hop for distance: ACL demonstrated greater ( $p < 0.01$ ) asymmetry for jump length (92.9% vs. 98.6%). MVC: Asymmetry in hamstring MVC was greater ( $p < 0.001$ ) in ACL than controls (77.4% vs. 101.3%).

**Conclusions:** The findings of greater inter-limb asymmetry in ACL subjects, especially for maximal hamstring muscle strength, have significant clinical implications since the hamstring muscles are important antagonists to the ACL. Thus, the present data suggest that an elevated risk for secondary ACL-rupture and/or risk of osteoarthritis exist in ACL patients.

## 152.

### **Feasibility and effect of a progressive strength-training program in older community-dwelling patients commenced shortly after hip fracture surgery.**

*Jan Arnholtz Overgaard, Morten Tange Kristensen*

Department of Rehabilitation Lolland Community, Denmark;

Department of Physical Therapy and Orthopedic Surgery,

Copenhagen University Hospital at Hvidovre, Denmark

**Background:** Having a hip fracture is associated with loss of fractured lower limb strength of more than 50% within few weeks of surgery, and poor return of functional mobility. Still, there is a lack of knowledge of the effect of different training programmes.

**Purpose / Aim of Study:** To investigate the feasibility of progressive strength-training program commenced shortly after hip fracture surgery, and to report functional adaptations, including details of specific weight loads, and if hip fracture related pain influenced testing, and strength training.

**Materials and Methods:** Thirty-one community-dwelling patients at a mean (SD) age of 77.9 (9) years (26 women), who commenced a 6-week rehabilitation program, twice weekly, at a mean of 17.5 (5.7) days after hip fracture surgery. The program included, balance, functional- and progressive fractured knee-extension and bilateral leg press strength training, with relative loads of 15- to 10 repetitions maximum (three sets per session).

**Findings / Results:** Significant ( $P<0.001$ ) improvements of 67% for fractured limb knee-extension strength, 59% for New Mobility Score, 61% for 6 minutes walk test (from 201 to 323 meters), and 10% for SF-36 were seen after rehabilitation. Knee-extension strength deficits of the fractured limb changed from 40% of the non-fractured limb to 17% after rehabilitation. Weight loads increased progressively ( $P<0.001$ ) during fractured knee-extension training, while hip fractured related pain was reduced ( $P=0.007$ ).

**Conclusions:** Progressive 6-week strength training initiated shortly after hip fracture is feasible and seems effective in reducing strength deficits and improving functional performances. Hip-pain was of minor influence. Nevertheless, a fractured knee-extension strength deficit of 17% remained. Thus, an extended or more intensive program focused at the fractured limb seems necessary.



153.

## **GENERATING ITEM-CONTENT FOR CONDITION-SPECIFIC QUESTIONNAIRES: Face Validity in Patient-Related Outcome Score**

*Jonathan Comins, Michael Krogsgaard, John Brodersen*

Section for Sportstraumatology M51, Bispebjerg University Hospital, and Research Unit and Section of University of Copenhagen; Section for Sportstraumatology M51, Bispebjerg University Hospital, Bispebjerg; Research Unit and Section of General Practice, Department of Public Health, University of Copenhagen

**Background:** Patient reported outcome (PRO) questionnaires are increasingly used to measure the effect of surgery in patients with knee pathology. PRO's commonly used to assess outcome can be generic, anatomically-specific, or pathology-specific. Most PRO's have been created on the basis of clinician-based consensus and are not patient-centered. Items (questions plus their response options) in PROs can be generated by clinicians or through patient interviews. Items used by clinicians possess face validity as defined by Mosier. **Purpose / Aim of Study:** The objective of this study was to find existing PRO items with potentially relevant content for patients with mechanically induced knee pathology (i.e., knee trauma).

**Materials and Methods:** An exhaustive literature search was conducted for PRO questionnaires in English, German, and Scandinavian languages used to assess outcome in patients with knee pathology. The items from the collected PROs were assessed for content redundancy and item reduction was carried out to isolate items of unique content. These items were grouped into one of the components of the ICF classification system.

**Findings / Results:** Thirty-one PRO's used to assess patients with knee problems were identified, yielding a total of 539 items. Approximately seventy percent of these items consisted of redundant content matter. The items were reduced to a pool of 157 items of unique content distributed across four ICF domains. These items will be presented.

**Conclusions:** The identified items can be used to build condition-specific PRO constructs for patients with different types of knee pathology.

154.

## HIP-FLEXION STRENGTH TRAINING IN THE CLINICAL SETTING

*Kristian Thorborg, Thomas Bandholm, Mette Zebis,  
Lars Andersen, Jesper Jensen, Per Hölmich*

Arthroscopic Centre Amager Hvidovre Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre Hospital; ArbejdsMiljøinstituttet, ; Arthroscopic Centre Amager, Hvidovre Hospital; Arthroscopic Centre Amager, Hvidovre Hospital

**Background:** Heavy slow Strength Training (HST) is an effective treatment for tendinopathy, and is applied in different overuse conditions. Hip-flexor (ilopsoas-related) tendinopathy is a common problem, but so far HST has not been promoted for this condition.

**Purpose / Aim of Study:** To investigate the effect and feasibility of 6-weeks hip-flexion strength training on hip-flexion strength in healthy subjects, using a simple clinical set-up including elastic bands.

**Materials and Methods:** Thirty-three healthy subjects were included in a randomised controlled trial and allocated to HST or control (CON). HST of the hip-flexors was performed 3 times per week for 6 weeks, on the dominant leg. The HST-group progressed from 15 repetition maximum (RM) (week 1) to 10 RM (week 2-5) to 8 RM (week 6-7), using elastic bands for external resistance. Isometric hip-flexion strength was measured in both legs pre- and post-intervention by a blinded assessor, using a reliable test- procedure.

**Findings / Results:** There was a significant within-group change in isometric hip-flexion strength in the hip-flexion strength of the trained leg (dominant leg, training group) from 1,90 (0.43) Nm/kg to 2.22 (0.54) Nm/kg, corresponding to a mean within-group change of 0.32 (95% CI 0.19-0.45) Nm/kg,  $p < 0.001$ . No within-group differences were seen in the standing leg in the training group, and in the control group. Between-group comparison of hip-flexion strength change in the trained leg (dominant leg, training group) versus the non-trained leg (dominant leg, control group),  $p < 0.001$ .

**Conclusions:** Hip-flexor strength training using elastic bands is an effective and simple intervention, improving muscle strength to the same extent as could be expected when training in strength-training machines. Furthermore, the intervention seems to induce sufficient loading to stimulate hip-flexor tendon repair.

**155.**

## **Long-term survival after severe trauma is not affected by Injury Severity Score (ISS)**

*Morten Wad, Sidsel Fruergaard, Claus Falck Larsen, Benny Dahl*  
Department of Orthopaedic Surgery Rigshospitalet; Department of  
Orthopaedic Surgery, Rigshospitalet; Trauma Center, Rigshospitalet;  
Department of Orthopaedic Surgery, Rigshospitalet

**Background:** Increasing interest has been directed towards long-term survival and outcome after severe trauma. There is, however, a paucity of literature describing these aspects of severe injury and only one previous study has reported on the long-term survival in Danish trauma patients.

**Purpose / Aim of Study:** The purpose of the present study was to assess whether injury severity affects long-term survival in trauma patients.

**Materials and Methods:** From March 1996 to September 1997 all patients more than 18 years of age, admitted to the emergency department at Rigshospitalet were prospectively included based on at least one of the following inclusion criteria: injury to more than one organ system, more than one fracture of the long bones or the axial skeleton, or fracture of the axial skeleton combined with another fracture. On discharge or death all diagnosed lesions were classified according to the Abbreviated Injury Scale (AIS) and the (ISS) Injury Severity Score was calculated. Survival status was registered in May 2012.

**Findings / Results:** A total of 153 patients were included. 13 patients had insufficient personal data leaving 140 patients for analysis. The median age was 34 years (range 18-87 years) and 66% were men. The one-year mortality was 23% and the overall mortality was 43%. Only within the first year after injury the mortality rate in patients with ISS > 24 was significantly higher than in patients with ISS from 16-24 ( $P < 0.05$ ).

**Conclusions:** To our knowledge this is the first time 15 years survival rates have been reported in Danish trauma patients. The results support previous findings that ISS only reflects short-term survival after severe injury.

## 156.

### **Low Dislocation Rate of Saturne® Dual-Mobility THA after Medial Femoral Neck Fracture. A Retrospective Study of 205 hips with a minimum 2.5 year follow-up**

*Steffan Tabori Jensen, Maiken Stilling, Søren Bøvling,*

*Torben Bæk Hansen, Morten Homilius, Christina Frølich*

ortopædkirurgisk HospitalsEnheden Vest, HEV; ortopædkirurgisk, HospitalsEnheden Vest, HEV; ortopædkirurgisk, HospitalsEnheden Vest, HEV; ortopædkirurgisk, HospitalsEnheden Vest, HEV; ortopædkirurgisk, HospitalsEnheden Vest, HEV; ortopædkirurgisk, HospitalsEnheden Vest, HEV

**Background:** Displaced medial femoral neck fracture (FNF) may be treated with primary arthroplasty, however dislocation is a serious complication. Large head-size dual- mobility (DM) total hip systems may increase range of motion to impingement and may thereby improve stability compared with conventional hip implants.

**Purpose / Aim of Study:** To investigate the dislocation and revision rate of primary DM cups in patients with acute FNF.

**Materials and Methods:** Since 2005 we used Saturne® DM articulation as standard treatment for displaced medial FNF. 205 consecutive patients (154 women) at a mean age of 78 years (range 30-98) were operated with SDM by residents and consultants by use of the posterior-lateral approach (PLA). We retrospectively evaluated all patient files and the digital x-ray archive for any incident of dislocation and revision until death of the patient or June 2012. The National Patient Registry will also be checked. Educational level of the surgeon was noted. Measurements of cup position are currently on-going.

**Findings / Results:** At a minimum 2.5 year follow-up there were 11 (5%) dislocations and 5 (2%) revisions. 82 patients (40%) died. The mean duration until dislocation was 17 days (range 1-60) and the number was between 1 and 3. Mean time until revision was 21 days (range 8-41). The educational level of the surgeon was unrelated to the dislocation risk ( $p=0.17$ ) and revision risk ( $p=0.45$ ). 44 stems (21%) and 65 cups (32%) were fixed with cementless technique and this did not jeopardize the risk of dislocation or revision ( $p>0.06$ ). Evaluation of correlations between cup position and dislocation and revision are on- going.

**Conclusions:** We conclude that the use of a cemented or cementless dual-mobility Saturne® hip system inserted via a PLA results in a low dislocation and revision rate regardless if the surgeon is in training or specialized.

**157.**

**Stress radiographic evaluation of knee collateral ligament laxity using the Telos-Device correlates with objective examination of knee instability**

*Mads Carlsson, Bent Lund, Peter Faunø, Svend Erik Christiansen,  
Martin Lind*

Div, Sportstrauma. Orthopaedic Dept. Aarhus University Hospital; Div, Sportstrauma. Orthopaedic Dept. , Aarhus University Hospital; Div, Sportstrauma. Orthopaedic Dept. , Aarhus University Hospital; Div, Sportstrauma. Orthopaedic Dept. , Aarhus University Hospital; Div, Sportstrauma. Orthopaedic Dept. , Aarhus University Hospital

**Background:** Biomechanical studies have demonstrated that stress radiographic evaluation of collateral ligament laxity relates to degree of ligament injury. Stress radiographic evaluation of collateral ligament laxity could therefore be an important supplement for clinical decision-making prior to knee collateral ligament reconstruction surgery

**Purpose / Aim of Study:** The present study investigates the correlation between objective clinical evaluation of collateral ligament laxity and stress radiographic evaluation using the Telos-Device (TD) in patients with collateral knee ligament laxity after knee injury.

**Materials and Methods:** In 56 patients with subjective collateral knee instability after knee injury, medial and lateral knee instability was clinically evaluated using International Knee Documentation Committee (IKDC)- classification with varus og valgus knee laxity expressed as side-to-side difference in joint opening (grade A 0- 2mm; grade B 3-5mm; grade C; 6-10mm; grade D >10mm). All patients who had minimum grade B laxity of either medial or lateral collateral ligament had supplementary TD stress radiography. The stress radiographic measurements were correlated with IKDC evaluations. We used the non-injured side as IKDC grade A control group.

**Findings / Results:** Stress radiographic laxity measures correlated with IKDC objective clinical examinations. For IKDC grade A, TD joint opening was average 0.12mm. For IKDC grade B, TD joint opening was average 1.49mm For IKDC grade C, TD joint opening was average 2.57mm

**Conclusions:** TD Stress radiographic evaluation of collateral knee ligament laxity correlated with objective knee laxity evaluation. As clinical knee laxity evaluation is complex, stress radiographic evaluation of collateral knee ligament laxity can support decision-making prior to collateral ligament reconstructive surgery

158.

## The Challenges of Recruiting Patients into a Sham Surgery Trial

*Kristoffer Hare, Stefan Lohmander, Ewa Roos*

Dep. of Orthopedics Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark/Slagelse Hosp; Dep. of Orthopedics, Clinical Sciences Lund, University of Lund, Sweden; , Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark

**Background:** The few available orthopaedic placebo controlled surgical trials, recent editorials and reviews emphasize that comparison against placebo is needed to examine the true efficacy also of surgical interventions.

**Purpose / Aim of Study:** To examine the feasibility of and to identify the challenges in recruiting patients into a placebo controlled surgical trial of arthroscopic partial meniscectomy.

**Materials and Methods:** Results presented are from an ongoing RCT where patients aged 35-55 with an MRI confirmed degenerative medial meniscus tear were randomized to arthroscopic partial meniscectomy or placebo surgery. Patients referred from general practitioners were screened. If eligible, oral and written information about the study including a 10 minute video was given to the patients and they were subsequently invited to participate. If willing they were referred to an MRI to confirm a meniscus lesion. Only when MRI confirmed a meniscus lesion were the patients finally included.

**Findings / Results:** 261 patients have been screened. 109 had clinical signs of a medial meniscus lesion. 13 declined to receive the patient information, 39 declined after reviewing the patient material and 55 agreed to participate. 2 patients underwent MRI which was negative before being informed of the study. All 55 patients who were willing to participate underwent MRI. Of these only 34 had a medial meniscus tear confirmed by MRI (2 pending). In total 25 patients were finally included from the 261 initially screened.

**Conclusions:** Fifty percent of eligible patients agreed to participate in the study. The number is somewhat higher than earlier surgical placebo controlled trials from other countries. A high proportion of these patients were later excluded due to the absence of a medial meniscus lesion on MRI, confirming a poor correlation between clinical signs and MRI findings.

159.

## **Transfusion of intra-operatively collected autologous blood in spinal surgery. Is it safe?**

*Michael Rud Lassen*

Spine Center Copenhagen Copenhagen University Hospital Glostrup

**Background:** Spinal surgery is often associated with blood loss and need for blood transfusions. Transfusion of allogenic blood introduces risks such as transfusion reactions and disease transmission. An autologous, whole blood transfusion alternative is the Sangvia system (Astra Tech AB, Sweden).

**Purpose / Aim of Study:** To investigate safety of the Sangvia system when used intra-operatively in spinal surgery.

**Materials and Methods:** 49 patients scheduled for spinal surgery were included. Blood was collected using the Sangvia system and patients were randomized to reinfusion of shed blood or no reinfusion. A maximum reinfusion volume of 1500 ml was applied. The shed blood and venous blood samples drawn before and after surgery were analyzed for plasma hemoglobin (p-Hb), hemoglobin, inflammatory mediators, potassium and creatinine. Adverse events were also registered.

**Findings / Results:** A mean volume of 490 ml was retransfused. The shed blood had elevated levels of p-Hb (total mean 12.5 g/l) that resulted in temporarily elevated serum concentrations of p-Hb after reinfusion. Potassium in shed blood was also elevated (total mean 47 imol/l). The peak level of systemic p-Hb reached 1.4 g/l at end of transfusion but normalization was obtained within 24 hours. No impact was seen on systemic potassium or creatinine levels. Reinfusion of autologous blood led to equal or lower increase of pro-inflammatory mediators and higher post-operative hemoglobin levels. Hematuria was reported in four patients after reinfusion but no other relevant adverse events were reported.

**Conclusions:** Reinfusion of shed blood collected during spinal surgery causes a temporary increase in systemic concentrations of p-Hb without affecting systemic potassium and creatinine levels or increasing risk for adverse events. The results indicate that the Sangvia system is safe to use in spinal surgery.

## 160.

### **Agreement between two strength devices used in the newly modified Constant score**

*Morten Tange Kristensen, Signe Hjerrild, Pernille Lund Skov Larsen, Maria Aagesen, Bente Hovmand, Ilija Ban*

Department of Physiotherapy and Orthopaedic Surgery Hvidovre University Hospital; , Metropolitan University College Copenhagen; , Metropolitan University College Copenhagen; , Metropolitan University College Copenhagen; , Metropolitan University College Copenhagen;

Department of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** The strength testing (part D) of the Constant score (CS) has been a major source of error, but a new and standardized CS, translated into Danish following international guidelines, provide new methodology. Still different devices are used for objective strength testing, which gives up to 25 out of the total 100 possible CS points.

**Purpose / Aim of Study:** To examine the agreement of the IsoForceControl (ISO) and the IDO isometer (IDO) for the evaluation of maximal shoulder abduction muscle strength in the modified CS.

**Materials and Methods:** Sixty healthy subjects, age 18-70+ years (range 19-83), 5 men and 5 women in each of six-decade groups, were included. The IDO and ISO were used in randomized order with an 8-minute rest between devices. Subjects performed three trials with strong verbal encouragement, with a 1-minute rest between trials. The best performance < 25 pounds was used in analysis. The same person supervised all strength testing, and was blinded to all results until end of study.

**Findings / Results:** The total Constant score reached an average (SD) of 92.7 (6.1) points, and was negatively associated with age ( $r = -0.419$ ,  $P=0.001$ ). Men presented higher ( $P<0.001$ ) total Constant (96.4 versus 88.9) and strength (22.4 versus 14.2 pounds) scores as compared to women. Paired t-test showed that the IDO produced an average of -0.58 (95%CI, -0.94 - -0.23) lower strength scores than the ISO ( $P=0.002$ ). The ICC2.1 was 0.97 (95%CI, 0.94-0.98), while the Standard Error of Measurement was calculated to 1 pound.

**Conclusions:** The agreement between ISO and IDO is acceptable at group level, but it is recommended that an individual should be tested with the same device at re-testing. Data from this study can be used as a preliminary Danish reference material, confirming the need for age and gender stratification when using Constant score in clinical trials.



161.

## **Bone Growth Plate Imaging: A Morphological and Functional Magnetic Resonance Study**

*Juan Manuel Shiguetomi-Medina, Maja Sofie Kristiansen, Steffen Ringgaard, Hans Stødkilde-Jørgensen, Ole Rahbek, Bjarne Møller-Madsen*

Children's Orthopaedics Department E Aarhus University Hospital NBG; The MR Research Center, Aarhus University Hospital Skejby; The MR Research Center, Aarhus University Hospital Skejby; The MR Research Center, Aarhus University Hospital Skejby; Children's Orthopaedics Department E, Aarhus University Hospital NBG; Children's Orthopaedics Department E, Aarhus University Hospital NBG

**Background:** Magnetic resonance technology allows for morphological and functional analysis of the bone growth plate which provide information about early changes caused by disease.

**Purpose / Aim of Study:** Proposal and validation of a magnetic- resonance-based method for studying the bone growth plate including morphological imaging and water content assessment.

**Materials and Methods:** Four tibiae were analyzed ex vivo using a 1.5T MRI and in vivo tibiae from 8 pigs comparing water-content results to previously obtained reference parameters from gelatin samples. The method was validated using dry-freeze technology, and histology samples were correlated to 7T MRI to validate the morphological imaging.

**Findings / Results:** Detailed morphology of the growth plate was observed in T1 and T2 MRI both ex vivo and in vivo. By in vivo samples imaging higher signal intensity on the functional sequences, such as water content and diffusion is obtained - functional magnetic resonance imaging is superior when done in vivo. We found a direct correlation of the growth plate thickness obtained by MRI and histology (CV=0.332). It is possible to calculate the water content from the growth plate using MR T1-mapping. An average difference of 3.68% (SD=1.2) between dry-freeze and MR values on control samples, and an average difference of 2.73% (SD=1.3) on cartilage samples were found.

**Conclusions:** Magnetic Resonance imaging provides detailed information about the morphology of the growth plate. It also provides a functional overview based on cartilage hydration and can detect early changes caused by disease. We proved that the linear measurements (thickness, longitude) done on MR imaging correspond to the structures they resemble, and that we can rely on T1- map-based water content values as the results correspond to the water content obtained by dry-freezing.

162.

## Fractures of the knee in children - what can go wrong?

*Veronica Leeberg, Stig Sonne-Holm, Jens Krogh Christoffersen,  
Christian Wong*

Department of Orthopaedic Surgery Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; , The Patient Insurance Association; Department of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** Intraarticular knee fractures (KF) in children are rare (3:100.000children/year). The Danish Patient Insurance Association (DPIA) receives complaints from patients who believe they've sustained a damage from their treatment. We used relevant cases to identify causality and co- factors contributing to these apparent malpractices.

**Purpose / Aim of Study:** A partial root core analysis was performed identifying factors contributing to apparent malpractices to proximal tibia fractures in children 15 years of age or younger from complaints in DPIA.

**Materials and Methods:** A review of medical journals, the in-house database and journals of DPIA. The selected cohort of cases of KF were retrieved by sweeping the DPIA database for the diagnose codes DS821 and DS821A-D.

**Findings / Results:** 13 cases of KF were identified with a majority of proximal tibial fractures and from high-energy traumas. The main complaint was missed diagnosis; KF interpreted as soft tissue injuries with no radiological examination primarily (6 cases), eminentia fractures were the main culprit, damage to the popliteal artery caused by a medial condyl fracture the most serious. All cases missed by junior doctors. Secondary complaints were problems with the bandaging time (ranging from 1-6 weeks) and type (3 cases), dissatisfied with correct treatment (3 cases) and insufficient operative procedure or complications (3 cases), where infection after internal fixation was the worst. Eight of the complaints were acknowledged by the DPIA, 6 receiving financial compensation ranging from 72.000 to 520.000 kr. Five out of 6 cases of missed diagnosis were acknowledged.

**Conclusions:** This study indicates that recognizing the degree of injury to the knee in children, which would lead to an x-ray examination, is the key parameter to prevent missed diagnoses and delayed and potentially more difficult surgery.

## 163.

### **Instability-Induced Periprosthetic Osteolysis Is Not Dependent on the Fibrous Tissue Interface**

*Rune V. Madsen, Denis Nam, Aleksey Dvorzhinskiy,*

*Mathias P Bostrom, Anna Fahlgren*

University of Copenhagen; , Hospital for Special Surgery, New York, USA; , Hospital for Special Surgery, New York, USA; , Hospital for Special Surgery, New York, USA; , Linköping University, Linköping, Sweden

**Background:** In the setting of implant motion, a fibrous tissue layer forms at the bone-implant interface, leading to implant migration and peri-prosthetic osteolysis. At the time of implant revision surgery, pro-resorptive signaling cytokines are expressed in the peri-implant fibrous membrane. However, the exact role of this fibrous tissue in causing peri-prosthetic osteolysis due to instability remains unknown.

**Purpose / Aim of Study:** The objective of this study was to determine the role of the fibrous tissue layer in osteoclast activity and peri-prosthetic bone loss.

**Materials and Methods:** We studied presence and absence of fibrous tissue in our established rat model for instability induced osteolysis (total n=48). Micro-CT and immunohistochemistry were used to determine whether fibrous tissue is required for both osteoclast activity and peri-implant bone loss.

**Findings / Results:** The amount of bone loss was increased by instability. The presence of fibrous tissue had no effect on the amount of bone loss. There was no enhanced effect in bone loss, when pressure and presence of fibrous tissue was combined. Instability by pressure induced dramatic bone resorption in the peri-prosthetic bone. The presence of fibrous tissue had no effect on the amount of osteoclasts, neither was there a combined effect in the presence of both pressure and fibrous tissue.

**Conclusions:** The current animal model mimicked this scenario through a compressed fibrous tissue membrane. However, the fibrous membrane had no effect on osteoclast activity and bone loss. Our findings suggest that the bone tissue surrounding an implant induces osteoclast differentiation and bone loss due to mechanical factors, such as fluid flow and pressure, even in the absence of a fibrous tissue membrane.

## 164.

### **Pitfalls in the treatment of pediatric ankle fractures – A partial root core analysis of 43 cases from the Danish Patient Insurance Association**

*Peter Buxbom, Stig Sonne-Holm, Jens Krogh Christoffersen, Christian Wong*  
Department of Orthopaedic Surgery Hvidovre University Hospital;  
Department of Orthopaedic Surgery,  
Hvidovre University Hospital; , The Patient Insurance Association;  
Department of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** In Denmark most insurance cases are assessed by one association, the Danish Patient Insurance Association (DPIA). Though cases of pediatric ankle fractures (PAF) in the DPIA is not a representative sample of PAF within the Danish population, this group still can give an overview of potential malpractices.

**Purpose / Aim of Study:** The purpose of this study was to investigate general patterns in the failure of treatment by conducting a partial root core analysis.

**Materials and Methods:** The DPIA archive was surveyed for medical journals with diagnosis code from DS823 to DS829 (< 15 years old). 43 journals were retrieved, excluding 20 patients because of PAF without articular involvement, leaving 23 medical journals.

**Findings / Results:** In 8 of the 23 cases the patient applied for compensation due to missed PAF at first consultation. 6 of these were seen by a resident doctor, where clinical outcome was categorized as 'severe complications'. 9 applied for compensation because of suboptimal interventional treatment; 4 cases had performed closed reposition and casting leading to secondary anisomelia and rotational defects - despite primary acceptable reposition. 3 Tillaux and 2 triplane had open reposition and internal fixation with one or two cannulated screws of fractures, still resulting in improper fracture reposition. 3 of these received insurance. In total, compensation was met in 9 cases, receiving from 13.000 to 449.720 Dkr. Severe PAF were overrepresented.

**Conclusions:** There are 2 predominant groups causing sequelae: doctor delay and consequences of treatment. Doctor delay was due to overlooked fracture at first consultation, primarily by resident doctors. When attempting closed reposition, secondary growth defects were interpreted as likely to occur. However, complications due to open reposition and internal fixation led to higher compensation.

165.

## Regeneration of Articular Cartilage in Sheep by Osteochondral Distraction

*Joachim Becker, Christensen Lise, Blyme Peter,  
Strange-Vognsen Hans-Henrik, Krogsgaard Michael*

Department of Sports Traumatology Bispebjerg University Hospital; Department of Pathology, Bispebjerg University Hospital; Department of Orthopedic Surgery, Bispebjerg University Hospital; Department of Orthopedic Surgery, Rigshospitalet; Department of Sports Traumatology, Bispebjerg University Hospital

**Background:** Articular cartilage injury has a poor prognosis for repair. The procedure of osteodistraction is used to stimulate formation of new bone tissue by dividing the bone into two segments and then gradually distracting the segments by use of an external fixation, thereby forming new bone

**Purpose / Aim of Study:** The purpose of our study was to establish whether a similar technique, osteochondral distraction, could be applied to regenerate hyaline articular cartilage as a potential treatment of cartilage defects.

**Materials and Methods:** 8 sheep were subjected to a cutting of the olecranon perpendicular to the articulation surface leaving the cartilage intact. The two segments were held in place by an external fixator, and a distraction device, that made it possible slowly to move the two segments apart from one another, was mounted. The sheep were then randomised into two groups. Distraction rate was set at 0.5 mm/day and 1 mm/day, respectively, until 10 mm was reached. The following consolidation period was 1 and 6 months, respectively. The joints were excised and examined histologically using H&E, Masson's trichrome, Van Gieson/Alcian, Azan-Mallory and Safranin-O. The stained samples were scored using the ICRS II grading system for cartilage repair.

**Findings / Results:** Macroscopically it was possible to form a new joint surface that resembled normal cartilage. Histological assessments indicated formation of fibrocartilage with minor amounts of hyaline cartilage. Of a maximum of 1400 points, the median ICRS II scores were 355 (group 1); 1310 (group 1 control = the contralateral elbow), 470 (group 2) and 1320 (group 2 control).

**Conclusions:** The osteochondral distraction procedure did produce a new joint surface, but the generated tissue contained only minor amounts of hyaline cartilage, consisting largely of fibrocartilage.

166.

## Rinsing allograft bone does not improve implant fixation - A study in 12 dogs

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

Orthopaedic Research Laboratory Aarhus University Hospital, Denmark;  
Orthopaedic Research Laboratory, Aarhus University Hospital, Denmark;  
Orthopaedic Research Laboratory, Aarhus University Hospital, Denmark;  
Orthopaedic Biomechanics Laboratory, Excelen and Minneapolis Medical  
Research Foundations, University of Minnesota, Minneapolis MN 55415,  
Minnesota, USA; Orthopaedic Research Laboratory,  
Aarhus University Hospital, Denmark

**Background:** Impacted morselized allograft bone is a well-established method for reconstructing bone defects at revision surgery. However, the incorporation of bone graft is not always complete, and substantial volume of fibrous tissue has been demonstrated around grafted implants.

**Purpose / Aim of Study:** We hypothesize that rinsing the bone graft may improve bone graft incorporation by removing the majority of immunogenic factors present in blood, marrow and fat. This was tested by comparison of early implant fixation of the two experimental groups.

**Materials and Methods:** Following approval of the Institutional Animal Care and use Committee, we implanted a cylindrical (10x6 mm) porous-coated Ti implant into each proximal tibia of twelve dogs. The implants were surrounded by a 2.5-mm gap into which morselized fresh frozen allograft bone was impacted. The bone graft of the two groups were either 1) untreated or 2) rinsed in 37°C saline for 3x1 minute. After four weeks, the animals were euthanized and implant fixation was evaluated by mechanical push-out test and histomorphometric analysis.

**Findings / Results:** The rinsing procedure revealed no difference regarding mechanical implant fixation when compared with the control group: Shear strength (MPa) 2.7 vs. 2.9 (p=0.45), stiffness (MPa/mm) 15 vs. 15 (p=0.98) or energy absorption (kJ/m<sup>2</sup>) 0.5 vs. 0.6 (p=0.49). The same was evident for the new bone formation on the implant surface and around the implant: Ongrowth (%) 6 vs. 7 (p=0.34) and Ingrowth (%) 9 vs. 9 (p=0.71). Although not statistically significant a 50% reduction in fibrous tissue ongrowth and ingrowth was found in the rinsed group (p=0.24).

**Conclusions:** Within the limits of this experimental model, we did not detect benefits of rinsing morselized allograft bone prior to impaction grafting.

167.

## Skeletal age assessment by a modified Sauvegrain method

*Camilla Mersø, Wasan Wahid, Kasper Gosvig, Niels Ellitsgaard*

Orthopaedic Department Hvidovre University Hospital; Department of Radiology, Hvidovre University Hospital; Department of Radiology, Glostrup University Hospital; Orthopaedic Paediatric Department, Hvidovre University Hospital

**Background:** Moderate anisomelia can be treated by hemiepifysiodesis around the knee of the long leg late in adolescence. Estimating the bone age of the child is an important factor in the preoperative planning. In 2007 Dimeglio simplified the method of Sauvegrain by evaluating the ossification centers of the olecranon alone in 11-13 year old girls and 13 -15 year old boys. Compared to the Greulich/Pyle method we find this method easier to use in clinic.

**Purpose / Aim of Study:** The aim of the study was to compare the method described by Dimeglio to our standard method of Greulich and Pyle.

**Materials and Methods:** The study material was 50 girls and 50 boys who were admitted to the emergency room on the suspicion of a forearm fracture. The inclusion criteria was a sufficient x-ray including the hand in the AP projection and the elbow in the lateral projection. Bone age was determined by the Greulich and Pyle method and by the ossification of the olecranon

**Findings / Results:** The correlation between bone age determined by either modus Greulich or by the ossification of the olecranon was good showing Spearmans correlation coefficients ranging from 0.66 to 0.91, all  $p < 0.001$ . The interobserver reliability for bone age determined by modus Greulich ranged from 0.68 to 0.84  $p < 0.001$  depending on whether the sexes were analyzed separately or pooled. Superior coefficients are presented determining bone age by the elbow where the Spearmans correlation coefficients ranged from 0.88 to 0.97  $p < 0.001$ . There were moderate but significant correlation between chronological age and bone age assessed by either method - Spearman correlation coefficients ranging from 0.55 to 0.61 (all  $p < 0.001$ )

**Conclusions:** Skeletal age assessment from elbow X- ray equals the Greulich/Pyle method. The lateral elbow is however easier to interpret and readily used in clinical decisionmaking

168.

## Slipped Capital Femoral Epiphysis in Denmark

*Mathilde Pihl, Niels Ellitsgaard*

Department of Orthopaedic Paediatric Surgery Hvidovre University Hospital;  
Department of Orthopaedic Paediatric Surgery, Hvidovre University Hospital

**Background:** Slipped Capital Femoral Epiphysis (SCFE) is an adolescence hip disorder with a low prevalence. By July 1th 2011 the National Board of Health centralized the treatment. Till then diagnosing and treatment was partly performed on local orthopedic departments. As the parameters on SCFE have not been analyzed in Denmark we found it necessary to describe them prior to merging of treatment.

**Purpose / Aim of Study:** The purpose of this study was to depict diagnosis, treatment and complications to SCFE in Denmark. How do we find SCFEs? Do we have a Danish standard? And what do we gain by centralizing?

**Materials and Methods:** A questionnaire was sent to all 35 orthopaedic departments, September 2010.

**Findings / Results:** Nineteen of the 35 departments surveyed met SCFE patients. The epidemiology was comparable to literature. Due to the diversity of symptoms and the fact that the condition is rare, patients were often seen by a GP as well as an orthopaedic surgeon prior to diagnosis, hence a delay. The diagnostic tool was X-ray, classifications were many and no standard for radiological diagnosis was found. One department used a standardized hipscore to register the clinical examination, 5 departments had guidelines for SCFE and 1 Region treated the children in specialized orthopaedic departments. Four departments investigated risk factors. The treatment in Denmark is adequate to the one found in literature, except for a tendency to correct the position of the femur head before pinning. Complications are similar to those described in literature, but in Denmark we have no standard of treatment.

**Conclusions:** Although comparable to the treatment taught by literature SCFE treatment in Denmark needs a standardisation in diagnostics and classification. Due to the merging suggested by the National Board of Health data for standardisation will be easily accessible.



169.

## Thermal Epiphysiodesis Made with Radio Frequency Ablation: An Alternative Treatment for Leg Length Discrepancy

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

Children's Orthopaedic Department E Aarhus University Hospital NBG; Children's Orthopaedic Department E, Aarhus University Hospital NBG; The MR Research Center, Aarhus University Hospital Skejby; Children's Orthopaedic Department E, Aarhus University Hospital NBG

**Background:** Anisomelia is a condition of leg length discrepancy. It is often treated with epiphysiodesis of the growth plate to inhibit growth. Epiphysiodesis has become the most commonly used procedure for leg length equalization. Current techniques may injure the surrounding structures. Therefore, there is a need for a reliable, precise procedure which overcomes the complications.

**Purpose / Aim of Study:** Development of a new technique for epiphysiodesis using radiofrequency ablation in an experimental porcine model.

**Materials and Methods:** Six 35kg pigs and two 25kg non-mature 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. Under general anesthesia, a probe was inserted and the ablation performed. T1, T2 and water content MR images were performed right after the procedure, 12 weeks later for 6 animals, and 6 months later for the last 2 ones. The length of both tibiae was measured immediately after the ablation and at the end of the study.

**Findings / Results:** Both legs were equal at the beginning of the study and, overall, there was an average leg length difference ( $P=0.006$ ) of 4.8mm ( $SD=2.25$ , Median=3.88) at the end. For the 12 week follow-up we found an average leg length difference of 3.9mm ( $SD=1.286$ , Median=3.666,  $P=0.014$ ), and for the 6 month one we found an average difference of 8.11mm. 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 that potentially involves less scarring, less exposure to X-rays, and reduces the risk of injuring the surrounding structures compared to current methods. These results show that this technique can arrest growth in a safe and effective way.

**170.**

## **Varus Derotation Osteotomy with the LCP-Hip plate for the Treatment of Hip Subluxation and Dislocation in Children with Cerebral Palsy**

*Nikolaj Sode, Michael Schultz-Larsen, Vilhelm Engell, Niels Wisbech Pedersen*  
Department of Orthopedics Odense University Hospital, Denmark; Health Care Unit, Danish National Defence; Department of Orthopedics, Odense University Hospital, Denmark; Department of Orthopedics, Odense University Hospital, Denmark

**Background:** Hip dislocation and pain caused by asymmetrical muscle forces across the hip is frequently observed in children with cerebral palsy. The condition is complicated by an increased risk of osteoporosis. Proximal femoral osteotomy is used in reconstructive surgery in order to improve physical capacity. A new pediatric LCP hip plate with low lateral profile and angular stability may improve the outcome of surgery.

**Purpose / Aim of Study:** The purpose of this study was to assess results from hip osteotomy operations using the LCP-hip plate in a group of children with cerebral palsy hip subluxation and/or dislocation.

**Materials and Methods:** A retrospective chart and radiograph review on outcome from 48 femoral osteotomies performed on 32 children with cerebral palsy; 22 boys and 10 girls. Unilateral femoral surgery (n=16), bilateral femoral surgery (n=16), pelvic reconstructive surgery, (n=19) and additional tenotomies (n=25) was performed. All children had cerebral palsy with Gross Motor Function Classification System levels: II (n=3), III (n=2), IV (n=10), V (n=17).

**Findings / Results:** Age at surgery 7.6 (3, 15) years (mean; min, max). Neck-shaft angle mean correction was 30 (0, 49) degrees of varisation and mean derotation was 23 (0, 45) degrees. Mean time to full support was 5,5 weeks (3-12 weeks). In 29 cases Shenton's line was broken preoperatively, postoperatively 15 of these were intact (data currently not available). In 2 cases we found soft tissue irritation from the LCP hip plate. 1 case had hip relaxation, and 1 case had spontaneous distal femur fracture. We found no cases of deep infection, loosening of osteosynthesis material or avascular necrosis.

**Conclusions:** With the LCP hip-plate we found similar results compared to other implants. Importantly we found no case of loosening of osteosynthesis material, suggesting the value of angular stability.

**171.**

**Expectations and health-related quality of life  
- a questionnaire survey of patients undergoing total  
hip replacements**

*Jane Schwartz Leonhardt, Per Kjærsgaard-Andersen*  
Ortopaedic Vejle Hospital; Ortopaedic, Vejle Sygehus

**Background:** Patients with fulfilled expectations after total hip replacement (THA) surgery experience higher satisfaction with the outcome of the surgery. Unrealistic expectations to the surgery may cause discouragement during the rehabilitation process, and some patients therefore avoid following the postoperative recommendations.

**Purpose / Aim of Study:** To examine how THA patients' expectations to pain, mobility, sleep, energy and mental balance are fulfilled three weeks after surgery. Supplemented with the patients' self- assessed health-related quality of life measured with Nottingham Health Profile (NHP).

**Materials and Methods:** Preoperatively and three weeks postoperatively the patients completed the NHP questionnaire, questions regarding expectations to surgery and fulfilment of expectations as well as demographic questions.

**Findings / Results:** 55 patients were included in the survey. All respondents (100 %) expected some or much improvement in their wellbeing after surgery. Three weeks after survey, the expectations were fulfilled to some or to a high degree: Pain (85,5 %), mobility (90.9 %), sleep (91.0 %), energy (80.0 %) and mental balance (90.9 %). For 23.6 % of the respondents their wellbeing was the same or worse three weeks after surgery. In general all patients experienced improved quality of life three weeks after surgery compared with the NHP questionnaire before surgery.

**Conclusions:** All patients expected an improvement in their wellbeing after surgery. 85.5-91.0 % of the patients had their expectations fulfilled within pain, mobility, sleep, energy and metal balance to some or a high degree. One fourth of the patients did not experience an improvement in their wellbeing three weeks after surgery. In general the patients experienced improved health-related quality of life.

172.

## 20 years performance of Boneloc cemented primary Exeter hip arthroplasty

*Per B. Thomsen, Jesper Dalsgaard, Dovydas Vainorius, Torben B. Hansen*  
Orthopaedic Research Unit Hospital Vest, Holstebro; Department of Orthopaedics, Hospital Vest, Holstebro; Department of Orthopaedics, Hospital Vest, Holstebro; Department of Orthopaedics, Hospital Vest, Holstebro

**Background:** Primary hip arthroplasty with Boneloc cement has in most studies resulted in high or even catastrophic short and midterm revision incidences. However, one femoral stem design concept (highly polished and tapered) has shown acceptable results.

**Purpose / Aim of Study:** The aim of our study is to evaluate 20 years survival of Boneloc cemented primary Exeter hip arthroplasty and the clinical and radiographical long term results.

**Materials and Methods:** In the period March 1992 - June 1994 200 consecutive Boneloc cemented primary Exeter hip arthroplasties were performed in 183 patients aged 26-90 (mean 70.7) years. 141 hips died without revision, 32 hips were revised. 18 hips plus 6 hips with only cup revision had clinical (Harris Hip Score) and radiographical follow-up and 12 hips had telephonic follow-up after 18-20 years. Long term prosthetic survival was assessed by Kaplan-Meier analysis.

**Findings / Results:** After mean 18.4 (17.6-19.6) years HHS was mean 78 (46-99) and Pain Score mean 40 (20-44). According to patients own evaluation of their hip all were very satisfied or satisfied. Twenty years cumulative prosthetic survival without revision was 73 (49-89) %. Twenty years cumulative stem and cup survival without revision for mechanical failure was 84 (68-96) % and 76 (61-92) % respectively. Deep infection accounted for 2 revisions. According to the Chi-Square test neither cementing technique nor cup size or metalbacking had any bearing on revision incidences. Radiographic evaluation showed definite loosening of 2 cups and one pelvic osteolysis. Stem subsidence greater than 2 mm was seen in 15 hips. Shift in stem orientation in 3 hips, one femoral osteolysis in Gruen zone 7 but no stem loosening.

**Conclusions:** This study provides the first long term results on Boneloc cemented primary hip arthroplasty. The Exeter prosthesis, especially the stem, maintains earlier published acceptable results in spite of the documented inferior quality of the cement.

173.

### **3D imaging of the spine using EOS system, is it reliable? A comparative study using CT imaging**

*Zaid Al-Aubaidi , David Lebel , Rienhard Zeller,  
Kamaldine Oudjhane, Benjamin Alman*

Orthopaedic Odense Universitet hospital ; Orthopaedic , Sick Kids hospital,  
Toronto, Canada; Orthopaedic, Sick Kids hospital, Toronto, Canada;  
Orthopaedic, Sick Kids hospital, Toronto, Canada;  
Orthopaedic , Sick Kids hospital, Toronto, Canada

**Background:** EOS was developed from a Nobel Prize- winning technology by a team of engineers; orthopaedic surgeons and radiologists. 3D views can be obtained from EOS through special algorithms involving manual outlining of the spinal contours by doing manual reconstructions. This process is based on the projection of elements out of a 3D library onto the 2D spinal contours generated by orthogonal X-rays.

**Purpose / Aim of Study:** The aim of this study is to evaluate the precision of the 3D geometry.

**Materials and Methods:** All patients presented with scoliosis, which had undergone EOS spinal X-rays and CT scan for a better visualization of their spinal deformity. To decrease the risk of different measurements due to progression of the deformity, the time limit between performing the CT and EOS was set to be not more than 6 months. The rotation was measured using Apical Vertebral Orientation (AVO) measured by the EOS, and the same method was used to measure the orientation of the apical vertebra by the CT. Due to the fact that CT is supine and EOS is standing, other measurements as the Cobb angle and the Apical Vertebral Rotation (AVR) according to Nash and Moe, were used. These were considered as the control variables measured using the EOS and the CT scout view, as to control the changes between the standing in EOS vs. the supine position in CT scanning. To evaluate the intraobserver and interobserver error regarding the precision of AVO measurements, these were repeated by the first author and the second author. For statistical analysis the Graph Pad soft ware was used and the unpaired t test was used.

**Findings / Results:** 7 patients, 3 males and 4 females, age between 10-18 years (15y5m). 3 patients were diagnosed with kyphoscoliosis, one with neurofibromatosis type I, one with Marfan syndrome, one with Myelomeningocelle and one with lymphoma. The average Cobb angle measured using the EOS was 32,25 (9-78), while using the CT scout view the Cobb angle was 26.38 (P= 0,56). There were no statistically significant difference regarding the inter- and intraobserver error. The average of these measurements was 8,3 vs. the measurement done by the CT 6,6 (P= 0,65). Only one of seven differed in the two AVR assessment according to Nash and Moe (p=0.29Fisher Exact).

**Conclusions:** The precision of EOS based measurement of vertebral rotation has never been tested in clinical practice. To the best of our knowledge this is the first study that looks at the precision of the EOS system compared to measurements obtained by CT. Our study did not find any statistically significant difference between EOS and CT vertebral rotation measurements. Although has limitations, this study does conclude that the measurement obtained by the EOS is comparable to that obtained by CT.

**174.**

## **A descriptive analysis of reasons for late onset of treatment of developmental hip dysplasia**

*Elisabeth Busk, Stig Sonne-Holm, Jens Krogh Christoffersen, Christian Wong*

Department of Orthopaedic Surgery Hvidovre University Hospital ;

Department of Orthopaedic Surgery,

Hvidovre University Hospital ; the Patient Insurance Association, ;

Department of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** The prevalence of developmental hip dysplasia (DDH) in DK is 3-5/1000. Unnoticed the condition can be severely disabling, developing from restriction in movements in childhood into a painful condition requiring demanding surgery and potentially arthroplasty.

**Purpose / Aim of Study:** A descriptive study combined with a partial root cause analysis was carried out analysing data from the Danish Patient Insurance Association (DPIA) to investigate, what caused DDH diagnosis to be missed or go untreated and subsequently suggest potential solutions to the problem.

**Materials and Methods:** DPIA journals with diagnosis codes for DDH and related conditions were retrieved (DQ65.0 to DQ65.9). We located twenty relevant cases (from 103 cases) describing late onsets of treatment for DDH.

**Findings / Results:** 13 patients were tested negative by Ortolani test (OT) shortly after birth with subsequent later diagnosis because of DDH symptoms. In 2 cases OT was not done primarily, and 5 patients had positive OT but neither ultrasound (US) (4) was done nor treatment initiated (1 even after positive US). Doctors delay resulted in initiation of treatment between 5 to 48 months of age with a mean age of 18 months. Open reduction was necessary in two of the cases and one child had pelvis osteotomy performed 2? years old.

**Conclusions:** It is suggested, that early recognition and treatment of DDH have a significant better clinical outcome and markedly reduce the need of surgery. The findings of this study suggest that clinical examination alone can be inadequate and that a lower threshold for US is needed. There are still widely spread opinions on how to screen and treat DDH. Recent changes in guidelines from the board of health make the general practitioner responsible for screening for DDH at 5 weeks of age. An increase in delayed diagnosis would be expected based on our findings.

**175.**

**A Review of Pregnant Trauma Patients received  
at Rigshospitalets TraumeCenter from  
January 2000 - May 2012**

*Peter Horstmann, Henrik Grønberg*

Department of Orthopaedic Surgery & Rigshospitalets TraumeCenter  
Rigshospitalet, Copenhagen; Department of Orthopaedic Surgery & Rigshos-  
pitalets TraumeCenter, Rigshospitalet, Copenhagen

**Background:** Pregnancy can lead to deviation from ATLS guidelines, most likely in attempt to reduce the fetal exposure to ionization radiation. Abstaining from a trauma CT (T-CT) can result in missed diagnoses and complications.

**Purpose / Aim of Study:** We aimed to investigate type of injuries and treatment routines in cases with pregnant trauma patients.

**Materials and Methods:** Using a local database of trauma cases received at Rigshospitalets TraumeCenter 1.1.00–1.5.12, all pregnant patients were identified (n=48). Each case was reviewed with focus on injury and type of radiographic study.

**Findings / Results:** Age and stage of pregnancy was 30 years [16-40] and 22 weeks [4-40] respectively. ISS was 2 [0-27] with "Extremities including pelvis" being the most frequently damaged region (n=10). A rise in ISS was noticed from 1.1.08. FAST was performed in 39 patients and 37 pt's had X-ray studies, incl. 23 cervical spine, 24 chest and 11 pelvis. Eleven pt's had a T-CT, 9 a regional CT only and 28 had no CT at all. More T-CT's were performed after 1.1.08 (8/15) than 1.1.00-31.12.07 (3/33). Ten pt's underwent acute surgery with fracture fixation the most frequent. Amongst the 7 secondary referred pt's T-CT had been performed in 1/7 and a regional CT in 5/7. Six pt's had pelvic fractures (PF), 2/6 had later caesarean section (CS) w. living foetus (1 acute, 1 elective), 2/6 had abortion (1 spontaneous, 1 assisted), 2/6 had CS within days of admission due to intrauterine death (ID) and 3/6 required ORIF. Two pt's w/o PF (1 with blunt injuries, 1 with splenic lesion) had acute CS. No initially missed injuries were later identified.

**Conclusions:** Adherence to protocol standards was low. The increased use of T-CT's corresponds to a simultaneous rise in ISS. The presence of pelvic fracture seems to be predictive of a high risk of obstetric complications such as ID or need for CS.

**176.**

## **A standardised test protocol based on the modified Constant Score and translation into Danish**

*Ilija Ban*

Department of Orthopaedics, Hvidovre University Hospital

**Background:** The Constant Score is considered a valid and reliable score to evaluate several shoulder disorders. The score is commonly used, but has been criticised for imprecise terminology and lack of a standardised methodology. A modified English guideline with several new recommendations was published in 2008, but a standardised test protocol was not included. The new version has never been translated into Danish.

**Purpose / Aim of Study:** 1) To translate and cross-culturally adapt the Constant Score from the modified guideline to Danish, and 2) to develop a standardised test protocol for the Constant Score.

**Materials and Methods:** A forward and back translation was done according to international recommendations. Consensus on a preliminary version was achieved. The subjective part was tested on six patients, while two physiotherapists gave feedback on the objective part. Relevant items were culturally adapted and rephrased and a simple standardised test protocol was developed.

**Findings / Results:** Only minor inconsistencies in translations were found. A few questions and words had to be rephrased due to cultural and linguistic differences. One of the authors of the modified Constant Score approved the back-translation as well as the test protocol.

**Conclusions:** A simple standardised test protocol of the modified Constant Score was developed in both Danish and English. With precise terminology and definitions the test protocol is first of its kind and we recommend it for standardised assessment of the Constant Score. Testing of validity, reliability and responsiveness of both versions needs to be done in future research.



177.

## Development and validation of a mathematical model of the femoral bone

*Tina Lercke Skytte, Stig Sonne-Holm,  
Lars Pilgaard Mikkelsen, Christian Wong*

Department of Orthopaedic Surgery Hvidovre University Hospital; Department of Orthopaedic Surgery, Hvidovre University Hospital; Department of Wind Energy, Technical University of Denmark; Department of Orthopaedic Surgery, Hvidovre University Hospital

**Background:** When introducing new femoral implants, experimental studies to determine their utility are needed. This is a time-consuming process with ethical issues, when using femoral bones from post-mortem subjects or conducting human trials.

**Purpose / Aim of Study:** The aim of this study was to construct and validate a mathematical model of a femoral bone. The intention was to evaluate how well femoral implants behave using the model, and consequently being able to reduce the need for experimental studies.

**Materials and Methods:** We used CT scan of a femoral bone to construct the geometry of the model. With respect to material properties we constructed two models: The first containing one material representing bone, and the second containing two materials representing cortical and cancellous bone. To validate the model, the conditions of an experimental study were imitated. Strains were extracted from 11 points and compared to the strains found experimentally.

**Findings / Results:** In the first model the direction of the strain was correct at 9 of the 11 measuring-points, and the behavior of the model correlated fairly well to the findings from the experimental study. However, the strains from the mathematical model were too small. The second model was improved with respect to the direction of the strain, by being correct in 10 of the 11 measuring-points, but the behavior of the model did not correlate well to experimental findings. The magnitude of the strains was slightly improved.

**Conclusions:** We found that the models do behave like a real femoral bone in several aspects, but adjustments are still needed. When a satisfactory model is constructed, femoral implants will be applied to the model, and it will be compared to other experimental studies. After the model has been thoroughly validated, it will prove a useful tool for investigating femoral implants.

178.

## **Endoscopic-assisted Treatment of Chronic Exertional Compartmental Syndrome (CECS) in the Lower Legs and Forearms**

*Mads Karlsson, Karl Jöhnk, Steffen Skov Jensen*

Sports Medicine Clinic, Dept. of Orthopedics The Regional Hospital of Viborg, Denmark; Sports Medicine Clinic, Dept. of Orthopedics, The Regional Hospital of Viborg, Denmark; Sports Medicine Clinic, Dept. of Orthopedics, The Regional Hospital of Viborg, Denmark

**Background:** CECS is a rare condition, mostly seen in athletes with repetitive movements. Treatment with open fasciotomy is the golden standard, if conservative treatment is failed. Using endoscopic subcutaneous treatment is a novel way of making decompression of forearms and legs with high exertional pressure. Advantages of using an endoscope are such as good visualization of neurovascular structures, less complications and early recovery.

**Purpose / Aim of Study:** We present this endoscopic-assisted technique as an option to open fasciotomy in treating CECS.

**Materials and Methods:** Three cases; two young adults doing high-level motocross (forearms) and one footballplayer (calf), was all diagnosed with CECS. At each site of the extremity, the skin was opened proximal and distal with a small incision. A subcutaneous tunnel was then created. Under vision of the endoscope the fascia of all compartments was incised. Afterwards incisions were closed with sutures, and the extremity wrapped with absorptive and compressing bandage.

**Findings / Results:** There were no early complications after surgery, and early recovery was accomplished following a retraining program in the three cases. They have all returned to their former activity with no restriction.

**Conclusions:** The procedure can be done and seems of benefit, and it should be considered in patients with CECS, where conservative treatment has failed. There is a low risk of complications.

179.

## Infantile Fibrosarcoma – Two case stories and review of the literature

*Martin Bille Henriksen, Jørgen Peter Holmberg Jørgensen,  
Bjarne Hauge Hansen, Henrik Schrøder*

Sarcoma Center of Aarhus, department of orthopaedic surgery Aarhus University Hospital; Sarcoma Center of Aarhus, department of orthopaedic surgery, Aarhus University Hospital; Sarcoma Center of Aarhus, department of orthopaedic surgery, Aarhus University Hospital; Sarcoma Center of Aarhus, Department of Pediatrics, Aarhus University Hospital

**Background:** Infantile fibrosarcoma (IFS) is a rare malignant soft tissue sarcoma (STS) in children, which represents 25% of all STS in children < 1 year. Histologically IFS is similar to fibrosarcoma in adults, however IFS can be linked to chromosomal translocation or trisomy. Recommended treatment is chemotherapy followed by surgery. Generally IFS has a good prognosis with 10-year survival of 84-90% and low tendency to metastasis (10%). Since 1996 only 5 patients has been diagnose with IFS at the sarcomacenter of Aarhus. We report the two recent cases which were unusually aggressive.

**Purpose / Aim of Study:** The report aims to elucidate IFS to be considered in the differential diagnostics in soft tissue tumors (STT) in children.

**Materials and Methods:** Cases are described from medical records. Literature searched on Pubmed, keywords: infantile, fibrosarcoma, congenital.

**Findings / Results:** Case 1: A 20 day old boy was admitted with a 58 x 32 mm big tumor involving the whole circumference of the left thigh. Tumor grew to 90 x 130 mm. Case 2: A 5 day old boy presented with a 34 x 26 x 32 mm tumor at the right wrist, noticed by the parents as a small nodule at birth. Tumor was observed but showed rapid growth up to 70 x 65 x 40 mm. Both tumors histology revealed IFS after incisional biopsy. Both infants were treated with chemotherapy but with no effect on tumor growth. In case 1 the patient further developed multiorgan failure with bleeding disorder. Limb sparing surgery was not possible in either case. Case 1 was hip disarticulation, but never recovered and died a few days later. Case 2 was amputated at a transhumeral level and shows no signs of relapse after 3? years of observation.

**Conclusions:** It is important to bear in mind the possibility of malignancy in a soft tissue tumor at infancy. Especially as it often will mimick a benign process as e.g. a hemangioma.

180.

## **Intra-rater Reliability and Between-leg Asymmetries in Unilateral Jump Performance and Muscle Strength in Healthy Adults**

*Anders Holsgaard-Larsen, Carsten Jensen, Per Aagaard*

Orthopaedic Research Unit, Institute of Clinical Research Odense University Hospital, University of Southern Denmark; Orthopaedic Research Unit, Institute of Clinical Research, Odense University Hospital, University of Southern Denmark; Institute of Sports Science and Clinical Biomechanic, University of Southern Denmark

**Background:** Asymmetry-index of the affected and unaffected limb is traditionally used to distinguish between normal or abnormal test scores of orthopaedic patients. Therefore, knowledge about the reliability in outcome measures and the extent of asymmetry in healthy subjects is crucial.

**Purpose / Aim of Study:** To investigate (i) intra-rater reliability in the assessment of unilateral jump performance and isometric knee extensor/flexor strength (MVC) and (ii) the magnitude of between-leg asymmetry in healthy males.

**Materials and Methods:** Test-retest measurements were performed in 13 healthy men (mean age: 27.1  $\pm$  6.1 years, BMI: 24.5  $\pm$  2) separated by 7 days. Subjects performed counter movement jumps (CMJ) with each leg positioned on a separate force plate (AMTI). Kinematic data were recorded (6-camera ViconMX system) and maximal jump height (JH), unilateral knee joint range of motion (ROM), and peak and mean sagittal knee moment were analyzed. Also, one-legged hop for distance (HD) and knee extensor and flexor MVC were obtained. Within-subject coefficient of variation (CVws), 95% CI for test-retest differences, and asymmetry ratios were calculated.

**Findings / Results:** CMJ: CVws was 4.8% for JH. For unilateral measures, CVws was 8.7%- 12.6%. Hop for distance: CVws was 3.1% - 4.3%. MVC: CVws was 7.7%- 14.1%. HD increased at retest (95% CI: [- 8.1 ; -0.1] and [-11.5 ; -2.0]) in both legs. Asymmetry ratios in unilateral CMJ were 100%, 80%, 80% for ROM, peak and mean knee moment, respectively, and 96% for HD and 73% and 85% for isometric knee flexor and extensor MVC, respectively.

**Conclusions:** Good-to-moderate test-retest reliability was observed for all measured variables. Signs of between-leg asymmetry were observed in healthy males. These findings have important relevance in studies where comparisons between healthy control groups and orthopaedic patients are made.

**181.**

## **Operative treatment of Colles fractures - a radiological study**

*Bekir Ince, Stig Sonne-Holm*

Orthopedic department Hvidovre Hospital;

Orthopedic department, Hvidovre Hospital

**Background:** Is interban fixation of Colles fracture an improvement ?

**Purpose / Aim of Study:** The purpose was to examine whether there was a difference in certain radiological parameters in patients treated with external fixation versus volar plating of distal radius fractures to decide how this common fracture should be treated.

**Materials and Methods:** We reviewed 174 patients with distal radius fractures. Of those patients, 36 were treated with external fixation and 138 with volar plate fixation. Each fracture was assessed by Olders classification. Six radiological parameters were measured for each patient at injury, postoperative and at follow-up provided radiographs were available.

**Findings / Results:** There was no significant differences in the groups concerning sex, but the external fixation group (mean: 51,6 years) was significantly younger than the internal fixation group, (mean 62,5 years),  $p=0,001$ . The internal fixation group had significantly better radiologic measurements in terms of radiocarpal interval and volar tilt. Radiocarpal interval was 2,89 mm postoperative and 2,37 mm at follow-up for the external fixation, whilst the internal fixation group had 1,98 mm postoperative and 2,08 mm at follow-up. This difference was significant. Volar tilt was 2,21 degrees postoperative and 0,83 degrees at follow-up for the external fixation group, whilst it was measured at 4,84 degrees postoperative for the internal fixation group. This dropped to 3,8 degrees at follow-up. Binary logistics also showed that internal fixation was an independent factor for better volar tilt. There were no significant differences between the groups in the measurement of radiocarpal interval, radial height, articular step-off or AP- distance.

**Conclusions:** The internal fixation group had better radiological measurement, however the litterature says no difference in clinical ourcome.

182.

## PATIENT SPECIFIC MUSCULOSKELETAL MODEL FOR CLINICAL GAIT ANALYSIS

*Christian Wong, Sofie Jacobsen, Derek Curtis, Jesper Bencke, Tine Alkjær, Erik Simonsen*

Department of Orthopaedic Surgery Hvidovre university hospital ; Department of Orthopaedic Surgery, Hvidovre university hospital ; Gait Laboratory, Hvidovre university hospital ; Gait Laboratory, Hvidovre university hospital ; Department of Neuroscience and Pharmacology, Faculty Of Health Sciences, University of Copenhagen; Department of Neuroscience and Pharmacology, Faculty Of Health Sciences, University of Copenhagen

**Background:** Crouch gait is a severe condition often seen in patients with cerebral palsy. In treatment of this condition and to prevent further deformation of the lower extremities, surgical procedures are often used to extend or move the short muscles with spasticity.

**Purpose / Aim of Study:** The aim of this project is to develop a patient specific musculoskeletal model, which can be used as an additional tool to examine patients before surgery. Ideally the model will be able to predict the outcome of different surgical procedures and hereby answer what-if scenarios.

**Materials and Methods:** A clinical Vicon gait analysis of 1 patient with severe crouch gait, bone deformities and muscle contractures was used to make a patient specific model of the right leg in AnyBodyTM. The model was based on the Twente Lower Extremity Model and it was scaled to the patient by radial basis functions. Based on physical examination, the model was adapted to this specific patient by: correcting for patella alta, changing the optimal fiber length, tendon slack length and total muscle length. These adoptions were made in 5 steps resulting in 5 models, for each step the model got more advanced.

**Findings / Results:** Muscle activity from the models was compared with measured EMG. The model provided information on muscle activities, lengths and strengths as well as joint reaction forces through the gait cycle, which cannot be derived from a normal gait analysis.

**Conclusions:** Though many similarities were found between estimated muscle activity and EMG, the model cannot accurately replicate the measured EMG. The most advanced model did not show considerably better results than the simplest model. Further studies are needed before the goal of a patient specific musculoskeletal model is reached.

**183.**

## **Poor function within 4-months of hip fracture surgery is associated with handgrip strength assessed in the acute orthopaedic ward**

*Louise Lohmann Faber; Morten Tange Kristensen*

Copenhagen university Copenhagen university; Department of Physiotherapy and Orthopedic Surgery, Hvidovre University Hospital

**Background:** Handgrip strength (HGS) that easily can be assessed at bedside is one of the indicators of sarcopenia (age related loss of muscle mass and strength) with defined cut points below 20 kg for women and 30 kg for men. This indicates that HGS could be used to identify hip fracture patients with risk of poor recovery, but knowledge of this is limited.

**Purpose / Aim of Study:** To examine number of patients not regaining their pre-fracture functional level and if HGS assessed during hospital stay is associated with this level within 4-months following a hip fracture.

**Materials and Methods:** Thirty-three patients (23 women) at a mean (SD) age of 74.9 (9.7) years, 20 with a cervical fracture, and admitted from their own home to an acute orthopaedic hip fracture unit. HGS was measured in kilograms with a handgrip dynamometer during admission, while the Functional Recovery Score (FRS, 0-100 points, a score of 100=fully independent) assessed the functional level at pre-fracture and at follow up.

**Findings / Results:** Five were lost to follow up and three died, leaving 25 (18 women) patients to be followed. The FRS was reduced ( $P < 0.001$ ) from a mean of 86.8 (14.0) to 72.0 (27.4) points and 76% had not regained their prefracture functional level at follow up. Further analysis showed, that 15 patients with HGS scores below the cut points indicating sarcopenia had died, or had lower follow up FRS scores with means of 62.4 (27.1) as compared to 86.5 (21.6) in patients with scores above cut points ( $P = 0.03$ ).

**Conclusions:** Three out of four patients did not regain their prefracture functional level within 4-months following a hip fracture. HGS assessed during admission seems as a simple tool in identifying patients with a poor prognosis and extended need of rehabilitation. Still, further studies with a longer follow up including a larger population are needed.

184.

## **Pulsed Electromagnetic Field (PEMF) Therapy in treatment of scaphoid nonunions**

*Predrag Kokanovic, Poul Verner Madsen*

Orthopedic surgery department Aalborg Hospital, University of Aarhus;  
Orthopedic surgery department, Aalborg Hospital, University of Aarhus

**Background:** Although the primary interaction of PEMF at the cellular interface is not known, there is evidence for stimulation of multiple biological responses that would enhance bone repair. These include stimulation of chondrogenesis, calcification, osteogenesis and angiogenesis.

**Purpose / Aim of Study:** This abstract presents a prospective observational study designed to evaluate the efficacy of noninvasive PEMF in the treatment of scaphoid nonunions.

**Materials and Methods:** PEMF (Physio-Stim®) has been used to stimulate bone repair of scaphoid nonunions from 2006 – 2012 at Aalborg Hospital. The patients were instructed in the use of the PEMF stimulator and were advised to employ it every day for 3 hours, preferably during night. Compliance was registered. There were 16 patients, 14 male and 2 female, with a mean age of 28 (17-53) years. Seven fractures were on the left, 9 on the right side. Eight fractures were located in the proximal, 7 in the middle, and 1 in the distal third of the scaphoid. Twelve patients were unsuccessfully operated on before PEMF treatment. The mean duration of PEMF treatment was 46 (6-117) weeks. The time from injury or failed operation to commencing PEMF treatment was 26 (11-63) weeks.

**Findings / Results:** The portable PEMF devices were well tolerated, but patient compliance was insufficient to meet the criteria of the manufacturer's guarantee. No adverse events were reported. The nonunion healed in 11 (69%) of the 16 patients: Seven (88%) of the 8 fractures in the proximal, and 4 (50%) of 8 in the middle and distal third of the scaphoid healed. There was no difference in patient compliance.

**Conclusions:** The results of this study support current findings in the literature suggesting that PEMF treatment may have a stimulatory effect on the bone-healing processes.



**185.**

## **Rotationplasty**

*Marie Anneberg, Thomas Baad-Hansen, Bjarne Hauge Hansen,  
Peter Holmberg Jørgensen, Johnny Keller*

Center for Bone and Soft Tissue Sarcomas Aarhus University Hospital, Denmark; Center for Bone and Soft Tissue Sarcomas, Aarhus University Hospital, Denmark; Center for Bone and Soft Tissue Sarcomas, Aarhus University Hospital, Denmark; Center for Bone and Soft Tissue Sarcomas, Aarhus University Hospital, Denmark; Center for Bone and Soft Tissue Sarcomas, Aarhus University Hospital, Denmark

**Background:** Rotationplasty is an alternative to amputation and expandable prosthesis in skeletally immature patients with primary bone tumor close to the knee. It involves a shortening of the leg with resection of the tumor and adjacent bone and soft tissue, followed by turning the distal part of the leg 180°, placing the ankle joint at the height of the contralateral knee.

**Purpose / Aim of Study:** The aim of this study was to identify postoperative complications, survival, frequency of local recurrence and metastases, level of function, and self-rated health assessments in 10 patients who underwent 11 rotationplasties, 1 bilaterally, from 1998 to 2010 at University Hospital of Aarhus, Denmark.

**Materials and Methods:** The study is based on 10 consecutive patients with high grade osteosarcomas operated by the same surgeon. The medical records were reviewed and the surviving patients scored with 3 different self-rated assessments of function and quality of life.

**Findings / Results:** Rotationplasty was successfully accomplished on 11/11 (100%) limbs. Median age was 9,5y [5-15] with median follow-up 40m [4-171]. 8/10 (80%) patients had no early postoperative complications. One patient had a necrosis of the anterior tibial muscle and a wound infection which required revision after 13 days. One patient had a hematoma, evacuated the 1st postoperative day. One patient got a pressure ulcer from the prosthesis requiring revision after 2 months. One patient had 2 traumatic fractures of the tibia after 14 and 18m. One patient had paronychia. 5/10 (50%) patients died from the disease. Two had a local recurrence, one in the fibula and one in talus and all had pulmonary metastases.

**Conclusions:** Rotationplasty provides good local tumor control with high level of function. The prosthesis is easily attached. Nerve preservation prevents development of phantom limb pain.

**186.**

**Snapping scapula in Denmark  
- Diagnostic strategy and treatment during one year**

*Martin Rathcke, Michael R. Krosgaard*

Section for Sportstraumatology M51 Bispebjerg University Hospital; Section for Sportstraumatology M51, Bispebjerg University Hospital

**Background:** Snapping scapula is a symptom with several pathologies. The treatment of this disease in Denmark is now centered at Bispebjerg Hospital.

**Purpose / Aim of Study:** We report the experience during the first year.

**Materials and Methods:** All patients with snapping scapula (scapula crepitans), defined as a painful and noisy dyscoordination of scapula during movement of the arm, were prospectively recorded. The diagnostic strategy included: 3-D-CT scan of scapula, MRI of the thoracoscapular region, injection of carbocaine/depomedrol in the bursa, UL-scan of the thoracoscapular space and neurophysiological investigation when it was found relevant. The last seven patients tried NMS treatment prior to decision about surgery.

**Findings / Results:** 21 patients were admitted. Two had true exostoses, which were removed arthroscopically. One had lasting effect of the corticosteroid injection. Thirteen had a short effect of the injection and were regarded as classical snapping scapulae with a dynamic impingement between the superomedial corner of scapula and the thoracic wall. They had the superomedial corner of scapula removed arthroscopically. Two patients had no effect of NMS, two reported that NMS reduced symptoms, and three have not terminated treatment. We have not had any complications to surgical treatment. Two patients had resection of bone. MRI did not result in additional information compared to 3-D-CT. In one patient a clearly inflamed bursa was visible on UL.

**Conclusions:** 3-D-CT gave valuable information in several patients. MRI is probably not necessary as a diagnostic tool. Positive effect of carbocaine injection in the superior part of the scapulothoracic bursa was used in the decision rule for surgical treatment. Outcome will be reported, when patients are observed for > one year.

187.

## THA for femoral neck fractures - Is it worth waiting for?

*Jeppe Staghøj, Leif Broeng*

Ortopædkirurgisk afdeling Køge Hospital;

Ortopædkirurgisk afdeling, Køge Hospital

**Background:** Elderly patients with displaced femoral neck fractures are offered arthroplastic hip replacement. Patients with a relatively high level of activity and a life expectancy > 5-10 years are selected for Total Hip Alloplastics (THA). THA surgery is a specialized procedure and performed during daytime only.

**Purpose / Aim of Study:** The aim of the study is to determine the level of morbidity and mortality for the relatively healthy elderly with displaced femoral neck fracture selected for THA.

**Materials and Methods:** Retrospective study on THA after femoral neck fractures for patients admitted to Køge Hospital. Cases have been identified by procedural and diagnostic codes (KNFB30+40 & S72.0) and data has been extracted from patient records: Age, ASA group, surgical delay, complications and 1 year mortality. The recorded complications include: deep venous thrombosis/pulmonary embolism, urinary tract infection, pneumonia, organic psychosis and deep infection that required surgical revision. Inclusion criteria: THA and femoral neck fracture. Exclusion criteria: Previous ipsilateral internal fixation or suspected pathologic fracture. Study period December 2008 - June 2011.

**Findings / Results:** 69 cases were included. 58 waited >24h and 11 waited <24h. No significant difference in ASA classification and age between the two groups. Patients waiting <24h, complication rate 0.18 (2/11) and 1 year mortality rate 0.18 (2/11) Patients waiting >24h, complication rate 0.22 (13/58) and 1 year mortality rate 0.03 (2/58)

**Conclusions:** The present data is insufficient for a final conclusion. The preliminary results suggest that it may be safe to let selected patients with displaced femoral neck fracture wait for THA.

**188.**

**The Effect of Adherent Endotoxin on  
Osseointegration of Uncemented Implants  
– An Animal Study**

*Andreas West, Jørgen Baas, Joan Bechtold, Edward Greenfield, Kjeld Søballe*  
Orthopaedic Research Laboratory Aarhus University Hospital; Orthopaedic  
Research Laboratory, Aarhus University Hospital; Excelen Center for Bone  
and Joint Research and Education, University of Minnesota; School of  
Medicine's Department of Orthopaedics, Case Western Reserve University;  
Department of Orthopaedics, Aarhus University Hospital

**Background:** The long-term success of uncemented joint replacements depends on sufficient initial fixation through osseointegration, and maintenance of this fixation over time. Strong initial osseointegration provides a biomechanically stable environment for the implants to endure in under the conditions of regular loading. Other than cell culture studies, few studies of osseointegration have focused on the effect of biological surface contaminants such as endotoxins.

**Purpose / Aim of Study:** We hypothesized that endotoxin in the form of lipopolysaccharide from gram-negative bacteria would have a deleterious effect on the osseointegration of uncemented implants in-vivo.

**Materials and Methods:** The design was a four-armed paired animal study in 12 dogs. Using a 0.75-mm gap model, we placed four extra-articular uncemented implants in the proximal humeri of each dog. Four groups of implants were tested: 1) Cleaned by manufacturer, 2) Rigorously cleaned, 3) Rigorously cleaned with low-dosage LPS add-back, and 4) Rigorously cleaned with high-dosage LPS add-back. After four weeks of observation, bones were harvested and the osseointegration was evaluated by biomechanical analysis. Histomorphometrical analysis is still pending.

**Findings / Results:** Biomechanical push-out analysis showed, that all the rigorously cleaned groups independent of adherent LPS absorbed more total energy when compared to the manufacturer-cleaned group, and LPS add-back groups had higher max shear strength and apparent shear stiffness. Furthermore, the low-dosage add-back group had higher max shear strength and apparent shear stiffness than the rigorously cleaned group.

**Conclusions:** Histomorphometrical analysis will provide mechanistic information supporting the biomechanical push-out test for this in-vivo study of the effect of adherent endotoxin on the osseointegration of uncemented implants.

189.

## **The efficacy of intraoperative Gardner-Wells Skull Tongs -unilateral femoral traction in correction of pelvic obliquity in non-ambulatory cerebral palsy patients; A retrospective comparative study**

*Zaid Al-Aubaidi, David Lebel , Andrew Howard, Benjamin Alman, Reinhard Zeller, Stephan Lewis*

Ortopædkirurgisk Odense Universitet hospital ; Orthopaedic, Sick Kids hospital /Toronto; Orthopaedic , Sick Kids hospital /Toronto; Orthopaedic, Sick Kids hospital /Toronto; Orthopaedic, Sick Kids hospital /Toronto

**Background:** Paralytic scoliosis is the most common cause of pelvic obliquity. When present, pelvic obliquity can add to a skewed trunkal balance, leading to bad seating and pressure sores

**Purpose / Aim of Study:** The aim of this study is to examine the efficacy of using the Gardner-Wells tongs and unilateral femoral traction on the correction of pelvic obliquity.

**Materials and Methods:** We assembled a consecutive series of 39 patients diagnosed with spastic cerebral palsy (CP) GMFCS level V and a severe scoliotic curve, all treated with posterior spinal instrumented fusion (PSIF) from T2 or T3-Pelvis in the period from 1999 to 2009 in a single institution. The treatment group consisted of 22 patients who underwent PSIF with intraoperative skull-femoral traction as adjunct. The control group consisted of 17 patients treated without traction - 12 treated with PSIF and 5 treated with combined anterior release and PSIF

**Findings / Results:** The two groups matched regarding their age, gender, curve severity and curve type. There was a significant difference in pelvic obliquity between the two groups. The average correction of scoliotic curves and pelvic obliquity was 66% and 76% in the traction group and 62% and 60% in the control group, respectively. These were unchanged at follow up. There were no statistically significant differences in the two groups regarding correction of their coronal and sagittal balance. We did not have any traction related complications. There were no significant differences regarding surgical time, blood transfusion or hospital length of stay between the two groups. There were no cases with crankshaft phenomenon documented clinically or radiologically in any of the patients.

**Conclusions:** To the best of our knowledge this the first report describing the use of Gardner-Wells tongs and unilateral femoral traction intraoperatively. This study could not confirm that that the use of intraoperative skull-femoral traction can end with better correction. However the use of intraoperative skull femoral traction as an adjunct in the treatment of patients with scoliosis and pelvic obliquity should be left to the discretion of the surgeon. In cases where traction is considered, our results support the use of a simplified technique using Gardner- Wells tongs.

## 190.

### **The use of Ultrasound imaging in Diagnosing ruptures of the Distal Biceps tendon**

*Rasmus Mikkelsen*

Ortopæd kirurgisk afdeling Køge Sygehus

**Background:** The use of Ultrasound imaging in diagnosing acute ruptures of the distal biceps tendon has proven successful in other studies. These studies have had few patients, but also few radiologists performing the ultrasound.

**Purpose / Aim of Study:** To investigate the usefulness of Ultrasonography in the diagnosis of distal biceps tendon ruptures.

**Materials and Methods:** Through database search we identified all distal biceps tendon ruptures (n=25) at our institution in the period 2009-2012. Our group of patients consisted of 24 men and one woman. Patients were seen in the emergency department, and then referred to the ortopaedic out-patient section. To assist diagnosis, ultrasound was used in 18 cases, and in 7 cases diagnosis was based on clinical assessment only. The golden standard for determining if a rupture was present was surgical exploration. 23 of 25 patients was surgically explored, while two based on Ultrasound imaging were treated nonoperatively.

**Findings / Results:** Our patient population of men at an average age of 49, corresponded well to other studies. 20 of 25 patients had complete distal biceps tendon rupture. Three were diagnosed with partial tears and two had an intact tendon. Of the 18 patients where ultrasound was performed, 12/13 with complete rupture were correctly diagnosed. Sensitivity was 92,3%. However specificity was low at 40%. Ultrasound failed to identify the partial lesions. When diagnosis was based on clinical examination alone, 6 of 7 was correctly diagnosed as complete rupture, and one where surgical exploration didn't confirm clinical diagnosis.

**Conclusions:** In the diagnosis of distal biceps tendon ruptures, ultrasound imaging can confirm a clinical indication, but fails to recognize non-complete ruptures. Given validated clinical tools for diagnosis, adding ultrasound doesn't provide extra information.

**191.**

## **Health related quality of life and disability in patients surgically treated for spondylodiscitis**

*Casper Dragsted, Martin Gehrchen, Theis Aagaard, Benny Dahl*

Spine Unit, Department of Orthopaedic Surgery Rigshospitalet; Spine Unit, Department of Orthopaedic Surgery, Rigshospitalet; Department of Infectious Medicine, Rigshospitalet; Spine Unit, Department of Orthopaedic Surgery, Rigshospitalet

**Background:** The primary treatment of spondylodiscitis is non-surgical. However a significant proportion of the patients undergo surgery and there is no consensus on the indications or choice of surgical technique. It is therefore of relevance to obtain knowledge about the mortality and health related quality of life (HRQL) in patients operated for this condition.

**Purpose / Aim of Study:** Describe characteristics and compare HRQL in surgically treated patients with spondylodiscitis with HRQL in the normal population.

**Materials and Methods:** Retrospective cohort of patients surgically treated for spondylodiscitis including psoas abscesses from 2005- 2010. Post-surgical spondylodiscitis were excluded from the study. Study variables included indication, surgical technique, neurological status, mortality, microbiological diagnosis and HRQL assessed with EuroQuol 5D (EQ-5D) and Oswestry Disability Index (ODI).

**Findings / Results:** A total of 70 patients were operated with a mean age of 60 years at the time of surgery. The majority of patients were men, and lumbar levels were primarily affected. The median follow-up period was 2.1 years and the 1-year mortality rate was 6%. At follow-up the mean ODI and EQ-5D was 29 and 0.656 respectively. Both scores are significantly reduced compared to the normal population ( $p < 0.05$ ). Neurological impairment was present in 33% prior to surgery and this group scored significantly lower on the EQ-5D and higher on ODI at follow-up compared to patients without neurological impairment, reflecting increased disability ( $p < 0.05$ ).

**Conclusions:** Patients undergoing surgical treatment for spondylodiscitis have significantly lower HRQL and more disability than the background population years after surgery.

## 192.

### **How does isolated changes in hip and pelvis range of motion affect The Gait Deviation Index score (GDI); pathologic simulation form a healthy control**

*Nielsen Dennis Brandborg, Jensen Carsten , Rosenlund Signe,  
Holsgaard-Larsen Anders*

Orthopaedic Research unit, Department of Orthopaedics and Traumatology Odense University Hospital (OUH); Orthopaedic Research unit, Department of Orthopaedics and Traumatology, Institute of Clinical Research, University of Southern Denmark (SDU), Odense University Hospital (OU); Orthopaedic Research unit, Department of Orthopaedics and Traumatology, Institute of Clinical Research, University of Southern Denmark (SDU), Odense University Hospital (OU); Orthopaedic Research unit, Department of Orthopaedics and Traumatology, Institute of Clinical Research, University of Southern Denmark (SDU), Odense University Hospital (OU)

**Background:** The use of index scores to describe the overall function of a patient's performance during gait has become more widespread the last years. A commonly used index is The Gait Deviation Index (GDI). The GDI have been used on a variety of different patients; from evaluating orthopedic intervention in children with cerebral palsy to the effect of pharmacological treatment in adult with Parkinson. In patients with hip pathologies e.g. prior to hip arthroplasty reduced and/or altered ranges of motion (RoM) in the different planes have been observed. The effect of these changes on GDI has still not been investigated.

**Purpose / Aim of Study:** The purpose of this study was to determine the isolated effect of hip and pelvis RoM on the GDI.

**Materials and Methods:** 3-dimensional gait analysis was performed on one healthy subject at the motion analysis laboratory at Odense University Hospital, using Vicon motion capture (6 MX3 cameras at 100Hz) and the Plug-in-gait model. The GDI was calculated using the original data from Schwartz and Rozumalski. The GDI was calculated based upon the original data from one subject and 10 simulated trials, each trail with a relative reduction in RoM of 5% intervals for the hip and pelvis, respectively.

**Findings / Results:** Reductions in hip flexion/extension and pelvis tilt RoM affected the GDI as expected. However, in the coronal and transversal plane the relative changes had little effect on the GDI and transversal rotations of the hip slightly increased the GDI.

**Conclusions:** The GDI seems to be responsive to kinematic changes at isolated joints. Furthermore, the effect of how related joints are affected by reduced RoM in the hip and pelvis are not included in this study. Thus, caution should be taken when comparing the present effect of an isolated joint to an overall index score.



**193.**

## **Barographic Measurement of Seating Position in Children with Cerebral Palsy Undergoing Hip Surgery**

*Line Kjeldgaard Pedersen, Ole Rahbek, Bjarne Møller-Madsen*

Department of Orthopedic Surgery Aarhus University Hospital; Department of Orthopedic Surgery, Aarhus University Hospital; Department of Orthopedic Surgery, Aarhus University Hospital

**Background:** Children with Cerebral Palsy GMFCS IV/V are often wheelchair bound necessitating symmetrical and low pressure seating in order to prevent skin pressure ulcers and pain.

**Purpose / Aim of Study:** To determine whether surgical correction of hip luxation or subluxation and hip dysplasia improves seating position. Furthermore this study aim to establish a method of barographic measurement of seating position in children without postural seating control.

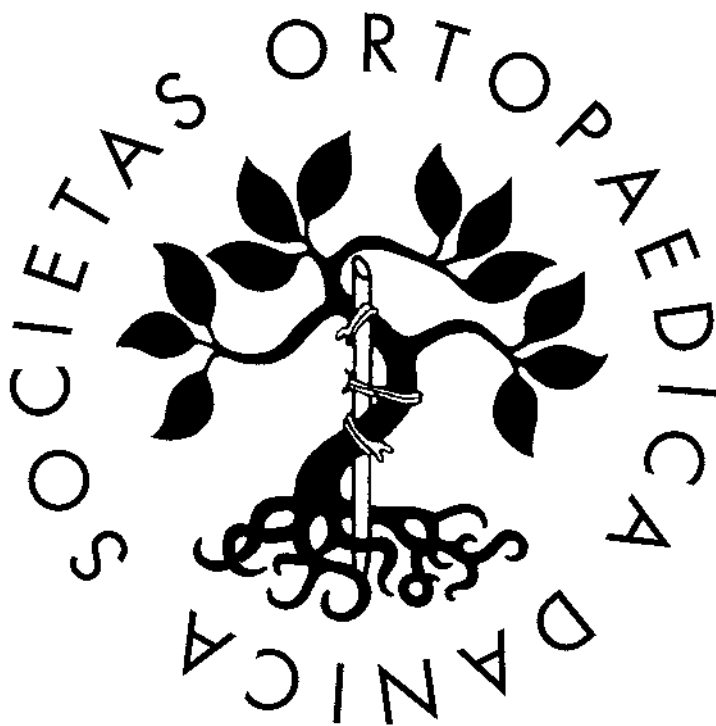
**Materials and Methods:** 10 children with Cerebral Palsy underwent barographic measurement of seating position and postural balance before and after hip surgery. A recording of 30 seconds with the child seated on the flexible ConforMat with a back inclination of approximately 90 degrees was performed using the Clin Seat Type 5315 Sensor, Tekscan, Boston, Mass, USA.

**Findings / Results:** Analysis of the barographic measurements were performed using original software. Each recording were averaged in order to obtain a static measurement for the statistical analysis. The midline was estimated and the peak contact pressure for both the left and the right sides was calculated. Results shows improvement in asymmetry in 2 of 10 patients and improvement in asymmetry but shifting to the opposite side in 3/10 patients. 3 of 10 patients had worsening of asymmetry and 2 of 10 patients had worsening of asymmetry but shifting to the opposite side.

**Conclusions:** In conclusion, it has not been documented that unilateral hip surgery improves seating symmetry measured by barography of seating position.







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## **DOS BESTYRELSE**

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### **Formand**

Ledende overlæge  
Benn Rønnow Duus  
Ortopædkirurgisk afdeling M  
Bispebjerg Hospital, Bispebjerg Bakke 23  
2400 København NV  
E-mail: president@ortopaedi.dk

### **Næstformand**

Professor, overlæge, dr. med.  
Søren Overgaard  
Ortopædkirurgisk afdeling O  
Odense Universitetshospital  
Søndre Boulevard 29  
5000 Odense C  
E-mail: vicepresident@ortopaedi.dk

### **Afgående formand**

Overlæge, klinisk lektor  
Per Kjærsgaard-Andersen  
Ortopædkirurgisk afdeling  
Vejle Sygehus  
Kappeltoft 25  
7100 Vejle  
E-mail: pastpresident@ortopaedi.dk

### **Kasserer**

Afdelingslæge Henrik Palm  
Ortopædkirurgisk afdeling  
Hvidovre Hospital  
Kettegårds Allé 30  
2650 Hvidovre  
E-mail: tresurer@ortopaedi.dk

### **Redaktør**

Specialeansvarlig overlæge, ph.d.  
Steen Lund Jensen  
Ortopædkirurgien Nordjylland  
Klinik Farsø, Højgårdsvej 11  
9640 Farsø  
E-mail: editor@ortopaedi.dk

### **Formand for Videnskabeligt Udvalg**

Sektorchef, overlæge, dr.med.  
Martin Lind  
Idrætssklinikken  
Ortopædkirurgisk afdeling E  
Århus Universitetshospital,  
Tage Hansensgade 2  
8000 Aarhus C  
E-mail: scientific@ortopaedi.dk

### **Formand for Kvalitetsudvalget**

Ledende overlæge  
Claus Munk Jensen  
Ortopædkirurgisk afdeling  
Gentofte Hospital  
Niels Andersensvej 65  
2900 Hellerup  
E-mail: quality@ortopaedi.dk

### **Formand for Uddannelsesudvalget**

Overlæge  
Niels R. Wisbøch Pedersen  
Ortopædkirurgisk afdeling O  
Odense Universitetshospital  
Søndre Boulevard 29  
5000 Odense C  
E-mail: education@ortopaedi.dk