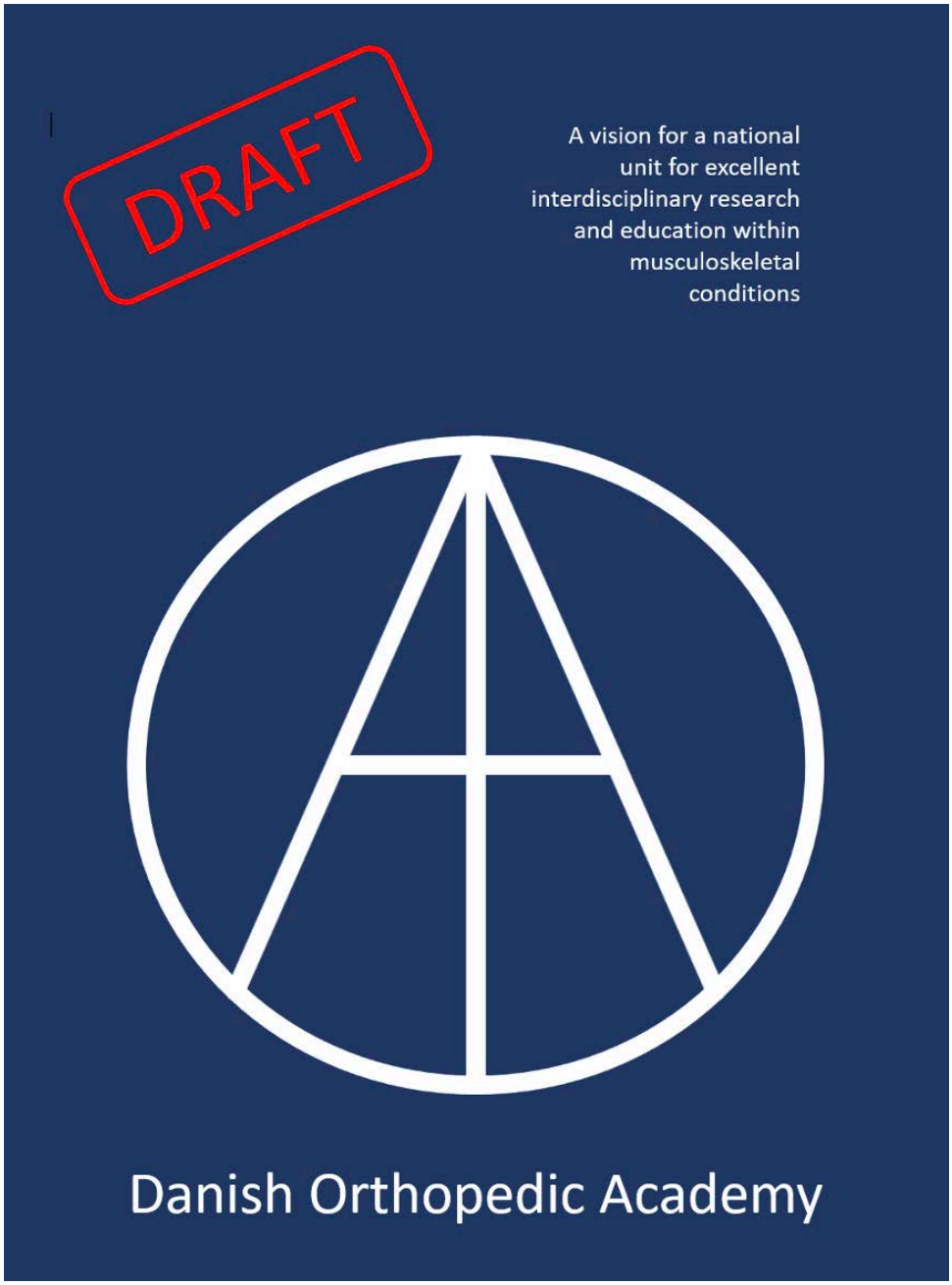
DOS Kongressen
15-17 November 2023
Copenhagen, Denmark

DOS Abstracts



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Editor
Jan Duedal Rölfing
editor@ortopaedi.dk

DOS Secretary
Helena Reinholdt
office@ortopaedi.dk

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All peer-reviewed abstracts being accepted for either oral presentation or poster presentation at the annual congress of the Danish Orthopaedic Society (DOS, ortopaedi.dk) are curated and published in a citable format.

SCIENTIFIC PROGRAM

DOS Kongressen 2023

15.-17. november 2023

TIME	Wednesday, 15 November 2023				
	Auditorium	**Room 01+02**	**Room 102-105**	**Room 202-205**	
09:00-09:30 **09:30-10:00** **10:00-10:30**	**Symposium** **It's not me, It's you.** **Arthroscopy or Knee Replacement?**	**Session 1: Trauma** (Bjarke Viberg and Christina F Frandsen)	**Session 2: Spine** (Søren O Nissen and Rikke Rousing)	**Session 3: Pediatrics** (Bjarne M Madsen and Louise Klingenberg)	
10:30-11:00	*Coffee in Exhibition Area*				
11:00-11:30 **11:30-12:00**	**Session 4 : YODA Best Paper** - Auditorium		**Session 5: Sport** (Adam Witten and Martin Lind)	**Meet the Experts for Specialists:** **Acute Hand Injuries**	**Forum for UAO**
12:00-12:30 **12:30-13:00**	**SECTRA symposium: 12.20-12.50** **Mødelokale 01+02**		*Lunch in Exhibition Area*		
13:00-13:30 **13:30-14:00** **14:00-14:30** **14:30-15:00**	**Subspeciality Meetings**				
15:00-15:30	*Coffee in Exhibition Area*				
15:30-16:00 **16:00-16:30** **16:30-16:45**	**Subspeciality Meetings**				
17:00-17:30 **17:30-18:00**	Poster Walk				
18:15 -	**YODA General Assembly**				

TIME	Thursday, 16 November 2023			
	Auditorium	**Room 01+02**	**Room 102-105**	**Room 202-205**
07.30-08.00 **08.00-08.30** **08:30-09:00** **09:00-09:20**	**General Assembly** - Auditorium			
09:30-10:00 **10:00-10:30** **10:30-11:00**	**Symposium** **A Culture in Orthopedics Where Everyone Can Thrive and Develop**	**Session 6: Shoulder / Elbow** (Dennis Karimi and Thomas F Jensen)	**Session 7: Tumor, Amputation and Infection** (Tine Nymark and Klaus K Petersen)	**Session 8: Hip Arthroplasty** (Peter Horstman and Søren Overgaard)
11:00-11:30	*Coffee in Exhibition Area*			
11:30-12:00 **12:00-12:30**	**DOS Honorary lecture** - Auditorium **Lisa Hadfield Law: 'Squeezing the Juice out of Teaching and Learning'**			
12:30-13:00 **13:00-13:30**	**Zimmer Biomet symposium: 12.50-13.20**	**Protesekompagniet symposium: 12.50-13.20**	*Lunch in Exhibition Area*	
13:30-14:00 **14:00-14:30** **14:30-15:00**	**Symposium** **Danish Orthopedic Academy (DOA)**	**Session 9: Trauma** (Arvind Von Keudell and Katrine Borum)	**Session 10: Sport** (Morten L Olesen and Henrik Aagaard)	**Session 11: Knee Arthroplasty** (Julie R Brandt and Kirill Gromov)
15:00-15:30	*Coffee in Exhibition Area*			
15:30-16:00	**Professor lecture, Bjarke Viberg** - Auditorium			
16:00-16:30 **16:30-17:00**	**Session 12: DOS Best Paper** - Auditorium (Michael M Petersen and Michala Skovlund)			

TIME	Friday, 17 November 2023			
	Auditorium	**Room 01+02**	**Room 102-105**	**Room 202-205**
09:00-09:30 **09:30-10:00**	**Symposium: New Curriculum –** **Experiences From the First Year**	**Session 13: Foot/Ankle and Trauma** (Morten S Larsen and Ellen H-Petersen)	**Session 14: Hand and Wrist** (Lone Kirkeby and Rasmus W Jørgensen)	**Session 15: Hip Arthroplasty** (Morten Bøgehøj and Per K Andersen)
10:00-10:30	*Coffee in Exhibition Area*			
10:30-11:00 **11:00-11:30**	**Guildal Lecture and donations** - Auditorium **Tim White, Trauma, Edinburgh: Realistic Orthopaedics**			
11:30-11:45	*Presentation of new specialists in Orthopedic Surgery*			
11:45-12:15 **12:15-12:45**	*Lunch in Exhibition Area*			
12:45-13:15 **13:15-13:45**	**Meet the Experts for Junior Doctors:** **Pediatric Traumatology**	**Session 16: Trauma** (Per H Gundtoft and Annie Primdahl)	**Session 17: Sport and Shoulder/Elbow** (Anne Kathrine B Sørensen and Stig Brorson)	**Session 18: Knee Arthroplasty** (Per W Kristensen and Ann Ganestam)
13:45-14:00	*Coffee in exhibition area*			
14:00-14:30 **14:30-15:00**	**DOS Battle** - Auditorium Søren Ohrt Nissen			

CONTENT

WEDNESDAY, 15 NOVEMBER 2023

THURSDAY, 16 NOVEMBER 2023

FRIDAY, 17 NOVEMBER 2023

SESSION 1: TRAUMA

15 November 2023

09:00 - 10:30

Room: 01+02

Chairs: Christina Frandsen and Bjarke Viberg

1. Intensified in-hospital physiotherapy for patients after hip fracture surgery – a randomized feasibility trial

Camilla Kampp Zilmer[1], S. Peter Magnusson[1,2,3], Inger Birgitte Bährentz[1], Thomas Giver Jensen[4], Signe Østergaard Zoffmann[1], Henrik Palm[4], Morten Tange Kristensen[1,5], Theresa Bieler[1]

1 Department of Physical and Occupational Therapy, Copenhagen University Hospital Bispebjerg and Frederiksberg, Copenhagen, Denmark.
2 Institute of Sports Medicine, Department of Orthopaedic Surgery M, Copenhagen University Hospital Bispebjerg and Frederiksberg, Copenhagen, Denmark.
3 Center for Healthy Aging, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark.
4 Department of Orthopedic Surgery, Copenhagen University Hospital Bispebjerg and Frederiksberg, Copenhagen, Denmark.
5 Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark.

Background: Intensified acute in-hospital physiotherapy for patients with hip fracture may enhance patient's ability to regain basic mobility at discharge, but frail patients may not be able to complete such intensified physiotherapy.
Aim: The primary aim was to investigate the feasibility of intensified physiotherapy and secondarily to assess the effect of intensified physiotherapy on regained basic mobility at discharge in patients with hip fracture in a single-center, pragmatic, randomized, unblinded feasibility trial.
Materials and Methods: Sixty home-dwelling patients (41 women/19 men, mean age 79 years) with hip fracture and an independent pre-fracture basic mobility level were randomized (2:1) to intensified physiotherapy with two daily sessions on weekdays focused on training of basic mobility and weight-bearing activities (n=40) versus usual care physiotherapy once daily (n=20). Outcomes were physiotherapy completion rates during hospitalization (successful, partial, cancellation), causes of non-successful completed physiotherapy and recovery of basic mobility evaluated with the Cumulated Ambulation Score (CAS).
Results: In the intensified physiotherapy group 82% of the sessions were successfully- or partially completed versus 94% in the usual care group. The main reason for not completing physiotherapy was fatigue. At discharge (median of 7 days post-surgery) significantly (p=0.02) more patients in the intensified physiotherapy group (50%) had regained their pre-fracture basic mobility level (CAS=6) than in the usaul care group (16%).
Interpretation / Conclusion: Intensified acute in-hospital physiotherapy seems feasible for patients after hip fracture surgery, and it may enhance recovery. Intensified in-hospital physiotherapy is mainly restricted by fatigue. The sizeable proportion of patients that regained basic mobility at discharge should be further evaluated in a future full-scale randomized controlled trial.

2. Extent of informal caregiving to older persons after hip fracture: a prospective cohort study

Jonas Ammundsen Ipsen [1,2], Bjarke Viberg [4,5,6], Eva Draborg [3], Inge Hansen [1,2]

1. Department of Physical Therapy and Occupational Therapy, Lillebaelt Hospital, University Hospital of Southern Denmark, Kolding
2. Department of Regional Health Research, University of Southern Denmark, Odense
3. Danish Centre for Health Economics, Department of Public Health, University of Southern Denmark, Odense
4. Department of Orthopaedic Surgery and Traumatology. Lillebaelt Hospital, University Hospital of Southern Denmark, Kolding
5. Department of Orthopaedic Surgery and Traumatology. Odense University Hospital, Odense 6. Department of Clinical Research, University of Southern Denmark, Odense

Background: Patients has a need for help upon discharge to home after hip fracture. To meet the need, patients receive formal care from municipalities and/or informal care (IC) from family/friends. IC can help patients with tasks as collecting medication, buying groceries and showering. Tasks that otherwise would require assistance by formal caregivers. Thus, informal care can cloak an otherwise unmet need for care after hip fracture. Nevertheless, knowledge on informal caregiving are very scarce and current estimates does not fit older home-dwelling persons.
Aim: To explore the extent of informal caregiving to older home-dwelling persons after hip fracture.
Materials and Methods: This prospective study is part of the 'Rehabilitation for Life' trial and encompasses a regional hospital and the municipalities of the catchment area. Inclusion criteria was 65+ home-dwelling persons cognitively un- impaired, after hip fracture. Exclusion criteria: short life expectancy and revised surgery. IC was reported in diaries and collected biweekly for 12 weeks after discharge. Outcome was total amount of IC the first 12 weeks after discharge, presented as median and interquartile range. As a sub-analysis, the median amount of IC was used as cut-off for a high and low dependent group.
Results: A total of 226 person's participated, median age 78 years (73-84) and 60% were women. Ninety-one percent received IC median 28 hours (10, 64). Week 1-2, 72% received IC median 8 hours (0, 28). At week 11-12, 35% received IC median 0 hours (0, 7). Fourty-seven percent were high dependent median 66 hours (46-107), fifty-three percent were low-dependent median 11 hours (2- 20). The high dependent persons had lower mobility and Barthel-20 scores (p=0.02 and p=0.00) and less frequently lived alone (p=0.04).
Interpretation / Conclusion: Even though formal care in Denmark is free of charge, a staggering 91% of the cohort received IC median 28 hours. The proportions and amounts declined during the 12 weeks. At discharge, persons' high dependent on IC had difficulties with everyday activities and relied more on partners. Indicating that persons with poor mobility, difficulties with everyday tasks and IC may have an unmet need for care.

3. Infection among patients with hip fracture: Predictive ability of Charlson, Elixhauser, Rx-risk, and Nordic multimorbidity indices

Dorete K. Storbjerg[1], Nadia R. Gadgaard[1], Alma B. Pedersen[1]
1. Department of Clinical Epidemiology, Aarhus University Hospital and Aarhus University;

Background: Post-surgery infection is a common complication among hip fracture patients. Comorbidity indices are important for case-mix confounder adjustment. It is however unknown whether different comorbidity indices have equal predictive ability for post-surgery infections.
Aim: The aim of this population-based cohort study was to evaluate the predictive ability of Charlson Comorbidity Index (CCI), Elixhauser Comorbidity Index (ECI), Rx-Risk Index (Rx-Risk), and Nordic Multimorbidity Index (NMI) for any infection up to 1 year after discharge for hip fracture surgery.
Materials and Methods: We included 92,600 hip fracture patients from the Danish Multidisciplinary Hip Fracture Registry (2004-2018) and linked their data to the Danish National Patient Registry and Danish National Prescription Database. Disease categories in the CCI and ECI were based on diagnosis codes, Rx-Risk was based on prescription codes, and NMI was based on both diagnosis- and prescription codes. A 1, 5, and 10-year lookback period were applied to calculate comorbidity indices. Logistic regression was used to calculate c-index to assess discrimination ability of indices individually and combined with a base model of age and sex. Outcomes were any infection in-hospital and any infection 1 year after discharge.
Results: Majority of patients were females (71%), and mean age was 83 years. With a 10-year lookback period, the c-index for individual comorbidity indices for in- hospital infections varied from c-index=0.53 to c-index=0.56, similar to base model alone (c- index=0.56). The predictive ability of comorbidity indices in combination with base model varied from c-index=0.56 to c-index=0.57. Within 1 year after discharge, NMI in combination with base model had best predictive ability for infections (c-index=0.615), followed by CCI and ECI (c-index=0.60) and Rx-Risk (c-index=0.58). Discrimination was similar for all lookback periods.
Interpretation / Conclusion: Comorbidity indices have low predictive ability for infection up to 1 year after hip fracture surgery, similar to predictive ability of age and sex alone. Thus, use of comorbidity indices as a tool for predicting infections is limited. For case-mix adjustment, evaluated comorbidity indices are of equal value.

4. Dual mobility total hip arthroplasty shows similar dislocation rate as hemiarthroplasty in cognitively impaired patients with hip fracture

Christina Frølich Frandsen[1], Maiken Stilling[1,2,3], Torben Bæk Hansen[1,2], Tobias Kvanner Aasvang[4], Morten Tange Kristensen[4,5,6]

1. University Clinic for Hand, Hip and Knee Surgery, Department of Orthopaedics, Gødstrup Hospital
2. Department of Clinical Medicine, Aarhus University, Denmark
3. Department of Orthopaedics, Aarhus University Hospital, Aarhus, Denmark
4. Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark.
5. Department of Physiotherapy, Copenhagen University Hospital, Amager-Hvidovre, Denmark.
6. Department of Physical and Occupational Therapy, Copenhagen University Hospital, Bispebjerg-Frederiksberg and Department of Clinical Medicine, University of Copenhagen, Denmark

Background: Cognitive impairment is seen in approximately 30% of patients with hip fractures and associated with poorer outcome. When treating displaced femoral neck fractures (FNF) hemiarthroplasty (HA) has been the preferred choice of arthroplasty, especially in cognitively impaired patients. A total hip arthroplasty (THA) is considered a relevant alternative but rarely chosen, partly due to an expected increased risk of dislocation compared to HA. However, dual- mobility THA has shown reduced risk of dislocation, but no studies have compared the risk in cognitively impaired patients.
Aim: Primarily, to compare the 90-day dislocation rate of HA versus THA in cognitively impaired patients with FNF. Secondly, to compare the 30-day post-surgery mortality and 30-day post-discharge readmission rates.
Materials and Methods: A consecutive cohort of 436 patients, 65 years or older, with a FNF admitted at two hospitals from January 2018 to June 2019 were evaluated for inclusion. Patients were screened for cognitive impairment upon admission and surgically treated with one hospital using uncemented HA and the other using dual-mobility THA (cemented, uncemented or hybrid). Outcome was extracted from electronic patient records regarding dislocation, readmission (defined as any acute physical hospital contact for any cause), and mortality. Chi-squared and Fishers exact test was used to evaluated between group differences.
Results: 164 out of the 436 patients (38%) with a median age of 85 years had cognitive impairment and were included. 101 patients were treated with HA and 63 with THA. Baseline characteristics of the two groups were similar. The 90-day dislocation rate was 11.9% in the HA-group and 6.5% in the THA-group (p=0.3). A higher readmission rate was observed in the HA- group (37.6%) versus THA-group (19.1%), p=0.01. Corresponding, mortality rates were 15.8% for HA and 14.3% for THA (p=0.8), respectively.
Interpretation / Conclusion: Our findings do not support the hypothesis of a higher risk of dislocation in cognitive impaired patients treated with THA in comparison with the more commonly used HA. Furthermore, the premise of a larger surgical stress when using THA resulting in poorer outcomes such as readmission and mortality is not supported.

5. Low haemoglobin nine days after discharge is associated with reduced mobility two months after hip fracture surgery

Martin Aasbrenn[1,2], Thomas Giver Jensen[3], Marie West Pedersen[4], Nicolai Henning Jensen[4], Troels Haxholdt Lunn[6,7], Eckart Pressel[1,7], Henrik Palm[2,3], Anette Ekmann[1], Charlotte Suetta[1,2,7], Søren Overgaard[2,3], Morten Tange Kristensen[2,4]

1. Department of Geriatric and Palliative Medicine, Bispebjerg-Frederiksberg University Hospital;
2. University of Copenhagen, Department of Clinical Medicine, Faculty of Health and Medical Science;
3. Department of Orthopaedic Surgery and Traumatology, Bispebjerg-Frederiksberg University Hospital;
4. Department of Physical and Occupational Therapy, Bispebjerg-Frederiksberg University Hospital;
5. Department of Orthopaedic Surgery, North Zealand Hospital; 6. Department of Anaesthesia and Intensive Care, Bispebjerg-Frederiksberg University Hospital; 7. Copenhagen University Hospital Herlev and Gentofte, Department of Internal Medicine

Background: Haemoglobin is essential for optimal skeletal muscle function and anaemia can be a limiting factor in rehabilitation after acute disease.
Aim: We examined the association between haemoglobin early after discharge and mobility two months after a surgically treated hip fracture.
Materials and Methods: Older patients (≥65 years) surgically treated for a hip fracture at Copenhagen University Hospital Bispebjerg and Frederiksberg in 2021 and referred to a outpatient visit two months after discharge were included in the study. Haemoglobin was measured 9 days after discharge from the hospital. New Mobility Score (NMS, 0-9 points) was evaluated by a physiotherapist two months after the admission. Anaemia was defined according to the WHO definition (Haemoglobin <13 g/dL in men, <12 g/dL in women) The association between haemoglobin and NMS was evaluated by linear regression, with age and sex as covariates.
Results: We included 102 patients with a mean (SD) age of 78 (9) years; 75 (74%) were women. Haemoglobin at the 9-day visit was 10.6 g/dL (SD 1.3) and 89 (87%) had anaemia according to the WHO definition. The average NMS two months after the admission was 4.7 (SD 2.2). Low haemoglobin at the 9th day after discharge was associated with reduced NMS at the 2 month control (β=0.80, 95% CI 0.36-1.38, p=0.002).
Interpretation / Conclusion: In hip fracture patients, we found an association between haemoglobin in the second week after discharge and mobility two months after surgery. Whether treatments to increase haemoglobin in the postoperative phase could enhance rehabilitation and increase recovery should be evaluated in further studies.

6. Quality of care and mortality in hip fracture patients in the course of the COVID pandemic. A population based cohort study

Alma B. Pedersen[1,2], Nickolaj Risbo[1,2], Bjarke L. Viberg[3,4], Henrik Palm[5], Niels Dieter Rock[3]

1. Department of Clinical Epidemiology, Aarhus University Hospital
2. Department of Clinical Medicine, Aarhus University
3. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital
4. Department of Clinical Research, University of Southern Denmark
5. Department of Orthopaedic Surgery, Copenhagen University Hospital Bispebjerg

Background: Few international studies on hip fracture patients suggested no increase in mortality but negative impact on quality of care indicators during COVID compared to pre-COVID period.
Aim: We assessed the quality of in-hospital care for hip fracture patients in Denmark and subsequent mortality before and during the early stages of COVID pandemic.
Materials and Methods: We obtained data on hip fracture patients and quality indicators from the Danish Multidisciplinary Hip Fracture Registry in the COVID period (11 Marts 2019 to 27 January 2021, overall and in five separate periods), and compared these to a pre-COVID period (13 March 2019 to 10 March 2020). Mortality and comorbidity data were from the other Danish medical databases. By different COVID periods, we calculated the proportion of patients (%) that have fulfilled >80% of the relevant quality indicators (a composite score). We used Cox regression to calculate hazard ratios (HR) comparing 30-day mortality in COVID period with pre-COVID period, adjusting for age, gender, comorbidity and residence.
Results: A total of 6575 were treated for hip fracture in the pre-COVID period, and 5919 in the COVID period. Overall, there was no difference in gender, age, fracture and surgery type, body mass index, and comorbidity prevalence between pre-COVID and COVID periods. The composite score was 73% in pre-COVID period, compared to 73% to 80% in the five COVID periods. 30-day mortality was 9.5% in pre-COVID period, compared to 10.8% in the overall COVID period. Mortality varied from 10% in the COVID period with few restrictions, 11.1% in the first national lockdown, to 11.9% in the second national lockdown. HR for mortality was 1.15 (1.02-1.30) in the overall COVID compared to pre-COVID period. HRs varied from 1.07 (0.89-1.29) to 1.31 (1.06-1.62) in five COVID periods. We observed regional variations in the HRs when comparing overall COVID with pre-COVID period.
Interpretation / Conclusion: The quality of in-hospital care for hip fracture patients in Denmark was higher in the COVID compared to pre-COVID period. Unfortunately, 30-day mortality was also higher in the COVID compared to pre-COVID period.

8. Adjusting perioperative methadone dose for elderly and fragile hip fracture patients (MetaHip-trial) - an adaptive dose-finding trial

Jesper Ougaard Schønnemann[1], Thomas Strøm [2], Kirsten Specht [3], Kevin Heebøll Nygaard[1]

1. Department of Orthopaedics, University Hospital of Southern Denmark, Aabenraa
2. Department of Anesthesiology and Intensive care, University Hospital of Southern Denmark, Aabenraa
3. Center for COPD, Center for Health and Rehabilitation, Copenhagen

Background: Hip fractures are associated with severe pain and are sustained by the elderly. Demand for adequate pain relief combined with a low tolerance for drugs makes the analgesic treatment of elderly patients difficult. A single dose of methadone reduces postoperative pain and opioid consumption. However, the safety of using methadone for elderly and fragile patients is unknown.
Aim: Determining the maximal tolerable dose of methadone in elderly hip fracture patients.
Materials and Methods: Hip fracture patients ≥60 years were consecutively included at a Danish University Hospital in 2023. An adaptive algorithm assigned either 0.10 mg/kg, 0.15 mg/kg, or 0.20 mg/kg of methadone to each patient, administered one time intravenously at the induction of anesthesia. Primary outcome was respiratory depression (RD) and the algorithm would continuously monitor the occurrence throughout the study. The occurrence of RD required a decrease in dosage for the next patient and the absence allowed an increase. This allowed real-time dose adjustment during our study. Data collection was initiated at the post- anesthesia care unit (PACU) and continued at the orthopedic ward where observation charts were completed at 6, 24, and 72 hours after surgery. Secondary outcomes include time spent in PACU, verbal rating pain score (VRS), opioid consumption, and nausea/vomiting.
Results: 30 patients completed the study of which 14 underwent general anesthesia and 16 underwent spinal anesthesia. Three patients experienced RD in PACU. All three received 0.15 mg/kg methadone and they all underwent general anesthesia. None of the patients in spinal anesthesia experienced RD and no patients experienced RD after discharge from PACU. Elderly hip fracture patients undergoing spinal anesthesia did not experience respiratory depression after 0.15 mg/kg methadone.
Interpretation / Conclusion: We have demonstrated that methadone is safe to use during hip fracture surgery. Our data suggest that the maximal tolerable dose of methadone in elderly hip fracture patients undergoing general anesthesia is 0.10 mg/kg. Our results show a great divergence in the tolerability of methadone depending on the type of anesthesia and call for further studies.

9. Quantifying Variability in Daily Accelerations Recorded by Inertial Sensor in Healthy Individuals: Implications for Gait Measurements in Free-Living Environments

Arash Ghaffari[1], John Rasmussen [2], Søren Kold[1], Ole Rahbek[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital
2. Department of Materials and Production, Aalborg University

Background: Gait measurements can vary due to various intrinsic and extrinsic factors, and this variability becomes more pronounced using inertial sensors in a free-living environment. Therefore, identifying and quantifying the sources of variability is essential to ensure measurement reliability and maintain data quality.
Aim: This study aimed to determine the variability of daily accelerations recorded by an inertial sensor in a group of healthy individuals.
Materials and Methods: Ten participants, including six females, with a mean age of 50 years (range: 29–61) and BMI of 26.9 kg/m² (range: 21.4–36.8), were included. A single accelerometer continuously recorded lower limb accelerations over two weeks. We extracted and analyzed the accelerations of three consecutive strides within walking bouts if the time difference between the bouts was more than two hours. Multivariate mixed-effects modeling was performed on both the discretized acceleration waveforms at 101 points (0-100) and the harmonics of the signals in the frequency domain to determine the variance components for different subjects, days, bouts, and steps as the random effect variables. Intraclass correlation coefficients (ICCs) were calculated for between-day, between-bout, and between-step comparisons.
Results: The results showed that the ICCs for the between-day, between-bout, and between-step comparisons were 0.73, 0.82, 0.99 for the vertical axis; 0.64, 0.75, 0.99 for the anteroposterior axis; and 0.55, 0.96, 0.97 for the mediolateral axis. For the signal harmonics, the respective ICCs were 0.98, 0.98, 0.99 for the vertical axis; 0.54, 0.93, 0.98 for the anteroposterior axis; and 0.69, 0.78, 0.95 for the mediolateral axis.
Interpretation / Conclusion: Overall, this study demonstrated that accelerations recorded continuously for multiple days in a free-living environment exhibit high variability, mainly between subjects, with some variability arising from differences between days and walking bouts, particularly in the anteroposterior and mediolateral axes. However, reliable and repeatable gait measurements can be obtained by identifying and quantifying the sources of variability.

10. Risk of secondary surgery following surgical treatment of fractures in adults

Anders Bo Rønnegaard[1], Signe Steenstrup Jensen[1], Peter Toft Tengberg[2], Per Hviid Gundtoft[1,3], Bjarke Viberg[1,4]

1. Department of Orthopedic Surgery and Traumatology, Kolding Hospital - part of Hospital Lillebaelt
2. Department of Orthopedic Surgery, Hvidovre Hospital
3. Department of Orthopedic Surgery, Aarhus University Hospital
4. Department of Orthopedic Surgery, Odense University Hospital

Background: The risk of secondary surgery following primary, fracture-related surgery of the extremities is either unknown or only described in a limited number of studies. In order to inform patients adequately it is important to have studies concerning large cohorts for statistical accuracy and subgroup analyses.
Aim: To estimate the risk of experiencing any secondary, musculoskeletal surgery within 2 years of primary fracture-related surgery using osteosynthesis.
Materials and Methods: We performed a nationwide register study on adult patients surgically treated for fractures at a Danish hospital in 2016 with 2 years of follow-up using data from the Danish Fracture Database, the Danish National Patient Registry and the Danish Civil Registration System. Primary outcome was risk of any secondary, musculoskeletal surgery defined as any surgical procedure code within 2 years after primary surgery. Secondary outcome was risk of major reoperation defined as reosteosynthesis, nonunion, arthroplasty, and deep infection. We calculated risk using the cumulative incidence function accounting for death as a competing risk and presented with 95% confidence intervals (CI) overall and stratified on age, sex and anatomical area.
Results: We included 9,719 adult patients of which 63% were female and the median age was 70 years (20–100). Fractures of the upper leg were most frequent. The overall risk of secondary musculoskeletal surgery was 20% (95% CI (19.1–20.6)) and for major reoperation it was 8% (95% CI (7.1–8.2)). Males had a higher risk of all outcomes compared to females. Across anatomical areas risk of secondary surgery ranged from 11% (95% CI 9.9–11.7) in the upper leg to 70% (95% CI 66.6–73.6) in the hand. For major reoperations it ranged from 4% (95% CI 3.5–5.3) in the forearm to 13% (95% CI 11.2–14.8) in the ankle and foot.
Interpretation / Conclusion: This study provide estimates for the risk of experiencing secondary, musculoskeletal surgery and major reoperations following primary, fracture- related surgery of the extremities, which can be used by orthopedic surgeons counselling patients prior to fracture-related surgical procedures.

SESSION 2: SPINE

15 November 2023

09:00 - 10:30

Room: 102+105

Chairs: Rikke Rousing and Søren Orht-Nissen

11. Cost-Effectiveness of Instrumented Versus Uninstrumented Fusion for Degenerative Spondylolisthesis

Andreas Kiilerich Andresen[1,2], Mikkel Østerheden Andersen[1,2], Leah Carreon[1,2], Jan Sørensen[3,4]

1. Center for Spine Surgery and Research, Lillebaelt Hospital, Middelfart, Denmark
2. Institute of Regional Health Research, University of Southern Denmark, Odense, Denmark
3.RCSI Healthcare Outcome Research Centre, RCSI University of Medicine and Health Sciences, St. Stephen's Green, Dublin, Ireland
4.Danish Centre for Health Economics, University of Southern Denmark, Winsløwparken, Odense, Denmark

Background: For patients with persistent symptoms due to degenerative spondylolisthesis surgical intervention may be recommended, typically decompression and fusion, either instrumented or uninstrumented. Instrumentation in the form of screw fixation, is considered standard of care outside of Scandinavia, however, fusion surgery in elderly patients is challenging due to osteoporotic bone stock, higher risk of complications and implant failure. With an aging population, cost-effectiveness studies are increasingly more important to guide surgeons and politicians decisions.
Aim: The aim of this study is to investigate whether instrumented posterolateral fusion is cost-effective compared to uninstrumented posterolateral fusion in elderly patients who undergo fusion surgery for one-level degenerative spondylolisthesis with spinal stenosis.
Materials and Methods: This cost-effectiveness analysis is based on a single-center, open label, randomized controlled trial, where patients with symptomatic degenerative spondylolisthesis were randomly assigned 1:1 to either instrumented posterolateral fusion or uninstrumented posterolateral fusion. Quality-Adjusted Life Years were obtained from EuroQoL-5D-3L. Use of health services were obtained from patient charts and accumulated until 2 years after index surgery.
Results: Of the 108 patients included in the study, 107 patients received the allocated intervention. There were no differences in preoperative demographics. Although the base price for instrumented posterolateral fusion was significantly higher than for uninstrumented posterolateral fusion, average cost of surgery was only €146 higher. The instrumented group has significantly less reoperations (2% vs 13%, p=0.03) outpatient visits (12 vs 38, p=0.015), MRIs performed (12.9% vs 35.0%, p=0.019). The base case incremental cost-effectiveness ratio was estimated at €1,536 per QALY.
Interpretation / Conclusion: Although the initial cost for implants are higher in the instrumented group, the cost is offset by increased use of health resources and reoperations in the uninstrumented group after surgery. The base case analysis suggested that the ICER for instrumented posterolateral fusion was well below usual levels of thresholds for cost effectiveness.

12. Outcomes and Complications after Two-Level Anterior Cervical Discectomy and Fusion (ACDF) with or without Anterior Plating: A Propensity Matched Cohort study.

Jenny Kornberg[1], Kristian Høy[1], Mikkel Østerheden Andersen[2], Leah Carreon[2]

1. Department of Orthopaedics, Aarhus University Hospital
2. Center for Spine Surgery and Research, Lillebaelt Hospital

Background: Anterior cervical discectomy and fusion (ACDF) is the current standard of treatment for disc herniation and radiculopathy resistant to non- operative care. ACDF can be performed with or without plating, but the use of plate versus stand-alone cage is still a matter of debate.
Aim: The aim was to compare self-reported outcomes, subsidence, and revision rate in patients with two-level ACDF surgery with and without plate.
Materials and Methods: Prospective data from 96 patients with MRI verified cervical foraminal stenosis or disc herniation, eligible for two-level ACDF surgery, were identified and collected from The Danish National Spine Registry, DaneSpine. Demographics, patient reported outcomes, previous spine surgery and reoperations were all patient-reported using questionnaires pre- and minimum 1-year postoperative. The patients were divided into two groups, plated or not. To minimize baseline differences, propensity-score matching was applied based on age, gender, body mass index, smoking status, pre-op neck and arm pain, EQ-5D and NDI. One-year postoperative x-rays were examined to determine the amount of subsidence.
Results: A total of 86 (89,6%) patients undergoing two- level ACDF surgery had completed pre-op, surgical and one-year follow-up data. Thus, two matched cohorts consisting of 37 patients could be created. Interestingly plated patients reported significantly lower neck-pain (24.1 vs. 40.1 p=0.018) and higher EQ-5D (0.76 vs 0.62 p=0.038) scores one year after surgery compared to those without. At follow-up, there were no difference in subsidence (8 vs 9, p=1.000) or revision rates (1 vs 2, p=0.389) between the two groups.
Interpretation / Conclusion: Anterior plating in patients undergoing two-level ACDF leads to less neck pain compared to no plate but does not reduce cage subsidence or reoperation rate.

13. Rate of unexpected malignancy in patients with vertebral compression fracture undergoing percutaneous vertebroplasty – six years after implementation of a new magnetic resonance imaging scanning protocol

Line Adsbøll Wickstrøm[1,2], Mikkel Østerheden Andersen[1,2], Søren Rafael Rafaelsen[3], Andreas Andresen[1,2], Signe Elmose[1,2], Leah Carreon[1,2]

1. Centre for Spine Surgery and Research, Region of Southern Denmark, Middelfart
2. Department of Clinical Research and Institute of Regional Health Research, University of Southern Denmark, Odense
3. Department of Radiology, Clinical Cancer Centre, University Hospital of Southern Denmark, Hospital Lillebaelt, Vejle

Background: Discrimination between benign and malign vertebral compression fracture (VCF) can be difficult. However, early diagnosis of malignant VCF is crucial to further treatment and prognosis. An earlier study at an orthopeadic department reported a rate of unsuspected malignancy of 4.9% in patients with VCF who underwent percutaneous vertebroplasty (PVP) when biopsies were obtained during the procedure. MRI scanning protocol was changed in this period.
Aim: To investigate if the rate of unsuspected malignancy in biopsies in patients with VCF who underwent PVP at the same othopeadic department has changed after implementation of a new MRI scanning protocol.
Materials and Methods: Retrospective on 427 patients with vertebral compression fracture undergoing PVP from 28th of April 2017 to 28th of April 2022, identifying operated patients from the Danish national DaneSpine registry. Subsequently, individual clinical information was collected in journal records.
Results: The rate of unsuspected malignancy was 0.9% (4/427) and the overestimation of malignant VCF was 50% (16/32).
Interpretation / Conclusion: During the last 5 years, the rate of unsuspected malignancy in patients with VCF undergoing PVP has improved considerably from 4.9% to 0.9%. Furthermore, MRI is over-diagnosing malignancies. Thus, the new scanning procedure is effective in differentiating between benign and malign VCFs.

14. The magnetic field strength and the force distance dependency of the magnetically controlled growing rods used for early-onset scoliosis.

Lars Diekhöner[1], Charlotte Sommer Meyer[2, 3], Kresten Wendell Rickers [2,3], Søren Peter Eiskjær [2, 3]

1. Aalborg University, Physics Group, Department of Materials and Production, Aalborg
2. Department of Orthopedic Surgery, Aalborg University Hospital, Aalborg
3. Department of Clinical Medicine, Faculty of Medicine, Aalborg

Background: Untreated early-onset scoliosis (EOS) leads to respiratory insufficiency and reduced life expectancy. Magnetically controlled growing rods (MCGR's) have revolutionized the treatment of EOS. It is now possible to do painless lengthening in the outpatient clinic without anesthesia. However, MCGR's have inherent complications like non-functioning of the lengthening mechanism.
Aim: We aimed to specify one correct indication for MCGR use by measuring the lengthening forces at varying distances between the external remote controller (ECR) and the MCGR to quantify the role of implantation depth.
Materials and Methods: The magnetic field strength was measured on new and explanted rods, at different distances between the external remote controller and the MCGR and likewise in patients before and after distractions in the outpatient clinic. All rods were from the MAGEC system (Nuvasive Inc., US). Two new and 12 explanted MCGRs was used for the lab measurements of the elicited force using a forcemeter. At the outpatient clinic we measured on four patients, each with two implanted rods.
Results: At a distance of 25 mm, the force was reduced to approximately 40% (ca. 100 N) compared to zero distance (ca. 250 N), most so for explanted rods. The magnetic field strength of the internal actuator decayed fast with increasing distances and plateaued at 25–30 mm approximating zero.
Interpretation / Conclusion: Based on our findings, it is of outmost importance minimizing the implantation depth to ensure proper functionality of the rod lengthening. Therefore, we recommend a distance of 25 mm from skin to MCGR to be considered a relative contraindication to clinical use in EOS patients.

15. Patient-reported outcome after adult spinal deformity surgery – Are there differences between primary and revision surgery?

Amalie Schramm[1], Lærke Ragborg[1], Martin Heegaard[1], Lars Valentin Hansen[1], Benny Dahl[1], Martin Gehrchen[1], Søren Ohrt-Nissen[1]

Spine Unit, Department of Orthopedic Surgery, Rigshospitalet, Copenhagen, Denmark

Background: Surgical treatment of adult spinal deformity (ASD) can significantly impact health-related quality of life (HRQoL) but is associated with a high revision rate. Whether the same patient-reported outcome (PRO) can be expected after revision surgery compared to primary surgery is uncertain.
Aim: The aim of this study was to compare PRO between revision and primary ASD surgery. We hypothesized that revision surgery would result in poorer HRQoL and treatment satisfaction.
Materials and Methods: We conducted a retrospective study on ASD patients undergoing primary and revision surgery on ≥ 5 levels. We included patients at a single centre ≥ 18 years old having either primary or revision surgery from 2010 to 2020, who had completed ≥ 2 years postoperative HRQoL-questionnaires. Patients were divided into two groups: 1) primary surgery or 2) revision surgery. HRQoL and treatment satisfaction were assessed with SRS-22r and EQ-5D-3L and compared between groups.
Results: One hundred and seventy-four patients completed the postoperative questionnaires (89 primary surgery and 85 revision surgery). Mean age was 60±16 years in the revision group and 52±20 in the primary group. 71% in the revision group and 56% in the primary group were female. Median [interquartile range] SRS-22r subscore was 3.1 [2.4-3.8] and 3.3 [2.4-4.0] in the revision and primary group, respectively (p=0.150). The satisfaction score was 4.0 [3.0-4.5] vs. 4.0 [3.5-4.5] (p=0.206) and the EQ-5D-3L index score was 0.374 [0.304-0.537] vs. 0.416 [0.304-0.641], (p=0.136). The function/activity score was 2.8 [2.2-3.4] in the revision group vs 3.2 [2.4-4.0] in the primary group (p=0.027).
Interpretation / Conclusion: We found no difference in overall patient-reported HRQoL and treatment satisfaction between revision and primary surgery. Although revision surgery is associated with a higher morbidity and risk of complications, patients can expect the same PRO compared to their primary surgery.

16. Spinal Decompression and Posterolateral Fusion Improves Walking Capacity and Balance and Reduces Residual Urine in Patients with Spinal Stenosis

Andreas Kiilerich Andresen[1,2], Leah Carreon[1,2], Mikkel Andersen[1,,2],

1. Center for Spine Surgery and Research, Lillebaelt Hospital, Middelfart, Denmark
2. Institute of Regional Health Research, University of Southern Denmark, Odense, Denmark

Background: Patients with lumbar spinal stenosis complain of leg pain, impaired walking capacity and loss of balance. This decrease in function and balance leads to considerable disability and difficulty with normal function in society. In addition, spinal stenosis has been suggested to cause urinary retention, but this has not been extensively studied.
Aim: The purpose of the study is to investigate whether decreased walking capacity, balance and residual urine volume will improve after decompression and fusion surgery.
Materials and Methods: Patients scheduled for decompression and fusion due to spinal stenosis with grade 1 degenerative spondylolisthesis were enrolled. Walking distance was measured and timed (maximum of 1000m). Tandem test was performed, at 10 second intervals patients were asking to stand side-by-side, in semi-tandem and in tandem position. Patient scores range from 0-30. A post voiding ultrasonic bladder scan was performed by a registered nurse. Patients were grouped based on post void bladder volume above or below 100ml.
Results: 101 patients were included in the study, mean age was 70.7 years, 77% were female, of these 90% had symptoms for more than 6 months prior to surgery. Preoperatively, patients had a mean walking distance of 123.9meters (86.5;161.2), which increased to 791.1m (722.6;859.7) at one-year follow up ($p<0.001$). The correlating walking speed was 0.91m/s (0.86;0.97) preoperatively, with an increase to 1.17m/s (1.12;1.22) at 1 year follow up ($p=0.02$). The tandem test had a mean preoperative score of 19.6 (17.7;21.24), an increase to 26.0 (24.7;27.4) was seen at 3 months follow up, and was sustained after 2 years 12 (11.9%) of patients had more than 100ml residual urine at preoperative, this was down to 2 patients at 3 months follow up, and at 24 months follow up zero patients had significant urine retention.
Interpretation / Conclusion: Patients who had decompression and fusion due to spinal stenosis with grade 1 spondylolisthesis had severe neurological impairment regarding walking capacity, balance, and urine retention which, regardless of chronicity, was significantly improved after decompression surgery.

17. Revision surgery in Adult Spinal Deformity (ASD): A 2-year comparison between Lumbar Pedicle Subtraction Osteotomy (PSO) and supplemental Posterior Lumbar Interbody Fusion (PLIF)

Lærke Ragborg[1], Niklas Tøndevold[1], Ture Karbo[1], Casper Dragsted[1], Robert Svardal-Stelmer[1], Lars Valentin Hansen[1], Benny Dahl[1], Martin Gehrchen[1]

Spine Unit, Dept. Of Orthopedic Surgery, Rigshospitalet, Copenhagen, Denmark

Background: High revision rates remain a concern when treating patients with ASD. PSO is the golden standard when treating rigid deformities; however, it can be associated with high postoperative complications, including mechanical failure. The PLIF technique is thought to facilitate the restoration of the lordosis and subsequently sagittal alignment and improve intercorporal bony fusion.
Aim: The main purpose of this study was to compare revision rates and sagittal correction in patients with ASD treated with either PSO or PLIF without PSO.
Materials and Methods: In 2016, PLIF was introduced at our institution as an alternative method to creating lordosis, as opposed to only having been using PSO during the previous years. We, therefore, analyzed two cohorts of patients with ASD undergoing either: PSO in 2010- 2015 or PLIF in 2016-2020, retrospectively. None of the patients received both treatments during the period. ASD was defined as posterior fusion of ≥5 levels including sacrum. The rate of mechanical failure was obtained and analyzed using competing risk analysis. Full-spine radiographs were analyzed and compared between cohorts.
Results: We included 119 patients (89 PSO and 30 PLIF) with a mean age of 64.1±10 years. Baseline demographics and radiographic parameters were comparable between cohorts except for SVA; 115±28 mm vs 87±46 mm (p-value<0.05) and segmental lordosis; 5.0±17° vs 14±3° (p- value<0.05) for PSO and PLIF, respectively. Competing risk analysis showed a cumulative incidence of revision surgery of 38.2% (95% CI 28.1-48.3) vs 16.7 (95% CI 3.3-30.0) (p-value <0.05) for PSO and PLIF at 2-year follow-up. We found an increased odds ratio for revision surgery when treated with PSO of 2.77 (95% CI 1.10-6.69) (p-value <0.05) after adjusting for preoperative SVA and segmental lordosis. A comparable sagittal alignment was obtained for both groups postoperatively.
Interpretation / Conclusion: A substantially lower revision rate was seen for patients undergoing PLIF compared with PSO at a 2-year follow-up. Moreover, an increased odds ratio for revision was found for PSO patients. A satisfactory sagittal correction was obtained for both groups regardless of the procedure. Thus PLIF should be considered when technically possible.

18. The effect of night-time bracing on the sagittal profile in adolescent idiopathic scoliosis

Martin Heegaard[1], Niklas Tøndevold[1], Benny Dahl[1], Thomas B Andersen, [1], Martin Gehrchen[1], Søren Ohrt-Nissen[1]

Spine Unit, Dept. of Orthopedic Surgery, Rigshospitalet, Copenhagen University Hospital, Denmark

Background: Adolescent idiopathic scoliosis (AIS) characterized by a coronal scoliosis and often a sagittal hypokyphosis. The effect of bracing on the sagittal profile is not well understood.
Aim: The aim of this study is to assess the effect of night- time bracing on the sagittal profile in patients with AIS.
Materials and Methods: We retrospectively included AIS patients with a main curve of 25-45° treated with a night-time brace in our institution between 2005 and 2018. Patients with an estimated growth potential irrespective of Risser stage and menarchal status were included. Coronal and sagittal radiographic parameters were recorded at brace initiation and post bracing using the classification described by Abelin-Genevois for sagittal parameters and Lenke for the coronal deformity. Patients were followed until surgery or one year after brace termination.
Results: One hundred forty-six patients were included. Maximum thoracic kyphosis (TK) increased by a mean of 2.5° (±9.7) (p=0.003). Twenty-seven percent (n=36) of the patients were hypokyphotic (T4/T12 <20°) at brace initiation compared with 19% (n=26) at brace termination (p=0.134). All other sagittal parameters remained the same at follow-up. We found no association between progression in the coronal plan and change in sagittal parameters.
Interpretation / Conclusion: This is the first study to indicate that night-time bracing of AIS does not induce hypokyphosis. We found a small increase in TK during bracing but 20% still remained hypokyphotic. The coronal curve progression was not coupled to change in TK.

19. Usability and performance expectancy determines the use of a clinical decision support system in spine surgery

Søren Eiskjær[1], Casper Friis Pedersen[2], Simon Toftgaard Skov[3], Mikkel Østerheden Andersen[2]

1. Dept. of Orthopedic Surgery, Aalborg University Hospital; 2. Lillebaelt Hospital, Middelfart, Denmark
3. Elective Surgery Center, Silkeborg Regional Hospital

Background: We are of the opinion that predictive modeling of the outcome of spinal surgery using AI or ML can support the right treatment decision for the patient with a spinal disorder. For that purpose, we have constructed a clinical decision support system (CDSS) named PROPOSE. Based on patient reported outcome measures (PROM) a real time prediction is made for the outcome after surgery – quality of life (EQ-5D, ODI) back and leg pain, walking distance, return to work and risk of complications. However, a CDSS will only be used in the clinical setting if the clinicians can accept using the CDSS.
Aim: The aim of the current study was to develop a model for the factors that drive or impede the use of an AI clinical decision support system (CDSS) PROPOSE supporting the shared decision making on the choice of treatment of ordinary spinal disorders.
Materials and Methods: Sixty-two spine surgeons were asked to answer a questionnaire regarding behavioral intention to use the CDSS after being presented for PROPOSE. The model behind the questionnaire was the unified theory of acceptance and use of technology (UTAUT). Data were analyzed using PLS-SEM.
Results: Results: The most important and significant factors were the degree of ease of use associated with the new technology – effort expectancy/usability followed by performance expectancy - the degree to which an individual believes that using a new technology will help him or her to attain gains in job performance. Social influence and trust in the CDSS were other factors in the path model. r2 for the model was 0.63 – indicating that almost two thirds of the variance in the model was explained. The only significant effect in the multigroup analyses of path differences between two subgroups was for PROPOSE use and social influence ($p = 0.01$)
Interpretation / Conclusion: Shared decision making is essential to meet patient expectations in spine surgery. A trustworthy CDSS with ease of use and satisfactory predictive ability and promoted by the leadership will stand the best chance of acceptation and bridging the communication gap between surgeon and patient.

20. Evaluation of an Artificial Intelligence (AI) Based Scoliosis Measurement Program

Miao Wang[1], Ming Sun[2], Haisheng Li[2], Yukang Yang[3], Peter Helmig[2], Kestutis Valancius[2], Cody Bunger[2], Tianyu Liu[3], Yu Wang[4], Ebbe Hansen[2]

1. Department of Orthopaedics, Regions Hospital Horsens, Denmark
2. Department of Orthopaedics, Aarhus University Hospital, Denmark
3. Department of Automation, Tsinghua University, China 4. Department of Orthopaedics,Beijing University Hospital, China

Background: Scoliosis refers to the three-dimensional deformity of the spine with one or several segments of the spine bent laterally with vertebral rotation. Reliable measurement of spinal curve is crucial for determining therapeutic decision for scoliosis patients. Cobb Angle is the gold standard, but it is an objective measurement with variant from surgeon to surgeon. A solid and reliable measurement tool is needed. Artificial Intelligence has showed great potential in image measurement.
Aim: To compare the performance of an AI based scoliosis measurement tool with senior scoliosis surgeons in Denmark
Materials and Methods: Trained the AI algorithm with 650 scoliosis X-ray images by using Convolutional Neural Network (CNN). Another 100 scoliosis X-ray have been assigned into two groups randomly. Each group has been measured by AI and two surgeons. All four surgeons measured Cobb angles twice with minimal 3 weeks interval. Intraclass correlation coefficients (ICC) were used to determine the interobserver and intraobserver reliabilities. (ICC can range from 0 to 1, where 0 means no reliability and 1 means perfect reliability, ICC between 0.9 to 1 means excellent reliability). The correlation of scoliosis curve angle measurements between AI program and senior surgeons have been tested with Pearson correlation coefficient and the mean absolute error.
Results: ICC is 0.96 in group 1 and 0.90 in group 2, which means excellent reliability. Pearson Correlation coefficient was 0.956 in group 1 and 0.930 in group 2. Spearman rank-order correlation was 0.960 ($p < 0.001$) in group 1 and 0.900 ($p < 0.001$) in group 2. The absolute error between AI and surgeons are 3.5°±3.1°in group 1 and 5.0°±3.8° in group 2. In total the absolute error is 4.2°±3.3°. In 67% of all cases, there were only 0-5° different between AI program and spine surgeons.
Interpretation / Conclusion: There is statistic correlation of Cobb angle measurement between our new developed AI program and senior spine surgeons. The reliability is statistic excellent in both patients' groups. Our new AI program can provide reliable Cobb angle measurement as good as senior spine surgeons.

SESSION 3: PAEDIATRIC ORTHOPAEDICS

15 November 2023

09:00 - 10:30

Room: 202+205

Chairs: Louise Klingenberg and Bjarne Møller-Madsen

21. Age-related trends in unintentional injuries among children and adolescents in an urban Danish population 1980-2021. A study of 292,737 cases.

Frederik Haller[1,2], Jens Martin Lauritsen[1,2], Christian Færgemann[1,2]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital.
2. Orthopaedic Research Unit, University of Southern Denmark.

Background: Pediatric unintentional injuries remain a common cause of morbidity. However, no larger study has described the age and gender stratified epidemiology of unintentional injuries among children and adolescents.
Aim: The study aimed to describe the age and gender stratified epidemiology of unintentional injuries in children and adolescents in an urban Danish population from 1980-2021.
Materials and Methods: A retrospective study of all children and adolescents aged 0-17 years treated for lesions due to unintentional injuries at Odense University Hospital 1980-2021. We extracted information about age, gender, place of injury, time of injury, and diagnoses from the emergency department register. We estimated gender specific annual incidence rates (IRs) in different age groups (0-4, 5-9, 10-14, and 15-17 years) per 1000 population/years. The severity was measured using a diagnose-based tool, which transformed diagnoses into mild or severe injuries.
Results: Overall, 292,737 unintentionally injured children and adolescents were included. The median age was 10 years for both gender and 57.4% were boys. The overall IR was 241.2 (CI: 240.2-242.2) for boys and 187.5. (CI: 186.5-188.4) for girls. The highest IR was in the age group 15-17 years for boys and 10-14 years for girls, respectively 275.6 (CI: 273.1-278.1) and 231.6 (CI: 229.6- 233.5). The overall IR for severe injuries was 26.9 (CI: 26.6-27.3) for boys and 20.4 (CI: 20.0-20.8). The highest IR for severe injuries was in the age group 10-14 years in both gender. The IRs for severe injuries decreased significantly in the 10-14 and 15- 17 years age groups for both genders and the 5-9 years age group for boys. The upper limbs were the most frequently injured. Bone fractures accounted for 14.5% of all lesions. Injury time, injury place, and diagnoses varied significantly between age groups.
Interpretation / Conclusion: The IRs varied significantly between the different age groups throughout the study. The study provides information about the injury frequency, mechanism, location, and type of injury, which are useful when coordinating the resources at emergency departments and planning preventive campaigns targeting different age groups.

22. Birthweight correlates to pubo-femoral distances and alpha angles in hip ultrasound of newborns at six weeks of age.

Maria Tirta[1], Michel Bach Hellfritzsch[2,3], Rikke Damkjær Maimburg[2,5,6,7], Mads Henriksenb[2,3], Natallia Lapitskaya[2,3], Søren Kold[1,2], Bjarne Møller Madsen[2,4], Ole Rahbek[1,2], Hans-Christen Husum[1,2]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital, Denmark
2. Danish Paediatric Orthopaedic Research, www.dpor.dk
3. Department of Radiology, Aarhus University Hospital, Denmark
4. Department of Children's Orthopaedics, Aarhus University Hospital, Denmark
5. Department of Midwifery, University College of Northern Denmark, Aalborg
6. Department of Clinical Medicine, Aarhus University, Denmark
7. Department of Occupational Medicine, Danish Ramazzini Centre, Aarhus University Hospital, Denmark

Background: There is inconsistency in the literature as to the relationship between increased birthweight and risk of developmental dysplasia of the hip (DDH).
Aim: The aim of this study was to investigate the correlation of birthweight to pubo-femoral distances (PFD) values in DDH ultrasound, as well as if increased birthweight is negatively correlated to Graf α angles in newborns undergoing hip ultrasound at five- six weeks of age as well as correlation with gender.
Materials and Methods: Newborns' data and ultrasound measurements were collected during a one- year study period from October 2021 to October 2022. Information recorded included birthweight, gestational week, gender, age at examination, and at ultrasound measurements. We excluded multiple births since newborns from multiple births are usually lighter, as well as born more premature, newborns born at 37 gestational week or less, and newborns with incomplete information. Simple and multiple linear regression analysis were performed to evaluate the association of birthweight and PFD, and secondly that of birthweight and α angle.
Results: 670 newborns (1340 hips) were included in this study with equal distribution of males and females. Birthweight was statistically significant higher for male newborns 3712 ± 450 grams vs 3555 ± 428 grams ($p<0.001$). Increased birthweight was positively correlated to PFD values (crude coefficient = 0.245 (95% CI: 0.127; 0.363)) the correlation was still present after adjusting for gender, family history, and breech presentation (adjusted coefficient 0.253 (95% CI: 0.132; 0.373). The stratified model for males was statistically insignificant for both the crude coefficient ($p=0.163$) and the adjusted ($p=0.06$). The effect of birthweight on α measurement for the females was statistically significant (crude coefficient -0.939 (95% CI: -1.828; -0.050); adjusted coefficient -0.926 (95% CI: -1.029; -0.035)).
Interpretation / Conclusion: This study indicated that increases in birthweight is positively correlated to PFD measurements for both females and male newborns, and negatively correlated to α angle measurements in female newborns screened for DDH at six weeks of age.

23. Point-of-care ultrasound in hip dysplasia screening increases detection rates by 60%

Hans-Christen Husum[1,2], Michel Bach Hellfritzsch[2,3], Rikke Damkjær Maimburg[2,5], Bjarne Møller-Madsen[2,4], Mads Henriksen[2,3], Natallia Lapitskaya[2,3], Søren Kold[1,2], Ole Rahbek[1,2]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital, Denmark
2. Danish Paediatric Orthopaedic Research, Aarhus University Hospital, Denmark www.dpor.dk
3. Department of Radiology, Aarhus University Hospital, Denmark
4. Department of Children's Orthopaedics, Aarhus University Hospital, Denmark
5. Department of Midwifery, University College of Northern Denmark, Aalborg

Background: Screening programmes for hip dysplasia (DDH) can be divided into selective referral of at-risk newborns for hip ultrasound (US) or universal referral of all newborns regardless of risk of DDH. While selective screening is the predominant approach worldwide, it fails to reduce the rate of late diagnoses of DDH. Conversely, universal screening increases detection rates, but the need for examiners trained in the complex gold standard US examination method, makes it challenging to implement.
Aim: The present study investigates the effectiveness of a selective screening program using a point-of-care (POC) US examination method as a referral criterion for follow-up (FU) hip US and compares it to the traditional selective screening criteria of clinical examination and risk factor identification.
Materials and Methods: We prospectively included all newborns consented to receive a POC pubo-femoral distance (PFD) US screening in addition to the traditional screening for DDH at our institution. The PFD criterion was compared to traditional referral criteria in terms of sensitivity and specificity in detecting US abnormal hips as well as detection- and referral rates.
Results: We included 2,735 newborns of which 616 received a FU hip US. After exclusion 561 newborns were included for analysis. 317 newborns (11.6%) were referred by traditional screening criteria and 303 newborns (10.8%) were referred by the PFD criterion. Sensitivities/specificities for detecting ≥Graf type IIa hips were: 17.4%/94.2% for clinical examination, 27.9%/47.5% for risk factors, 40.7%/51% for clinical examination and risk factors combined and 65.1%/72% for PFD examination using a cut-off of 5.8 mm. Differences in sensitivities and specificities between traditional referral criteria and the PFD criterion were statistically significant ($p<0.01$). PFD US increased the detection rate of immature hips (Graf IIa) by 72% and dysplastic hips (≥ Graf IIc) by 60% with similar referral rates
Interpretation / Conclusion: Early POC PFD US screening was significantly more effective in detecting abnormal hips than traditional selective screening. As PFD US is an accessible examination method, PFD screening may be a viable alternative to current selective screening for DDH.

24. National rates of pediatric fractures over a 20–year timespan in Denmark. A population-based cohort study

Anja Rønnov Lund[1], Christian Færgemann[1], Per Gundtoft[2,3], Bjarke Viberg[1,2]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital
2. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt Kolding
3. Department of Orthopaedics, Aarhus University Hospital

Background: Previous reports on incidences of Scandinavian pediatric extremity fractures have varied, as they are often anatomically specific and based on institution specific findings. In order to gain knowledge of current and future burden on the health care system, a national cohort assessment is necessary.
Aim: To assess incidence, proportion and distribution of pediatric extremity fractures in Denmark in relation to age, sex, and anatomical areas.
Materials and Methods: A population-based cohort study with data retrieved from the Danish National Patient Registry between 1999-2018. All fractures were registered following the 10th revision of the International Classification of Diseases. Age was categorized into four groups while anatomical region was categorized into six groups. Incidence rate was calculated based on national population counts.
Results: We found a total of 668,595 pediatric extremity fractures. The overall incidences rates of extremity fractures were 3,164 (CI 3,156-3,171) per 100,000 person years for all children. The incidence rate increased from 3,078 (CI 3,044–3,111) in 1999 to 3,402 (CI 3,367– 3,437) in 2018. The distribution between sex (57% boys) and age groups (11% 0-3 years, 21% 4-7 years, 33% 8-11 years, 36% 12-15 years) did not change during the study period. The distribution was different from girls to boys in the age groups, for girls 29% was in the 8-11 years old and 41% in 12-15 years old in comparison to 38% and 29% for the boys. The distribution between the anatomical areas did not change markedly and there were 111,212 upper arm fractures (15%), 293,786 (39%) lower arm, 181,599 (24%) hand, 10,070 (1%) upper leg, 83,916 (11%) lower leg and 80,914 (11%) foot fractures. There were different distribution rates between the age groups. The first and second most frequent fracture areas were lower arm (32% and 46%) and upper arm (27% and 23%) for 0-3 and 4-7 year old, lower arm (44%) and hand (24%) for 8-11 year old, and hand (34%) and lower arm (32%) for 12-15 year old.
Interpretation / Conclusion: The IR increased during the study period thereby yielding a greater burden to the health care system. There were different distribution rates of fracture in relation to sex, age and anatomical area.

25. Five-day accelerated Ponseti protocol is efficient and safe in the treatment of clubfoot

Vilhelm Engell [1,2], Søren Ege Qwist [1,2]
1. Department of Children's Orthopaedics, Aarhus University Hospital
2. Danish Paediatric Orthopaedic Research, www.dpor.dk

Background: The management of clubfoot is non-operative with repeated manipulation and casting as described by Ponseti. Later accelerated versions of the Ponseti method have been published. Studies suggest the deforming forces are resolved within hours of the manipulations. Recently, a method with daily manipulation and casting have been described.
Aim: We have used a five-day accelerated Ponseti method with daily manipulations and castings, in order to accommodate parental needs for faster and more convenient treatment since 2020.
Materials and Methods: In our accelerated one-week protocol we added an ultrasound evaluation of the clubfeet at three months to asses any deformation or damage to the cartilage/bones and/or swelling of the soft tissues. Otherwise, management was according to the Ponseti method.
Results: This prospective consecutive series included all clubfeet, where the parents chose the five-day accelerated Ponseti protocol. All patients completed the treatment with full clinical correction. 21 clubfeet in 14 patients were included. Pirani score at inclusion was median 6 (4-6) and at control at 3 months median 0 (0-0,5). Median 5 (4-5) casts to obtain correction before Achilles tenotomy, which was performed in all cases. Ultrasound evaluation at three months; no signs of deformation or damage to the cartilage/bones or soft tissue swelling was observed. There were no early recurrences at 1year follow-up. Pirani score at follow-up was median 0 (0- ½).
Interpretation / Conclusion: Morcuende et al. reported results of an accelerated Ponseti protocol for clubfoot. Edema of the feet was a concern. Hence, they recommended 5-day casting interval. However, others have found accelerated Ponseti techniques to be effective and safe. The fact that no feet had signs of deformation or damage to the cartilage/bones or soft tissue swelling at ultrasound evaluation at three months, indicates that the five – day accelerated Ponseti protocol is safe. A longer follow-up time may tell relapse frequency. Overall acceleration of the Ponseti method seems efficient and safe.

26. Knee-related Quality of Life, Symptoms, Pain, and Function in Sport and Recreational activities in adults with a history of adolescent Sinding-Larsen Johansson disease: A registry-based cohort study

Kasper Krommes [1], Kristian Thorborg [1,2], Amalie Bjerre Jørgensen [1,3], Mathias Fabricius Nielsen [1], Lasse Christensen [4], Per Hölmich [1,2]

1. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark;
2. Department of Clinical Medicine, University of Copenhagen, Denmark;
3. Faculty of Physiotherapy, Center of Nutrition and Rehabilitation, University College Absalon, Roskilde
4. Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense

Background: Sinding-Larsen Johansson Disease (SLJD) is a common growth-related condition in adolescence that causes knee pain and decreased sports-participation. However, little is known about its long-term consequences into adulthood.
Aim: To investigate the long-term consequences of SLJD based on self-reported knee health of adults diagnosed with SLJD during adolescence compared to normative data.
Materials and Methods: All adults aged 18-55 years, diagnosed in Danish secondary care with SLJD during 1977-2020, were invited to complete a survey on SLJD-history and current knee- related health. Knee-related health was assessed with the Knee Injury and Osteoarthritis Outcome Score (KOOS) on subscales Quality of Life (QoL), Symptoms, Pain, and Sport/Rec. A priori we planned to subgroup participants according to sex and age (female/male; 18-25, 26-35, 36-45, 46- 55 years), and compare these to matched subgroups from a healthy cohort (Williamson et al. 2015, n=1000).
Results: 76 adults completed the survey (age 36.9±13 years, 45% male). Due to few observations in the SLJD-subgroups, all participants were compared to weighted means from the entire healthy cohort across KOOS subscales, showing clinically relevant differences (QoL: -28 points, $p<0.0001$; Symptoms: -14 points, $p<0.0001$; Pain: -15 points, $p<0.0001$; Sport/Rec subscale -32 points, $p<0.0001$). Adults reporting “a lot of pain” vs. “little pain” during SLJD in adolescence had decreased KOOS- Symptom score (77 vs. 92 points, $p<0.05$). Adults reporting being “some”/“very” limited in their sports-participation during SLJD in adolescence, had increased risk of having “some”/“severe” symptoms from their SLJD as adults (OR >1.30, $p<0.05$).
Interpretation / Conclusion: Adults diagnosed with SLJD in adolescence seems to have decreased self-reported knee health as adults when compared to healthy populations. The degree of pain, and limitations in sport and physical activity during SLJD in adolescence is associated to knee-related symptoms as adults. As it seems SLJD can lead to reduced knee- health in adulthood, and certain severity- characteristics can result in a worse prognosis, the information given during clinical consultations with adolescents with SLJD should reflect this.

27. Outcome of Pavlik Harness treatment for unstable hip dysplasia in infants

Mathias Hauge Bünger[1], Line Holm Jensen[1], Martin Gottliebsen[1]

1. Department of Children's Orthopaedics, Aarhus University Hospital
2. Danish Paediatric Orthopaedic Research, www.dpor.dk

Background: There is general consensus that unstable hips in infants require treatment if spontaneous improvement doesn't occur in patients with hip dysplasia (DDH). Many different braces and splints exist. In Denmark, abduction bracing using the Dennis-Brown rigid splint has traditionally been used. However, globally the Pavlik Harness (PHT) which is allowing hip motion in abduction is most commonly used. We report data of our experience with PHT of infants with DDH.
Aim: The aim of the study was to describe efficiency of PHT in our cohort of infant babies of unstable DDH.
Materials and Methods: The cohort includes 61 infants (5 boys/56 girls) PH treated for 23/24h in the hip clinic at AUH from 2020 to 2023. Decision of treatment was based on a combination of dynamic ultrasound (US) using a modified Graf method showing hip instability and clinical examination. In case of treatment, patients were seen at a one week follow-up to adjust the PH and do US to document the femoralhead centered in the acetabulum. At the one week mark parents were asked about problems using the PH. After this, hips were reviewed clinically and with dynamic US every 4th week until normalization (α- angle >60°, Cov>50% and stable) when PH treatment was stopped.
Results: The mean age of the infants at PHT beginning was 7.3 weeks (range 1-19), while mean treatment duration was 8.1 week (range 4-14). Of the 61 infants initiating PHT, hip normalized in 51 pt (84%). PHT was abandoned for a rigid DB splint in 6 patients (10%) and for closed reduction and hips spica casting in 3 patients (5%). 6 of 51 patients (12%) successfully PHT had an acetabular index >30° at the radiographs age 6 months. In 52% (32/61) of the infants, parents reported that their child appeared unaffected. 4 of 61 (7%) reported problems with breastfeeding, 23/61 (38%) had sleeping problems and irritability the first days. No parents terminated treatment by the self.
Interpretation / Conclusion: The data show that a most unstable hips can be successfully treated with the Pavlik Harness. In a few patients the PH failed, typically in very unstable hips in which the PH didn't provide enough abduction to keep the hips reduced or in irreducible hips. The PH was well tolerated by infants and parents.

28. Is Simple Talectomy a Beneficial Procedure for Severe Foot Deformity?

Marianne Frydendal Nielsen[1,2], Jan Duedal Rölfing[1,2], Line Kjeldgaard Pedersen[1,2], Michael Davidsen[1,2], Bjarne Møller-Madsen[1,2]

1. Department of Children's Orthopaedics, Aarhus University Hospital
2. Danish Paediatric Orthopaedic Research, www.dpor.dk

Background: Talectomy is rarely performed. Non-invasive techniques are the gold standard to redress Severe Neuromuscular Foot Deformity (SNFD). Yet, talectomy may be considered for rigid, painful, or neglected SNFD to obtain a stable, plantigrade and pain-free foot. We present a 10-year follow-up accessing radiological correction, functional outcomes, complications, and patient satisfaction.
Aim: The aim of the study was to investigate whether simple talectomy is a beneficial procedure.
Materials and Methods: This single centre retrospective case series evaluated talectomies in 2012-2022. Simple talectomy was combined with Steinman pin fixation of calcaneus to tibia for approximately six weeks. Main diagnoses included arthrogryposis multiplex congenita and cerebral palsy. The primary outcome was radiological correction rates. Tibiotalar angle (TiTa) and tibiocalcaneal angle (TiCa) were measured on mediolateral projections. Talectomy indications were pain, wounds, pressure marks, problems wearing shoes/orthoses and residual/recurrent deformity after former interventions. Secondary outcomes were functional outcomes graded as good/fair/poor based on degree of deformity and pain. Validated patient-reported outcome measures, i.e., EQ-5D-5L and two items from the Scoliosis Research Society-30 Questionnaire assessed health-related quality of life and patient satisfaction.
Results: 19 talectomies in 11 patients were analysed. Mean follow-up was 62 months (range 9-112 months). Mean TiTa prior talectomy was 137±17°. TiCa improved significantly with a mean difference of -24°(95%CI=[-44;-5])(p≈0.02). All 19 feet became plantigrade and pain-free with no skin sores. Functional outcomes were graded as 9/19(47%) good, 10/19(53%) fair and 0/19(0%) poor. 9/11(82%) patients could stand with support versus 6/11(55%) before talectomy. Four patients walked supported by aids prior surgery (all bilateral cases). In-house walking distance improved in three cases. Parents/primary caregivers ranked their satisfaction level between neutral and very satisfied. Perceived health was rated with a mean visual analogue scale score of 54±27 out of 100, emphasizing complex medical conditions.
Interpretation / Conclusion: Simple talectomy is a beneficial procedure for SNFD.

29. Scoping review of rotational guided growth in the growing bone

Ahmed Halloum[1], Søren Kold[1], Jan Duedal Rölfing[2], Ahmed A. Abood[1,3], Ole Rahbek[1]
1. Interdisciplinary Orthopaedics, Aalborg University Hospital
2. Children's Orthopaedics and Reconstruction, Aarhus University Hospital
3. Orthopaedic Oncology and Reconstruction, Aarhus University Hospital

Background: Guided growth is routinely used to correct angular deformities in long bones in children. It has also been proven to be a viable method to correct rotational deformities, but the concept is not yet fully examined.
Aim: The aim of this scoping review is to understand the extent and type of evidence in relation to the use of guided growth for correcting rotational deformities of long bones
Materials and Methods: Databases searched include Medline, Embase, Cochrane Library, Web of Science and Google Scholar. All published and unpublished studies were included. All identified citations were collated and uploaded into Rayyan.ai and screened by at least two reviewers. Data from included studies were extracted using a predesigned extraction tool.
Results: The search resulted in 3569 hits. 14 studies were included: 1 review, 3 clinical trials and 10 pre-clinical trials. The review covers guided growth for treating angular deformities of lower limbs but includes a paragraph about rotational deformities. Clinical trials: a total of 21 children (32 femurs and 5 tibiae) were included. Surgical methods were 2 canulated screws connected by cable, PediPlates obliquely oriented, and separated Hinge Plates connected by FiberTape. Rotation was achieved in all but 1 child. Adverse effects reported include limb length discrepancy (LLD), knee stiffness and rebound of rotation after removal of tethers. 2 pre-clinical studies were ex-vivo studies, 1 using 8-plates on Sawbones and 1 using novel z-shaped plates on human cadaver femurs. There were 5 lapine studies (2 using femoral plates, 2 using tibial plates and 1 using an external device on tibia), 1 ovine (external device on tibia), 1 bovine (canulated screws and cable on metacarp) and a case-report on a dog that had an external device spanning from femur to tibia. Rotation was achieved in all studies. Adverse effects reported include implant extrusions, LLD, articular deformities (including menisci), joint stiffness and rebound of rotation.
Interpretation / Conclusion: All included studies conclude that guided growth is a viable treatment for rotational deformities of long bones, but there is great variation in models and surgical methods used, and in reported adverse effects.

30. Measurement of anterior knee laxity with the Rolimeter® changes with flexion angle but not when a shortened Rolimeter® for smaller children is used

Maria Østergaard Madsen[1], Susan Warming[2], Robert Bennike Herzog[2], Michael Rindom Krogsgaard[1]

1. Section for Sports Traumatology M51, Copenhagen University Hospital Bispebjerg- Frederiksberg, Copenhagen, Denmark
2. Department of Physical and Occupational Therapy Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark

Background: The most widely used instrument to measure anterior tibial translation in the evaluation of anterior cruciate ligament (ACL) sufficiency is the Rolimeter®. Little is known about how knee flexion in the interval 10-40 degrees affects laxity measures. For smaller children the standard Rolimeter® is too long to fit onto tibia, so to be able to measure these children we have modified the Rolimeter®, reducing the length by 1/3 - but whether this modification influences the measurement of anterior tibial translation is unknown.
Aim: To investigate if anterior tibial translation measured by the Rolimeter® varies with knee flexion in the interval 10-40 degrees, and when a standard or a shortened ("pediatric") Rolimeter® is used.
Materials and Methods: Fourty-eight children and adults with an isolated ACL-rupture were measured with a standard Rolimeter® and the "pediatric" Rolimeter® with 1/3 reduced length. All patients were measured in 10°, 20°, 30° and 40° degrees of flexion by two independent observers.
Results: The weighted kappa showed that measurements made with the standard Rolimeter® and the "pediatric" version had moderate agreement. T-test demonstrated that anterior tibial laxity was significantly affected by the degree of knee flexion showing higher values with increasing flexion in the range 10°-40°. However, laxity of the injured and the non-injured knee changed to the same extent with knee flexion.
Interpretation / Conclusion: It is important that repeated measurements of anterior tibial translation are made with the same degree of knee flexion. The variance in laxity dependent on flexion can be compensated for by comparison with the non-injured side. The shortened, "pediatric" Rolimeter® can be used in the daily clinic to supply valid instrumented measurements of ACL stability in smaller children.

SESSION 4: YODA BEST PAPER

15 November 2023

11:00 - 12:00

Room: Auditorium

Chairs: Christian Bredgaard Jensen and Claus Varnum

31. Field sterility is a safe procedure in carpal tunnel release

Tobias Christian Bisgaard[1], Janni Kjærgaard Thillemann [1,2], Torben Bæk Hansen [1,2]

1. Department of Orthopaedics, University Clinic for Hand, Hip and Knee Surgery, Gødstrup Hospital
2. Department of Clinical Medicine, Aarhus University

Background: In February 2023, field sterility (FS) was implemented for outpatient surgery of minor hand surgery at Gødstrup Hospital, as these procedures may be performed safely in FS alone.
Aim: We aimed to compare infection rates after treatment of carpal tunnel syndrome (CTS) performed in standard sterility with full surgical draping to FS alone.
Materials and Methods: In a retrospective cohort study 140 patients (58 men) with a mean age of 61 years (range 21-95) were included after surgical treatment of CTS in FS alone, performed as open or endoscopic carpal tunnel release (CTR). In 2022, the year before implementing FS, 213 patients (81 men) with a mean age of 63 years (range 17-90) underwent similar surgical procedures under standard sterility settings and were selected as control group. Infection was registered from the hospital data charts, including samples performed at the hospital or by the patient's general practitioner. In case of a positive bacteriological sample within the first 14 days after surgery, infection was registered either as superficial without needs for surgery or deep with the need of surgical intervention.
Results: The control group and FS group were comparable on age, gender, operated side and surgical technique. There were 4 superficial infections (3%) in the FS group, which was a significantly lower rate compared to 16 superficial and 1 deep (open CTR) infection (12%) in the control group (p=0.046). The main agent causing infection was streptococcus aureus (81%). Three superficial infection was diagnosed after endoscopic CTR in 142 patients (2%), which is significantly less compared to 18 infections diagnosed after open CTR in 211 patients (9%), regardless the sterility procedure (p=0.03). However, patients treated by open CTR was mean 22 years (95% CI 19-25) older open CTR patients (p=0.000).
Interpretation / Conclusion: Field sterility for a minor hand surgical procedures including open and endoscopic CTR, is safe and without increased risk of infection. Thus, FS reduces the amount of draping's and thereby the costs. Furthermore, endoscopic CTR surgery technique showed less infection compared to the open technique but may be associated to higher age.

32. New reference values of central knee anatomy for 8-16-year-old children

Emma Hvidberg[1,2], Bjoern Vogt[3], Jan Duedal Rölfing[1,2], Georg Gosheger[4], Bjarne Møller-Madsen[1,2], Ahmed A Abood[1,2], Veronika Weyer-Elberich[5], Andrea Laufer[3], Toporowski Gregor[3], Robert Rödl[3], Adrien Frommer[3],

1. Danish Pediatric Orthopedic Research, Aarhus University Hospital, Denmark;
2. Children's Orthopedics and Reconstruction, Aarhus University Hospital, Denmark;
3. Pediatric Orthopedics, Deformity Reconstruction and Foot Surgery, Muenster University Hospital,
4. General Orthopedics and Tumor Orthopedics, Muenster University Hospital, Germany;
5. Institute of Biostatistics and Clinical Research, University of Muenster, Germany

Background: For correction of leg length discrepancy or angular deformity of the lower limb in skeletally immature patients temporary or permanent (hemi-)epiphysiodesis can be employed. These are reliable treatments with few complications. Recently, radiographic analysis of treatment related alternations of the central knee anatomy gained interest among pediatric orthopedic surgeons. To date the comparison and adequate interpretation of potential changes of the central knee anatomy is limited due to the lack of defined standardized radiographic references.

Aim: The goal of the study is to define new radiographic refences for the central knee joint anatomy in skeletally immature patients.

Materials and Methods: 503 calibrated long standing anteroposterior radiographs of 254 children aged 8-16 years with leg length discrepancy < 1 cm and mechanical axis deviation < 2 cm were retrospectively analyzed during the study period (2011-2020). Four specific radiographic parameters were assessed: femoral floor angle, tibial roof angle, width of femoral physis, and femoral notch- intercondylar distance. Parameters were analyzed in different age groups (8-10 years, 11-12, 13-14, 15-16) and by sex.

Results: All observed parameters were normally distributed with a mean age of 12.4 years (standard deviation (SD) 2, 95% confidence interval (CI) 12.2 to 12.6). The mean femoral floor angle was 142° (SD 6, CI 142 to 143), mean tibial roof angle was 144° (SD 5, CI 144 to 145), the mean width at femoral physis was 73 mm (SD 8, CI 72 to 74) and mean femoral notch-intercondylar distance was 8 mm (SD 5, CI 7.5 to 8.3). There were no clinically relevant age and gender dependent differences. The estimated intraclass correlation coefficient values were excellent for all measurements.

Interpretation / Conclusion: This is the first description of standardized reference values regarding the central and sagittal knee joint anatomy in children. We suggest considering values within the margin of two standard deviations (SD) as physiological range. These parameters might help to identify secondary deformities during growth modulating treatment such as epiphysiodesis.

33. Dynamic real-time evaluation of intra- and postoperative cefuroxime tissue concentrations in spine deformity surgery after repeated weight-dosed intravenous administration.

Magnus A. Hvistendahl[1,2], Mats Bue[1,2,3], Pelle Hanberg[1,2], Maiken Stilling[1,2,3], Kristian Høy[3]

1. Aarhus Denmark Microdialysis Research (ADMIRE), Ortho Research Lab, Aarhus University Hospital
2. Department of Clinical Medicine, Aarhus University
3. Department of Orthopaedic Surgery, Aarhus University Hospital

Background: Prophylactic antibiotics are central in preventing postoperative infections, yet knowledge on intra- and postoperative spine tissue concentrations in clinical settings remains limited. Thus, current antibiotic prophylactic regimens are based on empirical knowledge, surrogate measures (e.g. plasma samples), non-clinical evidence (experimental models), or inferior methodology (e.g. tissue specimens).
Aim: The aim was to dynamically investigate intra- and postoperative cefuroxime spine tissue concentrations after repeated weight- dosed administration in patients scheduled for spine deformity surgery.
Materials and Methods: Twenty patients (15 F, 5 M) were included (median age (range): 17.5 years (12-74), mean BMI (range): 22 (16-38), mean surgery time (range): 4 h 49 min (3 h 57 min-6 h 9 min). Repeated weight-dosed cefuroxime was administered intravenously (20 mg/kg) to all patients on average 25 min before surgery and again 4 hours later. Microdialysis catheters were placed for sampling in vertebral bone, paravertebral muscle, and subcutaneous tissue as soon as possible after surgery start. Upon wound closure, the vertebral bone catheter was removed, and two additional catheters were placed in the profound and superficial part of the incision. Microdialysates and plasma samples were obtained for up to 12 hours. The primary endpoint was time above the minimal inhibitory concentration of 4 µg/mL in percent (%T>MIC 4) of a) patients' individual surgery time, b) first- and c) second dosing interval.
Results: Mean %T>MIC 4 (range) of a) Patients' individual surgery time was 100% (100-100%) in all investigated tissues. b) The first dosing interval was 93% (93- 93%) in vertebral bone, paravertebral muscle, and subcutaneous tissue, and 99% (99-100%) in plasma. c) The second dosing interval was 87% (52-100%) in paravertebral muscle, 89% (52- 100%) in subcutaneous tissue, 91% (71- 100%) in the profound incision, 94% (72- 100%) in the superficial incision, and 71% (42-100%) in plasma.
Interpretation / Conclusion: Repeated weight-dosed cefuroxime administration resulted in sufficient cefuroxime spine tissue concentrations (>4 µg/mL) both intra- (up to 6 hours) and postoperative (up to 7.5 hours) in spine deformity surgery.

34. Functional performance tests, clinical measurements, and patient reported outcome measures are separate outcomes after primary anterior cruciate ligament reconstruction

Mustafa H. Hussein Al-Gburi[1], Jakob B. Kristiansen[2], Karl B. Christensen[3], Michael Rindom Krogsgaard[1]

1. Section for Sports Traumatology, Department of Orthopedic Surgery, Bispebjerg and Frederiksberg University Hospital, Copenhagen, Denmark
2. Department of Physical and Occupational Therapy, Bispebjerg and Frederiksberg University Hospital, Copenhagen, Denmark
3. Section of Biostatistics, Department of Public Health, University of Copenhagen, Copenhagen, Denmark

Background: The technical results after anterior cruciate ligament reconstruction (ACLR) are evaluated by laxity measures, the functional results by performance tests, and patients' perception by patient-reported outcome measures (PROMs). It is unknown whether one of these can represent outcome, or if they should all be reported.
Aim: To analyze the correlations between the three types of outcome one year after primary ACLR.
Materials and Methods: Consecutive adult patients who had an ACLR between 1.1.2019 and 31.12.2021 were offered a one-year follow-up by an independent observer. Preoperative information about laxity, peroperative information about graft size and pathology of menisci/cartilage and treatment of this (if present), and postoperative information about complications were registered. At one-year follow-up independent observers measured clinical and instrumented knee stability, range of motion, and results of four different hop tests. Patients completed 4 PROMs (IKDC, KOOS, Lysholm and KNEES-ACL) and Tegner activity scale, reported pain scores and answered anchor questions regarding satisfaction and willingness to repeat the operation. Spearman correlations were calculated between the Lysholm score, IKDC-score, each domain score in KNEES-ACL and KOOS and the other outcome modalities. The strength of the correlations were interpreted as: 0.00–0.30 negligible, 0.30– 0.50 low, 0.50–0.70 moderate, 0.70–0.90 high and 0.90–1.00 very high. **Results:** A total of 190 adults attended the one-year follow-up and 151 had all assessments. There were only few positive and weak correlations between performance tests and PROMS and between clinical measurements and PROMS (r = 0.00 – 0.38), and the majority were of negligible strength.
Interpretation / Conclusion: There was no clinically important correlation between scores obtained by PROMs, a battery of functional performance tests and instrumented laxity of the knee at 1-year follow-up after ACLR, meaning that the various modalities represent different aspects of outcome, and that one type of outcome cannot represent all. This is an argument for always to include and report all three types of outcomes, and conclusions based on one type of outcome may not be sufficient.

68. The effect of obesity on prosthesis orientation and positioning in patients with hip osteoarthritis following total hip arthroplasty

Hans Christian S. Vistisen[1], Mads J. Rex[1], Mogens Laursen[1], Thomas Jakobsen[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital

Background: In total hip arthroplasty (THA), orientation of prosthesis components is of the utmost importance regarding hip stability, component wear and failure rates. In literature, obesity has been related to increased leg length discrepancy (LLD) and poorer placement of the acetabular component as well as increased risk of dislocation.

Aim: The aim of this study was to investigate the effect of obesity on prosthesis component orientation and positioning in hip osteoarthritis patients operated with THA.

Materials and Methods: A retrospective observational study on 614 THAs at Farsoe Hospital in the period 2015- 2022, distributed in an obese (BMI >35) and a reference group (BMI 20-25). Pre- and postoperative x-rays were assessed for cup positioning and orientation, stem alignment and LLD according to standards in the TraumaCad software. Cup orientation was tried in safe zones of; +/-15 and +/-5 degrees from the optimal orientation suggested by literature. Crude and adjusted multiple linear regression models were used to detect statistically significant differences between the two groups.

Results: In the reference group, 58.5% of cups were within the Lewinnek safe zone versus 53.8% in the obese group. Adjusted linear regression models proved significantly lower odds ratio for the cup to be within the +/-5 safe zone in the obese group (0.61, p-value = 0.003), while there was no difference in the +/-15 safe zone (0.97, p-value =0.89). The obese group had significantly lesser anteversion (-4.04, p- value<0.001) and greater inclination of the cup (2.60, p-value = 0.0014). Furthermore, the obese group had a greater increase in lateral offset (1.76, p-value=0.016). There was no difference in stem alignment or LLD. Mean LLD was 5.8 mm with a SD of 4.5 mm in the obese group and 5.6 mm with a SD of 4.6 mm in the reference group.

Interpretation / Conclusion: This study found a lesser percentage of acetabular components inside the Lewinnek safe zone in the obese group. In the adjusted models, the obese group had a significantly lower odds ratio for the cup being in the +/-5 safe zone for cup orientation. The obese group had a significantly greater increase in lateral offset. There was no difference in stem alignment or LLD.

36. Computer-assisted intramedullary nailing of intertrochanteric fractures failed to improve the tip-apex distance and lag screw protrusion

Rasmus Holm Hansen, Jan Duedal Rölfing, Christian Lind Nielsen, Ole Brink, Per Hviid Gundtoft

1. Department of Orthopaedics, Aarhus University Hospital

Background: Intertrochanteric femoral fractures are commonly treated with intramedullary nails (IMN). A common complication of this treatment is lag screw cut-out. A tip-apex distance (TAD) of more than 20-25 mm is associated with an increased risk of cut-out. The Stryker ADAPT system is a computer-assisted navigation system, which has been reported to decrease the TAD.
Aim: To prospectively assess if ADAPT decreases the TAD and lag screw protrusion after implementation in our department.
Materials and Methods: All patients with intertrochanteric fractures treated with an IMN were prospectively included between 1 September 2020 and 12 March 2022. The cohort was divided in three periods: 54 patients operated before ADAPT implementation (pre-ADAPT), 50 patients with ADAPT during its implementation (ADAPT-period), and 59 patients without ADAPT after we discontinued its use (post-ADAPT). The TAD and lag screw protrusion beyond the lateral cortex were manually measured in accordance with previously published studies of TAD.
Results: The median TAD in the three periods were 17.0 mm (8-31), 15.5 mm (9-30), and 18.0 mm (11- 32) respectively. Thus, we found no statistically nor clinically relevant reduction of the TAD when using ADAPT compared with the pre-ADAPT period (p=0.62). In the pre-ADAPT period, 14 out of 54 patients had a TAD > 20 mm, while 10 out of 50 patients had a TAD >20 during the ADAPT-period. Importantly, ADAPT failed to reduce the number of outliers with TAD >20 mm (p=0.23) and TAD >25 mm (p=0.43, Chi-square test). Moreover, ADAPT did not significantly reduce the protrusion of the lag screw beyond the lateral cortex in the ADAPT period compared to the pre- and post-ADAPT periods.
Interpretation / Conclusion: ADAPT did not improve the TAD or lag screw protrusion during implementation. Importantly, it did not reduce the number of outliers and was thus discontinued at our department. We found no benefit to using the ADAPT system.

SESSION 5: SPORTS ORTHOPAEDICS

15 November 2023

11:00 - 12:00

Room: 102-105

Chairs: Adam Witten and Martin Lind

37. Does internal bracing with suture tape augmentation improve clinical outcome in ACL reconstructed patients?

Simone Elmholt[1], Torsten Nielsen[1], Anders Galaly[1], Kaspar Saxtrup[2], Mogens Hansen[3], Martin Lind[1]

1. Department of Orthopaedics, Aarhus University hospital
2. Private Hospital Mølholm, Vejle
3. Department of Orthopaedics, Silkeborg Regional Hospital

Background: Internal bracing with suture tape is a synthetic ligament augmentation that acts as a “seat belt” during the early healing and rehabilitation phase after an anterior cruciate ligament reconstruction (ACLR). Biomechanical testing has showed that suture tape augmentation improves the strength of the graft construct which may lead to improved clinical outcomes.
Aim: The aim of this present study was to compare clinical outcomes in ACLR patients with and without suture tape augmentation.
Materials and Methods: This study was a retrospectively register- based cohort study with data from the Danish Knee Reconstruction Registry (DKRR). A cohort of patients undergoing ACLR with either hamstring tendon autografts or quadriceps tendon autografts in combination with a synthetic ligament augmentation (InternalBrace) was identified. By using a propensity score, the InternalBrace group was matched 1:1 to a group of ACLR patients without augmentation (control group). The primary outcome was sagittal knee laxity and secondary outcomes were rotational stability with the pivot shift test, patient reported outcome measures (PROMs) with the Knee Injury and Osteoarthritis Outcome Score (KOOS) and revision surgery rates
Results: A total of 358 patients were included, 179 in the InternalBrace group and 179 in the control group. At one-year follow-up the InternalBrace group demonstrated a higher sagittal knee laxity of 2.1 mm (95% CI: 1.7;2.4) compared to 1.3 mm in the control group (95% CI: 1.1;1.6) (p=<0.01). There was no difference in the odds of having a positive pivot shift in the InternalBrace group (17% positive) compared to the control group (16%) (p=0.585). There was no difference in any of the KOOS subcategories between the groups (p>0.05 for all comparisons). At two-years follow-up 2 patients had a revision surgery in the InternalBrace group compared to 3 patients in the control group.
Interpretation / Conclusion: Patients undergoing ACLR with suture tape augmentation had an increased sagittal knee laxity compared to standard ACLR one-year postoperatively. There was no difference in pivot shift, PROMs and revision rates.

38. Long-term outcomes in patients with acute Posterior Cruciate Ligament injury treated non-operatively with a standardized exercise program and support brace intervention

Randi G. Rasmussen[1], Birgitte Blaabjerg[1], Torsten Grønbech Nielsen[2], Lene Lindberg Miller[1], Martin Lind[2],

1. Department of Physiotherapy and Occupational Therapy, Aarhus University Hospital;
2. Department of Orthopaedic Surgery, Aarhus University Hospital.

Background: Posterior Cruciate Ligament (PCL) injuries can be treated non-operatively with a structured rehabilitation program or with surgical reconstruction. However, while outcomes of PCL injuries treated surgically are well described, there is a paucity of larger prospective studies reporting long- term outcomes of exercise interventions.

Aim: The primary aim was to investigate patient- reported outcomes of a physiotherapy-led exercise and support brace intervention in patients with acute PCL injury in a five-year follow-up period. The secondary aim was to report conversion to surgical reconstruction.

Materials and Methods: Patients with an acute PCL injury (presenting within eight weeks of injury), completed a 16-weeks exercise intervention including 12 weeks in a support brace. Patient-reported outcomes were assessed with the International Knee Documentation Committee Subjective Knee Form (IKDC) and the Knee injury and Osteoarthritis Outcome Score (KOOS). Furthermore, conversion to surgery was prospectively extracted from medical records.

Results: Fifty patients were initially included in this present study. Twenty-eight patients had isolated PCL injury and 22 patients had combined PCL injury. The mean IKDC score improved from 35 at baseline to 70 at the five-year follow-up. All mean KOOS subscale scores increased (baseline/five- year follow-up): Symptoms: 52/87 points; Pain 56/88 points; Activities of Daily Living 58/90 points; Sport/Rec. 17/75 points; Qol 23/73 points. Seven patients (14%) converted to PCL surgical reconstruction whereof two patients had an isolated PCL injury and five patients had knee dislocation. Median time from initiation of non-operative intervention to surgery was 13 months (range 10-14).

Interpretation / Conclusion: The physiotherapy-led exercise and support brace intervention demonstrated improvements in patient-reported outcomes in long-term follow-up and the risk of PCL surgical reconstruction was considered low within the first five years.

39. KIDS-KNEES: the first condition-specific PROM for children with ACL deficiency is ready for use

Christian Fugl Hansen[1], Michael Krogsgaard[1], John Brandt Brodersen[2, 3], Martin Lind[4], Peter Faunø[4], Karl Bang Christensen[5]

1. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg;
2. The Research Unit for General Practice and Section of General Practice, Department of Public Health, University of Copenhagen
3. Primary Health Care Research Unit, Region Zealand
4. Sector for Sports Traumatology, Aarhus University Hospital
5. Department of Biostatistics, University of Copenhagen

Background: The existing patient reported outcome measures (PROMs) used to evaluate children with anterior cruciate ligament (ACL) deficiency have been characterized as insufficient by IOC, and they have poor content and construct validity for these patients. Thus, there is a need for an adequate outcome in large scale initiatives such as the European 'PAMI' and the American 'PLUTO' projects. A preliminary version of a new PROM for this patient group, 'KIDS-KNEES (ACL)', has been developed using adequate methods. The measurement properties need to be assessed before a final version can be released

Aim: To evaluate the construct validity of the preliminary 60-item version of KIDS-KNEES (ACL)

Materials and Methods: A nation-wide cohort of all children and adolescents in Denmark with an ACL injury, below the age of 16 at the time of injury, treated with ACL reconstruction or physiotherapy in the period 2016 to 2022 were invited to participate in the study. Hence, we included patients across various time points. Patients ≥18 years at the time of survey were excluded. Patients completed the preliminary version of KIDS- KNEES electronically in REDCap or as a paper version via postal mail. Using 'R' software, Item Response Theory models and Confirmatory Factor Analysis (CFA) evaluated the structural validity (dimensionality), local dependency, internal consistency and differential item functioning (DIF)

Results: There were 232 patients eligible for the study. The survey yielded an adequate sample size of 138 responses. Five declined the invitation while 89 did not respond. Items that fitted the CFA and IRT models, were free from DIF and showed no evidence of local dependence were retained. Items that did not fulfill these requirements were modified to fit the models or excluded

Interpretation / Conclusion: The Danish 'KIDS-KNEES (ACL)' is a multidimensional, structurally valid and reliable PROM for children and adolescents with ACL deficiency. It will be translated and adapted into relevant languages and made available for free to replace the currently used alternatives, due to its superior measurement properties

40. Agreement between arthrometers for measuring sagittal knee laxity in Anterior Cruciate Ligament injured patients

Rasmus Jens Plambeck[1], Jacob Olesen[1], Louise Mortensen[2], Lene Lindberg Miller[2,3], Torsten Grønbech Nielsen[2,3], Nanna Rolving[2]

1. School of Physiotherapy, VIA University College, Aarhus
2. Department of Physiotherapy and Occupational Therapy, Aarhus University Hospital
3. Department of Orthopaedic Surgery, Aarhus University Hospital

Background: Arthrometer testing is conducted to assess knee laxity in relation to anterior cruciate ligament (ACL) injury, and is used as part of a diagnostic test battery. Additionally, the tests are performed at follow-up visits after ACL reconstruction (ACLR) to evaluate knee stability. Although the Rolimeter and Lacmeter are commonly used arthrometers in the clinic for assessing knee laxity, the knowledge about measurement agreement between the two methods is lacking.
Aim: The aim was to investigate the agreement between the Rolimeter and Lachmeter in patients with either ACL injury or after ACLR.
Materials and Methods: This is a cross-sectional study, including patients with ACL injuries or ACLR, from the Department of Sports Trauma at Aarhus University Hospital. Three measurements were conducted with each arthrometer on each knee and only the third measurement from each knee and arthrometer was included in the analysis. The tests were carried out by two experienced testers. To ensure blinding, an assistant read the measurements. Laxity assessments for each individual knee as well as the difference in laxity between the two knees (side-to-side difference (SSD)) were analyzed using Bland-Altman plots, including calculation of bias and limits of agreement between the two measurement instruments. Differences between the instruments were compared using paired t-test. A maximal difference of 1 mm was allowed between the two arthrometers.
Results: 50 patients (ACL injury or ACLR) were included in the study. The preliminary analysis of 22 patients showed a systematic bias of -0.68 mm (95% CI: -0.35;-0.01) for the measurements on each individual knee, with the Lachmeter measuring 0.68 mm higher laxity than the Rolimeter. The Bland- Altman plot for the SSD between the two knees showed a systematic bias of 0.25mm (95% CI:-0.49;1.00) with the largest difference for the Rolimeter. The disagreement between the two arthrometers was thus within the 1 mm limit, corresponding to an acceptable agreement.
Interpretation / Conclusion: When used by the same tester, the Rolimeter and Lachmeter shows acceptable agreement and may therefore be used interchangeably in the clinic.

41. ACL injury mechanism in badminton: A register study of 539 Danish badminton players.

Niels Christian Kaldau[1], Frederik Flensted Andersen[1], Kristoffer Weisskirchner Barfo[1], Peter Nyby Hersnæs[1], Per Hølmich[1]

1. Sports Orthopedic Research Center Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Copenhagen, Denmark

Background: Over recent years, more ACL ruptures in badminton players have occurred e.g. the two former Olympic gold medalists, Carolina Marin and Li Xuerui. Little is known about the injury burden and mechanism in badminton.
Aim: To investigat the distribution of ACL injuries on the badminton court and the preceding movement.
Materials and Methods: The study, ACL Denmark, investigate ACL ruptures in a cohort of 90.600 participants. Of those, 539 participants reported ACL rupture during badminton and filled in a questionnaire on the injury mechanism and their pre-injury level. Data is presented as numbers, percentage, means and SD with chi square test for dichotomous outcomes.
Results: Most participants played badminton (n=435, 81 %) as primary sport and 155 (29 %) reported to play on a competitive level (Tegner score 8). The rear court (n=285, 40 %) was the most frequent location of injury but with a high percentage on the front and midcourt (n=154, 22 %). The rear court was more prevalent among players aged 18-29. The most prevalent movement preceding the ACL injury was the scissor kick jump on the rear court (100, 19 %) followed by lunge at the net (70, 13 %) and lunge at the rear court (69, 13 %). One hundred and six players (15%) were injured preceded by a deceptive shot from the opponent.
Interpretation / Conclusion: ACL injuries in badminton occur mostly on the rear court and the most prevalent movements preceding the injury are the scissor kick jump and the lunge.

42. The impact of clinical and patient reported outcome on physical performance at one-year follow-up after Anterior Cruciate Ligament Reconstruction

Torsten Grønbech Nielsen[1], Ulrik Dalgas[2], Martin Lind[1]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
2. Exercise Biology, Dep. Public Health, Aarhus University

Background: The majority of anterior cruciate ligament reconstructions (ACLr) patients wish to return to sport. Nonetheless, final clinical evaluation after ACLr normally includes no physical testing making it difficult to determine readiness to return to sport. It would be helpful to clinicians to identify easily determined factors associated with physical function in ACLr patients.
Aim: Aim of this study was to evaluate the association between physical test performance in ACLr patients and known ACL risk factors, knee laxity and patient reported outcomes at one-year follow-up
Materials and Methods: The cohort included ACLr patients undergoing surgery between 2009-2014. Inclusion criteria were: Isolated primary ACLr and existing data on single-hop, triple-hop or strength performance at one-year follow-up. To guide in return to sport after ACLr patients were invited to an extended one-year visit to clarify their readiness to return to sport. The extended test battery included a clinical evaluation (sagittal knee laxity, pivot shift test), three patient reported outcomes (KOOSsport, IKDC, SANE) and three physical tests (single- and triple-hop and leg extension strength test from which Leg Symmetry Index (LSI) was calculated). Multivariable regression analyses were performed for each of the three physical tests including known risk factors, clinical outcomes (laxity<3 mm and pivot shift grade 0 was applied as cut off for good vs. poor status) and patient reported outcomes (KOOSsport>75, IKDC>75.9 and SANE>92.7 was applied as cut off for good vs. poor status).
Results: A total of 480 patients were included in the study. Sagittal laxity<3 mm had a negative impact on the single-hop LSI, whereas pivot shift grade 0 or IKDC>75.9 had a positive impact on single-hop LSI. Age<20, pivot shift grade 0 and KOOSsport>75 were found to have be positively associated with triple-hop LSI. Finally, age<20 and IKDC>75.9 were positively associated with leg extension strength LSI.
Interpretation / Conclusion: Age, sagittal laxity, pivot shift and patient reported outcomes are associated with physical test performance one year after ACLr. Due to this finding age, sagittal laxity, pivot shift and patient reported outcome cannot replace a return to sport test battery

43. The Impact of posterior tibial slope on treatment outcome in Anterior Cruciate Ligament revision patients

Jacob Sorwad[1], Torsten Grønbech Nielsen[1], Ole Gade Sørensen[1], Lars Konradsen[2], Martin Lind[1]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark;
2. Section for Sports Traumatology, Department of Orthopedic Surgery, Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark

Background: Posterior tibial slope (PTS) has shown to be a potential risk factor in relation to Anterior Cruciate Ligament (ACL) injuries. The impact of PTS on treatment outcomes in ACL revision patients is yet to be investigated.
Aim: To investigate the impact of PTS on postoperative outcome in an ACL revision cohort evaluated by sagittal knee stability and patient-reported subjective knee function.
Materials and Methods: Lateral knee radiographs in ACL revision patients were retrospectively reviewed and both medial and lateral tibial plateau inclination angles were measured using tibial proximal anatomical axis as reference axis. Sagittal knee stability was evaluated on side-to-side difference using Rolimeter measurements at baseline and at one-year follow-up. Subjective reported outcomes were obtained using KNEES-ACL, KOOS, and Tegner Activity Scale (TAS) questionnaires at baseline and at two- year follow-up.
Results: A total of 105 ACL revision patients were included in this present study. No correlation between both medial and lateral PTS and knee stability prior to revision surgery and one-year post revision surgery was found. Furthermore, no correlation between KNEES-ACL, KOOS or TAS and medial and lateral PTS prior to revision surgery and two years post revision surgery was found.
Interpretation / Conclusion: The present study found no association between PTS with either knee stability or subjective reported outcomes in ACL revision patients.

SESSION 6: SHOULDER / ELBOW

16 November 2023

09:30 – 11:00

Room: 01+02

Chairs: Dennis Karimi and Thomas Falstie-Jensen

44. Weight-adjusted cefuroxime dosing provides sufficient surgical site concentrations in reverse shoulder arthroplasty - A clinical microdialysis study

Sara Kousgaard Tøstesen[1], Thomas Falstie-Jensen[2], Mats Bue[1,2], Pelle Hanberg[1], Mikkel Tøttrup[2], Janne Ovesen[2], Maiken Stilling[1,2], Theis Thillemann[2]

1. Aarhus Denmark Microdialysis Research Group (ADMIRE), Aarhus University Hospital
2. Department of Orthopedic Surgery, Aarhus University Hospital

Background: For reverse shoulder arthroplasty (RSA) the periprosthetic joint infection (PJI) rate is higher than that of anatomic shoulder arthroplasty and other joint replacement surgeries. RSA leaves a larger peri implant deadspace due to the deficient rotator cuff. The deadspace is defined as the residual tissue void after tissue loss with a presumable sparse vascularization. A compromised deadspace perfusion may promote inadequate concentrations of prophylactic antibiotics increasing the risk of PJI.
Aim: To assess the time with cefuroxime concentrations above the clinical breakpoint minimal inhibitory concentration (fT>MIC) for Staphylococcus aureus of 4 µg/mL in deadspace, bone, muscle, subcutaneous tissue and plasma during two dosing intervals (8 h x 2), following RSA surgery.
Materials and Methods: Ten patients, undergoing RSA surgery, were included. Cefuroxime was dosed according to weight (20 mg/kg), administered as an intravenous bolus infusion 30 min prior to surgery, and readministered after 8 h. Before wound closure, microdialysis catheters were placed for sampling in deadspace in the glenohumeral joint, cancellous bone of the coracoid process, in the deltoid muscle, and subcutaneous tissue in relation to the incision. Blood samples were drawn for reference. Continuous sampling was performed during two dosing intervals (16 hours). Cefuroxime concentrations were quantified using high-performance liquid chromatography.
Results: In the first dosing interval, a mean %fT>MIC (95%CI) of 90% (78-100) was found in deadspace which was comparable to bone 86% (74-98), deltoid muscle 85% (73-97) and subcutaneous tissue 83% (71-95), but longer than plasma 78% (66-90). All compartment specific fT>MIC results were similar between the first and the second dosing interval.
Interpretation / Conclusion: Weight-adjusted cefuroxime provided homogeneous target distribution demonstrated by comparable target tissue fT>MIC (4 µg/mL) for deadspace, cancellous bone, skeletal muscle, and subcutaneous tissue. Importantly, sufficient cefuroxime concentrations were achieved in the surgical deadspace. Consequently, it seems unlikely that the increased infection rates found in RSA can be explained by insufficient antibiotic distribution to the deadspace.

45. Variation in surgical trends and outcome following isolated proximal humerus fracture - A comparative longitudinal cohort study of 37,189 patients from Denmark and England

Helle K. Østergaard[1], Jennifer Lane[2,3], Antti P. Launonen[4], Inger Mechlenburg[5,6], Marianne Toft[1], Merete N. Madsen[7], Richard Craig[8], Dominic Furniss[3], Matt Costa[3], Stephen Gwilym[3], Jonathan Rees[3]

1. Department of Orthopaedic Surgery, Viborg Regional Hospital; 2. Barts Bone and Joint Health, Queen Mary, University of London; 3. NDORMS, University of Oxford; 4. Department of Orthopaedics, Tampere University Hospital; 5. Department of Orthopaedics, Aarhus University Hospital; 6. Department of Public Health, Aarhus University; 7. Elective Surgery Centre, Silkeborg Regional Hospital; 8. Milton Keynes University Hospital.

Background: Management of proximal humerus fractures (PHF) is controversial and can vary internationally. However, over the last decade high-level evidence from randomized trials has shown that for most of these fractures, surgical treatment is not superior to non-surgical treatment.

Aim: To estimate the incidence rates and temporal trends in the surgical treatment of PHF in Denmark and England, the risk of serious adverse events (SAE) and to evaluate the impact of large-scale surgical trial evidence upon clinical practice.

Materials and Methods: This was a multinational population-based cohort study using routinely collected data from England (Hospital Episode Statistics) and Denmark (National Patient Registry) from 1998 to 2018. All adult patients with an isolated PHF combined with predefined surgical procedure codes were included. Age and sex specific incidence rates were calculated along with incidence rates of each surgical procedure per calendar year. Furthermore, the cumulated incidence proportion of SAEs within 30 days of surgery was computed. Lastly, multivariable logistic regression analysis was undertaken to determine the impact of age, sex and comorbidity with SAE at 30 days and the risk of mortality at 30 and 90 days, and one year.

Results: A total of 37,189 patients were included (11,453 Denmark; 25,736 England). The median age was 68 years in Denmark and 63 years in England. The overall incidence rate of surgery in Denmark was 10 times higher for women aged 80 years than that observed in England. Plate fixation was the leading surgical procedure in Denmark from 2005 peaking in 2011, while arthroplasty remained the most frequent procedure in England. The cumulated incidence proportions of SAEs within 30 days of surgery were low in both countries, however higher in Denmark. In both countries, men had a significant higher risk of mortality at all time points compared to women. **Interpretation / Conclusion:** We found considerable variation in the surgical management of PHF between Denmark and England, despite high- certainty evidence from surgical trials. We have yet to understand and learn from the interplay of hospital, surgeon, and evidence based factors that lead to these variations in surgical practice between countries.

46. Impact of radial head arthroplasty diameter on elbow joint kinematics evaluated by dynamic radiostereometric analysis

Johanne Frost Teilmann[1,2], Emil Toft Petersen[1,3], Theis Muncholm Thillemann[3], Chalotte Krabbe Hemmingsen[1], Josephine Olsen Kipp[1,2], Thomas Falstie-Jensen[3], Maiken Stilling[1,3]

1. AutoRSA Research Group, Orthopedic Research Unit, Aarhus University Hospital
2. Department of Clinical Medicine, Aarhus University
3. Department of Orthopedic Surgery, Aarhus University Hospital

Background: Radial head arthroplasty (RHA) is a hemiprosthesis used in the treatment of complex elbow dislocation fractures. Improper RHA diameter and length may result in pain, joint stiffness, and osteoarthritis, which is likely caused by unfavorable biomechanical changes. The ideal size of the RHA is unknown and knowledge concerning elbow stability after different head sizes is warranted.
Aim: The aim of this experimental study was to evaluate the elbow kinematics of different sizes of radial head implants after RHA using dynamic radiostereometric analysis (dRSA)
Materials and Methods: Eight human donor arms were examined with dRSA during a motor-controlled elbow flexion-extension with the forearm in unloaded neutral position, and in supinated- and pronated position without and with 1kg either varus or valgus load, respectively. The elbows were examined before and after RHA with head diameters of anatomical size, -2mm (undersized), and +2mm (oversized). The length of the stem was not changed throughout tests. The ligaments were kept intact by use of a step-cut humerus osteotomy for repeated RHA exchange. Bone models were obtained from CT and AutoRSA software was used to match the bone models with dRSA recordings. To describe elbow kinematics, anatomic coordinate systems were applied to the humerus and radius.
Results: Compared to the native radial motion during elbow flexion-extension, the anatomical-sized RHA shifted the radius 2mm ulnar ($p<0.001$) in unloaded pronated position. The undersized RHA shifted the radius 1mm posterior ($p<0.001$) and 2mm ulnar ($p<0.01$) in unloaded pronated position and increased the varus angle by 2.5° ($p<0.001$) in supinated loaded position. The oversized RHA shifted the radius 2mm radially ($p<0.001$) in both supinated positions.
Interpretation / Conclusion: The anatomically sized RHA maintained the kinematics of the native elbow the best, but the kinematic changes with oversized and undersized RHA diameters were small, which could suggest some tolerance variation for the RHA diameter size. However, a few degrees or mm changes in elbow kinematics could potentially increase stress to the interosseous membrane and contact pressure within the joint, and evaluation of these parameters are encouraged.

47. Clavicle fractures does not increase the occurrence of later subacromial pain syndrome. A registry-based case-control study with 15-25 years follow-up of 131.838 persons from the Danish National Patient Register.

Anne Marie Nyholm[1], Adam Witten [2], Kristoffer Weisskirchner Barfod[2]

1. Department of Orthopaedics, Herlev and Gentofte Hospital;
2. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Hvidovre

Background: A clavicle fracture changes the mechanical axes of the shoulder girdle, potentially leading to scapular protraction and decreased subacromial space. If protraction of the scapula is a major risk factor for developing subacromial pain syndrome (SAPS), a previous clavicle fracture could increase the risk of later SAPS.
Aim: The purpose of this study was to investigate if a clavicle fracture was correlated with a higher occurrence or earlier diagnosis of SAPS.
Materials and Methods: In this retrospective case-control study with data from the Danish National Patient Register, all persons aged 18-60 years, with a hospital contact due to a clavicle fracture (DS420) between 1.1.1996 and 31.12.2005 were identified as cases. For each case, five controls, matched on age and sex, were identified. Primary outcome was the first hospital contact with a SAPS diagnosis (DM751-755) registered more than 180 days following a clavicle fracture. Persons were followed until 01.11.2021.
Results: 21.973 cases and 109.865 controls were included. The incidence of a clavicle fracture was 76 fractures per 100.000 persons per year. 23% were female. 1.640 (7.46%) cases and 8.072 (7.35%) controls later received a SAPS diagnosis, demonstrating no significant difference in occurrence of SAPS diagnosis ($p=0.56$). Mean time from fracture to SAPS diagnosis was shorter for cases compared to controls (4040 vs. 4442 days, $p<0.001$), and cases were slightly younger when receiving the diagnosis (mean age 51.3 vs 53.6 years, $p<0.001$). 1614 cases underwent surgical fixation. This subgroup had a statistically significant higher occurrence of later SAPS diagnosis (205 cases, 13%, $p<0.001$).
Interpretation / Conclusion: Clavicle fractures were not correlated to an increased occurrence of later diagnosis of subacromial impingement syndrome (SAPS). However, the diagnosis was given 1-2 years earlier for people with a previous fracture. Surgical fixation of the clavicle was correlated significantly with a higher occurrence of later SAPS diagnosis. Based on these findings no strong argument for protraction of the scapula as a major risk-factor for the development of SAPS was found. Surgery of a clavicle fracture to reduce the risk of later SAPS cannot be recommended.

48. The incidence and treatment trends of 23,917 humeral shaft fractures: Data from the Danish National Patient Registry from 1996 to 2018

Dennis Karimi[1], Søren Wacher Qvistgaard[1], Per Hviid Gundtoft[2], Stig Brorson[3], Bjarke Viberg[1, 4]

1. Dept. of Orthop. Surgery and Traumatology, Lillebaelt Hospital: University Hospital of Southern Denmark
2. Department of Orthopaedic Surgery and Traumatology, Aarhus University Hospital
3. Centre for Evidence-Based Orthopaedics, Zealand University Hospital and Department of Clinical Medicine, University of Copenhagen
4. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital and Department of Clinical Research, University of Southern Denmark, Denmark

Background: Humeral shaft fractures (HSF) can be treated surgically or non-surgically. National trends and distributions are sparsely reported.
Aim: We present the epidemiology of HSFs in Denmark (i) to report incidences and temporal trends, (ii) to report the distribution of treatment options.
Materials and Methods: The diagnosis (ICD-10: S42.3) and surgical procedure codes (NOMESCO: external fixation [KNBJ21], K-wire fixation [KNBJ41], screw fixation [KNBJ71], combined fixation [KNBJ81], and arthroplasty [KNBB0*, KNBB1*]) for HSF were obtained from the Danish National Patient Registry (DNPR) covering 1996-2018. The diagnosis code for HSF is validated in the DNPR. Patients aged 18 years and above were included. Surgical treatment was defined as a diagnosis of HSF combined with a surgical procedure within 3 weeks of injury. Non-surgical treatment was defined as a diagnosis and no relevant procedure registered within 3 weeks.
Results: A total of 23,917 HSFs (63% females) were identified. The overall mean incidence was 26/100,000/year. The overall age-specific rate was stable around 10 fractures until the age of 50 years, where the rate increased per five years with an average of 15 fractures/100,000/year. This resulted in a maximum rate of 141 fractures/100,000/year at the highest age range. A total of 78% of all HSFs were above 50 years. The incidences and treatment distribution remained stable over 23 years. Non-surgical treatment accounted for 86% (n= 20,534). Temporal changes occurred in surgical procedures. Intramedullary nail fixation decreased from 54% to 24% of all surgeries while plate fixation increased from 19% to 63%.
Interpretation / Conclusion: The overall incidence for HSF remained stable from 1996 to 2018. The majority of cases were females aged 50 years and above, suggesting there could be an association with osteoporosis in this group. The preferred treatment for HSF was non-surgical for all ages. Plating became more popular than nailing over the period under study.

49. Minimal important change (MIC) of the Western Ontario Osteoarthritis of the Shoulder index (WOOS) in patients with glenohumeral osteoarthritis and rotator cuff tear arthropathy

Josefine B. Larsen[1,2], Theis M. Thillemann[1,2], Antti P. Launonen [3], Helle K. Østergaard[2,4], Thomas Falstie-Jensen[1], Srdjan Zivanovic[4], Steen L. Jensen[5,6], Inger Mechlenburg[1,2], Ville Ponkilainen[3]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
2. Department of Clinical Medicine, Aarhus University, Aarhus N, Denmark
3. Department of Orthopaedic Surgery, Tampere University Hospital, Tampere, Finland
4. Department of Orthopaedic Surgery, Viborg Regional Hospital, Viborg, Denmark
5. Department of Orthopaedics, Aalborg University Hospital, Aalborg, Denmark
6. Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

Background: The Minimal Important Change (MIC) for patient- reported outcomes (PRO) is the value that describes the smallest improvement considered worthwhile by patients. To our knowledge, no MIC of the Western Ontario Osteoarthritis of the Shoulder Index (WOOS) score has been reported using the anchor-based predictive MIC calculation method. Additionally, no studies have reported a MIC for the Disabilities of the Arm Shoulder and Hand (DASH) based on patients with glenohumeral osteoarthritis or rotator cuff tear arthropathy, treated with an anatomical total shoulder arthroplasty (TSA) or reverse total shoulder arthroplasty (RSA), respectively. **Aim:** The aim of this study was to determine MIC for WOOS and DASH in a cohort of patients with glenohumeral osteoarthritis or rotator cuff tear arthropathy treated with TSA or RSA.
Materials and Methods: Data on 217 patients were collected at four hospitals in Denmark and Finland. Data were collected at baseline, and at 12 and 14 weeks after surgery. At 12 weeks the patients were asked about their perceived overall improvement after surgery measured by the Global Rating of Change Score (GRCS). The MIC estimate for the WOOS and DASH was calculated using logistic regression with the GRCS as an anchor with a predictive modeling approach.
Results: Patients had a mean age of 69.9 years and 55% were women. Our sample consisted of 46% with glenohumeral osteoarthritis and 53% with rotator cuff tear arthropathy. 85 patients had complete data. The estimated MIC for the WOOS score was 30.7 (95% CI 19.6; 42.4) and 5.1 (95% CI -2.8; 13.1) for the DASH.
Interpretation / Conclusion: The estimated MIC for WOOS was higher than shown in previous studies. For patients with glenohumeral osteoarthritis or rotator cuff tear arthropathy, treated with a TSA or RSA, the MIC values were 30.7 for WOOS and 5.1 for DASH. The estimated MIC for WOOS and DASH show wide confidence intervals, which could be due to the low sample size but also indicate a large heterogeneity within the patient group. For PRO measures such as WOOS and DASH, there is a need for further investigation of their psychometric properties in relation to their utility and interpretability in clinical trials.

50. Patient reported outcome after displaced two-part surgical neck fractures treated without surgery: a consecutive, prospective cohort of 174 geriatric patients

Stig Brorson[1,2], Signe Borg[1], Kenneth Holtz[1], Zaid Issa[1]

1. Centre for Evidence-Based Orthopaedics, Dept. of Orthopaedic Surgery, Zealand University Hospital
2. Department of Clinical Medicine, University of Copenhagen

Background: The two-part fracture of the surgical neck is the most common displaced fracture pattern in geriatric shoulder fractures. Randomized trials have failed to demonstrate superiority of surgery. Little is known about outcome outside control groups in experimental settings.
Aim: To evaluate short-term patient reported outcome in a consecutive, prospective cohort of geriatric patients with displaced two-part surgical neck fractures managed without surgery.
Materials and Methods: Patients aged 60 years or above referred to a Danish university hospital with a fracture of the proximal humerus within three weeks from injury were screened for eligibility. Fractures were classified according to Neer. Only two-part surgical neck fractures were included. We excluded patients with other fracture patterns, concomitant fractures, dementia or pathological fractures. All patients were followed in the outpatient clinic after two weeks, six weeks and six months post-injury. Prior to the six months visit all patients completed Oxford Shoulder Score (OSS)(0-48; 48 best) and EuroQoL-3D (-0.624 – 1; 1 best) and general health self- assessment, (0-100; 100 best). We report demographics, summary statistics, mean and standard deviations.
Results: We assessed 174 patients with two-part fractures for eligibility. Mean age was 77 years (SD 8.55), 77 % were females. We excluded 71 patients due to concomitant fractures (25), dementia (12), death (11) and other specified reasons (19). Reverse arthroplasty on pain indication was performed in four patients (2 %). Three patients were lost to follow-up. Patient reported outcome was available for 100 patients. Mean OSS at six months was 37.15 (SD 8.25) equal to 76 % of a full shoulder function. Normal value for females aged 71-80 is 82 %. Mean EuroQoL-3D index was 0.83 (SD 0.23). Population norm for Danish females aged 71-80 is 0.82. Mean general health self-assessment was 72.1 (SD 16.6).
Interpretation / Conclusion: At six months, patient reported shoulder function and quality of life was close to reference values for the background population. The healing potential in geriatric patients with displaced two-part surgical neck fractures is good, even when severe displacement and subsequent malunion are present.

51. Positive predictive value of humeral fractures in the Danish National Patient Registry

Dennis Karimi[1], Line Houkjær[2], Per Hviid Gundtoft[3], Stig Brorson[2], Bjarke Viberg[1, 4]

1. Dept. of Orthop. Surgery and Traumatology, Hospital Lillebaelt – University Hospital of Southern Denmark
2. Centre for Evidence-Based Orthopaedics, Zealand University Hospital
3. Department of Orthopaedic Surgery and Traumatology, Aarhus University Hospital
4. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Denmark

Background: National patient registers are a key tool in healthcare planning. To ensure a meaningful use and interpretation of data, validity is essential.
Aim: The purpose of this study was to validate humeral fracture diagnoses for adults in the Danish National Patient Registry (DNPR).
Materials and Methods: A validation study, including adults (≥18 years) with a humeral fracture seen at the emergency department in twelve Danish hospitals from March 2017 to February 2020. Administrative data were retrieved on 12,912 patients from the hospital databases. We extracted information on discharge and admission diagnoses based on the International Classification of Diseases, tenth version. Data from 100 cases were randomly sampled from each of the specific humeral fracture diagnoses (S42.2-S42.9). If less than 100 cases were registered for one of the specific diagnoses, all cases for that specific diagnosis were included. The positive predictive value (PPV) was calculated for each diagnosis. Radiographic images from the emergency departments were reviewed and assessed as the gold standard. The PPVs with 95% confidence intervals (CI) were estimated according to the Wilson method.
Results: In total, 661 patients were sampled between all available diagnosis codes. Overall, the PPV for humeral fracture was 89.3% (95% CI: 86.6- 91.4%). PPVs were 91.0% (95% CI: 84.0- 95.0%) for proximal humeral fractures, 89.0% (95% CI: 81.0-94.0%) for humeral diaphyseal fractures and 78.0% (95% CI: 68.9-84.9%) for distal humeral fractures. Out of the 661 cases, 361 patients were diagnosed with an unspecified humeral fracture code and the distribution of fractures were 66% for proximal humeral fractures, 16% for humeral diaphyseal fractures, 3% for distal humeral fractures.
Interpretation / Conclusion: The validity of the humeral fracture diagnosis and the classifications of proximal and diaphyseal fractures in the DNPR is high. This ensures that DNPR contains good data for register-based research on humeral fractures, but the diagnosis of distal humeral fractures has a lower validity and should be used with caution.

52. High rate of clinical improvement following anatomical total shoulder arthroplasty for glenohumeral osteoarthritis

Marc R K Nyring[1], Bo S Olsen[1], Alexander Amundsen[1], Jeppe V Rasmussen[1]

1. Department of Orthopaedic Surgery, Gentofte and Herlev Hospital

Background: The minimal clinically important difference (MCID) is defined as the smallest meaningful change in a health domain that a patient would identify as important. Thus, an improvement that exceeds the MCID can be used to define a successful treatment for the individual patient.
Aim: The aim of this study was to quantify the rate of clinical improvement following anatomical total shoulder arthroplasty for glenohumeral osteoarthritis.
Materials and Methods: Patients were treated with the Global Unite total shoulder platform arthroplasty between March 2017 and February 2019 at Herlev and Gentofte Hospital, Denmark. The patients were evaluated preoperatively and 3, 6, 12 and 24 months postoperatively using the Western Ontario Osteoarthritis of the Shoulder index (WOOS), Oxford Shoulder Score (OSS) and Constant- Murley Score (CMS). The rate of clinically relevant improvement was defined as the proportion of patients who had an improvement 24 months postoperatively that exceeded the MCID. Based on previous literature, MCID for WOOS, OSS and CMS was defined as 12.3, 4.3 and 12.8 respectively.
Results: 49 patients were included for the final analysis. One patient was revised within the two years follow-up. The rate of clinically relevant improvement was 87% using WOOS, 94% using OSS and 88% using CMS.
Interpretation / Conclusion: Based on three shoulder-specific outcome measures we found that 87% to 94% of patients had a clinically relevant improvement following anatomical total shoulder arthroplasty for glenohumeral osteoarthritis. This is a clear and distinct message that together with information about implant survival can be used to inform patients about their prognosis.

53. Persistent opioid use after elective shoulder arthroplasty

Alexander Scheller Madrid[1], Jeppe Vejlgaard Rasmussen[1]

1. Department of Orthopaedics, Herlev and Gentofte University Hospital, Denmark

Background: Surgical procedures have shown to have a substantial number of patients receiving prolonged opioids.
Aim: We wanted to show the pre-and postoperative utilization of opioids after elective shoulder arthroplasty.
Materials and Methods: Patient data were collected through the Danish Shoulder Arthroplasty Registry, only patients with a diagnosis of rotator cuff disease, arthrosis, or caput necrosis were selected. Patients with a previous fracture or contralateral operation were excluded. Potential risk factors were collected from The Danish National Patient registry. From The Danish National Health Service Perscription Database, preoperative and postoperative drug use was gathered. Preoperative opioid use is defined as receiving 1 or more prescriptions within 90 days before surgery. Postoperative opioid utilization is shown as the number of patients dispensing opioids within each quarter of the first postoperative year.
Results: Of 5600 patients included 2029(36%) were using opioids preoperatively. For preoperative opioid users, 91% dispensed opioids within the first quarter of the year (Q1), which decreased to 60% in Q2, 57% in Q3, and 56% in Q4. For patients with no opioid use 3 months before surgery in Q1 72% of patients dispensed opioids, in Q2 12%, Q3 10%, and Q4 11%.
Interpretation / Conclusion: A substantial amount of patients treated with elective shoulder arthroplasty were still receiving opioids up to 1 year postoperatively. Further studies are needed to understand the underlying mechanism and potential interventions that might reduce prolonged opioid consumption.

SESSION 7: TUMOR, AMPUTATION, INFECTION

16 November 2023

09:30 – 11:00

Room: 102-105

Chairs: Tine Nymark and Klaus Kjær Petersen

54. Bone and soft tissue concentrations of penicillin - is oral penicillin V non-inferior to intravenous penicillin G?

Hans Christian Rasmussen[1], Maiken Stilling[1,2], Johanne Lilleøre[1], Elisabeth Petersen[1], Magnus Hvistendahl[1], Andrea Jørgensen[1], Pelle Hanberg[1,3], Mats Bue[1,2]

1. Aarhus Denmark Microdialysis Research (ADMIRE), Ortho Research Lab, Aarhus University Hospital;
2. Dept. of Orthopaedics, Aarhus University Hospital;
3. Dept. of Head and Neck Surgery, Aarhus University Hospital.

Background: The β-lactam penicillin is often used in the treatment of soft tissue infections and osteomyelitis caused by penicillin susceptible Staph. aureus. Oral antibiotic treatment has been shown to be non-inferior to intravenous (IV) therapy when used during the first 6 weeks in complex orthopaedic infections (OVIVAtrial). However, the use of oral β-lactams in osteomyelitis treatment remains a topic of debate due to low and variable bioavailability.

Aim: Assess the time for which the unbound penicillin concentration exceeded targeted minimum inhibitory concentrations (fT>MIC) in cancellous bone and subcutaneous tissue after IV (penicillin G) and oral (penicillin V) treatment in a porcine microdialysis model.

Materials and Methods: 12 pigs (75kg) were assigned to standard clinical regimens of either three doses of IV penicillin G (1.2g) or oral penicillin V (0.8g) every 6h over 18h. Microdialysis catheters were placed for sampling in tibial cancellous bone and adjacent subcutaneous tissue. Data was collected in the first dosing interval (0-6h; prophylactic situation) and the third dosing interval (12-18h; assumed steady state). Plasma samples were collected for reference. MIC targets of 0.125µg/mL (S. aureus breakpoint), 0.25µg/mL (Strep. Group A, B, C and G breakpoint) and 0.5µg/mL (4xMIC) were applied.

Results: For all MIC targets, IV penicillin G resulted in a longer mean fT>MIC in cancellous bone during the first dosing interval, and in both cancellous bone and subcutaneous tissue during the third dosing interval compared to oral penicillin V. Across compartments, mean fT>MIC for IV penicillin G (MIC: 0.125, 0.25 and 0.5µg/mL) were ≥97%, ≥84% and ≥75% during the first dosing interval, and 100%, ≥95% and ≥88%, during the third dosing interval. The mean fT>MIC for oral penicillin V were ≥40%, ≥24% and ≥7% during the first dosing interval, and ≥42%, ≥36% and ≥18% during the third dosing interval.

Interpretation / Conclusion: The findings suggest that standard clinical dosing of IV penicillin G provides superior fT>MIC in cancellous bone and subcutaneous tissue compared to oral penicillin V, particularly in the third dosing interval. This emphasizes the importance of appropriate route of administration when applying penicillin treatment.

55. Comparative Effectiveness on the Use of Antibiotic Prophylaxis and Serious Adverse Events Following Primary Total Hip Arthroplasty (THA): A Systematic Review and Network Meta-Analysis of Randomized Trials

Armita Armina Abedi[1,2,3], Jacob Moflag Svensson[1], Alma Becic Pedersen[4,5], Claus Varnum [6,7], Sabrina Mai Nielsen [3,8], Jens Holm Laigaard[1,2], Robin Christensen[3,8], Søren Overgaard[1,2]

1. Dept. of Orthopedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg,
2. Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen
3. Section for Biostatistics and Evidence-Based Research, the Parker Institute, Bispebjerg and Frederiksberg Hospital, Denmark;
4. Department of Clinical Epidemiology, Aarhus University Hospital, Denmark;
5. Department of Clinical Medicine, Aarhus University, Denmark;
6. Department of Orthopedics, Lillebaelt Hospital, Vejle, Denmark;
7. Department of Regional Health Research, University of Southern Denmark, Denmark;
8. Research Unit of Rheumatology, Department of Clinical Research, University of Southern Denmark, Odense University Hospital, Denmark.

Background: Perioperative antibiotic prophylaxis (AB) is a routine in THA to reduce the risk of surgical site infections. However, it remains unclear whether there exists a superior AB practice approach in prevention of postoperative serious adverse events (SAEs).
Aim: To compare the relative effectiveness of different AB prophylaxis approaches in prevention of SAEs up to one year after the THA.
Materials and Methods: The study was designed as a systematic review and network meta-analysis of randomized trials (RCT). Data sources were MEDLINE, EMBASE and Cochrane Library to identify RCTs that examined the effect of AB prophylaxis in patients ≥ 18 years, receiving primary THA. SAE was defined as a composite of prosthetic joint infections, other serious infections, major cardiovascular events, venous thromboembolisms, and mortality. Our network meta-analysis was based on mixed-effects logistic regression. The odds ratio (OR) with 95% confidence interval was the primary measure of association.
Results: We screened 6,221 records for eligibility and included 10 trials (9,130 patients) for analysis. Trial arms were divided into five groups: placebo (3), single-dose (3), multiple doses up to 24 hours (6), and multiple doses >1 day (6), and AB cementation practice (2). Compared to placebo, all AB prophylaxis practices were superior in reducing the odds of having an SAE up to 1 year after surgery: OR (single-dose) = 0.16 (0.03 – 0.71), OR (multiple doses up to 24 hours) = 0.13 (0.03 – 0.48), OR (multiple doses >1 day) =

0.22 (0.07 – 0.71) and OR (AB cementation) = 0.06 (0.01 – 0.36). There was no evidence suggesting that a single-dose AB was inferior to multiple doses up to 24 hours (OR = 1.22 (0.40 – 3.70)) nor multiple doses >1 day (OR = 0.70 (0.19 – 2.54)). Furtheremore, there was no evidence suggesting that AB practice with multiple doses up to 24 hours was inferior to multiple doses >1 day, (OR=0.58 (0.20 – 1.67)).

Interpretation / Conclusion: Evidence from RCTs show that AB is effective in prevention of SAEs up to 1 year after THA. However, we could not confirm that any specific AB regime was superior. Thus, there is currently no evidence to suggest a preferable AB strategy.

56. Necrotizing Soft Tissue Infection – a descriptive study of 109 cases

Rehne Lessmann Hansen[1], Anette Marianne Fedder[2], Hans Michael Betsch[3], Karen Rokkedal Lausch[4], Mette Holm[5], Rikke Bek Helmig[6], Mikala Wang[7], Peter Christensen[8], Per Hviid Gundtoft1[1], Klaus Kjær Petersen[1]

1: Department of Orthopaedics, Aarhus University Hospital

2: Department of Emergency Medicine, Aarhus University Hospital

3: Department of Intensive Care Medicine, Aarhus University Hospital

4: Department of Infectious Diseases, Aarhus University Hospital

5: Department of Pediatrics and Adolescent Medicine, Aarhus University Hospital

6: Department of Obstetrics and Gynaecology, Aarhus University Hospital

7: Department of Clinical Microbiology, Aarhus University Hospital

8: Department of Surgery, Aarhus University Hospital

Background: Necrotizing Soft Tissue Infection (NSTI) is a rapidly progressing and potentially life-threatening soft tissue infection. Early diagnosis and prompt surgical intervention are crucial for improving patient outcomes.

Aim: To evaluate the impact of implementing a local/regional guideline for the treatment of NSTI.

Materials and Methods: At Aarhus University Hospital (AUH), a guideline for treating NSTI was introduced in 2020. A retrospective analysis of patients treated for NSTI at AUH from 2015 to 2020 (retro-group n=65) was conducted. From 2020 to 2023 data was collected prospectively in a local database (pro-group n=44). Clinical, laboratory, and surgical data were collected and analyzed using the electronic medical record.

Results: A total of 109 patients (61 men, 48 women) with a mean age of 61 years (SD 15.2) were included. Diabetes was the most frequent comorbidity (32%), followed by liver disease (6%) and cancer (8%). At the time of admission, the median CRP was 298.5 mg/L (IQR 187 to 389), leukocyte count 15.2 × 10^9/L (IQR 11.9 to 21), creatinine 110 µmol/L (IQR 75 to 155), and lactate levels were 2.45 mmol/L (IQR 1.3 to 4.2). 48% of the patients received pre-operative CT-scans, with no difference between the groups (p=0.72) The median time from suspicion of NSTI to surgical intervention was 90 minutes (IQR 35 to 209 minutes) in the retro-group and 79 minutes (IQR 54 to 137) in the pro-group (p=0.9) The most common bacteria isolated from tissue-samples were S. aureus, S. pyogenes, and Peptostreptococcus sp. 95% of patients were treated at the intensive care unit. The median SAP3-score was 56 (IQR 48 to 71), which correlated negatively with time to death (spearmans rho -0.62, p=0.045). 29 patients in the retro-group and 1 patient in the pro-group received hyperbaric oxygen treatment (P=0.005). 20 patients in the retro-group and 13 in the pro-group died after a median of 15 days (IQR 2 to 271) (p=0.68). **Interpretation / Conclusion:** Our results show an overall short time from suspicion of NSTI to intervention. The preliminary results find that the implementation of a NSTI guideline has not had a significant effect on time- delay to surgical intervention or short-term survival.

57. Fatigue, fear of being mobilized and residual limb pain limits independent mobility and physiotherapy early after major dysvascular lower limb amputation.

Anja Løve Berger[1], Morten Tange Kristensen[1,2]

1. Department of Physical and Occupational Therapy, Copenhagen University Hospital, Bispebjerg-Frederiksberg and Department of Clinical Medicine, University of Copenhagen, Denmark
2. Departments of Physiotherapy and Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark

Background: Patients with a major dysvascular lower extremity amputation (LEA) are characterized by multimorbidity and high risk of mortality. Early mobilization, physiotherapy (PT) and achieving independent mobility are key components in enhanced recovery programs also for these patients, but often challenged by lack of compliance. However, knowledge of factors limiting early mobility and participating in PT after LEA is sparse.
Aim: To investigate patient reported factors limiting the ability to achieve independency in basic mobility and participate in the planned PT during the first 3 days of PT after LEA.
Materials and Methods: A total of 60 consecutive patients with a mean (SD) age of 73.7 (12.1) years that underwent a LEA within a 7-month period and treated according to an enhanced program at a university hospital were included. The Basic Amputee Mobility Score (BAMS, 0-8 points) was used to evaluate the patient's independency in 4 basic mobility activities: 1) getting from lying to sitting in bed, 2) transfer from bed to wheelchair, 3) indoor wheelchair mobility, and 4) from wheelchair to standing on the non- amputated leg. Pre-defined limitations for not achieving a full BAMS score or inability to complete planned PT were: residual limb pain, pain elsewhere, fear of being mobilized, fatigue, nausea, acute cognitive dysfunction, or other, and noted on the first 3 days of PT.
Results: PT was started median postoperative Day1. Only 5 patients were independent in BAMS activity 2: transfer from bed to wheelchair, on PT Day1. Primary limiting factors for the 55 patients not independent were fatigue (44%) and fear of being mobilized (33%). 36 patients completed the planned PT on Day1, with the primary limiting factors for non-compliers being fatigue (38%) and pain in the residual limb (24%).
Interpretation / Conclusion: Fatigue and fear of being mobilized were the most frequent limiting factors for independent mobilization out of bed after LEA. Correspondingly, fatigue and pain in the residual limb restricted participation in the planned PT. These findings can be utilized in a multimodal perioperative setting to optimize treatment for overcoming these barriers, potentially leading to better compliance and outcomes.

58. Management of War Injuries at Aarhus University Hospital in 2022: Experience from 12 casualties admitted from Ukraine

Rehne Lessmann Hansen[1], Per Hviid Gundtoft[1], Juozas Petruskevicius[1], Ole Juul[1,2], Klaus Kjær Petersen[1], Christen Ravn[1,2]

1. Department of Orthopaedics, Aarhus University Hospital
2. Forsvarets Sanitetskommando

Background: Due to the war in Ukraine the number of casualties and complex cases exceeds the Ukrainian health service capacity. In collaboration with Health authorities of EU's countries many injured patients were transferred for further treatment in western countries, including Denmark.
Aim: To report experience from treating war-related musculoskeletal injuries at Aarhus University Hospital (AUH).
Materials and Methods: All casualties referred to AUH due to traumatic injuries suffered in Ukraine in 2022 were prospectively included in this cohort study focusing on injuries, treatment delay, microbiology, treatment, mental status, rehabilitation, and discharge.
Results: A total of 12 patients (male, 9-50 years) were transferred to AUH with a mean delay of 66 (4-157) days after injury. Only one patient arrived at daytime. Eight patients arrived without relatives, and nine patients were only able to speak Ukrainian or Russian. On arrival to AUH, patients were isolated, assessed and trauma scanned. Most injuries involved the extremities (10 cases), but injuries also involved spine (1), thorax (1), abdomen (2) and the brain (4). Nine patients had multiple injuries. Open wounds and colonization with CPO were seen in nine patients. Two patients arrived in sepsis and one with COVID. Treatment measures were organised with multidisciplinary approach. Total 35 operations were performed in the orthopaedic (24 procedures), abdominal (8) and neurosurgical (3) departments. Mean hospital stay was 33 days and indications for prolonged admission includes multiple operations, chronic infections, complications, malnutrition, and specialized physical and psychological rehabilitation. None of the patients were amputated, and only three patients were discharged in wheelchair. Three pts were discharged back to Ukraine, whereas the rest were either rehabilitated at local hospitals or in a municipal setting.
Interpretation / Conclusion: Several patients had a complex fracture-related infections that most likely could have been avoided if the patients were referred directly to Denmark after primary stabilization in Ukraine. We suggest sharing the efforts and experience in a few multidisciplinary centres where patients could also benefit from each other's company.

59. Epidemiology of first-time major lower extremity amputations – A Danish Nationwide study from 2010 to 2021.

Anna Trier Heiberg Brix[1,2], Katrine Hass Rubin[2,3], Tine Nymark[1,2], Hagen Schmal[1,4], Martin Lindberg-Larsen[1,2]

1. Department of Orthopedic Surgery and Traumatology, Odense University Hospital
2. Department of Clinical Research, University of Southern Denmark
3. OPEN - Open Patient Data Explorative Network, OUH and University of Southern Denmark
4. Department of Orthopedics and Traumatology, University Medical Center Freiburg

Background: Major lower extremity amputations (MLEA), defined as amputation above the ankle, are common procedures. Potential changes in surgical strategy and patient characteristics over time have not been described previously.

Aim: The aim of this study was to describe the incidence rates and surgical strategies of first-time MLEAs from 2010 to 2021. Furthermore, to describe patient and surgical center demographics during the same period.

Materials and Methods: This is an observational nationwide register study including all first-time MLEAs performed in patients ≥18 years from 2010 to 2021. Data were achieved from the Danish National Patient Register and the Danish National Prescription Database.

Results: A total of 12.669 first-time MLEA patients were identified in the study period. The annual number of first-time MLEAs each year was unchanged at approx. 1000 annually during the study period. In 2021 the total incidence was 21.3/100.000 and the adjusted incidence decreased by 2.3% (95% CI 1.8-2.8) per year. The frequency of transfemoral amputations increased, whereas knee disarticulation and transtibial amputation decreased. The comorbidity burden and age at MLEA were also unchanged during the study period. Within the study period a total 20% of patients underwent minor amputation, defined as below or through the ankle, and a total 39% had revascularization surgery prior to MLEA. There was no change in annual rates throughout the study period. The surgical centers performing MLEA were reduced from 26 to 17 during the study period.

Interpretation / Conclusion: We observed a decreasing incidence of first-time MLEA in Denmark and a shift towards increased use of transfemoral amputations. This trend was not explained by higher age, increasing comorbidity burden, or previous surgeries before first-time MLEA, as these factors were constant. Whether the change in surgical strategy is to the benefit of the patients should be investigated further.

60. Comparing radiotherapy regime for limb sparing surgery with wide or marginal margin in the treatment for localized deep seated high grade soft tissue sarcomas in the extremities and trunk wall. A Retrospective study from 2000-2016.

Andrea Thorn[1], Bodil Engelmann[2], Ninna Pedersen[3], Thomas Baad-Hansen[4], Michael Mørk Petersen[1]

1. Department of Orthopaedic Surgery, Rigshospitalet, University of Copenhagen
2. Department of Oncology, Herlev Hospital
3. Department of Oncology, AUH; 4. Department of Orthopaedics, Aarhus University Hospital.

Background: Treatment of Soft tissue sarcomas (STS) is in Denmark only practiced in two sarcoma centers: Aarhus University Hospital (AUH) and Rigshospitalet/Herlev Hospital (RH/HH). In 2018 the Danish Sarcoma Group approved a new cancer guideline dealing with radiotherapy of localized STS, and it was concluded that radiotherapy combined with limb sparing surgery with wide or marginal margin is the treatment of choice for all localized deep-seated H-M STS. The new guidelines are very similar to what has been the clinical practice in AUH for many years while the Sarcoma Center at RH/HH until 2018 has had a different more individualized approach not always treating with radiation therapy if tumors were removed with a wide margin regardless of tumor size.
Aim: Evaluate the treatment of deep-seated high-grade STS by comparing two different regimes of postoperative radiotherapy treatment regarding local recurrence (LR) and overall survival (OS).
Materials and Methods: We included the patients from the Danish Sarcoma Registry, with newly diagnosed H-M STS (Trojani 2+3) of the extremities or trunk wall between Jan 1, 2000 and Dec 31, 2016, primary surgery for a deep-seated (sub-fascial) tumor, and age > 18 with. The cohort was specifically validated regarding LR and OS. Statistics: Kaplan Meier survival analysis and log-rank test for comparison of groups.
Results: A total of 732 patients (RH/HH: n=337, AUH: n=395) with localized deep-seated H-M STS in the extremities and trunk wall, were operated on between 2000 and 2016. The last follow-up was on 01/01/2023 giving a minimum follow-up of 6 years. 432 patients died during the follow-up (RH/HH: n=201, AUH: n=231). The 5-year OS for RH/HH was 55.8% (CI-95: 50.5-61.1) and 54,4% (CI-95: 49.5-59.3) and no significant difference could be found (p=1). The same result could be found when looking at LR. 253 patients (RH/HH: n=117), AUH: n=136) were diagnosed with LR after their primary operation. The 5-year local recurrence free survival for RH/HH was 68% (CI- 95 63-72-9) and 67.8% (CI-95 63.2-72.5) for AUH and no difference could be found between the centers (p=1).
Interpretation / Conclusion: There was no statistically significant difference in OS or LR rates between patients treated at RH/HH and AUH.

61. Bone Cement Implantation Syndrome in Patients Surgically Treated With Cemented Endoprostheses due to Metastatic Bone Disease of the Femur

Thea Hovgaard Ladegaard[1], Michala Skovlund Sørensen[1], Michael Mørk Petersen[1], Jakob Stensballe[2,3]

1. Musculoskeletal Tumor Section, Dept. of Orthopedic Surgery, Rigshospitalet, University of Copenhagen
2. Department of Anaesthesiology and Trauma Centre, Rigshospitalet, Copenhagen University Hospital
3. Capital Region Blood Bank, Rigshospitalet, Copenhagen University Hospital, Denmark

Background: Patients with bone metastases in the femur (BMf) experience pathological fractures requiring surgery with cemented endoprostheses (cEPR). At the cementation process and prosthesis insertion, patients are at risk of experiencing hypoxia, hypotension, cardiac failure and potentially cardiac arrest, known as bone cement implantation syndrome (BCIS).
Aim: To investigate the incidence of BCIS in patients surgically treated with cEPR due to BMf.
Materials and Methods: We retrospectively assessed all patients with BMf operated with cEPR in two 18 months periods 2017 – 2018 (early cohort) and 2019 – 2020 (late cohort). Data were obtained from medical records. BCIS was classified 1-3 by degree of hypotension, desaturation and occurrence of pulmonary embolia, cardiac failure and/or death in the period from cementation until 5 minutes after. Patients with unknown time of cementation were excluded (n=22). Fishers exact test compared groups.
Results: We identified 165 patients, (79 in the early and 86 in the late cohort). In total 56/165 (34%) experienced BCIS (33% in the early cohort vs 35% in the late cohort). The classification of BCIS severity was: grade 1 (11% vs 21%), grade 2 (18% vs 14%) and grade 3 (3.8% vs 0%) in the early and late cohort, respectively. A trend toward an increase in mild BCIS (grade 1) and a decrease in severe BCIS (grade 2+3) were seen between the early and late cohort ($p=0.068$). The use of vasopressors increased significantly from 59% to 86% between the two periods ($p<0.001$).
Interpretation / Conclusion: BCIS is occurring in more than 1/3 of patients operated on for BMf with cEPR. Our study showed a reduction in the severity of BCIS and highlights the continued need to prevent BCIS in patients with BMf.

62. Survival and recurrence of Angisosarcomas in the extremities and trunk wall A retrospective long-term population based follow-up study

Christina Holm[1,2], Andrea Thorn[1], Thomas Baad-Hansen[2], Michael Mørk Petersen[1]

1 The Musculoskeletal Tumor Section, Department of Orthopedic Surgery, Rigshospitalet, University of Copenhagen, Denmark,
2 Department of Orthopaedics, Tumor Section, Aarhus University Hospital, Aarhus, Denmark

Background: Angiosarcoma is a rare tissue sarcoma, representing approximately 1-2% of all soft tissue sarcomas. Angiosarcomas origins from endothelial cells hence classified as a vascular neoplasm. Angiosarcomas arise at any anatomic site with the vast majority being located at cutaneous sites, primarily head/neck, in particular the scalp. Angiosarcoma is a understudied cancer with a suggested increasing incidence and high mortality.
Aim: The purpose with present study was to make a long-term population-based evaluation of overall survival, risk of local recurrence and metastasis in patients with newly diagnosed angiosarcomas in the extremities and trunk wall.
Materials and Methods: We identified a retrospective population-based consecutive cohort with newly diagnosed angiosarcoma in the extremities or trunk wall. Patients were included from The Danish Sarcoma Registry from January 1st, 2000 and December 31, 2016. Kaplan-Meier survival analysis was used for evaluation of overall patient survival. Competing risk analysis was used for assessing cumulative incidence of recurrence and metastasis. Patients were followed until death or end of study (January 1, 2023) resulting in a minimum follow-up of 6 years.
Results: We included n=72 patients with a mean age of 66 (22-95) years (F/M=38/34). Fifteen patients (21%) were alive at the end of study. Overall survival was 33% (95%CI: 22%-44%) and 26% (95%CI: 16%-36%) after 5, 10 years respectively. We found no differences in overall survival between patients + local recurrence or + metastasis (p=0.8), (p=0.2) respectively. The cumulative incidence of local recurrence was 32% (95%CI: 21%-43%) and 33% (95%CI: 22%-44%) at 5 and 10 years respectively. The cumulative incidence of metastasis was 13% (95%CI: 5%-21%) and 14% (95%CI: 6%-23%) after 5 and 10 year respectively.
Interpretation / Conclusion: Our long-term results from a population-based cohort demonstrated that angiosarcoma is an aggressive subtype of soft tissue sarcomas with high risk of local recurrence and metastasizing. The long-term overall prognosis is poor despite aggressive treatment.

63. Magnitude of Surgery is not a Risk Factor for 30-day Mortality in Patients Treated for Metastatic Bone Disease in the Extremities

Thea Hovgaard Ladegaard[1], Michael Mørk Petersen[1], Michala Skovlund Sørensen[1]

1. Musculoskeletal Tumor Section, Department of Orthopaedic Surgery, Rigshospitalet, University of Copenhagen

Background: Surgical treatment of metastatic bone disease in the extremities (BMex) is a tradeoff between preserving limb function without posing a risk for survival. A previous study (Sørensen et al., Medicine 2016) fount that extended surgery is not a risk for 30-day mortality and hypothesized that wide resection and reconstruction might reduce the risk of postoperative mortality.

Aim: To validate that the extent of the surgical trauma does not increase the risk of 30-day mortality in patients having surgery with endoprostheses (EPR) or internal fixation (IF) for BMex and identify if IF increases the risk of 30-day mortality.

Materials and Methods: A retrospective cohort study on a population-based cohort having EPR or IF for BMex in the Capital Region of Denmark Jan 2014-Dec 2019. Intraoperative variables and patient demographics were evaluated for association with 30-day mortality by logistic regression analysis and Kaplan Meier evaluated survival. We had no loss to follow-up.

Results: We identified 437 patients having surgical treatment for BMex. Overall 30-days survival was 85% (95CI: 81-88). Univariate analysis identified ASA score 3+4 (OR 3.50 [95CI: 1.68-7.3]), Karnofsky <70 (OR 5.84 [95CI: 3.33-10.93]), fast growth cancer (OR 3.97 [95CI: 2.3-6.86]), visceral metastases (OR 2.86 [95CI: 1.55-5.28]), multiple bone metastases (OR 2.38 [95CI: 1.10- 5.19]) and treatment at a secondary surgical center (OR 1.88 [95CI: 1.11-3.18]) as risk factors for 30-day mortality. Only male gender (OR 2.51 [95CI: 1.19-5.30]), ASA 3+4 (OR 3.2 [95%CI: 1.12-9.16]), Karnofsky <70 (OR 4.01 [95CI: 1.95- 8.23]), fast growth cancer (OR 3.5 [95CI: 1.62- 7.52]) and multiple bone metastases (OR 3.38 [95CI: 1.13-10.10]) were independent prognostic factors for 30-day mortality in multivariate analysis. No parameters describing the extent of the surgical trauma were found to be associated with 30-day mortality.

Interpretation / Conclusion: We confirmed our hypotheses about extent of surgery, measured as blood loss, duration of surgery and degree of bone resection, not being associated with 30-day mortality. Further, we did not find IF as a risk factor. Instead general health status of the patient and extent of primary cancer disease influenced survival post surgery.

SESSION 8: HIP ARTHROPLASTY

16 November 2023

09:30 – 11:00

Room: 202-205

Chairs: Peter Horstman and Søren Overgaard

64. Femoral head size does not influence metal ion levels after metal-on-polyethylene total hip arthroplasty: a 5-year report from a randomized controlled trial

Kristine I. Bunyoz[1], Georgios Tsikandylakis[2, 3], Kristian Mortensen[1], Kirill Gromov[1], Maziar Mohaddes[2,3], Henrik Malchau[3, 4], Anders Troelsen[1]

1. Department of Orthopaedic Surgery, Copenhagen University Hospital, Hvidovre, Denmark
2. Department of Orthopaedics, Sahlgrenska University Hospital, Gothenburg, Sweden
3. Department of Orthopaedics, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden
4. Harris Orthopaedic Laboratory, Dept. of Orthopaedics, Massachusetts General Hospital, Boston, USA

Background: In metal-on-polyethylene (MoP) THA large femoral metal heads are designed to increase stability and reduce dislocation risk. Theoretically, the increased head size could lead to increased taper corrosion with the release of metal ions and adverse reactions.
Aim: Using blood ion measurements, we aim to investigate the potential association between femoral head size and metal-ion release after MoP THA.
Materials and Methods: 96 patients were enrolled at two different centers and randomized to receive either a 32-mm metal head or a 36-44 mm metal head (the largest possible fitting the thinnest available polyethylene insert). Blood metal ions and PROMs (OHS, UCLA) were measured at two- and five-year follow-ups.
Results: Both 2- and 5-year median chrome, cobalt, and titanium levels were below taper corrosion indicative ion levels. At 5 years, median chrome, cobalt, and titanium levels were 0.5 µg/L (0.50-0.62), 0.24 µg/L (0.18-0.30), and 1.16 µg/L (1.0-1.68) for the 32-mm group, and 0.5 µg/L (0.5-0.54), 0.23 µg/L (0.17-0.39), and 1.30 µg/L (1-2.05) for the 36-44 mm group, with no difference between groups (p=0.825, p=1.000, p=0.558). At 2 years, 7 versus 4 patients had elevated ions in the 32-mm versus 36-44 mm group. At 5 years, 6 versus 7 patients had elevated ions in the 32-mm versus 36-44 mm group. At 5 years, median UCLA score was lower in the 36-44 mm group (p=0.020). The remaining PROMs showed no differences between groups.
Interpretation / Conclusion: 5 years after the insertion of MoP THAs, we found no differences in the blood metal ion levels between 32 mm heads and 36-44 mm heads and no corrosion-related revisions. As taper corrosion can debut after 5 years, there is still a need for long-term follow-up studies on the association between head size and corrosion in MoP THA.

65. No association between season of the year and risk of prosthetic joint infection after primary total hip arthroplasty: A cohort study on 58,449 patients with osteoarthritis from the Danish Hip Arthroplasty Register

Rajzan Joanroy[1,2], Jens K Møller[2,3], Sophie Gubbels[4], Søren Overgaard[5], Claus Varnum[1,2]
1.Department of Orthopaedic Surgery, Lillebaelt Hospital - Vejle, Denmark 2.Department of Regional Health Research, University of Southern Denmark, Denmark 3.Department of Clinical Microbiology, Lillebaelt Hospital - Vejle, Denmark 4.Division of Infectious Disease Preparedness, Statens Serum Institut, Denmark 5.Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg, Denmark 6.Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen

Background: The most devastating complication after total hip arthroplasty (THA) is prosthetic joint infection (PJI). Published danish surveillance data from the Healthcare-Associated Infections Database have indicated seasonal variation in primary THA and risk of PJI revision with a higher incidence during summer season. **Aim:** We investigated the association between season and risk of PJI revision and any revision following primary THA. **Materials and Methods:** This nation-wide register-based cohort study identified 58,449 patients from the Danish Hip Arthroplasty Register (DHR) with unilateral primary THA performed due to osteoarthritis from 2010-2018. From Danish health registries, we retrieved information on Charlson Comorbidity Index (CCI), immigration, death, microbiological data on intraoperative biopsies, cohabitation status and meteorological data from The Danish Meteorological Institute. Summer was defined as June-September, and THAs performed during winter (October-May) were used as controls. The follow-up for all patients was 1 year. Primary outcome was revision due to PJI confirmed or likely: the composite of revision with any culture-positive biopsy or reported PJI to DHR. The secondary outcome was any revision. The cumulative incidences and the adjusted relative risk (RR) with 95% confidence intervals (CI) were calculated by season of the primary THA. We adjusted for age, sex, CCI, cohabitation status, fixation type and duration of antibiotic treatment in relation to primary THA. **Results:** At 1-year follow-up, 1,507 patients were revised, of which 632 were due to PJI. The cumulative incidence of PJI for THAs performed during summer and winter was 1.1% (CI 1.0-1.3) and 1.1% (CI 1.0-1.2) and for any revision 2.7% (CI 2.5-3.0) and 2.5% (CI 2.4-2.7), respectively. The adjusted RR for PJI revision was 1.1 (CI 0.9 – 1.3) and for any revision 1.1 (CI 1.0-1.2) for THAs performed during summer vs. winter. **Interpretation / Conclusion:** We found no association between summer and the risk of PJI revision or any revision for patients with primary THA. Hence, the published surveillance data could not be verified in the present study. It seems safe to perform primary THA during the summer season.

66. The effect of perioperative analgesia on persistent pain after total hip and knee arthroplasty - a systematic review and meta-analysis

Jens Laigaard[1,2,3], Anders Peder Højer Karlsen[2,4], Mathias Maagaard[2,3], Troels Haxholdt Lunn[3,4], Ole Mathiesen[2,3], Søren Overgaard[1,3]

1) Dept. of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital Bispebjerg and Frederiksberg, Copenhagen, Denmark; 2) Centre for Anaesthesiological Research, Dept. of Anesthesiology, Zealand University Hospital, Køge, Denmark; 3) Dept. of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark; 4) Dept. of Anesthesia and Intensive care, Copenhagen University Hospital Bispebjerg and Frederiksberg, Denmark.

Background: Pain during rehabilitation from surgery is associated with persistent pain. This occurs in around 9 to 20% of patients after total hip or knee arthroplasty (THA/KA). The main reason for this, is believed to be central sensitisation, where the pain centres become hypersensitive after experiencing intense pain. **Aim:** To investigate the effect of perioperative analgesic interventions in reducing persistent pain after THA and KA. **Materials and Methods:** This was a systematic review and meta-analysis of randomised trials on perioperative analgesic interventions for osteoarthritis patients undergoing elective THA/KA. The protocol was registered (CRD42021284175) and published (PMID 35325472). Two authors independently screened records, extracted data, and assessed risk of bias. The primary outcome was pain scores 3-24 months postsurgically, reported as absolute mean differences (95% confidence interval) on the 0-100 visual analogue scale. **Results:** We searched CENTRAL, MEDLINE, and Embase up to October 19, 2021, and identified 38,202 unique records. We screened 892 articles and found 725 eligible trials, but pain outcomes 3-24 months postsurgically was only available from 37 trials, despite contact to authors of all eligible trials. All 37 trials were at high risk of bias. Most included trials investigated glucocorticoids (10 trial arms, 5369 patients), local infiltration analgesia (7 trial arms, 1932 patients), and gabapentinoids (6 trial arms, 1770 patients). We found no effect of glucocorticoids (-0.3 mm [95% CI -0.8 to 0.3]), local infiltration analgesia (0.0 mm [-0.4 to 0.4)) or gabapentinoids (-3.0 mm [-27.9 to 21.9]) on pain assessed at rest after 3-24 months. Similarly, we found no effect of glucocorticoids (0.2 mm [-0.4 to 0.7]), local infiltration analgesia (-1.4 mm [-4.0 to 1.1]) or gabapentinoids (2.8 mm [-1.3 to 6.8]) on pain assessed during movement. Other outcomes of interest, including serious adverse events, were rarely reported. **Interpretation / Conclusion:** Few trials on analgesic interventions for THA/KA reported long-term pain outcomes. All trials were at high risk of bias, and we did not find any evidence for or against perioperative analgesic interventions for reduction of persistent postsurgical pain.

67. Association between metabolic syndrome and patient-reported outcome after hip and knee arthroplasty - Results from 2,901 procedures performed in a high-volume centre

Rasmus Reinholdt Sørensen[1], Signe Timm[1], Lasse Enkebølle Rasmussen[1], Claus Lohman Brasen[2], Claus Varnum[1]

1. Department of Orthopaedic Surgery, Lillebaelt Hospital - Vejle
2. Department of Biochemistry and Immunology, Lillebaelt Hospital - Vejle

Background: Metabolic syndrome (MetS) is a common term used for metabolic deficiencies that can lead to cardiovascular disease, diabetes and other lifestyle-related conditions. Estimations are that 30% of the middle-aged population in Denmark suffers from MetS. It is unknown how MetS influences the outcome after hip and knee arthroplasty.
Aim: Primary aim was to investigate the change in patient-reported outcome (PRO) from baseline to 12 months after hip and knee arthroplasty in patients with MetS compared to patients without MetS. Secondly, PRO was compared at baseline, 3 and 24 months after surgery.
Materials and Methods: During May 1st, 2017 to November 30th, 2019 a cohort of 2,760 patients undergoing 2,901 hip and knee arthroplasties was established. Data from national registries and a local database were used to determine the presence of MetS and the patients´ scores on Oxford Hip Score (OHS) or Oxford Knee Score (OKS), UCLA Activity Score (UCLA), Forgotten Joint Score (FJS) and EQ-5D-5L score at baseline, 3, 12 and 24 months after surgery. Primary outcome was the change from baseline to 12 months in OHS and OKS. Secondary outcome was OHS and OKS at 3 and 24 months as well as UCLA, EQ5D-5L and FJS at 3, 12 and 24 months after surgery. Mixed effect linear regression, adjusted for age, sex, comorbidity and smoking, was applied to present marginal mean and associated 95% confidence intervals.
Results: fifty-two percent of the cohort met the criteria for MetS. Both groups showed an increase in OHS (MetS group 23 (22-23), non-MetS group 21 (21- 23)) and OKS (MetS-group 18 (18-19), non-MetS group 18 (18-19)) at 12 months follow-up. The difference between groups did not reach statistical significance (OHS p=0.39 and OKS p=0.97). Similar improvements were seen in UCLA, FJS and EQ-5D-5L at every time point.
Interpretation / Conclusion: Patients with metabolic deficiencies meeting the criteria for MetS reach the same improvement in PRO as individuals without MetS up to 24 months after hip and knee arthroplasty.

69. Long term evaluation of an Ultra-Short femoral neck preserving and proximal loading hip implant – a 10-year follow-up study

Martin Peter Nielsen[1], Janus D Christensen[1], Thomas Jakobsen[1], Poul Torben Nielsen

1. Department of Orthopaedics, Aalborg University Hospital

Background: Using radio stereometric analysis (RSA), we have previously shown good fixation of the ultra-short stem Primoris® at midterm follow-up (5 years). Bone mineral density (BMD) evaluations have shown promising results with preservation of proximal bone stock. Few studies have evaluated long term follow up on BMD, migration and patient satisfaction of an ultra-short stem.
Aim: The aim of this study was to investigate bone remodeling, implant migration analysis (RSA) and patient related outcome measures (PROMs) in patients treated with the Primoris ® stem with a 10- year follow-up
Materials and Methods: 50 patients (5 females and 45 males), mean age of 52 with end-stage osteoarthritis were treated with the Primoris® between 2011-13. Using DEXA scans we analyzed bone mineral density (BMD) in four different regions of interest (ROI). Implant migration was assessed using RSA. PROMs were evaluated with Harris Hip score, Oxford Hip score, WOMAC, EQ-5D score and UCLA activity score at the same follow up intervals. Follow up examinations were performed at day 1, 6 weeks, 6 months, 12 months, 2 years, 5 years and 10 years postoperatively.
Results: BMD showed a decrease in ROI1 (10.7%), ROI2 (12.7%), ROI3 (12.5%), ROI4 (4,.%) from day 0 to 10 years. Patient satisfaction at 10-year follow-up remained high with median values of Harris Hip score 98, Oxford Hip score 47, WOMAC 97 , EQ-5D score 1, UCLA activity score 7. RSA analysis showed minimal migration of the prosthesis in translation(X,Y,Z) and rotation(X,Y,Z) with a mean maximum total point motion at 10 years only of 0,79 mm.
Interpretation / Conclusion: This 10-year follow up study of the Primoris® stem revealed minimal migration, which is in accordance with migration patterns of traditional uncemented stems. In regards to preserving proximal bone stock for eventual later revision and the risk of fracture, results are encouraging with only minimal stress- shielding and PROMs comparable to patients treated with a standard uncemented stem.

70. Accelerations Recorded by Low-Frequency Wearable Sensors as Effective Discriminators of Knee and Hip Osteoarthritis

Arash Ghaffari[1], Pernille Damborg Clasen[1], Rikke Vindberg Boel[1], Andreas Kappel[1], Thomas Jakobsen[1], Søren Kold[1], Ole Rahbek[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital.

Background: Wearable inertial sensors can detect abnormal gait associated with knee or hip osteoarthritis (OA). However, few studies have compared sensor-derived gait parameters between patients with hip and knee OA or evaluated the efficacy of sensors suitable for remote monitoring in distinguishing between the two.

Aim: Our study seeks to examine the differences in accelerations captured by low-frequency wearable sensors in patients with knee and hip OA and classify their gait patterns.

Materials and Methods: We included patients with unilateral hip and knee OA. Gait analysis was conducted using an accelerometer ipsilateral with the affected joint on the lateral distal thighs. Statistical parametric mapping (SPM) was used to compare acceleration signals. The k-Nearest Neighbor (k- NN) algorithm was trained on 80% of the signals' Fourier coefficients and validated on the remaining 20% using 10-fold cross-validation to classify the gait patterns into hip and knee OA.

Results: We included 42 hip OA patients (19 females, age 70 [63-78], BMI of 28.3 [24.8-30.9]) and 59 knee OA patients (31 females, age 68 [62- 74], BMI of 29.7 [26.3-32.6]). The SPM results indicated that one cluster (12-20%) along the vertical axis had accelerations exceeding the critical threshold of 2.956 ($p=0.024$). For the anteroposterior axis, three clusters were observed exceeding the threshold of 3.031 at 5-19% ($p = 0.0001$), 39- 54% ($p=0.00005$), and 88-96% ($p = 0.01$). Regarding the mediolateral axis, four clusters were identified exceeding the threshold of 2.875 at 0-9% ($p = 0.02$), 14-20% ($p=0.04$), 28-68% ($p < 0.00001$), and 84-100% ($p = 0.004$). The k-NN model achieved an AUC of 0.79, an accuracy of 80%, and a precision of 85%.

Interpretation / Conclusion: In conclusion, the Fourier coefficients of the signals recorded by wearable sensors can effectively discriminate the gait patterns of knee and hip OA. In addition, the most remarkable differences in the time domain were observed along the mediolateral axis.

71. Impact of self-perceived stress on the risk of opioid use after Total Hip Arthroplasty in osteoarthritis patients

Nina M. Edwards [1], André S. Klenø [2], Alma B. Pedersen [2]

1. Department of Orthopaedic Surgery, Regionshospitalet Horsens, Denmark;
2. Department of Clinical Epidemiology, Department of Clinical Medicine, Aarhus University and Aarhus University Hospital, Aarhus, Denmark.

Background: Opioids are commonly used to treat pain after total hip arthroplasty (THA) surgery, however continued opioid use is seen in 16 % of patients 12 months after THA surgery. Increasing evidence show that psychological factors can affect pain and opioid use after surgery. However, little is known regarding the impact of a history of stress on opioid use after THA.
Aim: To examine the association between perceived stress and the risk of continued opioid use after THA in patients with osteoarthritis.
Materials and Methods: The 2013 and 2017 nationwide population-based health survey was used to identify 1,729 patients who completed a self-reported Perceived Stress Scale and who later on received a primary THA, identified through the Danish Hip Arthroplasty Registry. Patients were categorized into two groups: high level of stress and low level of stress (including no stress). The outcome was continued opioid use defined as ≥ 2 opioid dispensing 1-12 months after THA identified in the Danish National Health Service Prescription Database. We calculated prevalences of continued opioid use. We calculated the adjusted prevalence ratios (aPR) with 95% confidence intervals using log-binomial regression and adjusting for sex, age, comorbidities, and education. We calculated median morphine milligram equivalents (MME) for the entire year as the opioid dose multiplied by an MME conversion factor.
Results: Overall, 258 (15%) patients reported high level of perceived stress, and 26% of these had continued opioid use. 1,471 (85%) patients reported low level or no stress, and 15% of these had continued opioid use. The aPR for continued opioid use was 1.42 (1.11-1.80). The MME dose was 1000 for patients, who reported high level of perceived stress and 645 for patients, who reported low level or no stress.
Interpretation / Conclusion: Patients, who report high level of perceived stress before THA have a higher risk of continued opioid use and consume higher MME dose in the first post-operative year after THA than patients, who report low level or no stress. We examined important pre-existing patient characteristics and found important differences contributing to continued opioid use after THA.

72. Status on the true dislocation risk one year after primary total hip arthroplasty (THA) based on data from the Danish Hip Arthroplasty Register and the Danish National Patient Register (LPR3-version)

Lars L. Hermansen[1,2], Thomas F. Iversen[2], Pernille Iversen[3], Søren Overgaard[4,5]

1. Department. of Orthopedics, University Hospital of Southern Denmark, Esbjerg; 2. Department of Regional Health Research, University of Southern Denmark, Odense; 3. The Danish Clinical Quality Program and Clinical Registries; 4. Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg; 5. Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen;

Background: Dislocation is one of the leading indications for hip revision, but most patients are still treated by closed reduction only. The true burden of this complication has historically been difficult to measure truthfully. In 2019, we presented the true dislocation risk from 2010-2014 after conducting a nationwide review of patient files, and we initiated the work of implementing a new quality indicator in the Danish Hip Arthroplasty Register (DHR) based on the new Danish National Patient Register (DNPR - LPR3 version).
Aim: Prior to planned onset of the dislocation indicator in the 2022-annual DHR report, our aim with this study was to present the current national status of the true one-year dislocation risk after primary THA.
Materials and Methods: We included 5.415 primary THAs inserted from 1/7 2019 to 31/12 2019 and identified every hospital contact with the Danish healthcare system within the first postoperative year based on data from the DNPR. To identify every dislocation, we manually reviewed patient files containing more than 1.750 hospital contacts. All public hospitals and private clinics were included. Results are presented as proportions with 95% confidence intervals.
Results: We identified 243 dislocations in 152 THAs corresponding to a true one-year dislocation risk of 2.8% (2.4-3.3). During the follow-up, 37% of the patients suffered additional events of dislocation. THA due to osteoarthritis resulted in 2.5% (2.1-3.0) dislocations, while the risk was 4.5% (2.3- 7.7) and 5.3% (2.8-9.1) in patients with acute femoral neck fracture and sequalae after earlier hip fracture surgery, respectively. The results varied within the five regions of Denmark from 1.4% (0.9-2.3) to 5.4% (3.6-7.6), and between hospitals from 0% to 9.6% (3.2-21.0).
Interpretation / Conclusion: The true one-year dislocation risk after primary THA was 2.8%. This level corresponds well with our findings in the 2010-2014 cohort. The next step will be to validate our algorithm based on LPR3-data. The quality indicator in the upcoming DHR annual reports will contribute to identify both hospitals and implant-related factors associated with high dislocation rates and improvement potential.

73. 49 cases of revision knee- and hip arthroplasty with Sonication for diagnosis of possible bacterial infection

Morten Boye Petersen[1], Mikkel Rathsach Andersen[1]

1. Department of Orthopaedics, Gentofte, Gentofte-Herlev University Hospital

Background: Diagnostics of possible infection in revision hip or knee arthroplasty, has so far essentially been by taking five tissue biopsies, as described by Kamme 1981. However, it is often experienced that tissue samples are without significant bacterial diagnostics, even though the surgeon's experience is that the field is infected. Based on knowledge of biomembrane formation, sonication has been developed as a method for diagnosing periprosthetic infection (PJI).
Aim: To evaluate results with the first 49 cases using sonication, the sonication result was compared with the results of culture of tissue biopsies.
Materials and Methods: 49 implants removed during hip or knee revision of all courses from 2017 to 2023 were sent for sonication. According to EBJIS classification, preoperative 24 cases were with unlikely infection, 21 with infection likely and 4 with confirmed infection. If significant bacterial growth was found when culturing the sonication liquid, this was taken as diagnostic of bacterial infection. For all cases, five biopsies were taken a.m. Kamme. If two or more tissue biopsies showed growth of the same bacteria, this was taken as diagnostic for bacterial infection. Results after the two analysis methods were compared.
Results: In 28 operations, neither tissue biopsies nor sonication found diagnostic signs of bacteria. In 14 cases, sonication found bacteria, typically low virulence bacteria, with no growth in tissue samples. In 6 cases, both sonication and tissue samples found bacteria, and in all 6 cases, the same bacterial strain. In 1 operation, sonication found no growth, while tissue biopsies (3/5) found growth of Staphylococcus aureus
Interpretation / Conclusion: Sonication seems to have a role in bacterial diagnostic in revision surgery for PJI. Typically, low-virulence biomembrane forming bacteria such as e.g. Staph. Epidermidis is detected. In 14 cases (28%), bacteria could be detected by sonication, where tissue biopsies found no bacteria. In the cases where there was both growth by sonication and 2 of 5 possitve tissue cultures , there was good agreement in the bacterial diagnosis. However, in its current structure, the method is expensive and resource-demanding, which gives limitations to its use.

SESSION 9: TRAUMA

16 November 2023

13:30 – 15:00

Room: 01+02

Chairs: Katrine Borum and Arvind van Keudell

74. Team-based Digital Communication Reduces Patient-initiated Phone Calls to the Hospital After Discharge: Preliminary Results from a Randomized Clinical Trial

Lili Worre Høpfner Jensen[1], Søren Kold[1], Hans-Christen Husum[1], Ole Rahbek[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital, 9000 Aalborg, Denmark

Background: Digital communication solutions open up new opportunities for asynchronous post-discharge communication between patients and healthcare professionals. Concerns have been raised about an increased consumption of resources when patients are provided with easy digital access, e.g., that digital contact leads to more phone calls or double contacts.
Aim: We aimed to investigate the effects of a GDPR- safe team-based digital communication solution between orthopaedic surgery patients and healthcare professionals after hospital discharge (eDialogue) on phone calls to the hospital after discharge.
Materials and Methods: In a randomized clinical trial (n=70), we compared the number of phone calls to the hospital two months after discharge in patients randomized to standard communication pathways (n=35) or eDialogue (n=35). A secondary outcome was patients' perceptions of continuity of care, measured by The Patient Continuity of Care Questionnaire (PCCQ). The intervention group was given access to eDialogue and the control group used standard communication pathways after discharge, typically by phone. All patients answered weekly questionnaires regarding phone calls to the hospital. PCCQ was collected at baseline on the day of discharge (27 items) and four weeks after (14 items).
Results: Preliminary results four weeks after discharge shows that the intervention group had significantly less phone calls to the hospital than the control group (8 vs 50, $p<0.05$). The proportion of patients who called the hospital after discharge was 14% in the intervention group versus 46% in the control group ($p<0.05$). Patients in both groups reported similar perceptions of continuity of care at baseline and four weeks after discharge.
Interpretation / Conclusion: The study demonstrates that providing patients access to eDialogue can significantly reduce the number of phone calls to hospitals after discharge, while patients' perception of continuity of care remains the same.

75. THE KNEE INJURY AND OSTEOARTHRITIS OUTCOME SCORE (KOOS) FOR TIBIAL SHAFT FRACTURES

Rasmus Stokholm[1], Peter Larsen [1,2], Juozas Petruskevicius[3], Jan Duedal Rölfing[3], Morten K. Rasmussen[4], Steffen S. Jensen[4], Rasmus Elsøe[1]

1. Department of Orthopaedic Surgery, Aalborg University Hospital;
2. Department of Occupational Therapy and Physiotherapy, Aalborg University Hospital;
3. Department of Orthopaedics, Aarhus University Hospital;
4. Department of Orthopaedics, Viborg Regional Hospital

Background: In recent years patient-reported outcome measures (PROMs) have become prominent when evaluating the effect of treatment and patient satisfaction following orthopaedic disorders. Several generic and body region-specific PROMs have been used to assess patients with tibial shaft fractures. However, evidence is lacking in psychometric properties such as validity, reliability, responsiveness, and minimal clinically important difference when assessing patients with a tibial shaft fracture
Aim: To establish validity, reliability and responsiveness and to estimate the minimal clinically important difference (MICD) for each of the five KOOS subscales in patients with closed tibial shaft fractures.
Materials and Methods: This study is a multicentered prospective clinical trial including consecutive patients with closed tibial shaft fractures (AO 42-). Primary outcome measurement was the KOOS subscales pain, symptoms, ADL, sport and recreational activities (sport/rec) and QOL. Follow-up was repeated at 14 days, 6 weeks, and 3, 6 and 12 months postoperatively. Content validity was evaluated by patients ranking relevance of all the items in the KOOS questionnaíre, test-retest reliability by interclass correlation coefficient, responsiveness by effect size end estimation of minimal clinical important difference (MCID) by the anchor-base method.
Results: A total of 35 patients were included in the study. Mean age of patients was 46.2 with a range from 20 to 72. Female sex represents 11 of the 35 patients. Results indicated an acceptable content validity of all the KOOS subscales. The test-retest reliability was high for all the five subscales, with ICCs ranging 0.8-0.9. At follow-up 6- and 12- months responsiveness shows moderate to large effect sizes for the subscales pain, ADL, symptoms, and sport/rec, ranging 0.5- 1.2. The MCID of the KOOS subscales were: pain 5.2, symptoms 7.1, ADL 2.7, sport/rec 8.8 and QOL 8.8.
Interpretation / Conclusion: The KOOS appears to be a valid and useful questionnaire to capture patient perceived outcome within one year follow a closed tibial shaft fracture in adults. The questionnaire showed high content validity, high reliability, and acceptable responsiveness.

76. ESTABLISHING CONSTRUCT VALIDITY OF A NOVEL SIMULATOR FOR GUIDE WIRE NAVIGATION IN ANTEGRADE FEMORAL INTRAMEDULLARY NAILING

Lisa Beicker Salling[1], Jan Duedal Rölfing[1,2], Steven Long[3], Björn Vogt[4], Donald D. Anderson[3,5,6], Geb W. Thomas[3,6], Rune Dall Jensen[1]

1. Corporate HR, MidtSim,Aarhus, Denmark
2. Department of Orthopaedics, Aarhus University Hospital
3. Department of Orthopedics and Rehabilitation, University of Iowa Hospitals and Clinics;
4. Pediatric Orthopedics, Deformity Reconstruction and Foot Surgery, Muenster University Hospital
5. Department of Biomedical Engineering, University of Iowa; 6. Department of Industrial and Systems Engineering, University of Iowa.

Background: Antegrade femoral intramedullary nailing (IMN) is a common orthopedic procedure that residents are exposed to early in their training. A key component to this procedure is placing the initial guide wire with fluoroscopic guidance. A simulator was developed to train residents on this key skill, building off an existing simulation platform originally developed for wire navigation during a compression hip screw placement.
Aim: The objective of this study was to assess the construct validity of the IMN simulator.
Materials and Methods: Thirty orthopedic surgeons participated in the study: 12 had participated in fewer than 10 hip fracture or IMN related procedures and were categorized as novices; 18 were faculty, categorized as experts. Both cohorts were instructed on the goal of the task, placing a guide wire for an IM nail, and the ideal wire position reference that their wire placement would be graded against. Participants completed 2 assessments with the simulator. Performance was graded on the distance from the ideal starting point, distance from the ideal end point, wire trajectory, duration, fluoroscopy image count, and other elements of surgical decision making. A two-way ANOVA analysis was used to analyze the data looking at experience level and trial number.
Results: The expert cohort performed significantly better than the novice cohort on all metrics but one (overuse of fluoroscopy). The expert cohort had a more accurate starting point and completed the task while using fewer images and less overall time.
Interpretation / Conclusion: This initial study shows that the IMN application of a wire navigation simulator demonstrates good construct validity. With such a large cohort of expert participants, we can be confident that this study captures the performance of active surgeons today. Implementing a training curriculum on this simulator has the potential to increase the performance of the novice level residents prior to their operating on a vulnerable patient.

77. Using smartphones for remote monitoring of orthopaedic patients' physical activities during the perioperative period

Arash Ghaffari[1], Rikke Emilie Kildahl Lauritsen[1], Michael Christensen[2], Trine Rolighed Thomsen[3, 4], Harshit Mahapatra[2], Robert Heck[4], Søren Kold[1], Ole Rahbek[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital
2. Alexandra Institute, Aarhus N, Denmark
3. Department of Chemistry and Bioscience, Aalborg University
4. The Danish Technological Institute, Aarhus, Denmark

Background: Smartphones are often equipped with inertial sensors capable of measuring individuals' physical activities. Their role in monitoring the patients' physical activities in telemedicine, however, needs to be explored.
Aim: The main objective of this study was to explore the correlation between a participant's daily step counts and the daily step counts reported by their smartphone.
Materials and Methods: This prospective observational study was conducted on patients undergoing lower limb orthopedic surgery and a group of non- patients. The data collection period was from 2 weeks before until four weeks after the surgery for the patients and two weeks for the non-patients. The participants' daily steps were recorded by physical activity trackers employed 24/7, and an application recorded the number of daily steps registered by the participants' smartphones. We compared the cross-correlation between the daily steps time-series taken from the smartphones and physical activity trackers in different groups of participants. We also employed mixed modeling to estimate the total number of steps.
Results: Overall, 1067 days of data were collected from 21 patients (11 females) and 10 non-patients (6 females). The cross-correlation coefficient between the smartphone and physical activity tracker was 0.70 [0.53–0.83]. The correlation in the non-patients was slightly higher than in the patients (0.74 [0.60–0.90] and 0.69 [0.52–0.81], respectively).
Interpretation / Conclusion: Considering the ubiquity, convenience, and practicality of smartphones, the high correlation between the smartphones and the total daily step time-series highlights the potential usefulness of smartphones in detecting the change in the step counts in remote monitoring of the patient's physical activity.

78. Trends in Non-Operative Management of Low-Impact Pelvic Fracture Using the Nationwide Inpatient Sample from 2011 to 2018

Alexander Farid[1], Stephen Stearns[1], Joseph Atarere[1], Nishant Suneja[1], Michael Weaver[1], Arvind Von Keudell[1, 2]

1. Dept of Orthopaedic Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA.
2. Department of Orthopaedic Trauma, Bispebjerg Hospital, University of Copenhagen, Denmark.

Background: Nonoperative treatment remains the more common treatment modality for low-impact pelvic fractures.
Aim: In this study, we aim to better characterize the epidemiology of the population treated nonoperatively following low-energy pelvic fracture, while identifying recent trends in management of these patients.
Materials and Methods: We evaluated data from the Nationwide Inpatient Sample database, the largest inpatient care database in the United States, from 2011 to 2018. We selected for all adult patients with ICD-9 or -10 codes for pelvic fracture, excluding acetabular fracture, femoral fracture, and polytrauma to better isolate low-impact mechanisms. We then excluded operative patients. We collected data on baseline demographics and outcomes (length of stay, in-hospital mortality, hospital disposition) and assessed for change over time.
Results: 123,936 patients underwent nonoperative management of pelvic fracture. Mean age was 68.7. 70% were female, decreasing from 75% to 66% during our time frame. 59% of fractures featured pubic bone involvement. Average CCI was 3.83 with a stable trend. 62.4% of patients received care at an urban teaching hospital. Mean length of stay was 6.3 days. 62.8% of patients were discharged to a skilled nursing facility (SNF) (62.1-65.0%), while 2.0% (18.4-21.1%) were discharged home. Mean in-hospital mortality was 3.28%, stable over time, with increased mortality among men (5.1%, versus 2.5% among women) and those of Asian descent (3.8%).
Interpretation / Conclusion: Demographic trends have remained relatively stable, indicating the majority of patients being treated nonoperatively following low-impact pelvic fracture are female, in their mid-60s, with relatively low comorbidity. There was a relatively high rate of in-hospital mortality at 3.28%, particularly with male patients and patients of Asian descent, suggesting the need for higher surveillance for additional injury in patients with these characteristics. Patients were more often discharged to a SNF rather than home, indicating necessity for prolonged rehabilitation in this patient population. This persistent trend is notable in the setting of increasing consideration of cost of inpatient admissions and improvement in outpatient management of orthopedic injuries.

79. Etiologies of non-traumatic extremity compartment syndrome: A multi-center retrospective review

Richard Smith[1,2], Dafang Zhang[1], Michael Weaver[1], Arvind Von Keudell[1,3]

1. Dept of Orthopaedic Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA
2. Department of Orthopaedic Surgery, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
3. Department of Orthopaedic surgery, Bispebjerg Hospital, University of Copenhagen, Copenhagen

Background: Compartment syndrome is a disorder of increased intracompartmental pressure leading to decreased perfusion and tissue necrosis. Compartment syndrome often develops because of trauma. While less common, non-traumatic causes also exist. Etiologies of non-traumatic extremity compartment syndrome (NTECS) are often insidious and can occur when patients have altered levels of consciousness. Therefore, a high index of suspicion should be maintained.
Aim: The aim of this study is to determine the different etiologies of NTECS, understand the demographics of NTECS patients, and establish their rate of in- hospital mortality.
Materials and Methods: This is a retrospective cohort study of all patients diagnosed with NTECS at two level 1 trauma centers between January 2006-December 2019. Data related to the etiology of NTECS, patient demographics, and in-hospital mortality were collected from electronic medical records.
Results: Six hundred and four patients were included in this study with an average age of 54.6±9.0 years. The causes of NTECS for each patient was broadly categorized into one of seven etiologies. These included 243 hypercoagulable states, 132 found- down secondary to substance use, 64 perioperative positioning, 60 shock, 60 hypocoagulable states, 29 infection, and 16 IV infiltration. The IV infiltration etiology of NTECS had the highest percentage of female patients (50%) whereas the etiology of found down secondary to substance use had the highest percentage of male patients (71%). In-hospital mortality was highest in patients who developed NTECS due to hypercoagulable states (36%), shock (33%), and hypocoaguable states (25%). The average in hospital-mortality for all NTECS etiologies was 22%.
Interpretation / Conclusion: Many etiologies of NTECS exist. The etiologies are often insidious and associated with high rates of mortality. On average, more than 1 in 5 patients who develop NTECS will die during their hospitalization. Raising awareness, in addition to future research efforts, are necessary to improve clinical outcomes for these patients.

80. Risk of re-operation after treatment of distal femoral fractures with locking plates. A retrospective single-center cohort study

Adalet Corap[1], Fatma Kandela[1], Yasemin Corap[1], Bjarke Viberg[1], Michael Brix[1], Martin Lindberg-Larsen[1]

1. Orthopaedic Research Unit, Dept. of Orthopaedic Surgery and Traumatology, Odense University Hospital
2. Department of Clinical Research, University of Southern Denmark

Background: The incidence of distal femoral fractures and periprosthetic distal femoral fractures seems to be increasing, especially after the age of 60 years. There is currently no treatment algorithm regarding native and periprosthetic distal femoral fractures, however many cases are treated with internal fixation such as a locked compression plating (LCP). The risk of reoperation in hip fractures treated with internal fixation has been reported to be 21% within 1 year postoperatively
Aim: The aim of this study is to report the reoperation rate after treatment of distal femoral fractures with locked compression plating
Materials and Methods: We retrospectively identified 263 patients by procedure codes (KNFJ64, KNFJ65, KNFJ84, KNFJ85) and diagnosis codes (DS723, DS724, DS728, DS729) in a single institution from 2011 to 2022. Indications for surgery were native distal femoral fracture(n=117) and periprosthetic femoral fractures(n=45). A reoperation was defined as an amputation, new or re-osteosynthesis, primary or revision knee arthroplasty, or soft tissue revision within 1 year after native treatment. A major reoperation was defined as an amputation or a knee arthroplasty
Results: Out of the 162 eligible patients, 125 (77%) were female. The study population had a mean age of 74.8 years (SD 16.4). Overall, 37(23%) patients underwent reoperation within the follow-up period, 30 (18%) patients underwent reoperation within 1 year after surgery, 35 (21%) within 2 years, and all 37 patients underwent a reoperation within 5 years (23%). Causes of reoperation were infection(n=13), non-or malunion (n=5), pain (n=7), periprosthetic fracture(n=3), mechanical failure (n=3) or other (n=6). Only 6 patients underwent a major reoperation. 3 patients underwent more than 1 reoperation
Interpretation / Conclusion: The overall reoperation rate was 22.8% and the 1year reoperation rate were 18.5% % after treatment of distal femoral fractures with LCP. The overall reoperation rate was similar to the overall reoperation rate of 21% reported after operative management of hip fractures 1 year postoperatively hence, further analysis of causes of reoperations and risk factors are needed, and the treatment of distal femoral fractures with LCP should be monitored closely

81. Risk of complications and the influence on patient-reported outcome following patella fractures

Marie Arildsen[1,2], Peter Larsen[1,2], Kasper Kristensen[1,2], Kristian Damgaard Lyng[1,3], Rasmus Elsøe[1,2]

1. Department of Orthopaedics, Aalborg University Hospital
2. Interdisciplinary Orthopaedics, Aalborg University Hospital

Background: Although a high rate of both early and late complications following surgical treatment of patella fractures is common, current literature lacks large- scale clinical studies investigating the incidence of complications. The impact of early and late complications on patient-reported outcomes also lacks evidence.
Aim: The present study aimed to investigate the incidence of early and late complications following surgical treatment of patella fractures. Secondary aims were to investigate the association between early and late complications and the patient-reported outcome.
Materials and Methods: Cross-sectional study including all patients recorded with a patella fracture residing in the Northern Region of Denmark between 2010 and 2020. Early (before three months) and late complications were investigated by retrospective review of charts and x- rays. All patients were invited to participate in the study by reporting current knee-specific symptoms using the Knee Injury and Osteoarthritis outcome score (KOOS).
Results: 798 patients were included in the study. A total of 532 (67%) patients were treated conservatively, and 266 (33%) patients underwent surgery. The mean age at the time of fracture was 66.8, ranging from 6–103 years of age. The mean follow-up time was 6.4 years, ranging from 1.1– 12.3 years follow-up. Overall, the rate of complications was 26%. Overall, the rate of complication for the surgical group was 57%. The most common early complication was the loss of reduction followed by the removal of symptomatic hardware. The most common late complication was the removal of symptomatic hardware and knee arthroscopy. In all the five KOOS subscales (Pain, Symptoms, ADL, sport, and QOL), patients presenting with early and late complications reported statistically significantly worse scores than those without complications.
Interpretation / Conclusion: The overall incidence of complications in patients presenting with a patella fracture was 26%, with a mean follow-up time of 6.4 years. In the surgical group, 57% of patients experience at least one complication during the follow-up period. Early and late complications were significantly associated with worse patient-reported KOOS outcome scores.

82. Individual comorbid diseases as predictors of infection after surgery for hip fracture: a population-based cohort study among 87,593 patients

Nadia R. Gadgaard[1], Claus Varnum[2,3], Rob Nelissen[4], Christina Vandenbroucke-Grauls[1,5], Henrik T. Sørensen[1], Alma B. Pedersen[1]

1. Department of Clinical Epidemiology, Aarhus University Hospital and Aarhus University, Denmark;
2. Department of Orthopedic Surgery, Lillebaelt Hospital – Vejle, Denmark;
3. Department of Regional Health Research, University of Southern Denmark, Denmark;
4. Department of Orthopedics, Leiden University Medical Center, The Netherlands;
5. Department of Medical Microbiology and Infection Control, Amsterdam University Medical Center, Amsterdam, The Netherlands;

Background: Comorbidity level is strongly associated with risk of infection up to one year after hip fracture surgery. However, the impact of individual comorbidities as predictors of infection in patients with hip fracture is poorly understood.
Aim: We aimed to investigate individual comorbidities as predictors of infection among hip fracture patients.
Materials and Methods: Utilizing Danish population-based medical registries we obtained data on patients undergoing hip fracture surgery (2004-2017). Information on 27 comorbidities with prevalence of ≥1% was obtained 5 years prior to surgery. The main outcome was any hospital-treated infection within the first postoperative year and secondary outcomes were hospital-treated pneumonia and urinary tract infection (UTI). Cumulative incidence of infection was calculated considering death a competing risk. We used logistic regression to compute crude odds ratios (OR) with 95% confidence interval for infection.
Results: Of 87,593 hip fracture patients, 71% were female and the median age was 83 years. Most prevalent comorbidities were hypertension (23%), heart arrhythmia (15%), and cerebrovascular disease (14%). Among patients without any comorbidity, one- year incidence of any infection was 21%. Incidences of any infection were highest among patients with renal disease (43%), chronic pulmonary disease (43%), and hypotension (41%), and lowest for patients with dementia (28%), solid tumor (30%), and cerebrovascular disease (34%). ORs of any infection varied between 1.1 (1.0-1.1) for dementia and 2.1 (2.0- 2.2) for chronic pulmonary disease. Highest ORs for pneumonia was 2.9 (95% CI: 2.7-3.0) for chronic pulmonary disease, 1.9 (95% CI: 1.7-2.2) for pulmonary circulation disorders, and 1.9 (95% CI: 1.6-2.1) for hypotension. Highest ORs for UTI was 1.8 (95% CI: 1.6-2.1) for hypotension, 1.6 (95% CI: 1.5-1.8) for depressions/anxiety, and 1.5 (95% CI: 1.4-1.7) for complicated diabetes.
Interpretation / Conclusion: Most comorbidities were predictors of infection among hip fracture patients. Doctors should be aware of the risk of infection, particularly in patients with renal disease, chronic pulmonary disease, or hypotension given the high incidence of infection in these patients.

83. KKR 2023: Treatment of displaced unstable ankle fractures in patients above 70 years of age– fibular nail or ORIF?

Rasmus Elsøe[1], Morten Schultz Larsen[2], Rasmus Jørgensen[3], Lasse Bayer[4], Simone Dalskov[5]

1. Ortopædkirurgisk afdeling, Aalborg Universitets Hospital;
2. Ortopædkirurgisk afdeling, Odense Universitets Hospital;
3. Ortopædkirurgisk afdeling, Aarhus Universitets Hospital;
4. Ortopædkirurgisk afdeling, Nordsjællands Hospital, Hillerød;
5. Ortopædkirurgisk afdeling, Aalborg Universitets Hospital

Background: Ankle fractures can be treated by ORIF or minimal invasive fibular nail.
Aim: This KKR was conducted to evaluate if unstable ankle fractures in patients above 70 years of age should be treated with fibular nail or ORIF.
Materials and Methods:
Results: The evidence level was low and showed comparable results regarding functional outcome between the two treatment modalities and conflicting evidence regarding complications
Interpretation / Conclusion: Hence, no recommendations regarding treatment of unstableankle fractures in patients above 70 years with regards to treatment with fibula nails or ORIF canbe made

SESSION 10: SPORTS ORTHOPAEDICS

16 November 2023

13:30 – 15:00

Room: 102-105

Chairs: Morten Lykke Olesen and Henrik Aagaard

84. Effects of blood-flow restricted versus conventional resistance training on lower limb strength, functional performance and pain in selected patient groups - A systematic review and meta-analysis

Stian Langgård Jørgensen[1,2,3], Sine Brøchner-Kierkegaard[1,2,3], Mathias Høgsholt[1,2], Marie Bagger Bohn[2], Per Aagaard[4], Inger Mechlenburg[3,5,6]

1. Department of Occupational and Physical Therapy, Horsens Regional Hospital, Denmark
2. H-HIP, Department of Occupational and Physical Therapy and Department of Orthopedic Surgery, Horsens Regional Hospital, Denmark
3. Department of Clinical Medicine, Aarhus University, Denmark
4. Department of Sports Science and Clinical Biomechanics, University of Southern Denmark
5. Department of Orthopedic Surgery, Aarhus University Hospital, Denmark
6. Department of Public Health, Aarhus University, Denmark

Background: Limb unloading due to injury or surgery negatively affects muscle strength, muscle size and functional performance. Physical exercise is well documented to prevent disuse atrophy. Low-load blood-flow restricted resistance training (LL-BFR) and heavy-load resistance training (HL-RT) appear to induce comparable gains in skeletal muscle size and maximal muscle strength in healthy young-to- old populations. However, the high loading intensities with HL-RT may be contraindicated due to the high stress forces exerted on the joint and tendon structures. As LL-BFR utilizes reduced loading intensities, this training method has gained increasing usage in various rehabilitation settings.
Aim: To investigate the effectiveness of HL-RT and LL-BFR on gains in muscle strength, muscle mass, functional performance, and patient- reported outcome in patients with musculoskeletal dysfunction or injury.
Materials and Methods: The study was designed as a systematic review and meta-analysis. Web of Science, Cochrane Central, Medline, Embase, SportDiscus was searched on the 30th May 2022. Studies were included if: i) conducted as a Randomized Controlled Trial (RCT), ii) including patients, iii) comprising a LL-BFR intervention protocol and a group performing HL-RT (≥70%1RM) for at least eight exercise sessions, vi) involving at least one lower limb exercise. The Cochrane Risk of Bias tool was used to evaluate the risk of bias. Meta- analyses were performed using a random effects model with an adjustment to the confidence interval.
Results: Seven RCTs (n=303) were identified. HL-RT and LL-BFR showed comparable gains in maximal lower limb strength, quadriceps cross-sectional area, sit-to-stand performance, pain and subjective function. There was a moderate effect favoring LL-BFR for evoking gains in maximal isometric knee extensor strength. Certainty of evidence was low-to-very low.
Interpretation / Conclusion: HL-RT and LL-BFR seems equally effective in producing significant gains in muscle strength, muscle mass, functional performance and patient-reported outcomes in patients affected by musculoskeletal disorders. Notably, training adherence and dropout rates were found to be similar between HL-RT and LL-BFR, which both involved no-to-few adverse events.

85. Muscle- and tendon-related palpation pain is associated with worse self-reported hip and groin score in patients with FAIS undergoing hip arthroscopy: An analysis of 97 patients with 12-months follow-up

Lasse Ishøi[1], Otto Kraemer[1], Krisitan Thorborg[1], Per Hölmich [1]

1. Sports Orthopedic Research Center - Copenhagen (SORC-C), Department of Arthroscopic Surgery, Hvidovre Hospital, Copenhagen

Background: Hip arthroscopy improves function, but ongoing symptoms are not uncommon. The extent of muscle- and tendon-related groin pain is associated with worse self-reported pain in both intra- and extra-articular hip and groin conditions. At this point it is unknown if associations exist in femoroacetabular impingement syndrome (FAIS), and if it may explain ongoing symptoms.
Aim: We aimed to investigate the associations between muscle- and tendon-related hip and groin pain and self-reported symptoms before and after hip arthroscopy.
Materials and Methods: Ninety-seven patients (mean (SD) age: 32.3 (10.6)) with FAIS underwent hip arthroscopy by a single surgeon. Before and 12-months post-surgery, muscle- and tendon-related groin pain was identified with palpation: proximal and distal iliopsoas, proximal insertion of the adductor longus, and gluteal medius. Self-reported hip and groin function was collected with the Copenhagen Hip and Groin Outcome Score (HAGOS). Linear regression was used to analyze the associations between total number of painful muscle/tendon sites and HAGOS scores before and 12-months post-surgery.
Results: Before surgery 92.8 % had muscle- and tendon-related groin pain. Iliopsoas-related pain was the most common (80 %) followed by gluteal-related (75 %) and adductor- related (37 %) pain. Post-surgery, 66 % had muscle- and tendon-related groin pain, and proportions for the different palpation sites were: iliopsoas-related (56 %), gluteal- related (44 %), and adductor-related pain (12.5 %). Before surgery, the total number of painful muscle/tendon sites were negatively associated with 3 HAGOS subscales: pain, symptoms, and activities of daily living (beta- coefficient: -3.2 to -5.6, $p < 0.017$). Post- surgery, the total number of painful muscle/tendon sites were negatively associated with all HAGOS subscales (beta-coefficient: -4.1 to -5.3, $p < 0.05$).
Interpretation / Conclusion: The extent of muscle- and tendon-related groin pain identified with palpation resulted in worse self-reported pain and function in FAIS before and, 12-months post-surgery. This suggests that extra-articular pain sensitization may be an important contributor to ongoing symptoms after hip arthroscopy in two thirds of patients.

86. The national prevalence of patellar dislocation and trochlea dysplasia: A study from the nationwide Faroese Knee Cohort

Niclas Højgaard Eysturoy[1], Elinborg Mortensen[1], Hans-Christen Husum[2], Lars Blønd[3], Per Hölmich[4], Kristoffer Weisskirchner. Barfod[4]

1. Department of Orthopedic Surgery, National Hospital of the Faroe Islands, Torshavn.
2. Interdisciplinary Orthopaedics, Aalborg University Hospital, Denmark.
3. Zealand University Hospital, Køge and Aleris Hospital, Copenhagen, Denmark
4. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Copenhagen, Denmark

Background: .
Aim: To calculate the prevalence of patellar dislocation (PD) and Trochlear Dysplasia (TD) in a national cohort aged 15-19 years in the Faroe Island. We hypothesized the prevalence of PD to be 5-7%, around 80% of PD patients having TD, and 80% of patients with TD having bilateral TD.
Materials and Methods: All inhabitants in The Faroe Islands aged 15 to 19 years were invited by personal email to answer an online survey including basic demographics and questions concerning prior PD. Participants with prior PD were invited to take x-rays and MRI of both knees. Three cohorts were established: 1) The background cohort, consisting of the participants with no prior patellar dislocation, 2) The PD cohort, consisting of all participants with prior PD, 3) The clinical PD cohort, consisting of participants with prior PD who participated in the clinical and radiological follow-up. Trochlear dysplasia was defined as one of the following: Dejour type A-D on X-ray, Lateral Trochlear Inclination angle (LTI) < 11 ° or Trochlear Depth < 3 mm on MRI.
Results: 3,749 persons were contacted, 41 were excluded, and 1,638 (44%) completed the survey. 146 reported a prior PD (the PD cohort) and 100 accepted to participate and take X-rays and MRI of both knees (The clinical PD cohort). 76 persons were diagnosed with TD. The national prevalence of PD was 8.9%. The PD group had a significantly higher bodyweight, did less sports and had more smokers compared to the background cohort ($p<0.05$). The national prevalence of symptomatic TD was 6.8%. The prevalence of TD in the clinical PD cohort was 78.0%. TD was bilateral in 77.6% of patients with TD and 27.0% of patients with bilateral TD had dislocations in both knees.
Interpretation / Conclusion: The prevalence of PD in the Faroe Islands is markedly higher than shown in other countries. The national prevalence of TD and the prevalence of TD in participants with prior PD is high, and correlates to earlier findings, although earlier studies are conducted on a population with recurrent PD. Most patients with TD in one knee exhibited the same pathology in the opposite knee with no clinical symptoms.

87. Do patients with patellofemoral pain have increased subchondral metabolic activity?

Rudi Hansen[1,2], Bryan Haddock[3], Markus Lonsdale[4], René Svensson[2], Lisbeth Marner[4], Lene Rørdam[4], Inge Lise Rasmussen[4], Christoffer Brushøj[2], Stig Peter Magnusson[1,2], Marius Henriksen[5], Christian Couppé[1,2]

1. Dept. of Physical and Occupational Therapy, Bispebjerg and Frederiksberg Hospital, Copenhagen
2. Institute of Sports Medicine Copenhagen, Department of Orthopedic Surgery, Copenhagen University Hospital – Bispebjerg and Frederiksberg, Copenhagen, Denmark;
3. Dept. of Clinical Physiology, Nuclear Medicine and PET, Rigshospitalet, Copenhagen University Hospital
4. Department of Clinical Physiology & Nuclear Medicine, Bispebjerg Hospital, Copenhagen University Hospital, Copenhagen, Denmark
5. The Parker Institute, Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark.

Background: Anterior knee pain (patellofemoral pain, PFP) is a common knee problem that mainly affects young sports-active people. The etiology of PFP is not fully understood, making diagnosis and treatment challenging. Recently, [18F]sodium fluoride ([18F]NaF) positron emission tomography (PET) imaging has been used to evaluate bone metabolism and potentially identify areas of subchondral bone stress.
Aim: First, we aimed to assess if patients with unilateral PFP have increased bone metabolism in the painful knee compared to the pain-free knee at rest measured by [18F]NaF PET. Secondly, we aimed to compare the response in bone metabolic activity to knee loading (three times ten repetitions of single- leg squatting) between the painful and pain-free knee.
Materials and Methods: Twenty-seven patients diagnosed with unilateral PFP were recruited from the Institute of Sports Medicine Copenhagen, Bispebjerg-Frederiksberg Hospital, Denmark. All participants received an [18F]NaF PET scan of their knees before and after a bout of single-leg squatting. We assessed the following quantitative measures of bone metabolism: Mean and maximum Standardized Uptake Values (SUVmean and SUVmax), kinetic parameters of bone perfusion (K1), tracer extraction fraction, and total tracer uptake into bone (Ki) for the patella and medial and lateral parts of the trochlea. Statistical analysis was performed using a linear mixed model.
Results: We found no difference in SUV values or kinetic parameters between painful and pain-free knees at rest (SUVmean; p=0.478). The SUVmean, SUVmax, Ki and K1 change values were significantly higher on the painful compared with the pain-free side after knee loading in several joint regions, including the medial and lateral part of trochlea.
Interpretation / Conclusion: In our cohort of patients with unilateral PFP, there was no evidence for altered bone metabolism of the painful knee at rest compared to the pain-free knee. Kinetic modeling revealed differences in several parameters after exercise, indicating a differential response to load that could be associated with knee pain.

88. Successful isolation of viable stem cells from cryopreserved microfragmented human abdominal adipose tissue from patients with knee osteoarthritis

Jasmin Bagge[1], Per Hölmich[1], Freja Aabæk Hammer[1], Jan Nehlin[2], Lars Blønd[3], Lisbet Rosenkrantz Hölmich[4], Kristoffer Weisskirchner Barfod[1]

1. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital – Hvidovre, Denmark
2. Department of Clinical Research, Copenhagen University Hospital – Hvidovre, Denmark;
3. Department of Orthopedic Surgery, Zealand University Hospital – Køge, Denmark;
4. Department of Plastic Surgery, Copenhagen University Hospital – Herlev and Gentofte, Denmark.

Background: Treatment of knee osteoarthritis (OA) with stem cells from microfragmented adipose tissue (AT) has shown promising results. Cryopreservation and biobanking of stem cells are becoming increasingly important for research purposes, treatment of aged patients, and for repetitive treatments to improve long-term outcomes without the need for additional lipoaspirations.
Aim: To investigate if viable stem cells could be isolated and expanded from cryopreserved microfragmented AT harvested from knee OA patients by two different isolation methods; (1) tissue explant culture (TEC), and (2) enzymatic digestion (ED).
Materials and Methods: Microfragmented abdominal AT from knee OA patients was cryopreserved in cryomedium containing 10% dimethyl sulfoxide at -80oC. The samples were thawed for stem cell isolation by TEC and ED, respectively. Viability, population doublings, and doubling time was assessed by trypan blue staining. Cell type and senescence-associated β-galactosidase (SA-BGAL) activity were measured by flow cytometry. Osteogenic and adipogenic differentiation was assessed quantitatively by Alizarin Red S and Oil-Red-O staining. Statistical analysis was performed using paired t-tests. p-values <0.05 were considered statistically significant.
Results: Microfragmented AT from 7 patients was cryopreserved for a period of 46-150 days (mean 115.9 days, SD 44.3 days). Viable stem cells were successfully recovered and expanded from all patients using both isolation methods with no significant difference in viable population doublings or doubling time from passage 1 to 3 ($p>0.05$). Low levels of SA-BGAL activity were detected for both methods. Stemness was verified by stem cell surface markers and osteogenic and adipogenic differentiation performance. Adventitial stem cells (CD31-/CD34+/CD45-/CD146-), pericytes (CD31-/CD34-/CD45-/CD146+), transitional pericytes (CD31-/CD34+/CD45-/CD146+), and CD271+ stem cells (CD31-/CD45-/CD90+/CD271+) were identified using both methods. More pericytes were present when using TEC compared to ED ($p=0.04$).
Interpretation / Conclusion: Viable stem cells can be isolated and expanded from cryopreserved microfragmented AT using both TEC and ED. TEC provides more clinically relevant pericytes than ED.

89. Familiar association of Trochlear Dysplasia: A cross sectional study from the nationwide Faroese Knee Cohort

Niclas Højgaard Eysturoy[1,4], Noomi O. Gregersen[2], Guðrið Andorsdóttir[2], Elinborg S. Mortensen[1], Lars Blønd[3], Hölmich Per[4], Kristoff Weisskirchner Barfod[4]

1.Department of Orthopaedics, National Hospital of the Faroe Islands;
2. Faroe Genome Project, FarGen. Department of Health, Faroe Islands;
3. Zealand University Hospital, Køge and Aleris Hospital, Copenhagen, Denmark;
4.Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Copenhagen, Denmark

Background: .
Aim: The purpose of this study is to investigate the familiar association of trochelar dysplasi (TD) in a national cohort in the Faroe Island. The prevalence of patellar dislocation (PD) and TD in the Faroese population are 8.9% and 6.8%, respectively. Genetic risk factors may contribute to these high prevalence's. Due to the demographic history of the Faroese population, with few founders and isolation for centuries, we have the hypothesis that family relations (kinship) contribute to the relative risk of developing TD compared to the background population
Materials and Methods: All inhabitants in the Faroe Islands in the age from 15 to 19 years were invited to answer an online survey. Participants with prior PD were invited to participate further in the study, undergoing x-rays and MRI of both knees. TD was defined as one of the following: Dejour type A-D on X-ray, Lateral Trochlear Inclination angle < 11 ° or Trochlear Depth < 3 mm on MRI. The Multi-Generation Register at the National Biobank of the Faroe Islands was used to obtain information regarding family relations of the individuals with TD. Pedigrees were generated using the genetic pedigree software Progeny. Kinship, inbreeding coefficients and relative risk were calculated using the GENLIB software package in R. A control cohort from FarGen will be used as the background population.
Results: A total of 3,749 persons were contacted and 1,638 (44%) completed the survey. From these, 146 reported a prior PD and 100 accepted to participate in the clinical PD cohort. 76 were found to have TD. We reconstruct a single connected genealogical tree for the TD cohort with a genealogical depth of 9. The inbreeding coefficient for patients with TD was 0.003318. For 1. degree relatives of the patients with TD, the relative risk of TD was 2.7.
Interpretation / Conclusion: The relative risk of TD for siblings of a patients with TD was 2.7. This shows that there is a familiar association in the development of TD and that familiar association can be considered a risk-factor for PD. To show whether kinship and inbreeding reflect the relative risk of TD in the Faroese population, future perspective will be to compare the genealogical data of the TD cohort with the background population.

90. Identification of senescent stem cells in microfragmented abdominal adipose tissue. An analysis of tissue explant cultures from patients aged 29 to 65 years with knee osteoarthritis.

Freja A. Hammer[1], Per Hölmich[1], Jan O. Nehlin[2], Kristoffer Weisskirchner Barfod[1], Jasmin Bagge[1]

1. Sports Orthopedic Research Center - Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital - Hvidovre, Denmark
2. Department of Clinical Research, Copenhagen University Hospital - Hvidovre, Denmark

Background: Intra-articular injection of autologous stem cells from microfragmented adipose tissue is a promising treatment for patients with knee osteoarthritis (OA). However, studies on enzymatically processed adipose tissue have identified an increase in senescent stem cells with increasing donor age. This may diminish treatment outcome, due to lost proliferative and differentiation capacity, and secretion of inhibitory factors to surrounding cells.
Aim: To investigate the level of cellular senescence in stem cells derived from microfragmented adipose tissue.
Materials and Methods: Stem cells harvested from microfragmented abdominal adipose tissue from 20 patients with knee OA, aged 29 to 65 years (mean = 49.8, SD = 9.58), were analyzed as a function of patient age, and compared to control cells positive for cellular senescence. Steady state mRNA levels of a panel of genes associated with senescence were measured by qPCR. Intracellular senescence-associated proteins p16 and p21, and senescence-associated β- galactosidase activity were measured by flow cytometry. Cellular proliferation was assessed using a 5-ethynyl-2'-deoxyuridine (EdU) proliferation assay. Stemness was assessed by stem cell surface markers using flow cytometry, and the capacity to undergo adipogenic and osteogenic differentiation in vitro.
Results: No correlation was found between cellular senescence levels of the microfragmented adipose tissue-derived stem cells and patient age for any of the typical assays used to quantify senescence. The level of cellular senescence was generally low across all senescence- associated assays compared to the positive senescence control cells. Stemness was verified for all samples. An increased capacity to undergo adipogenic differentiation was found with increasing patient age ($p=0.0207$). No effect of patient age was found for osteogenic differentiation.
Interpretation / Conclusion: Autologous microfragmented adipose tissue- derived stem cells may be used in clinical trials of knee OA of patients aged 29 to 65 years, at least until passage 4, as they show stemness potential and negligible senescence in vitro.

91. Trochlear Shape and Patient-Reported Outcomes After Arthroscopic Deepening Trochleoplasty and Medial Patellofemoral Reconstruction: A Retrospective Cohort Study Including MRI Assessments of the Trochlear Groove

Lars Blønd[1,2], Kristoffer Weisskirchner Barfod[3]

1. Aleris Private Hospital, Denmark;
2. The Zealand University Hospital, Køge, Denmark;
3. Sports Orthopedic Research Center–Copenhagen (SORC-C), Copenhagen University Hospital, Amager-Hvidovre, Denmark.

Background: Sparse objective data documenting changes of the trochlea shape after trochleoplasty exists
Aim: The aim of the present study was to investigate whether standardized magnetic resonance imaging (MRI) measurements that characterize TD change significantly after combined arthroscopic deepening trochleoplasty (ADT) with medial patellofemoral (MPFL) reconstruction. We hypothesized that MRI measurements would approximate normal values
Materials and Methods: Patients who underwent ADT from October 2014 to 2017 were considered for this study. The preoperative inclusion criteria for ADT surgery were patellar instability, a dynamic patellar apprehension sign at 45° of flexion, a lateral trochlear inclination (LTI) angle of <11°, and failed physiotherapy. MRI was performed pre- and postoperatively and standardized MRI measurements were calculated: LTI angle, trochlear depth, trochlear facet asymmetry, cartilage thickness, and trochlear height. In the course of the MRI analysis at follow-up, a new 2- level method to measure LTI angle was implemented. The Banff Patella Instability Instrument 2.0 (BPII), Knee injury and Osteoarthritis Outcome Score (KOOS) and the Kujala score were obtained pre- and postoperatively
Results: A total of 16 knees in 15 patients (12 females and 3 males; median age, 20.9 years; range, 14.1-51.3 years) were evaluated. The average follow-up time was 63.6 months (range, 23-97 months). The median (range) LTI angle improved from 1.25° (–25.1° to 10.6°) preoperatively to 10.7°(–17.7° to 25.8°) postoperatively (P<0.001), trochlear depth increased from 0.0 mm (–4.2 to 1.8 mm) to 3.23 mm (0.25-5.3 mm) (P<0.001), and trochlear facet asymmetry improved from 4.55% (0.0%-28.6%) to 17.8% (0.0%-55.6%) (P<0.001). Cartilage thickness was unchanged (from 4.5 mm [range, 1.9- 7.4 mm] to 4.9 mm [range, 0.6-8.3 mm]; P=0.796). BPII, KOOS, Kujala scores improved significantly (P < .01 for all).
Interpretation / Conclusion: Combined ADT and MPFL reconstruction led to statistically significant and clinically relevant improvements in standardized MRI measurements that characterize TD and in patient reported outcomes. The improvements corresponded to those obtained by open trochleoplasty. No significant reduction in cartilage thickness was seen.

92. The feasibility of a 12-week progressive strength training program in patients with femoroacetabular impingement syndrome

Signe Kierkegaard-Brøchner[1,2], Joanne Kemp[3], Bent Lund[1], Bjarne Mygind-Klavsen[4], Kasper Spoorendonk[1], Marie Bagger Bohn[1], Ulrik Dalgas[5], Inger Mechlenburg[2,4]

1. Horsens Regional Hospital, Horsens, Denmark
2. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark
3. LaTrobe University, Melbourne, Australia
4. Aarhus University Hospital, Aarhus, Denmark
5. Exercise Biology, Department of Public Health, Aarhus University, Aarhus, Denmark.

Background: Patients with femoroacetabular impingement syndrome (FAIS) are offered hip arthroscopic surgery when conservative treatment has failed. However, we have no evidence-based training program to offer the patients.
Aim: The aim of the present study was therefore to develop and test the feasibility of a 12-week training program for patients with FAIS.
Materials and Methods: Fifteen patients (age 38±7, 11 women) with FAIS were recruited. The training intervention lasted 12-weeks and consisted of progressive strength training targeting the hip muscles 3 times/week. 7 supervised sessions were offered with home-based training in between. Feasibility was measured by completion rate, adverse events and adherence to training (attendance rate). We a priori defined an attendance rate of >75% of planned training sessions as satisfactory. Secondary outcomes were measured at baseline and at 12 week follow up: Patients completed the international Hip Outcome Tool 33 (0-100 score) (iHOT33) and the Copenhagen Hip and Groin Outcome Score (0-100 score) (HAGOS). Maximal hip muscle strength (MHMS) was assessed during hip flexion, extension, abduction and adduction using a fixated, hand-held dynamometer and patients performed a one legged hop for distance (HFD). A change >0.15 Nm/kg in MHMS and a change >15 cm in HFD was considered clinically important.
Results: 15/15 patients completed the training program. 97% training sessions were completed and no adverse events observed. No change was seen in patient reported outcomes (mean change [95% confidence interval]): iHOT33: 1.8 [-8;11], HAGOS Pain: 3.3 [-6;12], HAGOS Symptoms: 5.4 [-4;15], HAGOS Activities of Daily Living: 1.4 [-12;14], HAGOS Sport: -0.7 [-12;11], HAGOS Participation in sport: -5.0 [-21;10], HAGOS Quality of life: -3.6 [-10;2]. Clinically important changes were seen in MHMS during flexion: 0.20 [0.08;0.32], extension: 0.34 [0.14;0.55], abduction: 0.29 [0.13;0.46] and adduction: 0.23 [0.09;0.37] Nm/kg and HFD: 17 [9;24] cm.
Interpretation / Conclusion: Completion and adherence to the training program was high. Hence, the program is considered feasible and safe. Patients presented clinical important changes in MHMS and HFD. These changes were not reflected in their patient-reported outcomes.

93. Previous or postoperative surgery to the knee does not affect the long-term outcome after trochleoplasty for patellar instability.

Christian Dippmann[1], Peter Lavard[1], Anette Holm Kourakis[1], Volkert Siersma[2], Michael Rindom Krogsgaard[1]

1. Section for Sports Traumatology M51, Bispebjerg and Frederiksberg Hospital. A part of IOC Research Center Copenhagen, Denmark
2. The Research Unit for General Practice, Department of Public Health, University of Copenhagen

Background: At the section for Sports Traumatology Bispebjerg Frederiksberg Hospital, patellar instability patients with trochlear dysplasia (TD) have been treated for more than 10 years using an á la carte approach, by which all predisposing factors are treated in a single procedure. However, according to current literature secondary surgery (metal removal, arthroscopic brisement force, arthroscopic debridment, etc.) has to be performed in up to 30% following Bereiter TP.
Aim: To analyze whether previous or postoperative additional surgery after primary TP affected the 5- year outcome.
Materials and Methods: Consecutive patients with patellar instability and TD were treated according to the á la carte approach and were followed 1, 2 and 5 years postoperatively, including four patient reported outcome measures (PROMs). In this study 5 year outcomes were compared between patients with previous or postoperative additional surgery and patients with no other surgery.
Results: There were 131 consecutive patients (87 females) with a median age of 22 yrs. [range 14-38yrs.] 30% of the patients underwent additional surgery within the follow-up period. All PROM scores had improved one, 2 and 5 years after the surgery with no difference between the two groups ($p > 0.05$). Two patients had a patellar dislocation 9 and 24 months postoperatively (1.5%).
Interpretation / Conclusion: Previous surgery or additional surgery after TP does not seem to affect the outcome following the á la carte treatment strategy for patellar instability.

SESSION 11: KNEE ARTHROPLASTY

16 November 2023

13:30 – 15:00

Room: 202-205

Chairs: Julie Brandt and Kirill Gromov

94. Denosumab decreases the subsidence of cementless tibial implants by suppression of bone resorption. A randomized, double-blinded RSA study in 54 patients with 5 years follow-up

Karina Nørgaard Linde[1, 2], Søren Rytter[1, 2], Bente Langdahl[2, 3], Frank Madsen[1], Maiken Stilling[1, 2]

1. Department of Orthopedics, Aarhus University Hospital
2. Department of Clinical Medicine, Aarhus University
3. Department of Endocrinology and Internal Medicine, Aarhus University Hospital

Background: Cementless tibial implants migrate initially until osseointegration.
Aim: We hypothesized that Denosumab decreases migration and improves fixation of cementless tibial implants.
Materials and Methods: A prospective, double-blinded, randomized study including 54 patients operated with a total knee arthroplasty (TKA) using a cementless tibial implant (Regenerex). Patients were randomized to two injections subcutaneously (second postoperative day and 6 months postoperative) of Denosumab (60mg) (Dmab group) or 1 ml NaCl (9mg/ml) (placebo group). We compared Maximum Total Point Motion (MTPM) and subsidence (Y-translation) using Radiostereometry Analysis (RSA), bone turnover markers (CTX, P1NP), and periprosthetic Bone Mineral Density (p- BMD) by dual-energy X-ray absorptiometry (DXA). RSA, DXA and blood samples were obtained postoperative and at 2-, 6-, 12- and 24 weeks and at 1-, 2-, and 5-years follow-up.
Results: The Dmab group had significantly less tibial implant subsidence than the placebo group at 2- and 5-years follow-up ($p<0.04$). At 5 years follow-up, mean tibial implant subsidence was -0.20 mm (95% CI: -0.41; 0.00) in the Dmab group and -0.51 mm (95% CI: -0.72; -0.31) in the placebo group. MTPM throughout follow-up and continuous migration (MPTM between 1- and 2-years follow-up) were similar between groups ($p>0.05$). Bone resorption (CTX) was in the first year after surgery lower in the Dmab group than in the placebo group ($p<0.001$), bone formation (P1NP) was similar throughout follow-up, except at 1-year follow-up where P1NP was lower in the Dmab group ($p=0.02$). P-BMD was generally higher in the Dmab group until 12 months follow-up, but similar thereafter ($p>0.09$).
Interpretation / Conclusion: Two Denosumab injections given with a 6 months interval after TKA surgery resulted in lower subsidence of cementless tibial implants compared to placebo throughout follow-up. Bone resorption measured systemically was suppressed and there was a pattern of a higher early postoperative p-BMD in the Dmab group compared with the placebo group. However, p-BMD and CTX were similar after 12 months indicating the treatment did not have a lasting effect on the bone.

95. Comparing Bone Mineral Density In Cemented And Uncemented Femoral And Asymmetrical Tibial Component Design In Total Knee Arthroplasty. - A Part Of A Randomized Control Trial Design Using Dual-Energy X-Ray Absorptiometry

Müjgan Yilmaz[1], Gunnar Flivik[2], Thomas Lind[3], Anders Odgaard[1], Michael Mørk Petersen[1],

1. Rigshospitalet, Department of Orthopedic Surgery
2. Skane University Hospital, Lund, Sweden 3. Gentofte Hospital, Hellerup, Denmark

Background: Bone mineral density (BMD) tends to decrease after TKA mainly caused by surgical trauma, immobilization, stress- shielding and foreign body reaction. Clinically, a decrease in BMD is associated with the breaking strength of the bone, which is a related cause of periprosthetic fractures.
Aim: This study aimed to analyze BMD changes around cemented and uncemented femoral and asymmetrical tibial components following TKA surgery.
Materials and Methods: Patients in this study were included as part of a randomized controlled trial evaluating migration measured with radiostereometric assay. Randomization was performed with 1:1 allocation with group A (uncemented Trabecular Metal coated Persona® TKA, Zimmer Biomet, Warsaw, Indiana) or group B (cemented Persona® TKA, Zimmer Biomet, Warsaw, Indiana). A total of 66 patients were included of which two patients did not get the allocated treatment and one patient withdrew consent. Preoperative and postoperative after 1 week, 3 months, 6 months, 12 months and 24 months dual-energy X-ray absorptiometry (DEXA) measurements were performed. DEXA measurements of the distal femur and proximal tibia were analysed using region of interest (ROI). An unpaired t-test was used to evaluate differences in BMD between the two groups after 24 months. Approval from the scientific ethical committee (case no. H-16035883), and Danish Data Protection Agency (case no. 2012-58-0004), were obtained and registered at clinicaltrial.gov (NCT03563131).
Results: Femoral component: The highest decrease in BMD was observed in ROI I (cemented: 23.9% and uncemented: 32.6%). A significant difference between groups after 24 months was found in ROI I (p=0.00439) whereas ROI II (p=0.203) and ROI III (p=0.776) were non-significant. Tibial component: The highest decrease in BMD was observed in ROI I (cemented: 10.4% and uncemented: 5.05%). There were no significant changes between groups after 24 months (ROI I p=0.883, ROI II p=0.106 and ROI III p=0.247).
Interpretation / Conclusion: The highest decrease in BMD is observed in the anterior femur with a significant difference between, groups which can be clinically important due to the risk of periprosthetic fractures. No significant changes between tibial components were observed.

96. Monoblock versus Modular tibia insert in cementless TKA - 7 years results from a RCT with RSA data

Mikkel Rathsach Andersen[1], Nikolaj Sebastian Winther[2], Thomas Lind[1], Henrik Morville Schrøder[2], Gunnar Flivik[3], Michael Mørk Pedersen[2]

1. Department of Orthopeadics, Gentfote Hospital
2. Department of Orthopeadics, Rigshospitalet
3. Department of Orthopeadocs, Skånes Universitets Hospital

Background: Backside wear of the polyethylene insert in total knee arthroplasty (TKA) has been described to produce clinically significant levels of polyethylene debris, which can lead to aseptic loosening of the tibia components. Monoblock design eliminates backside wear of the polyethylene and therefore could improve longterm implant fixation. This randomized trial compares monoblock to modular polyethylene inserts with 7 years follow up including Radiostereometric Analysis (RSA) data.
Aim: To compared monoblock and modular cementless TKA designs in a randomized clinical trial with RSA data, clinical outcome and longterm follow-up.
Materials and Methods: : 65 patients (mean age 61 years) were randomized to receive either monobloc (n=33) or modular (n=34) cementless Zimmer Nexgen (TMT) tibia component and a cementless CR- Flex Porous Femoral Component. 35 patients (monoblok=18) (modular=17) completed 7 years follow-up. RSA and clinical outcome score was done postoperatively after weight bearing and after 3, 6, 12, and 24 months. The primary endpoint of the study was comparison of the tibial component migration (maximum total point motion (MTPM)) of the 2 different implant designs.
Results: There was no statistically significant difference in MTPM between the groups at 3 months (p = 0.2) or at 6 months (p = 0.1), but at 12, 24 and 84 months of follow-up there was a significant difference in MTPM of 0.36 mm (p = 0.02), 0.42 mm (p = 0.02) and 39 mm (p=0.02) between groups, with the highest average amount of migration 1.17 (.39-2.0) mm in the modular group. Continuous migration (from 12-84 months) was 0.13 mm in the monoblock group and 0.16 mm and in modular groups with no statistically significant difference (0.45). The largest translational and rotational migrations were a subsidence and a posteriorly tilt.
Interpretation / Conclusion: In this study group we did not detect a significantly different continuous migration for cementless monoblock tibia design when compared to modular design. The difference in initial migration between the groups, we believe should not be attributed to the elimination of backside wear in the monoblock design group.

97. The Oxford Knee Score should be reported as two separate domains instead of one total score; assessment of data from the SPARK study using confirmatory factor analysis

Christian Fugl Hansen[1], Michael Krogsgaard[1], Anne Mørup-Petersen[2], Anders Odgaard[3], Karl Bang Christensen[4]

1. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg
2. Department of Orthopaedic Surgery, Copenhagen University Hospital, Herlev-Gentofte
3. Department of Orthopaedic Surgery, Copenhagen University Hospital, Rigshospitalet
4. Department of Biostatistics, University of Copenhagen.

Background: The Oxford Knee Score (OKS) is a 12-item patient reported outcome measure (PROM), developed for patients having a total knee arthroplasty (TKA) but widely used to assess the impact of knee osteoarthritis (OA). A prerequisite for a PROM to be considered an adequate outcome is that it must be structurally valid, and this includes confirmation of unidimensionality, meaning that the sum score reflects one construct only (e.g., 'pain'). However, the construct validity of OKS has never been evaluated using modern test theory (MTT) models. As OKS contains items related to pain and physical function, we hypothesized that it is not unidimensional

Aim: To evaluate the construct validity of the Danish OKS

Materials and Methods: Data from the SPARK study of 1,452 patients who had undergone knee replacement due to OA was obtained. A randomly selected sample of TKA patients with a suitable size (n=100) was picked for analyses of unidimensionality, local dependency and item fit to the model. Confirmatory factor analysis (CFA) model fit was evaluated using the chi-squared statistic, and the close fit indices the root mean square error of approximation, the comparative fit index, and the Tucker-Lewis index

Results: OKS failed to fit into a unidimensional model of one total score. Reporting scale scores as two domains, "pain" with items 1, 4, 5, 6, 8, 9, 10, and "function" with items 2, 3, 7, 11, 12, improved fit indices, indicating better precision and a reduction of measurement error compared to the total score. Several items exhibited misfit to the model, and local dependence was also evident, but both were less prominent when scores were reported as two domains

Interpretation / Conclusion: The Danish OKS possessed inadequate structural validity in a cohort of patients treated surgically with TKA. Reporting scale scores as two separate domains increased measurement properties and the accuracy of the scale. Although few items still exhibited problems fitting the model, we advise that data in previous studies using OKS are reanalyzed, since an adequate calculation of scores may alter previous study conclusions

98. Implementation of discharge on the day of surgery after hip and knee arthroplasty – a prospective multicenter study from the center for fast-track hip and knee replacement

Oddrún Danielsen[1,2], Christian Bredgaard[1,3], Claus Varnum[1,4], Thomas Jakobsen[1,5], Mikkel Rathsach[1,6], Kim Sperling[1,7], Søren Overgaard[1,8], Christoffer Calov Jørgensen[1,9], Henrik Kehlet[1,10], Kirill Gromov[1,3], Martin Lindberg-Larsen[1,2]

1. Center for Fast-track Hip and Knee Replacement, Denmark
2. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital and Svendborg
3. Department of Orthopaedic Surgery, Hvidovre University Hospital
4. Department of Orthopaedic Surgery, Lillebaelt Hospital – Vejle
5. Department of Orthopaedic Surgery, Aalborg University Hospital
6. Department of Orthopaedic Surgery, Copenhagen University Hospital, Herlev-Gentofte
7. Department of Orthopaedic Surgery, Næstved, Slagelse and Ringsted Hospitals
8. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg
9. Department of Anaesthesia, Hospital of Northern Zeeland, Hillerød
10. Section of Surgical Pathophysiology, Copenhagen University Hospital, Rigshospitalet;

Background: Length of hospital stay after hip and knee arthroplasty is about 1 day in Denmark, but only very few have been discharged on day of surgery. Hence, a protocol for multicenter implementation of discharge on day of surgery has been performed [1]. [1]. Lindberg-Larsen et al. Study protocol for discharge on day of surgery after hip and knee arthroplasty from the Center for Fast- track Hip and Knee Replacement. Acta Orthop. 2023 Mar 20;94:121-127.

Aim: To investigate the implementation process and feasibility of discharge on day of surgery after primary hip and knee arthroplasty in a multicenter collaboration.

Materials and Methods: A prospective multcenter study from 7 public centers across Denmark. Patients were screened for eligibility using well-defined in- and exclusion criteria and eligible patients fulfilling discharge criteria were discharged on day of surgery. The study period is the first 6 months (September 2022 to March 2023) after implementation of the study protocol [1]. Data from the same centers in a 6 months period before COVID from July 2019 to December 2019 was used for baseline control.

Results: Of 2821 primary hip and knee arthroplasties, 36.7% (95% CI 34.9-38.5) were found eligible (range 21.4%-49.5% in centers) and 50,1% (range 24,3%-62,7%) of these were discharged on day of surgery. Overall, 20.9% (95% CI 19.4-22.4%) of all patients having primary hip and knee arthroplasty were discharged on day of surgery (range 9,2% to 30.9%). This was an increase compared to 5.6% (95% CI 4.9-6.3) at baseline (range 0-12.5%). The main causes of not being discharged on day of surgery despite being

eligible were: insufficient mobilization, postoperative nausea and vomiting, late return to ward and spinal anaesthesia that had not worn off.

Interpretation / Conclusion: During the first 6 months implementation period we found it possible to discharge 20,9% on day of surgery compared to 5.6% at baseline. Hence, discharge on day of surgery in a multicenter setting is feasible and may be increased further as major differences between centers were observed. However, patient safety should be monitored and reported.

99. Time trends in incidence and risk factors for revision due to periprosthetic joint infection after knee arthroplasty due to osteoarthritis: A Danish nationwide population-based cohort study, 1997-2019

Marie Anneberg[1], Anders Troelsen[2], Per Gundtoft[3], Henrik Toft Sørensen[1,4], Alma Becic Pedersen[1,4]

1. Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus University, Denmark
2. Department of Orthopedic Surgery, Hvidovre Hospital, Denmark
3. Department of Orthopedic surgery, Aarhus University Hospital, Denmark
4. Department of Clinical Medicine, Aarhus University Denmark

Background: Periprosthetic joint infection (PJI) is a serious complication after knee arthroplasty (KA) surgery. **Aim:** To examine the time trends in incidence and risk factors for PJI after KA from 1997 to 2019 in Denmark.

Materials and Methods: In this population-based cohort study, we used Danish Knee Arthroplasty Register to include primary KA due to osteoarthritis (n=115,120). Outcome was first-time PJI revision, within 0-3 months (early), >3-12 months (delayed), and 0- 12 months after KA. We computed cumulative incidences and adjusted hazard ratios (aHR) of PJI with 95% confidence intervals by calendar periods and by several patient- and surgical- related predictors.

Results: The overall incidence of PJI within the first year of primary KA was 0.7 (0.6 - 0.7). The incidence of PJI within the first year after primary KA increased from 0.5 (0.3 - 0.7) in 1997-2000 to 0.7 (0.6 - 0.8) in 2017-2019, driven by an increase from 0.1(0.0 - 0.2) to 0.5 (0.5 - 0.6) in early PJIs. We observed a decrease in the incidence of delayed PJIs from 0.4 (0.3 - 0.7) to 0.2 (0.1-0.2) in the same period. The aHR for PJI within the first year of primary KA was 1.6 (1.2 - 2.2) in 2018-2019 vs 2001-2004. The aHR was 5.1 (2.8 - 9.5) for sustaining an early PJI in 2018-2019 vs 2001-2004, whereas the aHRs for sustaining a delayed PJI was 0.5 (0.3 - 0.8) in 2018- 2019 vs 2001-2004 Age 75 years and above (vs age 65-74), male gender, and extreme obesity (vs normal weight) was associated with higher risk of PJI. There was an indication that high comorbidity (vs low) was associated with higher risk of PJI. The aHRs were 0.6 (0.4- 0.8) early PJI and 0.4 (0.2-0.6) for delayed PJI when comparing partial knee arthroplasty (PKA) to total KA.

Interpretation / Conclusion: The overall incidence of PJI after KA is low. The incidence of early PJI increased whereas the incidence of delayed PJI decreased from 1997-2019. PKA was associated with a lower risk of PJI (compared to TKA). Non-modifiable factors as gender, age, CCI and the observed time-effect after surgery, will allow clinicians to appropriately inform patients preoperatively and tailor treatment, follow-up regimen, and improve pre- and postoperative rehabilitation.

100. The influence of trochlea wear on patient reported outcome after medial unicompartmental knee arthroplasty.

Jonathan Winther Olsen [1], Christian Bredgaard Jensen [1], Kristine Ifigenia Bunyoz[1], Kirill Gromov[1], Anders Troelsen[1]

1. Clinical Orthopaedic Research Hvidovre, Department of Orthopaedic Surgery, Copenhagen University Hospital Hvidovre.

Background: In the past patellofemoral osteoarthritis (PFOA) was considered a contraindication to UKA. Re- cent studies and contemporary indications state that PFOA shouldn´t be considered a contraindication. Despite current knowledge, there is still a lack of insight into whether patients with trochlea wear, have a different short-term development in Patient Reported Outcome Measures (PROM) scores.
Aim: To examine the association between trochlear wear and PROM scores after medial UKA.
Materials and Methods: In this cohort study 549 medial UKA (mobile baring, uncemented Oxford) surgeries were performed between 2016 and 2020, of which 440 were included in the final dataset based on complete trochlear wear data. Only severe lateral facet PFAO with bony deformity was applied as a contraindication. During surgery, the patellofemoral joint was graded using the ICRS cartilage lesion classification system where the cartilage defects were subclassified as 0=normal changes (refer- ence group), 1-2=minor changes, and 3-4= severe/full cartilage loss. The PROMs included the Oxford Knee Score (OKS), Activity and Participation Questionnaire (APQ), and Forgotten Joint Score (FJS) which were completed preoperatively and at 3, 12, and 24 months after surgery. PROM changes were calculated, and linear regression models were used to calculate crude and adjusted estimates.
Results: We found no significant differences in PROM change at any follow-up between the different groups of trochlear wear regarding the OKS and the FJS. However, group 1-2 had a significantly larger change in their APQ score compared to group 0, at both 3- (crude 7,02 (95% Confidence Interval (CI) 0,347; 13,7) adjusted 8,60 (95% CI 1,76; 15,4)) and 24-month follow-up (adjusted 11,2 (95% CI 2,02; 20,4) with the latter applying only for the adjusted analysis.
Interpretation / Conclusion: There were no differences in OKS and FJS improvement between any of the trochlea wear groups at any follow-up. The APQ change was even favorable in group 1-2 vs group 0. Overall, the results support that trochlea wear should not be considered a contraindication to perform medial UKA unless there is severe lateral facet PFOA with bony deformation.

101. What if I told you that the Minimal Important Change is ZERO at three months after undergoing knee or hip arthroplasty?

Lasse Harris[1], Anders Troelsen[1], Berend Terluin[2,3], Kirill Gromov[1], Lina Ingelsrud[1]

1. Department of Orthopaedic Surgery, Copenhagen University Hospital Hvidovre, Copenhagen Denmark
2. Department of General Practice, Amsterdam UMC Location, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands
3. Amsterdam Public Health Research Institute, Amsterdam, The Netherlands.

Background: The Minimal Important Change (MIC) reflects what patients, on average, consider the smallest improvement in a score that is important to them. Numerous methods have been used to calculate MIC values, each with inherent limitations. However, a new adjusted predictive modeling method accounting for the proportion of improved or deteriorated patients and the imperfect reliability of the anchor question has been developed.
Aim: We applied the new predictive modeling method to determine Minimal Important Change values for the Oxford Knee and Hip Score at 3 months follow-up in patients undergoing knee or hip arthroplasty.
Materials and Methods: This cohort study used data from patients undergoing Total Knee Arthroplasty (TKA), Unicompartmental Knee Arthroplasty (UKA), or Total Hip Arthroplasty (THA) at a public hospital between April 2018 and September 2022. At 3 months postoperatively, patients responded to the Oxford Knee or Hip Score (OKS/OHS) and the MIC anchor question determining experienced changes in knee or hip pain and functional limitations. We used the anchor-based improved adjusted predictive modeling method to determine MIC values. Nonparametric bootstrapping was used to determine 95% confidence intervals (CI).
Results: We obtained complete 3-month postoperative data for 638 of 888 (72%) patients undergoing TKA, 407 of 535 (76%) undergoing UKA, and 859 of 1197 (72%) undergoing THA. The median age of the patients ranged from 68 to 71 years, and 57% to 60% were females. At 3 months postoperatively, 83% TKA, 86% UKA, and 93% THA patients reported important improvement, respectively. The OKS MIC values were 0.3 (CI -1.1 to 1.6) and 2.1 (CI 0.0 to 3.9) for TKA and UKA, respectively, and the OHS MIC value was 0.8 (CI -1.3 to 2.7) at 3 months postoperatively.
Interpretation / Conclusion: Three months after undergoing knee or hip arthroplasty, not experiencing any deterioration in pain and functional limitations is considered an important improvement. In addition to improving our understanding of patients' views on early postoperative outcomes, these clinical thresholds may aid in evaluating registry-based treatment quality.

102. Minimal Important Change for the 9-step Stair Climb Test in patients with knee osteoarthritis

Julie B. Pajaniaye[1,2], Eric Cheret[1], Cecilie H. Langvad[1], Pætur M. Holm[3,4], Søren T. Skou[3,4], Josefine B. Larsen[1,5], Inger Mechlenburg[1,5,6]

1. Department of Orthopaedics, Aarhus University Hospital; 2. Department of Dentistry and Oral Health, Aarhus University; 3. The Research Unit PROgrez, Department of Physiotherapy and Occupational Therapy, Næstved-Slagelse-Ringsted Hospitals; 4. Research Unit for Musculoskeletal Function and Physiotherapy, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark; 5. Department of Clinical Medicine, Aarhus University; 6. Department of Public Health, Aarhus University.

Background: Stair climb tests (SCT) evaluate stair negotiation and are part of the core recommendations for evaluating treatment effects on performance-based function in individuals with knee osteoarthritis (KOA). While no specific SCT is recommended, the 9-step SCT is commonly used. Minimal Important Change (MIC) is described as a measure of interpretability and is being defined as the minimum within-person change between repeated measurements that a patient would both perceive as a change and ascribe as important. The MIC of the 9-step SCT for patients with KOA has not yet been established.
Aim: The aim of this prospective cohort study was to estimate the MIC for the 9-step SCT for patients with KOA. Secondly, to assess the proportion of patients obtaining MIC, i.e. being responders to a 12-week exercise program, and to assess whether being a responder was associated with experiencing an important change.
Materials and Methods: Data from a randomized controlled trial conducted from July 2017 to October 2018 at Næstved Hospital was used. Patients with KOA underwent a 12-week exercise intervention consisting of neuromuscular exercises with/without strength training. SCT data was collected at baseline and at 12-week follow-up. Patients' self-reported experience of change of their knee problem was measured using the 7-point anchor question Global Perceived Effect Score (GPE) at follow-up. Perceived change was scored from "Better, an important improvement" to "Worse, an important worsening". The MIC estimate for the SCT was calculated using logistic regression with predictive modeling. **Results:** 72 participants (54% women; mean age 65.5 years) had complete data. MIC value (95% CI) for improvement was 2.3 (–1.2; 7.3) seconds for the 9-step SCT. 29 of 72 participants (40%) in the trial were responders and there was a statistically significant association between being a responder and experiencing an important change (GPE scores 6 and 7).
Interpretation / Conclusion: The MIC value of 2.3 seconds for the 9-step SCT for patients with KOA corresponds to minimal improvements that the average patient finds important. The estimated MIC value should be confirmed in larger cohorts to establish a narrower confidence interval.

103. Bone Remodeling Of The Distal Femur And Proximal Tibia After Cementless Total Knee Arthroplasty - A 7 Years Prospective Clinical DEXA Study

Mikkel Rathsach Andersen[1], Nikolaj Sebastian Winther[2], Thomas Lind[1], Henrik Morville Schrøder[2], Michael Mørk Pedersen[2]

1. Department of Orthopeadics, Gentofte Herlev Hospital 2. Department of Orthopeadics, Rigsjospitalet

Background: Loss of bone stock as a response to the bone trauma and immobilization related to joint replacement can increase the risk of periprosthetic fracture and aseptic loosening. There are few previous studies with longterm follow-up of of tibia and femur bone loss after cementless total knee arthroplasty (TKA).

Aim: The aim of this study was to investigate the short- term and long-term adaptive bone remodelling of the distal femur and the proximal tibia after cementless TKA.

Materials and Methods: 65 patients (mean age 61 years) were included and bone mineral density (BMD) mesassurements distal femur using dual energy x-ray (DEXA) were performed postoperatively and after 3, 6, 12, 24 and 84 months. We completed seven year follow up of 36 patients. Bone mineral density (g/cm2) was measured in three regions of interest in the periprosthetic bone of the distal femur and the proximal tibia. Also the BMD of distal tibia just above the ankles were meassured bilaterally as control.

Results: In the distal femur significant changes in bone mineral density were seen after 84 months of follow-up and bone mineral density decreased by 28.7% in the anterior region behind the anterior flange of the prosthesis, 16.2% in the posterior region and 10.3% in the proxiaml region. Most of the bone loss in the femur occured within the first 24 months. In the proximal medial region of the tibia bone mineral density decreased by 8.9% and in the proximal lateral tibia by 10.4%. During the first six months we found a temporary BMD increase in lateral proximal tibia. All the above BMD changes were statistically highly significant ($P<0.001$).

Interpretation / Conclusion: We found highly significant bone mineral change in the distal femur and proximal tibia after cementless total knee arthroplasty. Most of the BMD loss took place within the first 24 months. In the anterior femur region a decrease in bone mineral density of 28.7% during the seven year period. In the tibia we found less BMD loss and a temporary increase in lateral BMD which could be explained by correction of varus alignment. Taking the expected age related decay in this age group in to consideration the decrease was substantial and must be considered to predispose to periprosthetic fractures.

SESSION 12: DOS BEST PAPER

16 November 2023

16:00 – 17:00

Room: Auditorium

Chairs: Michala Skovlund and Michael Mørk Petersen

104. Local Cefuroxime tissue concentrations in the hand after single and repeated administration – a randomized clinical study of metacarpal bone, synovial sheath and subcutaneous tissue of patients undergoing trapeziectomy

Andrea René Jørgensen [1,2], Pelle Hanberg[1], Mats Bue [1,2,3], Charlotte Hartig-Andreasen [3], Nis Pedersen Jørgensen[4], Maiken Stilling[1,2,3]

1. Aarhus Denmark Microdialysis Research Group (ADMIRE), Orthopaedic Research Unit, Aarhus University Hospital, Aarhus N, Denmark; 2. Department of Clinical Medicine, Aarhus University, Aarhus N, Denmark; 3. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark; 4. Department of Infectious Diseases, Aarhus University Hospital, Aarhus N, Denmark

Background: The role of antimicrobial prophylaxis in shorter, clean soft tissue hand surgical procedures is debatable, but it is standard in hand surgeries involving bone and/or implants. A single preoperative antimicrobial administration may not provide sufficient antimicrobial coverage in all tissues for the duration of hand surgeries. **Aim:** To investigate the time that the free concentration of Cefuroxime was above minimal inhibitory concentration (fT>MIC) of 4 µg/mL for Staphylococcus aureus in targeted hand tissues after single and repeated administration, enabling evaluation of need for re-administration and optimal time for initial administration.

Materials and Methods: In a prospective, unblinded randomized clinical study, 16 patients (13 female, 3 male) with a mean age of 66 years (range 51 to 80 years) underwent trapeziectomy with suspensionplasty. Before wound closure, microdialysis catheters were placed in the metacarpal bone, the synovial sheath and subcutaneous tissue. After tourniquet release, patients were randomized to intravenous administration of a single Cefuroxime dose (1,500 mg) (Group 1, n=8) or repeated (2x1,500 mg) Cefuroxime dosing with a 4-h dosing interval (Group 2, n=8). Dialysates and venous samples were taken over a period of 8 h.

Results: fT>MIC of 4 µg/mL was longer in all compartments in Group 2 (range 96–100%) than in Group 1 (range 52–75%). A mean Cefuroxime concentration of 4 µg/mL was reached in all compartments in both groups within a mean time of 6 min (range 0–27 min). In Group 1, the mean concentrations decreased below 4 µg/mL between 3 h 59 min and 5 h 38 min after administration.

Interpretation / Conclusion: A single administration of Cefuroxime 1,500 mg provided antimicrobial tissue coverage for a minimum of 3 h 59 min. Administration of Cefuroxime in hand surgeries should be done a minimum of 27 min prior to incision in order to achieve sufficient coverage in all individuals. Re-administration of Cefuroxime should be considered in hand surgeries lasting longer than approximately 4 h from the time of initial administration.

105. Poor Patient-Reported Outcomes and Satisfaction after Revisions of Medial Unicompartmental Knee Arthroplasties for unexplained pain. A cross-sectional nationwide study on patients revised for Unexplained Pain vs Aseptic Loosening

Kristine Bollerup Arndt[1], Henrik Morville Schrøder[2], Anders Troelsen[3], Martin Lindberg-Larsen[1]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital; Department of Clinical Research, University of Southern Denmark, Odense
2. Department of Orthopaedic Surgery. Naestved Hospital, Denmark
3. Department of Orthopaedic Surgery, Clinical Orthopaedic Research Hvidovre, Copenhagen University Hospital Hvidovre, Denmark

Background: It is uncertain if patients undergoing revision of UKAs because of unexplained pain benefit from the surgery.
Aim: The aim of this study was to compare patient- reported outcome measures (PROM) and satisfaction 1 to 3 years after revision of medial unicompartmental knee arthroplasties (mUKA) for unexplained pain vs aseptic loosening.
Materials and Methods: We included 104 patients undergoing revision of mUKA's for the indications unexplained pain and aseptic loosening in the period January 1, 2018 to December 31, 2020 from the Danish Knee Arthroplasty Register. 52 patients were revised for unexplained pain and 52 for aseptic loosening. Questionnaires including PROMs (Oxford Knee Score (OKS), EQ-5D-5L, Forgotten Joint Score (FJS)) and questions about satisfaction with the surgery were sent to digitally secured mailboxes.
Results: Median OKS was 26 (IQR 22) vs 34 (IQR 12) 1 to 3 years after revisions for unexplained pain vs aseptic loosening, p=0.033. Median EQ-5D-5L Index was 0.7 (IQR 0.6) vs 0.8 (IQR 0.1) for unexplained vs aseptic loosening, p=0.014. Median FJS was 48 (IQR 10) vs 52 (IQR 14) for unexplained pain vs aseptic loosening, p=0.1. Satisfaction with the surgery (100=not satisfied; 0=very satisfied) was 55 (IQR 60) for unexplained pain vs 50 (IQR 67) for aseptic loosening, p=0.087, and patients revised for unexplained pain were less likely to find their knee problem importantly improved (p=0.032).
Interpretation / Conclusion: Patients undergoing revision of mUKAs for unexplained pain presented poor postoperative PROM scores, and PROM scores were worse compared to patients revised for aseptic loosening. This study support the evidence against revisions for unexplained pain.

106. Validity of the registration of periprosthetic joint infection after total knee arthroplasty in the Danish Knee Arthroplasty Register using microbiology data as a gold standard

Marie Anneberg[1], Eskild Bendix Kristiansen[1], Anders Troelsen[2], Per Gundtoft[3], Henrik Toft Sørensen[1,4], Alma Becic Pedersen[1,4]

1. Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus University, Denmark
2. Department of Orthopedic Surgery, Hvidovre Hospital, Denmark
3. Department of Orthopedic surgery, Aarhus University Hospital, Denmark; 4 Department of Clinical Medicine, Aarhus University Denmark

Background: Periprosthetic joint infection (PJI) is a serious complication after total knee arthroplasty (TKA). Recent studies have revealed low validity of the PJI diagnosis in several joint arthroplasty registers and suggested a systematic underestimation of the incidence of PJI
Aim: To assess the validity of recording of revision due to PJI within the first year after primary TKA in the Danish Knee Arthroplasty Register (DKR), using the Danish Microbiology Database (MiBa) as gold standard.
Materials and Methods: We included patients who underwent primary TKA between January 1st, 2016, and December 31st 2018, registered to both DKR and MiBa, with matching primary operation date and side (n= 18.454). MiBa holds nationwide information on results of all microbiology samples and procedure codes via linkage to the Danish National Patient Registry. PJI was defined in DKR as first-time revision due to PJI within the first year after primary TKA, registered as “PJI suspected” or “PJI verified by microbiology”. PJI was defined in MiBa as first-time same- side knee-related revision surgery within the first year after primary TKA, accompanied by cultures taken between 24 hours before to 48 hours after revision surgery, with a minimum of two samples out of a minimum of three samples positive with the same microorganism. We estimated the sensitivity, specificity, positive and negative predictive value (PPV and NPV) of PJI diagnosis in DKR.
Results: Amongst 18,454 primary TKA patients, we identified 147 PJIs in DKR and 158 in MiBa. Validating DKR against MiBa, 94 of PJIs in DKR were true positive, 53 false positive, 64 false negative, and 18243 true negative, corresponding to a sensitivity of 59.5% (51.4 - 67.2), a specificity of 99.7% (99.6 -99.8), a PPV of 63.9% (55.6% - 71.7), and a NPV of 99.7% (99.6 - 99.7). 60/64 false negatives were found within the first 3 months after primary TKA.
Interpretation / Conclusion: Using microbiology samples as gold standard, we found 40% underrecording of revision due to PJI after TKA in DKR during 2016-2018. 36% of PJI reported to DKR had negative cultures according to MiBa, and likely partly represents culture negative PJIs, as this remains a clinical diagnosis.

107. Short-term Patient-reported outcome after stemmed versus stemless total shoulder arthroplasty for glenohumeral osteoarthritis: A patient-blinded non-inferiority randomized clinical trial.

Zaid Issa[1,2], Jeppe Vejlgaard Rasmussen[3], Stig Brorson[1,2]

1. Department of Orthopaedics, Zealand University Hospital, Køge
2. Centre for Evidence-Based Orthopaedics (CEBO)
3. Department of Orthopaedics, Herlev Gentofte Hospital

Background: Stemmed total shoulder arthroplasty (TSA) is the dominant implant in the treatment of patients with primary osteoarthritis (OA) and an intact cuff. Stemless TSA systems have been used since 2004, but information about safety and efficacy is sparse. The metaphyseal fixation of the stemless TSA may be an advantage should the need of a revision arthroplasty arise.
Aim: The purpose of the study was to compare the short-term patient-reported outcome of stemless and stemmed total shoulder arthroplasty.
Materials and Methods: We conducted a non-inferiority randomized clinical trial. Patients with symptomatic OA, computerized tomography (CT) scan-verified adequate glenoid bone stock, and no total rupture of rotator cuff tendons verified by a magnetic resonance imaging (MRI) scan were randomly allocated to a stemmed or stemless TSA. The primary outcome was the Western Ontario Osteoarthritis Shoulder (WOOS) score at 12 months. The minimal clinically important difference (MCID) of WOOS is 12.3%. we used this value to define the non-inferiority margin.
Results: Eighty patients were randomised, 38 in the stemmed TSA group and 42 in the stemless TSA group. One patient in the stemless TSA group died after the 3 months follow-up, otherwise no dropouts. Demographics were comparable in both groups. At 12 months follow-up the mean WOOS was 77.8 (SD=22.0) and median 87.1 (IQR: 66.6-94.2) in the stemmed TSA group and 86.8 (SD=16.9) and 94.2 (IQR: 82.5-98.2) in the stemless TSA group (p-value for non- inferiority test =0.045). We found a statistically significant difference in the mean WOOS of 9.0% (95% CI 0.7- 17.0) but the lower limit of the CI (e.g., 0.7) did not cross the margin of non-inferiority (e.g., -12.5).
Interpretation / Conclusion: The stemless TSA is non-inferior to the stemmed TSA in terms of patient-reported outcome measures at short term follow-up. Sparing the humeral shaft canal for later revision could be an argument for using a stemless TSA.

108. No effect of capsular closure during hip arthroscopy - one-year follow-up of a prospective randomized controlled study.

Bjarne Mygind-Klavsen[1], Otto Kraemer[2], Bent Lund[3], Michael Krogsgaard[5], Per Hölmich[2], Martin Lind[1], Torsten Grønbech Nielsen[1], Lene Lindberg Miller[1], Karen Briggs[4], Marc J. Philippon[4], Christian Dippmann[5]

1. Div. of Sports Traumatology, Dept. of Orthopedics, Aarhus University Hospital, Denmark.
2. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre
3. Dept. of Orthopedics, Horsens Regional Hospital, Denmark.
4. Steadman Philippon Research Institute, Vail, USA.
5. Section for Sportstraumatology M51, Bispebjerg-Frederiksberg Hospital. Part of IOC Research Center Copenhagen, Denmark.

Background: Capsular management during hip arthroscopic procedures has recently been a hot topic in treatment of Femoroacetabular impingement (FAI) patients. Current cohort studies have demonstrated good outcomes in favor of capsular closure, however one randomized controlled trial did not demonstrate any significant differences in outcome after capsular closure versus unrepaired capsulotomy in FAI patients.
Aim: The aim of this controlled, randomized multicenter trial was to evaluate the effect of capsular closure in relation to subjective postop. outcomes and revision rates in patients undergoing hip arthroscopy for FAI.
Materials and Methods: All eligible FAI patients from four surgical centers in Denmark, referred for hip arthroscopy (n = 200) were randomly assigned to either closure or no closure of the interportal capsulotomy at termination of the arthroscopic procedure. The capsular closure was performed with 2-3 absorbable sutures, using the “Quebec City Slider” knot tying technique. The Copenhagen Hip and Groin Outcome Score (HAGOS) was primary outcome and scores were collected from The Danish Hip Arthroscopy Registry preoperatively and at one-year follow-up.
Results: Baseline epidemiological and morphological characteristics were comparable between the treatment groups, except for a higher percentage of females in the capsular closure group (66% vs. 48%). Both groups significantly improved after surgery ($p < 0.05$). At one-year follow-up, there was no difference between treatment groups in any of the HAGOS domainscores ($p > 0.05$). The revision rates after one year were identical in both groups (n=5), however, two patients in the non-closure group were treated with a total hip replacement.
Interpretation / Conclusion: This controlled, randomized multicenter trial demonstrated no evidence for improved outcome of capsular closure after interportal capsulotomy in arthroscopic treatment of FAI-patients.

109. Effects of a progressive rehabilitation and care program across sectors for older adults following hip fracture surgery

Inge Hansen Bruun[1,2], Charlotte Suetta [3,4], Jonas A. Ipsen[1,2], Lars T.Pedersen[1,2,5], Birgitte Nørgaard [6], Bjarke Viberg[7,8,9]

1. Department of Physical Therapy and Occupational Therapy, Lillebaelt Hospital, University Hospital of Southern Denmark, Kolding, Denmark
2. Department of Regional Health Research, University of Southern Denmark, Odense
3. Geriatric Research, Department of Geriatric and Palliative Medicine, Copenhagen University Hospital, Bispebjerg and Frederiksberg, Copenhagen, Denmark
4. Institute of Clinical Medicine, University of Copenhagen, Denmark
5. Department of Health Education, University College South Denmark, Esbjerg
6. Department of Public Health, User Perspectives and Community-based Interventions, University of Southern Denmark, Odense, Denmark
7. Department of Orthopaedic Surgery and Traumatology. Lillebaelt Hospital, University Hospital of Southern Denmark, Kolding, Denmark
8. Department of Orthopaedic Surgery and Traumatology. Odense University Hospital, Odense
9. Department of Clinical Research, University of Southern Denmark, Odense, Denmark

Background: Approximately half of the home-dwelling hip fracture patients can expect reduced functional level after one year. One issue contributing to this may be a lack of cooperation between the hospital and municipality concerning rehabilitation.
Aim: To assess the effect of a continuous and progressive rehabilitation and care program across sectors for home-dwelling hip fracture patients above 65 years.
Materials and Methods: A cluster-randomized stepped-wedge trial was carried out in Hospital Lillebaelt and the six municipalities within the hospitals' catchment area. The intervention group received a progressive strength-training program initiated in the hospital and continuing after discharge by the municipality's physiotherapists for 12 weeks using an empowerment-based approach. The intervention also included a follow-up visit by a nurse three days after discharge. The control group received the usual rehabilitation and care. The primary outcome was Timed Up and Go (TUG) measured eight weeks after surgery. Secondary outcomes were 30-day mortality, readmission rate, and New Mobility sum-score (NMS).
Results: In total, 336 patients were included, 168 (116 women) in the intervention group and 171 (108 women) in the control group. The mean age was 80, the mean Hindsoe-score was 8.7, and 50% were

admitted due to a femoral neck fracture. There were no baseline differences between the groups regarding age, sex, comorbidity, fracture, and mobility. Eight weeks after surgery, TUG was significantly higher in the intervention group (median 14.3 (IQR10-20) compared to median 13.9 (IQR 12- 22) in the control group (p=0.038). The same applies to the NMS; for the intervention group, the median NMS sum-score was 6 (IQR 4-7) and 5.5 (IQR 4-7) in the control group (p=0.042). There were no significant differences in 30-day mortality (p=0.57) and readmission rate (p=0.15) between the groups.

Interpretation / Conclusion: A cross-sectorial strength-training program demonstrated a significant increase in mobility in terms of TUG and NMS compared to usual rehabilitation and care. The program was designed as a real-life program and will therefore be easy to implement elsewhere.

SESSION 13: FOOT / ANKLE + TRAUMA

17 November 2023

09:00 – 10:00

Room: 01+02

Chairs: Ellen Hamborg-Petersen and Morten Schultz Larsen

110. Patient-reported outcomes after conservative treatment of Achilles tendon rupture with 11 weeks' immobilisation and non-weight bearing

Mette Frank Fenger[1], Per Hviid Gundtoft[2], Nanna Rolving[1], Louise Mortensen[1]

1. Department of Physiotherapy and Occupational Therapy, Aarhus University Hospital
2. Department of Orthopaedics, Aarhus University Hospital

Background: Treatment strategies for Achilles Tendon Rupture varies considerably. At Aarhus University Hospital, patients treated conservatively for achilles tendon ruptures follow a restrictive regime with immobilization for 11 weeks with late weight bearing (after 10 weeks) and no motion of the ankle during the treatment period.
Aim: To test the following hypothesis. A restrictive regime for Achilles Tendon Ruptures result in: 1. Low rate of re-rupture 2. Better Achilles Tendon Rupture Score (ATRS), due to smaller risk of elongation.
Materials and Methods: This was a questionnaire-based cross-sectional cohort study including patients with conservatively treated Achilles tendon rupture treated at Aarhus University Hospital between January 1, 2020 and July 31, 2022. A questionnaire including the ATRS was sent electronically to patients treated conservatively at AUH within the past 24 months. Additionally, patients were asked about reruptures, non-healed tendons, deep venous thrombosis and work status. ATRS scores were compared to data from Danish Achilles Database (DADB), which included patients, who follow a more liberal regime.
Results: Out of the 110 patients that received a questionnaire 100 responded. 83% were male and mean age was 55.6. The cohort was divided into three groups based on time from Rupture to questionnaire: group 1 (6-12 months) consisted of 36 patients, group 2 (12-24 months) consisted of 30 patients, and group 3 (>24 months) consisted of 34 patients. The mean ATRS scores were 49.0 in Group 1, 48.7 in Group 2, and 60.9 in Group 3. In DADB scores for similar patient groups were found to be 48.7, 57.7 and 64.0. Four patients (4%) had a rerupture, four patients (4 %) had a non-healed achilles tendons, and four (4%) patients experienced a DVT.
Interpretation / Conclusion: Assuming a minimal clinical important difference of 8 points on ATRS, we found no benefits in regards to neither ATRS scores nor reruptures between our study populations with a restrictive regime compared to group with a less restrictive regime.

111. Adaption and validation of the EFAS Score PROM for Danish speaking foot and ankle patients

Mick Nielsen[1], Jens Kurt Johansen[2], Anna Kathrine Pramming[3], Jeannette Østergaard Penny[4]

1. Department of Orthopaedic, University Hospital Zealand
2. Department of Orthopaedics Copenhagen University Hospital Hvidovre
3. Department of Orthopaedic, University Hospital Zealand
4. Department of Orthopaedic, University Hospital Zealand;

Background: The European foot and Ankle Society has developed the 6 question EFAS score, as a common European Patient reported outcome measures (PROM) covering patients with foot and ankle pathologies.
Aim: To translate and adapt the EFAS score into Danish. Furthermore to perform a validation, reliability and responsiveness testing of the new score.
Materials and Methods: Translation and adaptation in accordance with guidelines from Beaton et. al. 2000 We aimed for 100 foot and ankle patients, 50 of those as test-retest. Control group of 70 foot- healthy individuals was planned. Patients filled out pre- and 6 months post- surgery evaluation of the EFAS-DK score. Statistics: Validity: Floor, ceiling effect, Effect size (ES) EFAS-DK more than 0.8. and large difference between patient and control was expected. Reliability: precision, test-re-test ICC, Measurement error and smallest detectable change (SDC) Responsiveness: effect size and minimal important change (MIC). Interpretability: SDC
Results: No major challenges were encountered during the translation process. We included 123 patients, 96 of those completed the scores. Females/male: 64/32, age mean/median: 58/59, 20 to 85 years. 47 completed the test-retest. 66 controls included, age mean/median 51/52 (23-79). 45 returned the 6 months evaluation. EFAS-DK mean(SD) range. pre-operative: 8,5(5,4) 0 to 24, 6 months post-op: 14,0(5,3) 1 to 24, Controls baseline: 22,8 (1,8)17 to 24. Mean changes in total EFAS-DK score pre-to- post-op was 5,5. test-re-test: 0,1 Controls -0,5. Floor/ceiling effect for preoperative patients 2/96 and 1/96, for controls 0/45 and 27/45. Effect size EFAS-DK patient: 1,0 Effect size EFAS-DK control 0.3 Test-retest ICC; 0.93, Measurement error 1,37 and SDC: 3,2 MIC:1,5 EFAS points.
Interpretation / Conclusion: The ES is large for patients and low for controls. Low floor and ceiling effect. The ICC demonstrates excellent reliability. As for responsiveness the SDC by the patient was higher than the MIC which may reflect a weakness in our anchor questions. Overall, the EFAS-DK score seems to reliably identify relevant changes. Half the patients felt a large improvement in their foot, but as a general their operated foot are far from normal at 6 months postoperative.

112. Long-term outcome in a large cohort after operative stabilization of the deltoid ligament of the ankle.

Michael Rindom Krogsgaard[1], Henrik Palm[1], Kenneth Obionu[1], Yvette Astrup Cramer[1], Naja Bjørslev Lange[1], Tobias Haak[1], Christian Dippmann[1]

1. Dept. of Orthopedic Surgery, Bispebjerg and Frederiksberg University Hospital, Copenhagen, Denmark.

Background: 40 % of patients with chronic ankle instability have pathology of the deltoid ligament (DL), and DL reconstruction (DLR) can be indicated. DL instability can lead to ankle OA. Series after DLR are small.
Aim: Long-term follow-up of DLR in a large group of patients.
Materials and Methods: During the primary operation an ankle arthroscopy had been performed to visualize the DL, and other relevant pathologies were also treated surgically. 503 consecutive patients (524 ankles) who had a DLR 2010-2018 were due to patient complaints invited in sept-nov. 2021 to answer postoperative period questions, complete the questionnaire FAAM and a ROM (range of motion) scale, and answer a number of anchor questions – and were offered optional physical control. On Jan 12, 2022 a TV-program and newspaper articles on this cohort was alleging the possibility of malpractice. For risk of bias, it was decided to close the link to collection of patient-responses the day after.
Results: 342 had a history of a trauma to the ankle and 105 had previous ankle surgery. In 447 the operating foot surgeon evaluated the MRI as showing signs of a pathology to the DL. 421 feet (80%) had procedures in addition to DLR. A total of 269 (53.8%) patients responded to the invitation prior to the release of critical press coverage. 11 indicated that they did not wish to participate. For 71% the operation solved their ankle-problems, for 11 % it made no change and for 19 % the condition became worse. 163 (63 %) were satisfied with surgery and 87 (34 %) were dissatisfied. 63 % would repeat the operation, 11 % might choose operation and 21 % would not. 67 % had pain in the ankle during the past week, and 50 % were not able to run. The mean score of the FAAM ADL scale was 44 (vs. 58 in a group of healthy persons), and the FAAM Sport scale 13 (vs. 24). Mean ADL ability (scale 0-100) was 72 (vs. 89) and mean sports ability 53 (vs. 87).
Interpretation / Conclusion: The relatively high degree of satisfaction in our cohort despite suboptimal clinical results (50 % are unable to run) probably reflects the complex nature of pathology in the DL insufficient ankle. There is a need for structured scientific evidence to establish principles for treatment.

113. Nitinol staples in comparison to screws and plates in foot arthrodeses and osteotomies

Bjørn Nedergaard[1,2], Torben Stryhn[1,2], Bjarke Viberg[1,2]

1. Department of Orthopaedic Surgery and Traumatology, Lillebaelt Hospital Kolding
2. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital

Background: New generation Nitinol staples are easily implanted and are increasingly used in foot and ankle surgery. However, data regarding complications and reoperation rates when compared to standard treatment with screws and plates are scarce.
Aim: To assess reoperation rates after fixation with Nitinol staples in comparison to screws and plates in arthrodeses or osteotomies (A/O) of the foot.
Materials and Methods: This is a single center retrospective cohort study. Patients who had A/O with Nitinol staples, screws or plates in their feet from 01.08.2017 to 14.10.2020 were identified through the hospitals administrative database. Choice of implant was by the surgeon´s discretion. A/Os where a choice between staples, screws or plates was not relevant were excluded (e.g. subtalar arthrodesis). Patient files and x-rays were reviewed by two experienced foot and ankle- surgeons for surgical details and baseline clinical data. One year follow-up was conducted for reoperations. Descriptive statistics were applied.
Results: There were 395 patients with 486 A/O of the feet. Median age was 60 years (range 16-83) and 68% were females. The majority had an ASA score of 1 or 2 (83%), 7% had diabetes, 18% were smokers and 3% had alcohol overconsumption. There were 288 A/O treated with staples and 11.1% had a reoperation. Nonunions represented 3.1% while 5.9% were hardware removal. There were 73 A/O with screws and 20.5% had a reoperation. Nonunions represented 4.1% while 13.7% were hardware removal. There were 125 A/O with plates and 28.0% had a reoperation. Nonunions represented 8.0% while 16.0% were hardware removal. When assessing single joints, we observed reoperation rates of the 1st MTP-joint due to nonunion were 3.6% for staples, 4.2% for screws and 8.8% for plates. Reoperation rates of the 1st TMT-joint due to nonunion were 2.6% for staples and 7.5% for plates. Only 1 patient had surgery with screws only and no reoperation was observed.
Interpretation / Conclusion: A/Os in the feet with Nitinol staples seem to have few complications and low reoperation rates in comparison to plates and screws. Nitinol staples could be a future golden standard implant when performing arthrodeses and osteotomies in the feet.

114. Comparison of four Patient Reported Outcome Measures in patients with ankle fracture: A study on patient preferences and psychometric properties

Per Hviid Gundtoft[1,5], Julie Ladeby Erichsen[2], Mads Terndrup[3], Lauritz Walsøe[1], Lasse Pedersen[2], Bjarke Viberg[2,4,5], Alice Ørts[2,4], Charlotte Abrahamsen[5,6]

1. Department of Orthopaedic Surgery, Aarhus University Hospital
2. Department of Orthopaedic Surgery, Odense University Hospital
3. Department of Orthopaedic Surgery, Hvidovre Hospital
4. Department of Clinical Research, University of Southern Denmark, Odense, Denmark
5. Department of Orthopaedic Surgery, Lillebaelt Hospital – Kolding
6. Department of Regional Health Research, University of Southern Denmark

Background: In research studies of patients with ankle fractures several different patient reported outcome measures (PROM) have been used but few studies have compared them.
Aim: To compare patient preferences and psychometric properties of the Manchester Oxford Foot Questionnaire (MOXFQ), the Self-reported Foot and Ankle Score (SEFAS), the Olerud Molander Ankle Score (OMAS), and the Forgotten Joint Score (FJS) in adults with ankle fractures.
Materials and Methods: Patients with a surgically or non-surgically treated ankle fracture at three hospitals were included between 01.11.2018 to 31.08.2020. Patients received all four questionnaires 6-, 12-, 14-, 24-, 52-, and 104-weeks following the ankle fracture. Only fully completed questionnaires were included in the analysis. According to COSMIN guidelines, statistical tests were performed to assess structural validity, construct validity and reliability. Furthermore, floor- and ceiling effects were assessed at all time points. Content validity was assessed using cognitive interviews of nine patients, who were also asked to grade all four PROMs in order of priority.
Results: Each PROM was fully completed by 135 patients 12 weeks post-injury and by 111 at 14 weeks post-injury. When performing Confirmatory Factor Analysis, MOXFQ showed best model fit (CFI 0.946; TLI 0.936; RMSEA 0.08). When testing construct validity, all hypotheses were accepted except one as OMAS and FJS had a correlation of <0.7. All PROMs had an almost perfect test-retest reliability for the total score and for all domains. Interclass Correlation Coefficient 2.1 were between 0.81 to 0.91. Internal consistency measured by Cronbach's alpha ranged between 0.76 to 0.95 for the total scores and the domains. Only MOXFQ had an alpha of 0.69 for the domain social, which is below acceptable. The OMAS showed ceiling effect at 52-weeks and MOXFQ floor-effect at 104-weeks. Eight patients out of nine expressed that MOXFQ were the best or second-best at assessing their symptoms. Six patients scored SEFAS best or second-best.
Interpretation / Conclusion: All PROMs performed well in the psychometric evaluation. Patients rated MOXFQ and SEFAS highest. We recommend that MOXFQ should be used in future ankle fracture studies.

115. Outpatient surgery for ankle fractures – a pilot randomized controlled trail.

Christian Grundtvig Refstrup Rasmussen[1], Rasmus Elsøe[1], Christian Pedersen[1], Peter Larsen[2]

1. Department of Orthopaedics, Aalborg University Hospital
2. Department of Physiotherapy, Aalborg University Hospital

Background: Ankle fractures are very common injuries. Following surgical treatment, inpatient care for 4-10 days is common. Several studies have reported that outpatient surgical treatment of ankle fractures is safe. However, the literature lacks high quality randomised controlled trials comparing inpatients and outpatient care.
Aim: The aim of this study was to investigate the feasibility of outpatient care for selected surgically managed ankle fractures and the setup of a randomized controlled trail comparing in- and outpatient care of ankle fractures with regard to patient reported outcome, patient satisfaction, adverse events, pain, function and healing.
Materials and Methods: This study is a proof-of-concept study as part of a non-inferiority randomized control design to compare in- and outpatient care of ankle fractures. Included were adult patients (>= 18 years), stable ankle fractures necessitating surgical treatment and able to ambulate with walking aid and perform adequate ADL at home. Feasibility was based on two questions regarding patients experience with the treatment and the absence of any serious adverse events. Clinical results were obtained at 2 days, 2, 6 and 12 weeks and included pain, range of ankle motion (ROM), healing, Foot and Ankle Outcome Score (FAOS), European Quality of life 5 Dimensions questionnaire, (EQ5D-5L), workforce and Tegner Activity level. Adverse events were reported throughout the study.
Results: A total of 76 patients were accessed for eligibility and 22 patients were included. 49 patients were excluded, and 6 patients did not want to participate. The most common reasons for exclusion were: 22 patients were not able to ambulate with walking aid and perform adequate ADL at home and 15 patients were not stable in preoperative cast. The median age was 48.6 with and range from 18 to 77. Female sex represents 52%. Patient reported experience and satisfaction response completeness: 2 weeks – 17/22, 6 weeks 17/22 and 12 weeks 19/22.
Interpretation / Conclusion: Results indicate that a full RCT comparing in- and outpatient care of ankle fractures is feasible without adjustments of the protocol. High completeness in the planned follow-up procedure was observed.

116. KKR 2023: Venous thromboembolism prophylaxis for ankle fractures

Louise Thuren Jørgensen [1], Christian Cavallius[2], Nikoline Møller Lynnerup[3], Ole Brink[4]

1. Ortopædkirurgisk afd. M, Bispebjerg Hospital
2. Ortopædkirurgisk afd. O, Odense Universitetshospital
3. Ortopædkirurgisk afdeling. Herlev Hospital
4. Ortopædkirurgisk afdeling. Aarhus Universitetshospital

Background: Immobilization due to ankle fracture increases the risk of venous thromboembolism (VTE) including deep vein thrombosis (DVT) and pulmonary embolism (PE). There's no national Danish guideline about the use of thromboprophylaxis with low molecular weight Heparin (LMWH) when immobilizing patients due to ankle fracture, and current international guidelines disagree whether or not to use thromboprophylaxis .

Aim: The purpose of this short clinical guideline is to review current literature on the subject and to offer support when deciding for or against thromboprophylaxis when immobilizing patients with a brace or cast due to ankle fracture.

Methods: A systematic search of relevant literature was conducted on Pubmed, Embase and Cochrane on March 9th, 2023. The evidence was rated by standardized forms (AMSTAR2, Cochrane Risk of Bias-tool and GRADE).

Results: From a total of 545 studies, 441 were excluded on titles and abstracts, and 97 studies were excluded after reading full text by at least two of the authors. Further two studies were excluded due to wrong study design, and one was excluded due to a low score on AMSTAR2. Of the remaining four studies, two were metaanalyses, and two RCTs that already were included in the two meta analyses.

One meta-analysis showed significant lower incidence of asymptomatic DVTs, when using LMWH compared to placebo or no treatment (OR=0,48 (0,33;0,7)). The other meta-analysis showed significant lower incidence of symptomatic DVTs, when using LMWH compared to placebo or no treatment (OR 0,29 (0,09;0,95)).

No clear differences were found between the LMWH and control groups for PE. Major adverse events were rare.

Interpretation / Conclusion: Low-quality evidence showed that the use of LMWH reduced the incidence of DVT when immobilizing the lower limb due to ankle fracture, when compared with no prophylaxis or placebo. Low-quality evidence showed no clear differences in PE rates. The quality of evidence was reduced to very low because of heterogenicity in inclusion criteria, treatment protocols and measurement of outcome in the studies included in the two metaanalyses, resulting in a high risk of bias.

SESSION 14: HAND / WRIST

17 November 2023

09:00 – 10:00

Room: 102-105

Chairs: Lone Kirkeby and Rasmus Wejnold Jørgensen

117. Five-year recurrence of Dupuytren's contracture after needle fasciotomy or collagenase injection: a randomized controlled trial

Rasmus Wejnold Jørgensen[1], Claus Hjorth Jensen[1], Stig Jørring[1]

1. Hand Clinic, Department of Orthopedic Surgery, Herlev-Gentofte University Hospital of Copenhagen

Background: In this randomized controlled trial, we compared the recurrence of Dupuytren's disease at 5-years following needle fasciotomy or collagenase injection treatment for isolated metacarpophalangeal (MCP) joint contractures. We have previously reported three year results in favour of collagenase injections in the same cohort.

Aim: To compare the recurrence of Dupuytren's disease at 5-years following needle fasciotomy or collagenase injection treatment for isolated MCP joint contractures. Further, to investigate if the effect seen at 3 years was lasting at the 5-year follow up.

Materials and Methods: The study was conducted between 2013 and 2015. The study design was a single centre randomized controlled clinical trial with an independent blinded observer. Patients were randomized between collagenase clostridium histolyticum injections (Xiapex®) and percutaneous needle fasciotomy (CCH vs PNF). A total of 36 patients were followed in the PNF group and 32 in the CCH group. Two patients in the PNF group died before the 5 year follow up.

Results: Patients who were treated with CCH had a significantly lower recurrence rate than patients treated with PNF during the period ($p = 0.049$). Of the 34 patients who were followed in the PNF group, 59% (n=20) had recurrence of extension deficit or progression of the disease leading to further treatment. Of the 32 patients who were followed in the CCH group, 44% (n=14) had recurrence or progression. No serious adverse event was reported in any of the patients.

Interpretation / Conclusion: In this randomized controlled trial, we find less recurrence and progression of Dupuytren's disease using collagenase injection as compared to percutaneous needle fasciotomy five years following treatment for isolated metacarpophalangeal joint contractures.

118. Stable cup fixation at mid-term translates into good long-term survival of cemented and uncemented trapeziometacarpal arthroplasty: A prospective randomized radiostereometry study with 10 years follow-up.

Peter Godthaab Zeuner[1], Torben Bæk Hansen[1,2], Maiken Stilling[2,3,4], Janni Kjærgaard Thillemann[1,2,3]

1. University Clinic for Hand, Hip and Knee Surgery, Gødstrup Hospital, Herning, Denmark
2. Department of Clinical Medicine, Aarhus University, Denmark
3. AutoRSA Research Group, Orthopaedic Research Unit, Aarhus University Hospital, Denmark
4. Department of Orthopedics, Aarhus University Hospital, Denmark

Background: Aseptic loosening leading to revision has been a substantial problem with both cemented and uncemented cups in trapeziometacarpal (TMC) arthroplasties used for treatment of TMC arthritis. Radiostereometry (RSA) can measure cup migration over time as a measure of implant fixation, which predict the risk of aseptic loosening.
Aim: To evaluate if mid-term cup migration predicts long-term implant survival, and further, to present 10-year clinical results, and patient reported outcomes of cemented and uncemented TMC cups.
Materials and Methods: In a patient-blinded prospective randomized study 28 patients (5 men, 32 TMC joints) aged mean 58 years (range 41–77) were randomized to surgery with a cemented all-polyethylene cup (DLC, n=16) or an uncemented HA-coated Elektra screw cup with metal-on-metal articulation (Elektra, n=16).The same cementless HA-coated metacarpal stem was used. Clinical evaluation of grip strength, QDASH score, and pain on NRS scale, were collected at 3 and 6 months, 1, 2, 5 and 10 years. Imaging with RSA was performed until 5-years, with baseline image taken the first postoperative day. Implant survival was estimated at 10 years follow-up.
Results: Migration (total translation) within the first 2 years was small for both groups (<0.26 mm). From 2 to 5 years, total translation was 0.08 mm (CI95% -0.06 – 0.21) in the DLC group and 0.05 mm (CI95% -0.04 – 0.14) in the Elektra group, which was similar between groups (p=0.74). Compared with preoperative, 10-year grip strength, QDASH score, and pain at rest and in activity improved (p<0.05) and with no difference between groups throughout follow-up (p>0.13). The 10-year survival was 80% (CI95% 50 – 93) for the DLC group and 67% (CI95% 38 – 85) for the Elektra group (p=0.40). All patients with retained arthroplasties at the 10-year follow-up reported excellent satisfaction and willingness (100%) to repeat.
Interpretation / Conclusion: This first prospective randomized trial on DLC and Elektra TMC arthroplasties found similar and stable midterm cup-fixation, which translated into good long-term implant survival. Ten-year clinical outcomes and patient satisfaction was excellent for both groups.

119. Distal radioulnar joint kinematics during active forearm rotation: a paired comparison of patients foveal TFCC injured and non-injured side

Janni Kjærgaard Thillemann[1,2,3], Sepp De Raed[3,4], Emil Toft Petersen[1,2,3], Torben Bæk Hansen[1,2], Maiken Stilling[2,3,5]

1. Dept. of Orthopaedics, University Clinic for Hand, Hip and Knee Surgery, Gødstrup Hospital, Herning

2. Department of Clinical Medicine, Aarhus University

3. AutoRSA Research Group, Orthopaedic Research Unit, Aarhus University Hospital

4. NRT X-RAY A/S, Hasselager; 5. Department of Orthopaedic Surgery, Aarhus University, Denmark

Background: Foveal triangular fibrocartilage complex (TFCC) injury may cause distal radioulnar joint (DRUJ) instability. Dynamic radiostereometry (dRSA) is a precise imaging method valid for objective measurement of DRUJ kinematics.

Aim: To use dRSA to study kinematics during active forearm rotation in DRUJs with arthroscopic confirmed foveal TFCC lesion in comparison to non-injured DRUJs.

Materials and Methods: In a prospective cohort study 19 patients (10 men) with a mean age of 34 years (range 22-50) were included. All patients presented with trauma based symptomatic unilateral DRUJ instability evaluated clinically by Ballottement test and had a non-injured contralateral DRUJ for paired comparison. A foveal TFCC lesion was confirmed by arthroscopy post hoc. Bilateral image recordings were made with dRSA during forearm rotation, performed by the patient. Kinematic analyses using CT bone models and anatomical coordinate systems were used to describe the position of the ulnar head center in the sigmoid notch (SN) (DRUJ position ratio) and the ulnar head center distance to the SN (DRUJ distance).

Results: In general, the ulnar head moved in a volar direction of the SN during supination and in dorsal direction during pronation. However, in full pronation the DRUJ position ratio was up to 9% points (CI 1-17) more volar on the TFCC injured DRUJs, and in full supination up to 12% points (CI 3-21) more dorsal, compared to the non-injured DRUJs. The DRUJ distance did not differ in maximum supination and pronation, but in the range from 60o pronation to 10o supination, the DRUJ distance was significantly wider in TFCC injured DRUJs, with a increase of 1.3 mm (CI 0.3-2.3) in 0 degrees rotation.

Interpretation / Conclusion: The ulnar head position during active rotation was more volar in pronation and more dorsal in supination in DRUJs with a foveal TFCC injury. Consequently, the ulnar head moved towards the SN center when the full trajectory of forearm rotation was reached. Further, DRUJs with foveal TFCC lesion had wider distance in neutral forearm rotation, compared with non-injured DRUJs. Evaluation of combined kinematics (multidirectional) seems important when evaluating DRUJ instability during active patient performed exercises.

120. The interrater reliability of the diagnostic Hook -test in the arthroscopic definition of the foveal TFCC injury

Signe Juhl Dynesen[1,2], Robert Gvozdenovic

1. University of Copenhagen, Faculty of Health and Medical Sciences, Copenhagen
2. Department of Orthopeadic Surgery, Herlev/Gentofte University Hospital of Copenhagen
3. Department of Hand Surgery, Herlev/Gentofte University Hospital of Copenhagen
4. University of Copenhagen, Faculty of Health and Medical Sciences, Copenhagen, Denmark.

Background: The specificity and sensitivity of the Hook-test to assess foveal TFCC injuries is well documented. However, the inter-rater reliability of this test has only been investigated through studies, where surgeons evaluated the result of the hook-test by looking at videos of the test being performed. To our knowledge, a study that takes surgical testing technique into account has not yet been performed on the diagnostic Hook-test.
Aim: To evaluate the inter-rater reliability of the hook test in vivo, using the technique during live surgery.
Materials and Methods: From December 2022 to April 2023, 27 consecutive patients scheduled for diagnostic wrist arthroscopy were included after giving written consent for the study. The patients included 13 women and 14 men, ranging from 20 to 66 years of age. Four different hand surgeons were used as observers, three of surgeons' expert level III, and one of surgeons' expert level IV, according to Tang & Giddins. The diagnostic wrist arthroscopy would proceed as normal until the responsible operating surgeon (Observer 1) had performed the hook test. Afterward, one of the other participating surgeons (Observer 2) would be permitted to also perform the hook test during the same surgical procedure. Both surgeons, unaware of each other findings would independently report their assessments and the surgery would again proceed as normal. Afterward, Cohen's kappa was calculated and evaluated according to the scale proposed by Landis and Koch.
Results: Of the 27 wrists included, the surgeons were in agreement on 21 of the findings and disagreed on 6, (78%). Since some of the agreement could be derived by the chance alone, we calculated a Kappa value of 0,55, which corresponds to a moderate agreement according to the scale proposed by Landis & Koch.
Interpretation / Conclusion: Despite the reports of being highly accurate and with high sensitivity and specificity, the arthroscopic foveal TFCC hook test may not be as reliable as previously thought when evaluated in vivo. More research is needed on the subject.

121. Arthroscopic versus open cancellous bone grafting for scaphoid delayed/nonunion in adults (SCOPE-OUT): study protocol for a randomized clinical trial

Morten Kjær[1], Jeppe Vejlgaard Rasmusssen[2], Robert Gvozdenoviz[1,3]

1. Dept. of Orthopedics, Hand Clinic, Herlev-Gentofte University Hospital of Copenhagen, Denmark
2. Dept. of Orthopedics, Shoulder and elbow clinic, Herlev-Gentofte University Hospital of Copenhagen
3. University of Copenhagen, Faculty of Health and Medical Sciences, Institute of Clinical Medicine

Background: Scaphoid non-union results in pain and decreased hand function. Untreated, almost all cases develop degenerative changes. Despite advances in surgical techniques, the treatment is challenging and often results in a long period with a supportive bandage until the union is established. Open, corticocancellous (CC) or cancellous (C) graft reconstruction and internal fixation are often preferred. Arthroscopic assisted reconstruction with C chips and internal fixation provides minimal trauma to the ligament structures, joint capsule, and extrinsic vascularization with similar union rates. Correction of deformity after operative treatment is debated with some studies favouring CC, and others found no difference. No studies have compared time to union and functional outcomes in arthroscopic vs. open C graft reconstruction.

Aim: We hypothesize that arthroscopic assisted C chips graft reconstruction of scaphoid delayed/non-union provides faster time to union, by at least a mean 3 weeks difference.

Materials and Methods: Single site, prospective, observer-blinded randomized controlled trial. Eighty-eight patients aged 18–68 years with scaphoid delayed/non-union will be randomized, 1:1, to either open iliac crest C graft reconstruction or arthroscopic assisted distal radius C chips graft reconstruction. Patients are stratified for smoking habits, proximal pole involvement and displacement of > / < 2 mm. The primary outcome is time to union, measured with repeated CT scans at 2-week intervals from 6 to 16 weeks postoperatively. Secondary outcomes are Quick Disabilities of the Arm, Shoulder and Hand (Q-DASH), visual analogue scale (VAS), donor site morbidity, union rate, restoration of scaphoid deformity, range of motion, key-pinch, grip strength, EQ5D-5L, patient satisfaction, complications and revision surgery.

Results: N/A

Interpretation / Conclusion: The results of this study will contribute to the treatment algorithm of scaphoid delayed/non- union and assist hand surgeons and patients in making treatment decisions. Eventually, improving time to union will benefit patients in earlier return to normal daily activity and reduce society costs by shortening sick leave. Trial registration: ClinicalTrials.gov NCT05574582.

122. Inter- and intraobserver agreement for the CT scan assessment of union after surgery for scaphoid fractures and nonunion

Morten Kjær[1], Robert Gvozdenoviz[1,3], Ivanov Dimitar[2]

1. Department of Orthopedics, Hand Clinic, Herlev-Gentofte University Hospital of Copenhagen, Denmark
2. Department of Radiology, Bispebjerg and Frederiksberg University Hospital of Copenhagen, Denmark
3. University of Copenhagen, Faculty of Health and Medical Sciences, Institute of Clinical Medicine.

Background: Assessment of scaphoid union using X-Ray is often with some disagreement. Union is defined as signs of consolidation in 3/4 views. Inter- and intraobserver agreement are reported to be fair/moderate of conservatively treated scaphoid fractures. Overlining leads to misinterpretation, and bone bridging cannot be detected. CT-scans are increasingly used to evaluate union, allowing a 3-dimensional assessment of the trabecular architecture. Studies for scaphoid fractures and non-union after surgical intervention, where the metal artifact is present are limited.**Aim:** We hypothesized that inter- and intraobserver reliability of the CT-scan assessment of union after operative treatment for scaphoid fracture and nonunion between observers are moderate/substantial.

Materials and Methods: An institutional search identified 230 patients with operative intervention. We randomly selected 60 sets of CT scans (30 fractures and 30 nonunions). Inclusion criteria were age >18 years, operative intervention for scaphoid fractures, and non-union with CT scans 6-26 weeks postoperatively. Exclusion criteria were concomitant injury to the hand and earlier treatment for scaphoid non-union. Three observers evaluated the anonymized CT scans on two occasions 6 weeks apart in random order. Observers were asked to classify the scaphoids with >/< 50% bone bridging, and with no healing/partial healing/full healing.

Results: Cohens Kappa found overall moderate interobserver agreement (no healing vs. partial healing vs. full healing) (0.58), substantial (0.66) for non-union cases, and moderate for fractures (0.47). Overall interobserver agreement for >/<50% healing was fair (0.35), fair for fractures (0.23) and moderate for nonunion cases (0.46). Results from intrarater agreement await.

Interpretation / Conclusion: Our results suggest CT scan between observers are reliable in both scaphoid fractures and nonunion (no healing/partial healing/full healing). The agreement was better in nonunion cases compared to fractures. Interater reliability for >/< 50 % healing was fair suggesting attention for this evaluation. Subgroup analysis revealed consistent substantial agreement between 2 of the observers. The third observer varied between slight to a moderate agreement.

123. Outcomes after Flexor Tendon Surgery in the Capital Region of Denmark

Benedicte Heegaard[1], Rasmus Wejnold Jørgensen[1]

1. Hand Clinic, Department of Orthopedic surgery, Herlev-Gentofte University Hospital of Copenhagen

Background: The management of flexor tendon injuries in the hand is a well-known challenge worldwide, however, the exact outcomes and postoperative complications in Denmark have not yet been reviewed.
Aim: To report outcomes and incidence of postoperative complications in patients undergoing surgery after traumatic flexor tendon injuries in the hand. Secondly, to investigate if trauma in zone II of the hand is associated with a poor outcome.
Materials and Methods: We retrospectively reviewed patients who had been surgically treated for flexor tendon injuries of the hand in two hospitals in Denmark in the period of 2010-2020. Demographic information, trauma type and postoperative complications were recorded. Major postoperative complications included re- rupture, surgical tenolysis and admission due to infection. Minor complications included infection treated with oral antibiotics and decrease in mobility.
Results: In total, 281 patients (mean age 35 years, 64% male) were reviewed. Ninety-five (34%) patients had trauma in zone I, 137 (49%) had trauma in zone II, and 49 (17%) had trauma in the other zones of the hand. The median time from trauma to surgery was 3 days. The median time from surgery to the last visit at the hospital was 99 days with an average of 16 contacts to the hospital after surgery. In total, 18% experienced a major complication and 35% experienced a minor complication. Twenty-three (8%) patients experienced re-rupture, 15 (5%) underwent surgical tenolysis due to adhesions, and 6 patients (2%) were admitted and revised due to infection. At the final visit, 27% had a flexion deficit of > 1 cm and/or extension deficit of >10 degrees and 19 patients (7%) were treated with oral antibiotics due to infection. Traumas in zone II of the hand were not associated with a higher incidence of complications nor a worse outcome as compared to traumas in zone I.
Interpretation / Conclusion: Following traumatic flexor tendon injuries, 18% of patients experience a major postoperative complication and 35% experience a minor complication, including infection treated with oral antibiotics or decreased mobility. Patients with zone II traumas do not experience a poorer outcome as compared to patients with zone I traumas.

SESSION 15: HIP ARTHROPLASTY

17 November 2023

09:00 – 10:00

Room: 202-205

Chairs: Morten Bøgehøj and Per K Andersen

124. Multimorbidity is Associated with Revision Surgery after Primary Total Hip Arthroplasty – a Population-Based Cohort Study on 98,647 Danish Patients from 1995-2018.

Rikke Sommer Haaber[1,2], Katrine Glintborg Iversen[1,2], André Sejr Klenø[1,3], Martin Bækgaard Stisen[2,3], Inger Mechlenburg[2,3], Alma Becic Pedersen[1,3]

1. Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, Denmark
2. Department of Orthopedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
3. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark

Background: Primary total hip arthroplasty (THA) is a common major procedure for treating late-stage hip osteoarthritis (OA). However, revision surgery is a severe complication after THA. Evidence for guiding healthcare professionals on the risks of THA in multimorbid patients is sparse.
Aim: To examine the association between multimorbidity and risk of revision due to any cause and specific causes after primary THA due to OA.
Materials and Methods: We identified 98,647 THA patients and subsequent revisions in The Danish Hip Arthroplasty Register from 1995 to 2018. Data on multimorbidity measured with Charlson Comorbidity Index (CCI) was retrieved from The Danish National Patient Registry. By CCI (low, medium, high), we calculated cumulative incidence of revision due to any cause and aseptic loosening within 0-10- years and infection and dislocation within 0-2 years using the Aalen-Johansen method. Cause specific hazard ratios (HR) adjusted for sex, age, cohabitation, education, and surgery year were calculated using Cox regressions comparing patients with medium and high to those of low CCI. All estimates are presented with 95% confidence intervals.
Results: Overall, the prevalence of CCI was 70% (low), 24% (medium), and 6% (high). The cumulative incidence of revision due to any cause and aseptic loosening within 0-10 years was 6.5% (95%CI: 6.2;6.7) and 2.2% (95%CI: 2.1;2.4) in low CCI and 6.5% (95%CI: 5.8;7.3) and 1.5% (95%CI: 1.2;2.0) in high CCI. Revisions due to infection and dislocation within 0-2 years was 0.6% (95%CI: 0.5;0.6) and 0.8% (95%CI: 0.7;0.8) in low CCI and 0.8% (95%CI: 0.6;1.1) and 1.3% (95%CI: 1.01;1.6) in high CCI. The HR for revision due to any cause was 1.2 (95%CI: 1.2;1.3) for medium CCI and 1.4 (95%CI: 1.2;1.6) for high CCI compared to low CCI. In patients with high CCI compared to low CCI, the HRs for aseptic loosening was 1.3 (95%CI: 1.0;1.6), for infection 1.2 (95%CI: 0.9;1.6), and for dislocation 1.7 (95%CI: 1.3;2.2).
Interpretation / Conclusion: Multimorbidity is associated with increased risk of revision due to any cause, as well as revision due to specific causes up to 10 years after primary THA. These results should guide the shared decision when managing patients with multimorbidity.

125. Risk of 2nd revision and mortality following 1st revision due to prosthetic joint infection after total hip arthroplasty: A register-based cohort study on 1,669 patients from the Danish Hip Arthroplasty Register

Rajzan Joanroy[1,2], Sophie Gubbels[3], Jens K Møller[2,4], Søren Overgaard[5], Claus Varnum[1,2]

1.Department of Orthopaedic Surgery, Lillebaelt Hospital - Vejle, Denmark 2.Department of Regional Health Research, University of Southern Denmark, Denmark 3.Division of Infectious Disease Preparedness, Statens Serum Institut, Denmark 4.Department of Clinical Microbiology, Lillebaelt Hospital - Vejle, Denmark 5.Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg, Denmark 6.Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen

Background: Revision due to prosthetic joint infection (PJI) after total hip arthroplasty (THA) is associated with increased risk of second revision and death. However, the knowledge on risk and causes of second revision and mortality is sparse.
Aim: We investigated the risk of 2nd revision due to any cause and PJI and mortality following 1st revision due to PJI.
Materials and Methods: We identified 1,669 1st revisions from the Danish Hip Arthroplasty Register (DHR) during 2010-2019 and divided these into revision due to PJI or aseptic revision. Revision due to PJI was defined as a revision within 1 year after primary THA with any culture-positive biopsy or reported PJI to the DHR. Aseptic revisions within 1 year after primary THA were used as controls. From Danish health registries, we retrieved information on Charlson Comorbidity Index (CCI), death, microbiological data on intraoperative biopsies and cohabitation status. The cumulative incidences at the end of the study were calculated by 1st revision due to PJI or aseptic revision with 95% confidence intervals (CI). We estimated the adjusted relative risk (RR) for 2nd revision and mortality using the pseudo-observation method. For 2nd revision, we treated death as competing risk. We adjusted for age, sex, CCI, cohabitation status and femoral head size. All patients were followed from 1st revision until 2nd revision, death, emigration or end of study.
Results: Among 357 patients having 2nd revision, 215 were due to PJI. For 1st revision due to PJI or aseptic revision, the cumulative incidence of any 2nd revision was 35% (CI 31-40) and 19% (CI 15-22), respectively, and the cumulative incidence of 2nd revision due to PJI were 27% (CI 23-31) and 5.3% (CI 4.0-6.9), respectively. The adjusted RR for any 2nd revision was 2.8 (CI 2.2 – 3.7) and 2nd revision due to PJI 7.8 (CI 5 -12) for 1st revision due to PJI vs. aseptic revision. The adjusted relative mortality risk for 1st revision due to PJI vs. aseptic revision was 1.1 (CI 0.4-3.0).
Interpretation / Conclusion: The risk of any 2nd revision and 2nd revision due to PJI is significantly increased for patients with 1st revision due to PJI versus aseptic revision. The risk of mortality is not increased after 1st revision due to PJI.

126. Minimal important difference in opioid consumption based on adverse event reduction - a post-hoc analysis

Anders Peder Højer Karlsen[1,2], Jens Laigaard[3,4], Casper Pedersen[1], Kasper Højgaard Thybo[1], Kasper Smidt Gasbjerg[1], Anja Geisler[1,4], Troels Haxholdt Lunn[2,4], Daniel Hägi-Pedersen[4,5], Janus Christian Jakobsen[6,7], Ole Mathiesen[1,4]

1. Centre for Anaesthesiological Research, Dept. of Anaesthesiology, Zealand University Hospital, Lykkebaekvej 1, 4600 Koege, Denmark. 2Department of Anaesthesia, Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark 3Dept. of Orthopaedic Surgery and Traumatology, Bispebjerg Hospital, Copenhagen, Denmark. 4Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark 5Research Centre of Anaesthesiology and Intensive care medicine, Dept. of Anaesthesiology, Næstved-Slagelse-Ringsted Hospitals, Denmark 6Department of Regional Health Research, The Faculty of Health Sciences, University of Southern Denmark, Denmark 7Copenhagen Trial Unit, Centre for Clinical Intervention Research, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark

Background: Reductions in opioid consumption is frequently used to measure efficacy of analgesic interventions for total hip and knee arthroplasty. However, it is unclear what constitutes a minimal important difference for this outcome, i.e., how much less opioid the intervention group should consume to have us consider implementing the intervention into clinical practice.
Aim: We therefore aimed to determine the minimal important difference for morphine consumption, using opioid-related adverse events as anchor.
Materials and Methods: We conducted a post-hoc analysis of three trials (PANSAID [NCT02571361], DEX-2-TKA [NCT03506789] and Pain Map [NCT02340052]) assessing pain management after hip or knee arthroplasty. We examined the relationship between 0-24h iv morphine consumption and opioid-related adverse events: nausea, vomiting, sedation, and dizziness. The primary outcome was the Hodges-Lehmann median difference in morphine consumption between patients with no versus mild opioid-related adverse events. The secondary outcomes included the difference in opioid consumption between patients with mild versus moderate, and moderate versus severe opioid-related adverse events. We used quantile regression to test for interactions between the primary outcome and patient baseline characteristics.
Results: The difference in iv morphine consumption was 6 mg (95% CI 4-8) between patients with no versus mild opioid-related adverse events and 5 mg (95% CI 2-8) between patients with mild versus moderate events. There was no difference in opioid consumption between patients with moderate versus severe opioid-related adverse events (0 mg (95% CI -4 – 4)), possible because patients find it difficult distinguish between moderate and severe adverse events and because patients with severe events accept a higher level of pain and thus stop taking additional opioids.
Interpretation / Conclusion: Based on opioid-related adverse events, we suggest that 5 mg reduction in 0-24h iv morphine represents the minimal important difference for patients undergoing total hip and knee arthroplasty.

127. Less early subsidence of cemented Exeter short stems compared with cemented Exeter standard stems in Dorr type A femurs – a radiostereometry study with minimum five years follow-up

Peter Bo Jørgensen [1,2,3], Stig Storgaard Jakobsen [2,3], Dovydas Vainorius [4], Morten Homilius [4], Torben Bæk Hansen [3,4], Maiken Stilling [1,2,3]

1. AutoRSA Reseach Group, Aarhus University Hospital
2. Department of Orthopaedics, Aarhus University Hospital
3. Department of Clinical Medicine, Aarhus University
4. Department of Orthopaedics, Gødstrup Regional Hospital

Background: The Exeter short stem was designed for patients with Dorr Type A femurs and short- term results are promising.
Aim: The aim of this study was to evaluate the minimum five-year stem migration pattern of Exeter short stems in comparison with Exeter standard stems.
Materials and Methods: In a case-control study 25 patients (22 female) at mean age 78 years (range 70-89) received cemented Exeter short stem (cases). Cases were selected based on Dorr Type A femurs and matched first by Dorr Type A and then age to a control cohort of 21 patients (11 female) at mean age 74 years (range 70-89) operated with cemented Exeter standard stems (controls). Preoperatively, all patients had primary hip osteoarthritis, and no osteoporosis as confirmed by DXA scanning. Patients were followed with radiostereometry for evaluation of stem migration (primary end-point), evaluation of cement quality and Oxford Hip Score. Follow-ups were preoperative, 3, 12, 24 and minimum 5 years follow-up.
Results: At three months, subsidence of the short stem -0.87 mm (-1.07 to -0.67) was lower compared to the standard stem -1.59 mm (CI95% -1.82 to -1.36) (p=0.00). Both stems continued a similar pattern of subsidence until 5-year follow-up. At 5-year follow-up, the short stem had subsided mean -1.67 mm (CI95% -1.98 to -1.36) compared to mean 2.67 mm (CI95% -3.03 to -2.32) for the standard stem (p=0.00). Subsidence was not influenced by preoperative bone quality (osteopenia vs. normal) or cement mantle thickness
Interpretation / Conclusion: In conclusion, the standard Exeter stem had more early subsidence compared with the short Exeter stem in patients with Dorr type A femurs, but thereafter a similar migration pattern of subsidence until minimum five years follow-up. • Both the standard and the short Exeter stems subsides. • The standard stem subsides more compared to the short stem in Dorr type A femurs. • Subsidence of the Exeter stems was not affected by cement mantle thickness.

128. 3- The changes in physical activities during the early recovery period after hip and knee replacement surgeries

Arash Ghaffari [1], Regitze Gyldenholm Skal[1], Søren Kold[1], Andreas Kappel[1], Thomas Jakobsen[1], Ole Rahbek[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital.

Background: Wearable technology has emerged as a promising tool for measuring physical activity (PA) and monitoring post-operative recovery. However, the changes in PA as a biomarker for recovery have not been fully explored, particularly during the early post-operative period when the risk of complications is elevated and changes in PA may not be significant.
Aim: We aimed to explore early changes in the pattern and the level of PA after hip and knee replacement surgeries.
Materials and Methods: This cohort study involved 11 hip replacement patients (four females) and five knee replacement patients (four females) with the ages of 66 [43-78] and 66 [25-74] years, respectively. Data were collected two weeks before until four weeks after surgery using a physical activity tracker, which recorded the patients' daily PA data, including the time spent on different PA categories, the number of steps, and the activity index (AI).
Results: According to the results, the time spent resting during the four weeks after surgery compared to before surgery decreased from 112% to 106%, while continuous walking time increased from 27% to 77%, and the activity index (AI) increased from 35% to 73%. Furthermore, step counts increased from 18% to 67%, and sit-to-stands increased from 65% to 93%. However, there were no significant changes in sitting, standing, and sporadic walk time, as well as the number of steps taken sporadically. Additionally, during the post-operative period, the step counts, walking time, AI, and the number of sit-to-stands had the least variance between weeks.
Interpretation / Conclusion: In conclusion, wearable sensors are a feasible tool for measuring PA during the peri-operative period in orthopedic surgery patients. Continuous step count, walking time, AI, and sit-to-stands showed relatively obvious changes and stable patterns, which makes them reliable parameters for remote monitoring of patients during the post- operative period.

129. The effect of obesity on early complications and patient-reported outcome measures in patients with unilateral osteoarthritis following total hip arthroplasty.

Hans Christian S. Vistisen[1], Mads J. Rex[1], Thomas Jakobsen[1], Mogens Laursen[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital, Aalborg, Denmark

Background: The benefits of total hip arthroplasty (THA) in patients with hip osteoarthritis are well established. Literature has reported lower improvements and lower total patient-reported outcome scores (PROMs) among obese patients. In addition, reports show increased risk of early complication in obese patients.
Aim: The aim of this study was to investigate the impact of obesity on PROMs, early complications, and revisions in patients with hip osteoarthritis operated with THA.
Materials and Methods: A retrospective observational study on prospectively collected data from 461 total hip replacements at Farsoe Hospital in the period 2015-2021 distributed in an obese (BMI >35) and a reference group (BMI 20-25). OHS and EQ-5D-3L were assessed preoperatively and one year postoperatively. Medical charts were reviewed for readmissions within 90 days and revision surgery within one year. An RCS comorbidity score was calculated for all patients. Crude and adjusted multiple linear regression models were used to detect statistically significant differences in ΔOHS, ΔEQ-5D-3L, readmission rate and revision rate between the two groups.
Results: Using adjusted multiple linear regression models, we found a statistically significant difference in ΔOHS and ΔEQ-5D-3L between the obese group and the reference group (-3.06, [-4.78; -1.35]; -0.06, [-0.09; -0.03]). In addition, obese patients had an odds ratio for reaching clinically significant change of 0.41, which was statically significant (0.41, [0.22;0.76]). The mean ΔOHS and ΔEQ-5D-3L were great among all patients (20 +/-9.6; 0.3 +/-0.2). Furthermore, found a significant difference in readmission between the two groups using an adjusted Poisson regression with linear link function (0.11, [0.19; 0.04]). There was no statistically significant difference in revisions.
Interpretation / Conclusion: This study found obese patients to have lesser improvement in OHS and EQ-5D-3L compared to a normal weight reference group. Both groups exhibited great increases in both OHS and EQ-5D-3L, however postoperative scores were significantly lower in the obese group. Furthermore, this study found obese patients to have a higher rate of early complications, but no significant difference was found regarding revision rates.

130. KKR 2023: Short Clinical Guideline on total hip arthroplasty in the elderly, cemented or non-cemented stem fixation.

Søren Overgaard [1], Peter Horstmann[2], Manuel Bieder[3], Haubro Martin[4], Morten Bøgehøj [5], Thomas Jakobsen [6]

1. Bispebjerg Hospital / DHR. 2. Gentofte Hospital. 3. Næstved Sygehus. 4. Odense Universitetshospital. 5. Aarhus Universitetshospital. 6. Aalborg Universitetshospital.

Background: Total hip arthroplasties in Denmark is performed with either cemented or non-cemented stem fixation. The non-cemented stem has been showed to be associated to a higher risk of early reoperation due to periprosthetic fracture. The cemented stem has, in some studies, shown increased risk of late revision due to aseptic loosening.
Aim: Both cemented and non-cemented stems are used today, thus DSHK has found it relevant to compare these two fixation methods for patients above the age of 60 years, with regard to risk of reoperation, dislocation, risk of thromboembolic complication and patient reported outcome.
Materials and Methods: The following PICO questions were investigated: Does patients above 60 years of age with primary osteoarthritis operated with total hip arthroplasty have better effect of a cemented fixation than non-cemented stem fixation with regard to reoperation, mortality, dislocations within the 1st year, thromboembolic complications and functional outcome.
Results: Reoperation: Overall, there is a lower revision rate for cemented and hybrid A THA especially for patients above 75 years of age. Men tend to have a higher revision rate. Few studies report cause for revision, but periprosthetic fracture seems to be a common early complication for the non-cemented THA, whereas the aseptic loosening is more common for the cemented THA in the late revisions. Mortality: The non-adjusted numbers show a higher mortality for the cemented stem but after adjusting the numbers even out. Some studies find a higher mortality in the first days following surgery for cemented fixation but this evens out quite quick and after one year there is no difference between the two groups. Mortality seems not to be associated to fixation type, more to age, gender and comorbidities. Dislocation within the 1st year One study reported that cemented fixation prevents dislocation (OR 0,71 p=0,001) compared to non-cemented. Thromboembolic complications Thromboembolic complications is a well-known complication after THA. One study showed significant increase in pulmonary embolism with in 30 days when comparing cemented to non-cemented. Another study showed no difference between the two groups. Functional outcome: Only two studies were found and due to the low number of included patients, the conclusion were very unclear.
Interpretation / Conclusion: To consider the use of cemented fixation of the stem in patients above the age of 70 years since the risk of reoperation is reduced in cemented stem fixation. The literature shows lower risk of revision in women down to the age of 60 years, the difference increases with rising age.

SESSION 16: TRAUMA

17 November 2023

12:45 – 13:50

Room: 01+02

Chairs: Annie Primdahl and Per Hviid Gundtoft

131. Trends in Treatment of Clavicle Fractures in Adults: An Epidemiological Study in Denmark, 1996-2018.

Ida Tryggedsson[1], Bjarke Viberg[2,3], Gundtoft Per Hviid[4], Ilija Ban[1], Søren Overgaard[1,5], Arvind von Keudell[1,6]

1. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg
2. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital
3. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt Kolding
4. Department of Orthopaedic Surgery, Aarhus University Hospital
5. Department of Clinical Medicine, Faculty of Health and Medical Sciences
6. Harvard Orthopaedic Trauma Initiative, Brigham and Women's Hospital, Boston, USA

Background: In recent years, several randomized studies have been conducted to determine the best treatment for clavicle fractures (CF), but no clear difference in functional outcome after surgical or non-surgical (NS) treatment has been shown. Historically, CF are treated NS, but this has been challenged due to a few studies that reported higher rates of nonunion and decreased functionality following NS treatment. As a result, surgical treatment has gained popularity, adding to the ongoing controversy over optimal treatment for CF. In 2012, National Clinical Guidelines recommended NS treatment as the primary approach for CF in Denmark.
Aim: To assess treatment patterns for CF in adults; investigating general trends as well as gender and age differences in Denmark from 1996-2018.
Materials and Methods: Data on diagnosis and interventions were obtained from Danish National Patient Register in the period 1996-2018. We included all patients aged 18 years and above with a CF diagnose (DS420). Patients treated surgically were categorized based on codes for the use of plates or other techniques. NS treatment was defined as no surgical code within 3 weeks of fracture.
Results: We found a total of 81,597 CF (67% men) with a mean yearly incidence of 65/100,000/year. Absolute numbers increased from 3,156 in 1996 to 3,885 in 2018. This increase was only seen in the 50+ cohort and mainly among men. 75,501 (92.5%) were treated NS, leaving 6,096 CF for surgical treatment with plates accounting for 95% of the modalities. Surgery was primarily performed on patients under the age of 65. In 1996, only 1% were treated surgically, but the surgery rate inclined gradually until a sudden increase in 2008, peaking at almost 14% in 2011-12, then declining to 8% in 2016 and subsequent years. In 2018, the mean surgical percentage was 7.2 but varied from 0.0 to 14.7% among hospitals.
Interpretation / Conclusion: Despite an increase of CF, NS treatment remained the main treatment of choice. There was a notable increase in the use of surgical treatment from 2008-12, followed by a decline in 2016 and subsequent years. The fluctuations in treatments may have been influenced by studies supporting surgical treatment and national guidelines recommending NS treatment.

132. Translation, cultural adaptation and psychometric testing of the 'The Brachial Assessment Tool' (BrAT) for brachial plexus injury.

Helene Kissow[1], Sofie Høj Wiingreen[1], Bridget Hill Hill[2], Alice Ørts Hansen[1,3]

1. Department of Orthopaedic Surgery, Odense University Hospital, Odense, Denmark
2. Epworth Monash Rehabilitation Medicine Unit Epworth HealthCare, Melbourne, Australia
3. Department of Clinical Research, University of Southern Denmark, Odense, Denmark.

Background: There is a growing need for valid and reliable patient-rated outcome measures for use in clinical practice and research. 'The Brachial Assessment Tool' (BrAT) is a unidimensional, 3 sub scale, 31-item, 4-response patient-reported outcome measure designed to assess the ability of adults with traumatic Brachial Plexus injury (BPI) to perform activities of daily living. The BrAT has been shown to be a valid, reliable, and responsive tool.
Aim: To translate and cross-culturally adapt the BrAT into Danish and assess face validity and reliability in adults with traumatic BPI.
Materials and Methods: The translation followed international guidelines. The pre-final version was cognitive tested by 19 adults who had a traumatic BPI. Face validity and reliability were evaluated according to the COSMIN guideline. Patients were recruited at an outpatient hand clinic. Results for the subscales and summed score were compared at time 1 and time 2 to determine test- retest using intraclass correlation coefficient model 2.1, internal consistency using Cronbach alpha and the smallest detectable change.
Results: The Danish translation revealed minor cultural differences, which were clarified. Cognitive testing showed no major issues with completion and understanding. All participants found the items relevant and important. 64 patients with traumatic BPI were recruited in the reliability arm. 56 completed the retest, 50 reported a stable hand condition between tests and were included in the analysis. Mean (sd) age was 47.06 (17.34), and 72% of participants were men. The Intra-class-correlation coefficients for the three sub-scales and the total score ranged from 0.91 to 0.95 (95% CIs 0.85 to 0.97). Internal consistency ranged from 0.87 to 0.98. Smallest detectable change scores ranged from 3.95 to 9.17 for the subscales and 15.71 for the total score.
Interpretation / Conclusion: BrAT (DK) appears to have face validity and is a reliable measure of activity for adults with traumatic BPI. It can be used in clinical practice for goal setting and to inform future interventions and treatment evaluations.

133. Assessment of technical competence in distal radius fracture fixation by a volar locking plate: A global Delphi consensus study.

Mads Emil Jacobsen[1, 2, 3], Leizl Joy Nayahangan[2], Monica Ghidinelli[4], Chitra Subramaniam[5], Kristoffer Borbjerg Hare[6, 7], Lars Konge[2, 3], Amandus Gustafsson[1, 2, 3]

1. Center for Orthopaedic Research and Innovation (CORI), Department of Orthopaedics, Næstved, Slagelse, and Ringsted Hospitals
2. Copenhagen Academy for Medical Education and Simulation (CAMES), Rigshospitalet
3. Faculty of Health and Medical Sciences, University of Copenhagen 4: AO Education Institute, AO Foundation, Davos, Switzerland 5: AO North America, AO Foundation, Wayne, PA, USA 6: Department of Orthopaedics, Odense University Hospital 7: Department of Regional Health Research, University of Southern Denmark

Background: Volar locking plate fixation of distal radius fractures is among the most common orthopaedic trauma procedures and should be mastered by graduating orthopaedic residents. Surgical education in orthopaedic trauma is transitioning from a traditional time-based approach to competency-based medical education (CBME). Constituting a cornerstone of CBME, valid and objective assessment is a prerequisite for a successful transition.
Aim: The aim of this study was to develop a procedure specific assessment tool to evaluate technical competence in volar locking plate osteosynthesis of a distal radius fracture.
Materials and Methods: We invited international orthopaedic/trauma experts involved in resident education to participate as panelists in an iterative, four-round Delphi process to reach consensus on the content of the assessment tool. Round 1 was an item generating round where the panelists identified all potential assessment parameters. In round 2 the panelists rated the importance of each of the suggested assessment parameters and reached consensus on which to include in the assessment tool. Round 3 yielded specific assessment score intervals for specific bone and fracture models included in a virtual reality simulator currently under development. In round 4 the panelists weighted the scores for each assessment parameter that would impact the overall results.
Results: Eighty-seven surgeons representing forty-two countries participated in the study. Round 1 resulted in forty-five potential assessment parameters grouped into five procedural steps. After round 2, the number of parameters was reduced to thirty-nine. After the final round an additional parameter was removed, and weights were assigned to each of the remaining parameters.
Interpretation / Conclusion: Using a systematic methodology, an assessment tool to evaluate technical competence in distal radius fracture fixation was developed. Consensus of international experts ensures the content validity of the assessment tool. The development of this assessment tool represents a first step in the evidence-based assessment that is essential to CBME. Before implementation, further studies exploring validity and reliability of the assessment tool will be conducted.

134. Intra- and interrater reliability of the Radiographic Union Score for HUmeral fractures (RUSHU)

Peter Bremholm[1], Kasper Eriksen[1], Line Houkjær[2], Martin Hochheim[3], Kristoffer Hare[4], Joakim Jensen[4], Bjarke Viberg[4, 5], Dennis Karimi[1]

1. Department of Orthopaedic Surgery and Traumatology, Lillebaelt Hospital: University Hospital of Southern
2. Centre for Evidence-Based Orthopaedics, Zealand University Hospital and Department of Clinical Medicine, University of Copenhagen
3. Department of Orthopaedic Surgery and Traumatology, Hvidovre Hospital: Copenhagen University Hospital
4. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital
5. Department of Clinical Research, University of Southern Denmark

Background: The Radiograhic Union Score for HUmeral fractures (RUSHU) is a tool used to assess healing in humeral shaft fractures. Patients who score below 8 points after six weeks from time of injury have a 12 times higher risk of nonunion. However, the score must demonstrate high external validity through reliable measurements before it can be utilized as a valid tool in clinical practice.
Aim: This study aimed to evaluate the intra- and interrater reliability of the RUSHU.
Materials and Methods: A random sample of 175 patients with a humeral shaft fracture were selected from a database of 327 cases, provided they met the inclusion criteria of being over 17 years of age, having radiographs approximately six weeks after the diagnosis, and having non- pathological fractures. The radiographs were independently assessed twice by six raters (two medical students, two residents, and two trauma specialists) with a minimum interval of two weeks. The raters were provided with a guide to measure the RUSHU. Intraclass Correlation Coefficient (ICC) was used to calculate intra- and interrater reliability, with ICC values interpreted as poor (<0.50), moderate (0.50–0.75), good (0.75–0.90), and excellent (>0.90). ICC was calculated for the individual cortices, the total RUSHU, and the Binary Score of <8 or ≧8.
Results: Intrarater ICCs ranged from 0.82 to 0.99 (95% CI: 0.75-0.99) for individual cortices, 0.94 to 1.00 (95% CI: 0.92-1.00) for the total RUSHU, and 0.83 to 0.99 (95% CI: 0.77-0.99) for the Binary Score. Interrater ICCs ranged from 0.87 to 0.91 (95% CI: 0.82-0.94) for individual cortices and were 0.93 (95% CI: 0.87-0.96) for the total RUSHU and 0.92 (95% CI: 0.88-0.94) for the Binary Score.
Interpretation / Conclusion: The study findings show excellent intra- and interrater reliability for the total RUSHU and good to excellent intra- and interrater reliability for the individual cortices and Binary Score. The RUSHU can be used reliably by medical students to specialists. However, further studies are necessary to confirm the predictive value of the RUSHU as a prognostic tool for nonunion risk before it can be widely implemented in clinical practice.

135. Steady-State Piperacillin Concentrations in the Proximity of an Orthopedic Implant: A Microdialysis Porcine Study

Johanne Gade Lilleøre[1,2], Andrea René Jørgensen[1,2], Martin Bruun Knudsen[1,2], Pelle Hanberg[1,2], Kristina Öbrink-Hansen[1,3], Sara Kousgaard Tøstesen[1,2], Kjeld Søballe[1,4], Maiken Stilling[1,2,4], Mats Bue[1,2,4]

1. Department of Clinical Medicine, Aarhus University, Denmark
2. Aarhus Denmark Microdialysis Research Group (ADMIRE), Aarhus University Hospital, Denmark
3. Department of Infectious Diseases, Internal Medicine, Gødstrup Hospital, Denmark
4. Department of Orthopaedics, Aarhus University Hospital, Denmark

Background: Implant-associated osteomyelitis is one of the most feared complications following orthopedic surgery. Although the risk is low it is crucial to achieve adequate antibiotic concentrations proximate to the implant for a sufficient amount of time to protect the implant surface and ensure tissue integration.
Aim: The aim of this study was to assess steady-state piperacillin concentrations in the proximity of an orthopedic implant inserted in cancellous bone.
Materials and Methods: Six female pigs received an intravenous bolus infusion of 4 g/0.5 g piperacillin/tazobactam over 30 min every 6 h. Steady state was assumed achieved in the third dosing interval (12–18 h). Microdialysis catheters were placed in a cannulated screw in the proximal tibial cancellous bone, in cancellous bone next to the screw, and in cancellous bone on the contralateral tibia. Dialysates were collected from time 12 to 18 h and plasma samples were collected as reference.
Results: Time above the minimal inhibitory concentration (fT>MIC) was evaluated for MIC of 8 (low target) and 16 µg/mL (high target). For the low piperacillin target (8 µg/mL), comparable mean fT>MIC across all the investigated compartments (mean range: 54– 74%) was found. For the high target (16 µg/mL), fT>MIC was shorter inside the cannulated screw (mean: 16%) than in the cancellous bone next to the screw and plasma (mean range: 49–54%), and similar between the two cancellous bone compartments.
Interpretation / Conclusion: To reach more aggressive piperacillin fT>MIC targets in relation to the implant, alternative dosing regimens such as continuous infusion may be considered.

136. Use of the bioabsorbable Activa IM-Nail™ in pediatric diaphyseal forearm fractures: a prospective cohort study with six months follow-up

David Gøttsche[1], Morten Jon Andersen[1,2]

1. Dept of Orthopedic Surgery, Copenhagen University Hospital - Herlev and Gentofte
2. Dept of Clinical Medicine, University of Copenhagen

Background: Pediatric diaphyseal forearm fractures (PDFF) are very common injuries. Fractures needing surgery are most often treated with metal Elastic Stable Intramedullary Nails (ESIN). Nail removal is widely advocated; however, it is a substantial burden on the child, the family and healthcare economy. Bioabsorbable Intramedullary Nails (BIN) made from poly L-lactide-co-glycolide (PLGA) have been developed for some of the same indications as metal ESIN.
Aim: To evaluate the feasibility and safety of the Activa IM-Nail™ for PDFF.
Materials and Methods: From May 1st 2021 all patients with open physes and unstable PDFF of the radius, ulna or both were sought to be prospectively and consecutively recruited. If consented patients were operated with the Activa IM-Nail™. Primary outcome was radiographic healing assessed by the Radiographic Union Score (RUS) at 3 months. Secondary outcomes were pain, wound appearance, neurovascular status, bilateral elbow and forearm range of motion (ROM), fracture angulation and displacement.
Results: 26 children were eligible for inclusion, 9 children were excluded due to criteria, 17 children were operated with BIN, 7 girls and 10 boys, mean age 10 years (4-14). There were no serious adverse device effects (SADE). Two children had postoperative fracture angulation that did not require manipulation. After 3 months, all patients had pain free and normal ROM. RUS was at least 8 at three months and 10 at six months follow up.
Interpretation / Conclusion: We did not see any SADEs. All children had solid healing and normal ROM at 3 months. The use of BIN for PDFF is feasible, seems very safe, and eliminates the need for implant removal.

137. KKR 2023: Operative versus non-operative management of olecranon fractures in low-demand elderly patients (Updated KKR 2018)

Liv Vesterby[1], Anne-Kathrine Belling Sørensen[1], Michael Brix[2]

1. DSSAK, 2 DOT

Background: Fractures of the olecranon account for approximately 20% of all forearm fractures. Tension band wire (TBW) and plate fixation (PF) are well-known methods for treating stable displaced fractures of the olecranon (Mayo type II A+B). However, operative treatment has a high rate of complications, including wound breakdown, infection, loss of reduction and further surgery to remove prominent metalwork. Several recent studies have advocated for non-operative treatment for stable displaced olecranon fractures in the elderly.
Aim: To evaluate the effect of operative treatment versus non-operative treatment for stable displaced fractures of the olecranon in elderly low-demand patients.
Materials and Methods: A review of the literature from January 2018 to March 2023 was performed using MeSH term in PubMed. 35 studies were imported for screening. Initial screening by title was performed by three authors. Two authors then screened the remaining abstracts and ultimately the full-length articles leaving 8 studies for inclusion (3 reviews and 5 observational studies). Inclusion criteria were studies available in English reporting outcomes on operative and non-operative treatment in elderly low-demand patients with stable, dislocated fractures of the olecranon (Mayo type II A+B). Critical outcomes were defined as risk of further surgery following primary surgery or conservative treatment. Secondary outcomes were defined as patient reported outcome scores. Observational studies were included, given the limited amount of literature on the topic.
Results: The 3 reviews report an overall high risk of reoperation in patients treated with TBW or PF compared with patients treated non-operatively. The observational studies published later on support the findings of the reviews.
Interpretation / Conclusion: Non-operative treatment is recommended in elderly low-demand patients with stable displaced olecranon fractures (Mayo type II A+B), as the benefit of operative treatment may be limited and uncertain, and due to high risk of complications, such as infection, loss of reduction and need of further surgery. The evidence of the guideline is considered low due to lack of high evidence studies.

SESSION 17: SPORTS ORTHOPAEDICS AND SHOULDER / ELBOW

17 November 2023

12:45 – 13:50

Room: 102-105

Chairs: Anne Kathrine Balling Sørensen and Stig Brorson

138. Shoulder instability following recurrent traumatic anterior dislocations measured with radiostereometry during apprehension-relocation test.

Josephine Olsen Kipp[1,3], Emil Toft Petersen[1,2], Thomas Falstie-Jensen[2], Johanne Frost Teilmann[1], Anna Zejden[4], Rikke Jellesen Åberg[4], Maiken Stilling[1,2,3], Theis Muncholm Thillemann[2,3]

1. AutoRSA Research Group, Orthopaedic Research Unit, Aarhus University Hospital
2. Department of Orthopedic Surgery, Aarhus University Hospital
3. Department of Clinical Medicine, Aarhus University
4. Department of Radiology Aarhus University Hospital

Background: Anterior shoulder instability (ASI) is characterized by recurrent dislocations of the glenohumeral joint (GHJ) and may induce glenoid bone defects. Apprehension- relocation test is the preferred clinical test to evaluate shoulder instability. To our knowledge, the GHJ kinematics during apprehension-relocation test has not previously been studied in patients with ASI.
Aim: The aim of this study was to examine the GHJ kinematics during an apprehension- relocation test in patients with ASI scheduled for a Latarjet procedure with radiostereometry (RSA).
Materials and Methods: Twenty patients (16 males, mean age 31 years (21-40)) with severe ASI and glenoid bone loss scheduled for the Latarjet procedure on one side, and a healthy shoulder on the contralateral side, were included at Aarhus University Hospital. Three consecutive static RSA recordings were performed bilaterally on the patient's shoulders during 1) relaxation (abducted and externally rotated), 2) apprehension test, and 3) relocation test. Double examination was performed to examine the repeatability of the tests. Bone models from CT scans were aligned on the RSA recordings. Anatomical coordinate systems were applied to describe the GHJ kinematics.
Results: Preliminary results for the first eight patients showed that for the unstable shoulder, the mean anterior humeral head translation during apprehension was 0.31 mm (SD=0.88) compared to the relaxed position. For the contralateral healthy shoulder, the humeral head translated 2.11 mm (SD=1.08), which was significantly more than the unstable shoulder. No statistically significant difference was found between the healthy and the anterior unstable shoulder for the relocation test. For the double examinations, no significant differences were found in any of the positions.
Interpretation / Conclusion: RSA is a feasible method to assess GHJ kinematics. Anterior translation is lower in ASI compared to the patient's healthy shoulder during apprehension test, which may be explained by patient's increased muscle guard during apprehension due to smaller glenoid size and translation distance to dislocation.

139. Evaluation of glenohumeral joint kinematics following a simulated bony Bankart lesion. A dynamic radiosteometric cadaver study.

Josephine Olsen Kipp[1,3], Emil Toft Petersen[1,2], Theis Muncolm Thillemann[2,3], Thomas Falstie-Jensen[2], Lars Lindgren [4], Maiken Stilling[1,2,3]

1. AutoRSA Research Group, Orthopaedic Research Unit, Aarhus University Hospital
2. Department of Orthopedic Surgery, Aarhus University Hospital
3. Department of Clinical Medicine, Aarhus University
4. Department of Radiology, Aarhus University Hospital

Background: During anterior shoulder dislocation, the anterior rim of the glenoid may be damaged with a combined labral and bone lesion (bony Bankart lesion). This leads to a reduced contact surface in the glenohumeral joint (GHJ) and may result in anterior shoulder instability. Instability symptoms typically occur during active abduction and external rotation. Dynamic evaluation of GHJ kinematics during motion has not previously been described.
Aim: The aim of this study was to establish an experimental setup to measure the GHJ translation before and after a 15% anterior glenoid bone lesion using dynamic radiostereometric analysis (dRSA).
Materials and Methods: Nine human donor arms were fixed in a motorized fixture allowing a controlled 90 degrees external rotation of the GHJ positioned at 60 degrees of abduction. Dynamic radiostereometry recordings were performed before and after inducing a bony Bankart lesion (15% of the glenoid width). All shoulders were tested before and after bony Bankart lesion and both stages with and without a 10N anterior directed load. Bone models from computed tomography scans were aligned on the dynamic radiostereometry recordings and anatomic coordinate systems were applied to describe GHJ kinematics during motion.
Results: Without loading, the maximal anterior- posterior translation range of the humeral head increased with a mean of 0.56 mm (SD=1.68) after the bony Bankart lesion. With a 10N anterior directed load, the maximal anterior-posterior translation range increased by a mean of 1.32 mm (SD=1.53) after the bony Bankart lesion compared to the native joint. After the bony Bankart lesion, the humeral head position was 0.62 mm (SD = 1.04) more inferior for the unloaded joint. With a 10N anterior load, the humeral head position was 1.18 mm (SD = 1.16) more inferior for the loaded joint, as compared with the intact glenoid.
Interpretation / Conclusion: After 15 % bony Bankart lesion the humeral head translated anteriorly and inferiorly compared to the intact glenoid during active rotation in 60 degrees abduction. However, the 10N anterior directed load was not sufficient to demonstrate statistical significance of the pathomechanics.

140. Ultrasonographic findings in patients with isolated unilateral subacromial pain syndrome and intact rotator cuff tendons.

Adam Witten[1], Mikkel Bek Clausen[2], Kristian Thorborg[1], Per Hölmich[1], Kristoffer Weisskirchner Barfod[1],

1. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark
2. Department of Midwifery, Physiotherapy, Occupational Therapy and Psychomotor Therapy, Faculty of Health, University College Copenhagen, Copenhagen, Denmark

Background: The aetiology of subacromial pain syndrome (SAPS) remains enigmatic. It is theorized that the supraspinatus tendon (SUPRA) and the subacromial bursa (BURSA) are the primary pain-generating structures. SUPRA and BURSA are generally considered to be thickened in patients with SAPS, but this assumption lacks validation. Some consider mechanical impingement of the subacromial structures to be the primary cause of pain, others do not. There is a trend to abandon the term impingement, though it has never been investigated if it can be visually observed.
Aim: To measure SUPRA, BURSA and acromiohumeral distance (AHD), and assess the presence of mechanical impingement in patients with SAPS, and compare it to their asymptomatic side.
Materials and Methods: Patients were recruited from the outpatient clinic, Hvidovre Hospital, using validated criteria for SAPS. Patients with contralateral shoulder pain, acromioclavicular osteoarthrosis, rotator cuff tears, biceps tendon or labral pathology, or calcified tendinitis were excluded. Validated ultrasonographical measurements methods were used. Thickness (mm) of SUPRA and BURSA were measured perpendicular to the tendon longitudinal axis, 2 cm from the lateral border of the SUPRA footprint, with the shoulder in slight internal rotation. AHD (mm) was measured as the shortest distance from the anterolateral acromion to humerus with the shoulder in neutral position. Impingement was defined as visual bulging (Yes/No) of BURSA in active shoulder abduction.
Results: We examined 56 patients with unilateral SAPS from 01.09.21 to 31.12.22. We found significantly more cases of ultrasonographic impingement in painful shoulders compared to the pain-free (45 vs 18, Chi-Square p = 0.04). Mean measurements of painful and pain-free shoulders did not differ: SUPRA 5.4 vs 5.5 mm; BURSA 1.9 vs 1.9 mm; AHD 11.1 vs 11.0 mm.
Interpretation / Conclusion: In this cohort of patients with isolated unilateral SAPS, we found more cases of ultrasonographic impingement in painful shoulders compared to the pain-free, but no significant differences in SUPRA, BURSA or AHD between painful and pain-free shoulders. These findings question the dogma of thickened subacromial structures being the primary aetiological explanation.

141. TITLE Patients with subacromial pain syndrome often present with varying combinations of concomitant shoulder pathology. A cross-sectional study in a secondary care setting.

Adam Witten[1], Mikkel Bek Clausen[2], Kristian Thorborg[1], Per Hölmich[1], Kristoffer Weisskirchner Barfod[1]

1. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark
2. Department of Midwifery, Physiotherapy, Occupational Therapy and Psychomotor Therapy, Faculty of Health, University College Copenhagen, Copenhagen, Denmark

Background: Subacromial pain syndrome (SAPS) lacks recognized diagnostic criteria. This could lead to variations in concomitant shoulder pathology across patient populations. It is possible that the presence of concomitant pathology can explain why some patients do not benefit from a typical non-surgical approach, or from surgery aimed at SAPS. It is not known how often SAPS is seen in combination with concomitant pathology or in which pattern. Knowledge of this could be valuable to stratify treatment and in the design and interpretation of future studies.
Aim: To investigate how often, and in which pattern, SAPS is seen with associated concomitant shoulder pathology.
Materials and Methods: Patients with insidious onset of shoulder pain, referred to the outpatient clinic, Hvidovre Hospital, were eligible for inclusion. Patients were systematically screened for SAPS using validated criteria and for 7 predefined concomitant pathologies. We used 18 standardized physical examination tests performed by experienced orthopedic specialists and radiographs, ultrasound and/or MR when indicated. Patients with frozen shoulder, cervical pathology, glenohumeral osteoarthritis (OA) or previous fractures/surgery/radiotherapy in the shoulder girdle, were excluded.
Results: We identified and examined 741 patients, with insidious onset of shoulder pain, from 01.09.21 to 31.12.22. 408 (55%) were diagnosed with SAPS. 160 (39%) had at least one type of concomitant pathology (acromioclavicular OA 76 (48%), full-thickness rotator cuff tears 60 (38%), biceps tendon pathology 54 (34%), labral pathology 17 (11%), minor shoulder instability: 14 (9%), calcified tendinitis: 6 (4%). A combination of concomitant pathology, with two or more different types, were seen in 53 (33%) patients. In total, 18 different combinations of concomitant pathology were seen.
Interpretation / Conclusion: Patients with SAPS constitute an etiological heterogenic group, presenting with many different patterns of concomitant shoulder pathology. The clinical importance of individual concomitant pathologies remains uncertain, but the high prevalence underpins the need for a systematic and transparent approach in future studies to ensure qualified interpretation and comparison of studies.

142. Open knotless suture-staples procedure for partial, low-grade gluteus medius tendon repair - a promising novel technique

Patrick Korsgaard, Jeppe Lange, Bent Lund, Marie Bagger Bohn

1. Department of Orthopaedics, Horsens Regional Hospital.

Background: In 2018 an endoscopic “suture staples” technique for partial thickness hip abductor tendon (HAT) repair was reported by Domb et al.1 We have adopted the technique, but perform surgery as an open procedure. The technique is potentially beneficial in selected cases of HAT, due to the minute iatrogenic soft tissue injury.
Aim: To report 1-year follow-up on our first cases of an open “suture staples” procedure.
Materials and Methods: From our database on HAT repairs (n>120), we extracted cases with a “suture staples” procedure, who had a minimum of 1-year follow- up. Patients were selected for this procedure, if presenting with Lateral Hip Pain and had HAT pathology on MRI, but no bony changes at the anterior footprint and with an intact gluteus minimus tendon. During surgery the tendon complex had to appear intact, but display “wave sign”. In all other cases a standardized detachment of the tendon complex was performed. Bursectomy was not performed, but the bursa was divided to access the tendon complex. Oxford Hip Score (OHS), Numeric Rating Scale (NRS), The Euro-Qol Visual Analogue Scale (EQ-VAS) and Copenhagen Hip and groin outcome score (HAGOS) were filled out before surgery at baseline and 12 months post-surgery. Global Rating of change score (GROC) were collected at 12 months. Data are presented as median with 25-75% interquartile range. All patients gave consent to participate in this study.
Results: 6 patients (5 females), age 55 years (49-58), Body Mass Index 28 (22-29), had reached a 1-year follow- up. The duration of surgery was 31 minutes (27-36). At 1-year 6 of 6 (100%) reported success on GROC. OHS improved from 20 (17-24) to 43 (40-45) (p=0.03). HAGOS improved statistically significant in all sub-scales. Pain during activity decreased on NRS from 9 (8-10) to 1 (0-2) (p=0.03). EQ-VAS went from 55 (50-60) to 95 (90-99) (p=0.03). All index hips tested stronger at 12 months follow up.
Interpretation / Conclusion: We present a novel surgical procedure for minor HAT pathologies with excellent 1-year results. Due to the technical simplicity of the procedure, our novel technique appears of value in selected HAT cases. More research into this procedure is warranted.

143. Exercise compared to a control condition or other conservative treatment options in patients with Greater Trochanteric Pain Syndrome: A systematic review and meta-analysis of randomized controlled trials

Troels Kjeldsen[1,2,3], Katrine Jessen Hvidt[1], Marie Bagger Bohn[4], Bjarne Mygind-Klavsen[1], Martin Lind[1,2], Adam Ivan Semciw[5,6], Inger Mechlenburg[1,2,7]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark
2. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark
3. The Research Unit PROgrez, Department of Physiotherapy and Occupational Therapy, Næstved-Slagelse-Ringsted Hospitals, Denmark
4. H-HiP, Department of Orthopaedic Surgery, Horsens Regional Hospital, Denmark
5. Department of Physiotherapy, Podiatry and Prosthetics and Orthotics, La Trobe University, Australia
6. Department of Allied Health, Northern Health, Australia
7. Department of Public Health, Aarhus University, Aarhus, Denmark.

Background: Greater trochanteric pain syndrome (GTPS) is a regional pain syndrome involving pathology of several potential anatomical structures. It is believed that the primary causes of GTPS are tendinosis or tears of the hip abductors, and a shift in focus of GTPS treatment to address these structures has previously been proposed. However, no review has performed meta-analyses focused specifically on exercise compared with a control condition or other conservative treatments across multiple clinical outcomes in this condition.
Aim: To estimate the effectiveness of exercise at end of treatment and at long-term follow-up compared with a control condition or other conservative treatment in patients with GTPS.
Materials and Methods: Randomized controlled trials comparing exercise interventions for patients with GTPS with a control condition; corticosteroid injection; shock wave therapy; or other types of exercise programs were included. Risk of bias was assessed using the Cochrane ROB2 tool. Meta- analyses were performed using a random-effects model. The certainty of the evidence was rated by the GRADE approach.
Results: Meta-analyses showed that in the long term, exercise reduces hip pain and disease severity while improving patient-reported physical function and global rating of change compared with a control condition. Compared with corticosteroid injection, exercise improves long- term global rating of change. No serious adverse events from exercise therapy were reported.
Interpretation / Conclusion: The current evidence supports the implementation of exercise as first-line treatment in patients with GTPS. Compared with corticosteroid injection, exercise is superior in increasing the likelihood that patients experience meaningful global improvement.

144. Ten years' experience with a local allograft bank - optimizing the treatment for 552 patients.

Helia Azkia[1], Lene Holm Harritshøj[2], Connie Nielsen[2], Niels Agerlin[3], Mette Gotlieb Jensen[4], Pia Charlotte Andersen[1], Michael Rindom Krogsgaard[1]

1. Department of Orthopedic Surgery, Bispebjerg and Frederiksberg University Hospital, Copenhagen
2. Department of Clinical Immunology, Rigshospitalet, Copenhagen University Hospital
3. Department of Neurosurgery, Rigshospitalet, Copenhagen University Hospital
4. Transplantation coordinator, Rigshospitalet, Copenhagen University Hospital

Background: In 2011 the Danish National Board of Health (DNBH) centralized treatment of multi- ligament injury and revision ligament surgery of the knee, meniscus transplantation, and advanced cartilage procedures to few departments with the purpose to increase experience and quality of these challenging procedures. This increased the need for allogeneic connective tissue (grafts). It is possible to obtain grafts from tissue banks in other countries, but from an ethical point of view Denmark should be self-providing, and there are differences in how grafts are obtained and preserved, which might affect tissue quality. Therefore, a local tissue bank was established in 2014.
Aim: To report experience from this tissue bank.
Materials and Methods: Various logistic models were explored. It was decided to connect allograft donation to the organ donor program. The age limit for donors is 50 years for tendons, 40 for menisci, and 30 for hyaline cartilage. After permission from relatives is obtained the transplantation coordinator contacts the orthopedic team (two surgeons and two nurses), and after organ donation the musculoskeletal tissue is removed. The tissue is handled and stored by dept. of clinical immunology. The donor is tested for contagious disease and the grafts are cultured for contamination. After negative results, the grafts are released for use.
Results: Since June 2014 there has been 31 donations, resulting in 1160 grafts. 40 grafts had a positive bacteria culture and were discarded. Until April 2023, 552 recipients have been treated by use of these allografts: 175 knee multi-ligament reconstructions (Rs), 226 revision ligament Rs, 44 meniscal transplantations (Ts), 18 fresh cartilage Ts, 3 tibial plateau+meniscal Ts, 2 ulnar Rs, 5 AC joint, 9 SC joint and 1 PTF joint stabilizations, 4 quadriceps Rs, 9 labral Rs (hip) 2 pectoralis major tendon Rs, 1 revision ankle stabilization, 45 one ligament Rs (knee). There are no recorded transplantation related complications. During the period it was necessary in addition to buy 245 grafts from tissue banks in Belgium.
Interpretation / Conclusion: Through the established donation program it has been possible to offer optimal treatment for several highly specialized musculoskeletal conditions.

SESSION 18: KNEE ARTHROPLASTY

17 November 2023

12:45 – 13:50

Room: 202-205

Chairs: Ann Ganestam and Per Wagner Kristensen

145. The feasibility and safety of lateral unicompartmental knee arthroplasty in a fast-track setting – a prospective cohort study of 170 procedures.

Kristine Ifigenia Bunyoz[1], Christoffer Calov Jørgensen[1], Pelle Baggesgaard Petersen[2], Henrik Kehlet[2], Kirill Gromov[1], Anders Troelsen[1]

On behalf of the Lundbeck Foundations Centre for Fast-track Hip and Knee Replacement Collaborative Group

1. Department of Orthopaedic Surgery, Clinical Orthopaedic Research Hvidovre (CORH), Copenhagen University Hospital Hvidovre, Denmark
2. Section for Surgical Pathophysiology, Rigshospitalet, Copenhagen University Hospital, Denmark

Background: In existing studies on fast-track unicompartmental knee arthroplasty (UKA), the majority of surgeries are medial UKA. There are substantial differences between lateral and medial UKA surgery, why outcomes cannot automatically be compared. To gain information about the feasibility and safety of fast-track protocols in lateral UKAs, we investigated length of stay (LOS) and early complications after lateral UKA, performed using a fast-track protocol in well-established fast-track centers.
Aim: To investigate the length of stay (LOS) and early complications after lateral UKA, performed using a fast-track protocol in well-established fast-track centers.
Materials and Methods: We retrospectively evaluated prospectively collected data on patients undergoing lateral UKA in a fast- track setup from 2010-2018, at seven Danish fast- track centers. Data on patient characteristics, LOS, complications, reoperations, and revisions, were analyzed using descriptive statistics.
Results: We included 170 of patients with a mean age of 65.5 years (SD 12.3). Median LOS was 1 day (Interquartile range IQR 1-1), which was unchanged from 2012-2018. 17.6% were discharged on the day of surgery. Within 90 days, seven patients (4.1%) experienced medical complications and five patients (2.9%) experienced surgical complications. Three patients (1.8%) were reoperated. Two of the reoperations were soft tissue revisions and the third was the removal of an exostosis due to catching of the patella. One patient (0.6%) was revised due to a bearing dislocation.
Interpretation / Conclusion: Our findings suggest that lateral UKA in a fast-track setting is feasible and safe. However, the performance of surgeries with lateral UKAs is potentially underutilized and therefore also holds potential benefits for this group of patients. This is the first study reporting on lateral UKA and enhanced recovery. The results should encourage orthopedic centers to implement fast-track protocols in this subgroup of patients.

146. Are changes in clinical and functional knee scores in patients undergoing primary arthroplasty for knee osteoarthritis influenced by preoperative multimorbidity?

Katrine Glintborg Iversen[1,2], Rikke Sommer Haaber[1,2], Martin Bækgaard Stisen[2,3], André Sejr Klenø[1,3], Martin Lindberg-Larsen[4], Alma Becic Pedersen[1,3], Inger Mechlenburg[2,3]

1. Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, Denmark
2. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
3. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark
4. Department of Orthopaedic Surgery, Odense University Hospital, Odense, Denmark.

Background: Patients undergoing primary total knee arthroplasty (TKA) due to osteoarthritis (OA) are known to have a high prevalence of multimorbidity. Only few studies have examined the impact of multimorbidity on clinical and functional knee scores after TKA, and there is inconsistency among the results. Hence, the question remains whether multimorbidity impacts functional- and knee impairment in patients undergoing TKA.
Aim: To investigate the impact of multimorbidity on changes in clinical and functional knee scores following TKA due to OA.
Materials and Methods: We conducted a population-based cohort study including 22,881 TKA patients identified in the Danish Knee Arthroplasty Register from 1997 to 2021. Patients were classified as having low, medium, or high multimorbidity based on the Charlson Comorbidity Index. The outcome was defined as the mean change (from preoperative to one-year post-TKA) in clinical and functional knee scores measured by the two components in the American Knee Society Score (AKSS) (0 worst to 100 best). The association between multimorbidity and outcome was analyzed using multiple linear regression adjusting for sex, age, cohabiting status, and baseline AKSS.
Results: Overall, the prevalence of patients with low, medium, and high multimorbidity was 75%, 21%, and 4%, respectively. Mean change scores in the clinical AKSS for patients with medium and high multimorbidity were 0.6 points (95%CI: 0.1;1.1) and -1.1 points (95%CI: -2.1;0.0) compared with patients with low multimorbidity. The mean change scores in functional AKSS for patients with medium and high multimorbidity were -2.5 points (95%CI: -3.1; -1.8) and -6.10points (95%CI: -7.3;-4.9) compared with patients with low multimorbidity. These differences were not clinically significant.
Interpretation / Conclusion: TKA patients with knee OA and medium or high multimorbidity can expect similar improvements in clinical and functional AKSS as patients with low multimorbidity.

147. Starting up a Lateral Unicompartmental Knee Arthroplasty practice

Kristine Ifigenia Bunyoz[1], Kirill Gromov[1], Anders Troelsen[1]

1. Department of Orthopaedic Surgery, Copenhagen University Hospital Amager Hvidovre, Denmark

Background: Historically, registry studies have reported unsuccessful results of treatment with lateral unicompartmental knee arthroplasty (UKA). Identifying patients for the procedure has been less clear and the procedure has been perceived to be technically more challenging than medial UKA. Achieving a steep learning curve and good results can therefore be difficult.
Aim: We aim to present the preliminary results and learning curve of our first performed lateral UKAs by two surgeons already experienced in performing medial UKAs.
Materials and Methods: We present our first 60 primary fixed-bearing lateral Oxford UKAs (57 patients) performed between 2016 and 2021 with a minimum of 1- year follow-up. The indication for lateral UKA was posttraumatic (n=4) and isolated lateral osteoarthritis (n=56). Two patients had a lateral UKA supplemental to a primary medial UKA. Mean age and BMI were 67.8 (SD ±12.7) and 29.3 (±5,6). 75% were females, and 70% had ASA 2. The median pre-surgery Oxford Knee Score (OKS) was 23 (IQR 19.5-27.5). Patients completed the Oxford Knee Score (OKS) (primary outcome), the Activity and Participation Questionnaire (OKS-APQ), and the Forgotten Joint Score (FJS) at 3-, 12-, and, 24-months after surgery.
Results: 86.7% of patients were discharged within 48 hours after surgery. One patient required a soft tissue revision due to infection. There were no other reoperations. One patient died from an unrelated reason. At 1-year follow-up, the median (interquartile range) OKS, APQ, and the FJS were 43,5 (36-46), 81 (44-100), and 75 (55-90).
Interpretation / Conclusion: Starting up a lateral UKA practice is safe and efficient, provided that the surgeons are already experienced in performing medial UKA and do the surgeries on a regular basis in well-indicated patients with isolated lateral knee osteoarthritis at short-term follow-up.

148. 1- Inertial measurement units with low sampling frequency can differentiate between osteoarthritic and non-osteoarthritic knees

Arash Ghaffari[1], John Rasmussen[2], Søren Kold[1], Rikke Emilie Kildahl Lauritsen[1], Andreas Kappel[1], Ole Rahbek

1. Interdisciplinary Orthopaedics, Aalborg University Hospital
2. Department of Materials and Production, Aalborg University

Background: Inertial measurement units (IMUs) can objectively measure gait quality in real-life situations, but they provide limited data compared to gold-standard gait labs. Thus, appropriate data analysis is critical to exploit this technology in clinical settings. In this regard, the Fourier representation of a signal, despite many advantages, has not been entirely investigated.
Aim: This study aimed to differentiate between the Fourier representation of gait signals in individuals with and without knee OA.
Materials and Methods: We included 27 patients with unilateral knee osteoarthritis (15 females) and 18 healthy controls (11 females). Gait acceleration signals were recorded during overground walking. We obtained the frequency features of the signals using the Fourier transform. The logistic LASSO regression was employed to distinguish between the acceleration data from individuals with and without knee OA using the features from the frequency domain of the signals as well as the participant's age, sex, and BMI. The model's accuracy was estimated by 10-fold cross-validation.
Results: We could demonstrate that the frequency contents of the signals were different between the two groups. The average accuracy of classifying the gait signals using the frequency features was 0.91 ± 0.01. In addition, the distribution of the selected features in the final model differed between patients with different severity of knee OA.
Interpretation / Conclusion: In conclusion, using logistic LASSO regression on the Fourier representation of acceleration signals can accurately determine the presence of knee OA. The features in the model were also different between patients with different severity of knee OA.

149. Inducible micromotion during step-up test evaluated in stabile and continuous migrating medial unicompartmental knee arthroplasties. A dynamic and static RSA study with minimum 5 years follow-up.

Jonathan Hugo Jürgens-Lahnstein, Emil Toft Petersen, Tobias Dahl Vind, Søren Rytter, Maiken Stilling

1. Department of Orthopaedics, Aarhus University Hospital
2. AutoRSA Research Group, Aarhus University Hospital

Background: Static radiostereometric analysis (static RSA) is a method to evaluate knee prosthesis stability post-operatively by use of several RSA images obtained over a minimum of 2 years. Based on MTPM migration from 1 to 2 years follow-up knee prostheses can be classified as stable or continuous migrating. Dynamic radiostereometric analysis (dynamic RSA) records the inducible displacement of a loaded knee prosthesis during a single step- up examination. The predictive power of inducible displacement on knee prosthesis revision surgery is unknown.
Aim: Investigate the association of inducible displacement (dynamic RSA) and continuous migration (static RSA) of medial unicompartmental knee arthroplasty (UKA).
Materials and Methods: 55 patients with a medial UKA and static unloaded RSA follow-up to either 2 years or 5 years follow-up (n=8 at 2 years, n=47 at 5 years) were examined with dynamic RSA during a step-up test in addition to standing Hip-Knee-Ankle radiographs (for the mechanical loading axis) and static RSA. Patients with tibial component static RSA migration between 1 and 2 years above 0.2mm MTPM were classified as continuous migrators. For both static and dynamic RSA we recorded translations and rotations along all 3 axis (x, y, z) as well as total translation (TT) and MTPM (implant coordinate system).
Results: 10 patients had UKA tibial components that were classified with continuous migration. The UKA tibial components showed a pattern of inducible displacement during the stand phase of the examination with subsidence of -0.04 mm (95% CI -0.06; -0.01) for stable implants and of -0.08 mm (95%CI -0.16; 0.00) for continuous migrating. The mean TT during the stand phase of the examination was 0.02 mm (95%CI:0.00; 0.05) for stable implants and 0.07 mm (95%CI -0.01; 0.13) for continuous migrating. Varus and valgus alignment of the knee did not influence the inducible displacement pattern of the tibial component UKA ($p>0.05$).
Interpretation / Conclusion: We did not find a statistically significant inducible displacement difference of tibial components in UKA classified as stable or continuous migrators on static RSA. UKA inducible migration for prediction of later revision should be investigated in larger studies.

150. The knee arthroplasty usage profile of orthopaedic surgeons and the association with patient-reported outcome: A cohort study of 2045 patients

Julie Kristine Steen Møller[1], Kristine Ifigenia Bunyoz[1], Cecilie Henkel[1], Christian Bredgaard Jensen[1], Kirill Gromov[1], Anders Troelsen[1]

1. Clinical Orthopaedic Research Hvidovre (CORH), Department of Orthopaedic Surgery, Copenhagen University Hospital Hvidovre, Kettegård Alle 30, 2650 Hvidovre, Copenhagen, Denmark

Background: It has been shown that a usage rate of medial unicompartmental knee arthroplasty (UKA) of more than 20% is associated with low revisions rates. Also, medial UKA have been shown to have superior patient-reported outcomes measures (PROMs) compared with total knee arthroplasty (TKA).
Aim: As it remains unknown how differences in knee arthroplasty usage profile (the mix of total and unicompartmental surgeries) of the orthopaedic surgeons relates to the PROM improvements of all treated knee osteoarthritis patients we aimed to investigate this.
Materials and Methods: We included 2045 patients who had primary knee arthroplasty between August 2016 and August 2021 with min. 1 year follow-up. The Oxford Knee Score (OKS), the Forgotten Joint Score (FJS) and the Activity and Participation Questionnaire (APQ) were assessed pre- and postoperatively at 3 and 12 months. Arthroplasty usage profiles were defined based on the yearly surgeries performed by the surgeons: 1) only TKA, 2) TKA +<20% medial UKA, 3) TKA +>20% medial UKA, and 4) TKA +>20% medial UKA + lateral UKA + patellofemoral UKA. Changes in mean PROM scores were calculated and linear regression models were used to calculate crude estimates and estimates adjusted for sex, age, BMI, and preoperative PROM score.
Results: Both profile 3 and 4 had a higher change in mean score in OKS, FJS, and APQ at 3 and 12-month follow-up compared to profile 1. In the 12-month adjusted analysis profile 4 had 1.6 points (CI 0.63- 2.6) higher OKS change, 7.1 points (CI 4.0-10.2) higher FJS change, and 7.2 points (CI 3.5-10.6) higher APQ change than profile 1. There were no significant differences between profile 1 and 2 at any follow-up. Nor were there significant differences between type 3 and 4. Percentage of patients who obtained an excellent OKS (OKS>41) was 41.8% for profile 3+4 versus 32.4% for profile 1+2 ($p<0.001$).
Interpretation / Conclusion: These findings suggest that an orthopaedic surgeon performing >20% medial UKAs results in a higher postoperative change in mean PROM score among all treated knee osteoarthritis patients. Together with previously established benefits of medial UKA our findings further support that knee arthroplasty surgeons should integrate medial UKA in their practices.

151. KKR 2023: The usage of patella resurfacing in total knee replacement (TKA)

Mikkel Rathsach Andersen[1], Julie Ringstrøm Brandt[2], Ann Ganestam[3].

1. Gentofte Hospital 2. Sygehus Lillbælt/DSHK. 3. Hvidovre Hospital/DSHK

Background: The usage of patella resurfacing in total knee replacement (TKA) is optional and the two methods are considered equals. In Denmark in 2020 71.8 % of total knee replacement was made with patella resurfacing. The high percentage of resurfacing reflects the assumption that the revision rate due to anterior knee pain is higher with the patella not resurfaced. DSHK (Danish society of hip and knee arthroplasty) therefore decided to assess the literature and make recommendations in a short clinical guideline (KKR).
Aim: To investigate if patella resurfacing in primary TKA has better results concerning short and long term follow up revision rate, patient reported outcome and pain score, than non-resurfaced primary TKA.
Materials and methods: Two meta-analysis was found, publiced in 2021 and 2023. Both included the same 30 RCT studys and no further RCT studys has been publiced since. AMSTAR II critical appraisal tool was used to assess the quality of the meta-analysis. GRADE assessment was used to evaluate the strength of evidence for the relevant outcomes.
Interpretation/Conclusion: This KKR is a weak recommendation towards using patella resurfacing in TKA due to a significant lower revision rate after 5 years follow up.

POSTERS

15 November 2023
17:00 - 18:00

Poster Walk 1: Trauma

Poster Walk 2: Experimental and Innovation

Poster Walk 3: Foot / Ankle

Poster Walk 4: Upper Extremity

Poster Walk 5: Hip and Knee Arthroplasty

Poster Walk 6: Sports Orthopaedics

Poster Walk 7: Spine and Tumor

Poster Walk 8: Paediatric Orthopaedics

POSTER WALK 1: TRAUMA

15 November 2023

17:00 – 18:00

Chairs: Christian Cavallius and Ole Brink

199. Does bicycle helmets protect against head injuries in all road traffic accidents involving motorized counterparts?

Lars Binderup Larsen[1,2], Rikke Rysgaard[1], Henriette Thorlacius-Ussing[1]

1. Danish Road Traffic Accident Investigation Board, Copenhagen, Denmark Havarikommissionen for Vejtrafik Ulykker, HVU
2. Accident Analysis Group, Odense, Denmark

Background: Head injuries are frequent in road traffic accidents involving cyclists and use of a bicycle helmet has been recommended to reduce the risk for these injuries. Several studies have shown good protective good overall effect.
Aim: • To assess in which accidents helmet use reduce head injury. • Can potentially use of helmets reduce head injuries for those cyclists not wearing a helmet? • To assess the role of helmet use for those who escaped head injury.
Materials and Methods: The AIB is a multi-disciplinary group that makes in-depth analyses of frequent and severe road traffic accidents. Analyses are based on a comprehensive collection of data and information. Information regarding the injuries is collected from medical recordings and data from autopsy. Injuries are classified according to AIS. For this study data regarding bicyclists involved in accidents in the period 2005 to 2021 were included.
Results: The study included 56 bicyclists with head injury and 35 bicyclists without head injury. The use of a helmet had not been effective against severe or fatal head injury in 8 out of 17. This was mainly due to the speed of the other part or the fact that the cyclists had been run over by a heavy vehicle. The use of a bicycle helmet would have been able to reduce head injuries in 20 out of 38 cyclists who did not use a helmet. 35 cyclists had no head injuries. In only 2 cases the helmet was the reason for that, while there was a large number where helmet use had not been important due to the lack of impact on the head.
Interpretation / Conclusion: In some accidents, there have been such great forces in the accidents that helmets have not had enough protective effect. It was most frequent due to high speed of vehicle, or the cyclist being run over by a heavy vehicle. To avoid accidents with severe and fatal head injuries with these factors, measures other than increased helmet use is required. However, in several accidents a positive effect of the helmets was recorded. There is still great potential in reducing head injuries through increased use of helmets.

201. Posttraumatic arthritis and functional outcomes after nonoperatively treated distal radius fractures: A prospective study with a minimum 3-year follow-up

Rikke Thorninger[1,2], Karen Romme[1], Daniel Wæver[3], Martin Bille Henriksen[1], Michael Tjørnild[1], Martin Lind [2,3], Jan Duedal Rölfing [2,3]

1. Department of Orthopaedics, Regional Hospital Randers, Randers, Denmark
2. Department of Clinical Medicine, HEALTH, Aarhus University, Aarhus, Denmark
3. Department of Orthopaedics, Aarhus University Hospital, Aarhus, Denmark

Background: Recent studies have shown that distal radius fractures (DRFs) in elderly patients can be treated non-operatively with good functional results after 1 year. However, scientific evidence regarding longer follow-up to assess post- traumatic arthritis (PA), complications, and functional outcomes is scarce.
Aim: This prospective case series aimed to evaluate these outcomes in a cohort of 50 patients (≥ 65 years old) with non-operatively treated DRFs, according to National Clinical Guidelines, after a minimum of 3 years.
Materials and Methods: The cohort of 50 patients also served as a control group in a prior published RCT study. The primary outcome was PA. Secondary outcomes were complications, Quick Disabilities of the Arm, Shoulder and Hand Outcome Measure (QuickDASH), Patient-Rated Wrist/Hand Evaluation (PRWHE), pain, range of motion and grip strength.
Results: Initially 50 patients were enrolled. Of these 50 patients 9 had died, 3 could not be reached, and 3 withdrew their consent to participate in the 3- year follow-up. Another 3 patients did not show up and further attempts to reach the patients by telephone were unsuccessful. Full data of 32 patients with a mean follow-up of 3.3 years were available: 10/32 patients had radiological signs of PA, but only 3 of these patients reported pain. A total of 11/32 fractures healed in mal-union (> 10° dorsal angulation). There was no significant difference in QuickDASH or PRWHE from 1 year to the latest follow-up.
Interpretation / Conclusion: This study thus adds to the literature stating that radiological signs, including PA and mal- union, do not necessarily result in symptoms. Moreover, it underpins that non-operative treatment of these patients results in good functional outcomes after 1 and 3 years.

203. Prevalence of monoclonal gammopathy in patients with hip fracture

Martin Aasbrenn[1,2], Luana Sandoval Castillo[1], Thomas Giver Jensen[3], Morten Tange Kristensen[2,4], Troels Haxholdt Lunn[2,5], Eckart Pressel[1,2], Henrik Palm[2,3], Søren Overgaard[2,3], Anette Ekmann[1], Charlotte Suetta[1,2],

1. Dept. of Geriatric and Palliative Medicine, Copenhagen University Hospital Bispebjerg-Frederiksberg;
2. University of Copenhagen, Department of Clinical Medicine, Faculty of Health and Medical Science
3. Dept. of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital Bispebjerg-Frederiksberg
4. Dept. of Physical and Occupational Therapy, Copenhagen University Hospital Bispebjerg-Frederiksberg
5. Dept. of Anaesthesia and Intensive Care, Copenhagen University Hospital Bispebjerg-Frederiksberg
6. Copenhagen University Hospital Herlev and Gentofte, Department of Internal Medicine

Background: Monoclonal gammopathy of undetermined significance (MGUS) is a premalignant plasma-cell disorder that can progress to multiple myeloma. MGUS is associated with increased risk of vertebral fractures but evidence regarding the association between monoclonal gammopathy and hip fractures is limited.
Aim: We aimed to examine the prevalence of MGUS among patients aged ≥65 years surgically treated for hip fractures.
Materials and Methods: Older patients (≥65 years) surgically treated for a hip fracture at Copenhagen University Hospital Bispebjerg and Frederiksberg in 2021 and living in Denmark were included in the study. Blood tests during admission were analysed for a monoclonal immunoglobulin.
Results: In total, 375 patients were surgically treated for a hip fracture, out of these 218 (58%) were screened for MGUS. A monoclonal immunoglobulin was present in 26/218 (12%) of the screened patients. The isotype was IgG (17), IgM (7) and IgA (2), respectively. The concentration of the monoclonal immunoglobulin was above 2.0 g per deciliter in 5/26 (19%). In patients aged under 80 years, a monoclonal immunoglobulin was present in 8/93 (9%); whereas the prevalence was 11/85 (13%) in patients aged 80-89 years,and 7/40 (18%) in patients aged 90 years or older. The 1-year mortality in patients with a monoclonal immunoglobulin was 9/26 (35%) versus 38/192 (19%) in those without, P = 0.12.
Interpretation / Conclusion: The present data show that monoclonal gammopathy is relatively common among patients with hip fractures and that the 1-year mortality is high in these patients. However, further research is needed to better understand this relationship, and the clinical utility of screening remains unknown.

204. Tibial Plateau Fractures and postoperative weight bearing

Andreas Saine Granlund[1], Arvind von Keudell[1,2]

1. Department of Orthopaedics, Bispebjerg Hospital
2. Department of Orthopaedics, Harvard Medical School, Boston

Background: The optimal postoperative weight bearing regimen for uni- or bicondylar tibial plateau fractures remains a topic of debate. Traditionally, non- or touch down- weight bearing for at least 10-12 weeks with early range of motion is recommended, however more recent studies suggest that early weight bearing may not result in any loss of reduction or hardware failure.
Aim: This study aims to compare orthopedic trauma surgeons' preferences for postoperative regimens and the factors that influence their decision-making in relation to weight bearing status after tibial plateau fractures.
Materials and Methods: The survey was presented during the 2023 annual meeting for Danish Orthopedic trauma surgeons (DOT). Participants were asked questions related to surgical technique, the timing of weight bearing after osteosynthesis and factors that influenced the surgeon's decision-making process for 3 unicondylar and 3 bicondylar tibial plateau fractures.
Results: 79 out of 114 attending the annual DOT meeting answered our survey. 90% of respondents were Danish, 83% were men and around 50% of respondents treated > seven tibial plateau fractures per year. After surgery 25,5% of the respondents recommended non-weight bearing, 31,5% touch down weight bearing, 21,5 % partial weight bearing and 20,5% recommended full weight bearing respectively. 82% of the surgeons stated that the sense of stability in their own construction affects their postoperative weight bearing plan and in 51% the regimen was based on “gut feeling”. Responders believed they get absolute stability in only 59% of their own fixations and 50% responded do not believe patients are following the postoperative weight bearing plan.
Interpretation / Conclusion: Our survey study demonstrated wide variability among Danish surgeons regarding postoperative weight bearing in tibial plateau fractures. Interestingly only 59% of the surveyed felt they obtained absolute fixation treating tibial plateau fractures and over 80% believed that their presumed fixation construct affects weight- bearing status rather than following the AO recommendations. Further research is required to understand the stability of tibial plateau fractures and quantify whether we can allow patients to weight bear earlier.

205. Implementation of Cemented Hemiarthroplasty (HA) in Patients with Acute Femoral Neck Fracture. A Comparative Cohort Study

Jonas Hammershøy[1], Charlotte Densing Petersen[1], Marlene Dyrløv Madsen[2], Doris Østergaard[2,4], Klaus Nymark Andersen[2], Torben Beck[2], Thomas Giver Jensen[2], Troels H. Lunn[1,3,4], Henrik Palm[1,4], Lene Viholt[1,3], Søren Overgaard[1,4]

1. Copenhagen University Hospital – Department of Orthopedic Surgery and Traumatology Bispebjerg and Frederiksberg, Copenhagen
2.Copenhagen Academy for Medical Education and Simulation (CAMES Herlev), Capital Region Copenhagen
3. Department of Anesthesia and Intensive Care 4. Dept og Clinical Medicine, University of Copenhagen, Copenhagen, Denmark

Background: We introduced cemented HA as a new routine for treatment of patients with a femoral neck fracture (FNF). This is in accordance with the national Danish guideline. The implementation was preceded by an education strategy based on interviews and teaching sessions
Aim: To investigate and compare peri- and postoperative complications after the introduction of cemented HA to cementless in a general orthopedic department
Materials and Methods: We reviewed patient files of those who received a HA from July 2022 – February 2023. 3 HA brands were used. The change was from the uncemented Corail to the cemented Lubinus SPII stem with a unipolar modular head or some C- stems. During the period trauma surgeons have been supervised as needed. Perioperative complication (fissure, fracture, death), and postoperative complications (dislocation, infection, reoperation, death during admission) were identified
Results: A total of 93 HA'ies were performed on 33 males and 60 females from July 2022 to February 2023. During the period 50 cemented Lubinus SPII, 31 uncemented CORAIL, and 12 cemented C-stems were performed by 9 trauma and 6 reconstruction surgeons. Mean operation time was 88 min (95% CI 82-95) for Lubinus, 77 min (85-69) for CORAIL, 76 (86-66) min for C-stem. Perioperative complications: Lubinus: 1 fissure and 2 fractures (all wired), and 1 death. CORAIL: 3 fissures and 1 fracture (all wired), but 0 deaths. C-stem: no complications. Postoperative complications: Lubinus SPII were 1 dislocation which was reoperated, 0 infections, 2 deaths during hospital stay. CORAIL: 1 dislocation, 1 infection, 0 reoperations, 3 deaths during hospital stay. C-stem: 3 dislocations (2 reoperated), 0 infections, and 2 deaths during hospital stay
Interpretation / Conclusion: During this implementation period including the learning curve we observed some perioperative but a few postoperative complications with the newly introduced cemented HA stem (Lubinus). There seems to be even fewer complications as expected from earlier studies. We believe that by a well-planned introduction and implementation of a new surgical procedure we have so far achieved rather few complications

208. Morel-Lavallée lesions of the knee and lower leg case series and their subsequent surgical management

Anton Alexander Nolte Peterlin[1], Hans Gottlieb[1], Andreas Ibrahim Jørgensen[1]

1. Department of Orthopedics, Herlev and Gentofte Hospital

Background: Morel-Lavallée lesion (MLL) is a posttraumatic soft tissue degloving injury, resulting from direct or tangential shearing forces hereby separating skin and subcutaneous tissues from the underlying fascia. A cavity characteristically containing hemolymphatic and serosanguinous fluid develops, and over time consolidates with an organized pseudocapsule. In contrast to the frequency of traumatic injuries, MLLs are uncommon, difficult to diagnose, and complicated to treat. Current literature around MLL management is based on lesions around the hip and trochanter region, with no previous studies reporting a uniform surgical management strategy for lesions over the knee and lower extremity.
Aim: To present an innovative treatment method for lower leg MLLs with subsequent negative pressure wound therapy (NPWT).
Materials and Methods: Case series, over one year two females and one male with lower leg MLL, all with similar trauma mechanisms with a direct and shearing force to the knee and or lower leg. Two involved motor vehicles and all had clinical presentations with painful and persistent lesions. Magnetic resonance imaging and ultrasound were the determining diagnostic modalities. Operative treatment included uniform surgical debridement while preserving dermal vascularity, capsulectomy, and partial wound closure using black foam (NPWT) to minimize fluid buildup and reformation of the lesion. Finally, the foam was retracted over 2 revisions in out-patient clinic.
Results: All had one effective operative debridement, hospitalized less than 5 days, had 2 NPWT changes, and treatment ending within 2-3 weeks. At their 12-month follow-up all were symptom free. Decreased cutaneous sensation around the lesion, which was present in 2 of the 3 patients prior to surgery was the only complication.
Interpretation / Conclusion: Morel-Lavallée lesions of the lower leg and knee are sparsely reported in literature, making the disease difficult to diagnose and treat. In our case series we reported an easy to manage diagnostic routine as well as a novel surgical treatment which included debridement, capsulectomy and secondary management with NPWT in an out-patient setting. The operative methods resulted in excellent healing results with pain free motion.

209. Myth-busting peripheral nerve blocks

Alex Jørgen Romanowski, Hessel Andersen Jakob [1], Peter Toquer[2], Rikke Malene H. Grønholm Jepsen[1]

1. Department of Anaesthesiology, Zealand University Hospital
2. Department of Orthopaedic Surgery, Zealand University Hospital

Background: The use of peripheral nerve blocks (PNB) is associated with better outcomes for patients compared to general anesthesia. However, some surgeons are reluctant to use PNB due to the risk of adverse events, especially for patients in high risk of developing acute compartment syndrome (ACS) due to concerns that PNB will mask ischemia symptoms. This review is based on the latest literature and international guidelines available on PubMed.
Aim: The purpose was to investigate the risks of applying PNB.
Materials and Methods: The review is based on systematic searches in PubMed using PRISMA 2020 guidelines. Included articles investigated the use of PNB without concomitant use of spinal or epidural anesthesia. Articles in Danish or English, from 2012 onwards were included. Thirty articles were selected, due to a limit on references when publishing a review in The Journal of the Danish Medical Association.
Results: Nerve damage from PNB can be divided into chemical, vascular, inflammatory, and systemic damage. The incidence of nerve damage is low and often transient. Anesthetic literature generally concludes that low dose PNB blocks postoperative pain, but not ischemic pain related to ACS. Anesthetic literature regards low dose PNB, even in high- risk procedures, to be safe with sufficient post- operative observation of ACS symptoms. The use of low dose PNB is supported in the rather scarce number of case reports published on patients with PNB developing ACS and experiencing break-through pain. Some of these reports seems to be interpreted differently, depending on the publishing journal/guideline being orthopedic or anesthesiologic. The most recent American orthopedic guideline does not - as opposed to previous versions being against - conclude anything on the use of PNB.
Interpretation / Conclusion: The risk of adverse events associated with the use of PNB is low. Low dose PNB is considered safe by anesthesiologists and is no longer discouraged in orthopedic guidelines. However, as the evidence level is low, there is a need for more research to inform the interdisciplinary discussion between orthopedic surgeons and anesthesiologists on the risk of using PNB in patients at risk of developing ACS.

210. Morel-Lavallée Lesion

Markus Gadeberg[1], Adam Witten[1], Lisbet Hölmich[2], Jan Duedal Rölfing[3], Per Hölmich[1], Kristoffer Weisskirchner Barfod[1],

1. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopaedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Denmark
2. Department of Plastic Surgery, Copenhagen University Hospital, Herlev-Gentofte, Denmark
3. Department of Orthopaedics, Aarhus University Hospital, Denmark

Background: Morel-Lavallée lesion (MLL) is a closed degloving injury caused by traumatic sheering of subcutaneous tissue from the underlying fascia. The lesion typically occurs in high-energy traumas but may also occur in low-energy traumas in sports (most often cycling, football, and American football). It is estimated that the diagnosis is missed in upwards of one-third of patients in the acute stage.
Aim: To present an overview of MLL and propose a treatment algorithm.
Materials and Methods: In this narrative review, Pubmed was searched for original studies from inception to 13-09- 2022 using the term “Morel-Lavallée”. 264 studies were identified.
Results: MLL can be divided into acute (<3 weeks) and chronic (>3 months or verified capsule formation). Treatment revolves around minimizing fluid and necrotic tissue and creating persistent contact between cavity walls. Treatment includes compression, percutaneous aspiration, sclerodesis and surgery. Surgical treatment is recommended for acute MLL with infection, avascular skin, or underlying fractures, and for chronic MLL with inadequate response to non-surgical treatment or chronic MLL with capsule formation. There are many surgical options, that can be applied stepwise depending on the treatment response. Suction curettage is the first-choice surgical approach for both acute and chronic MLL. Surgical drainage and open debridement are other surgical options. Vacuum Assisted Closure (VAC) can be used as adjunct to surgical treatment. Postoperative treatment should consist of compression and low-suction drainage. MRI and ultrasound can be used to verify the diagnosis and to monitor treatment progress if multiple interventions are needed.
Interpretation / Conclusion: Morel-Lavallée lesion (MLL) is a rare painful condition, but is probably significantly underdiagnosed, especially in the acute phase. Surgery should be reserved for complicated cases and chronic cases with insufficient response to non-surgical treatment. The literature primarily consists of heterogenous case-series and cohort studies, why further research is warranted.

212. Patient safety after surgical treatment of distal femoral fractures with locking plates. A retrospective single-center cohort study.

Fatma Kandela[1], Adalet Corap[1], Yasemin Corap[1], Michael Brix[1], Bjarke Viberg[1], Martin Lindberg-Larsen[1]

1. Orthopaedic Research Unit, Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Department of Clinical Research, University of Southern Denmark

Background: Studies investigating patient safety in terms of postoperative complications and readmissions after treatment of distal femoral fractures are very limited. The one-year mortality after operative treated native distal femoral fractures has been reported between 2 to 37%.
Aim: To evaluate the risk of in-hospital complications, readmissions and mortality after surgical treatment of distal femoral fractures using locking plates.
Materials and Methods: We retrospectively identified 263 patients by procedure codes (KNFJ64, KNFJ65, KNFJ84, KNFJ85) and diagnosis codes (DS723, DS724, DS728, DS729) in a single institution from 2011 to 2022. Out of 263 patients, 162 patients were treated for a distal femoral fracture with a locking compression plate (LCP). Indications for surgery were native distal femoral fracture (n=117) and periprosthetic femoral fractures (n=45).
Results: Out of the 162 eligible patients, 77% were females and the population had a median age of 76 years. Most (73.5%) of the patients were living in their own homes and 19.1% of the patients were living in nursing homes. The median length of stay (LOS) was 7 days (range 1-46 days) and in 28.4% (n=46) of cases an in-hospital complication was observed. The most frequent in-hospital complications were urinary tract infections (n=17), and anemia or electrolyte imbalances (n=7). The median time from diagnosis to operation was 42 hours (range 5-411 hours). The 90-day readmission risk was 24.2% and the most frequent causes were infections in the treated area (n=9) and pneumonia (n=5). 5 patients were readmitted more than one time. The most serious complications observed within 90 days were cardiovascular complications (n=3) and pneumonia (n=5). The 1-year mortality was 18.8%.
Interpretation / Conclusion: We found high rates of in-hospital complications, readmissions and mortality after surgical treatment of distal femoral fractures using locking plates. These results indicate room for improvement in the perioperative set-up when treating these at-risk patients.

215. Cost-effectiveness analysis of operative versus nonoperative management of humeral shaft fractures in Denmark

Sara Woldu[1], Alexander Farid[2], Tynan H. Friend[3], Henrik Palm[1], Arvind Von Keudell[1,2]

1. Copenhagen University Hospital, Bispebjerg and Frederiskberg Department of Orthopaedic Surgery and Traumatology Section for Sports Traumatology Institute of Sports Medicine Copenhagen
2. Department of Orthopaedic Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA.
3. Center for Surgery and Public Health, Department of Surgery, Brigham and Women's Hospital, Boston, MA, USA.

Background: Humeral shaft fractures can be managed operatively with open reduction–internal fixation (ORIF) or intramedullary nailing (IMN) or nonoperatively with functional bracing. A consensus on optimal management has not been reached. Surgical advances have made operative treatment increasingly attractive, particularly given the shorter time to union, decreased nonunion rate, and earlier mobility.
Aim: Cost-effectiveness has increasingly become a consideration in the management of orthopedic injuries. The aim of this study is to compare the cost- effectiveness of operative versus nonoperative management of humeral shaft fracture in a Danish context.
Materials and Methods: A decision tree model for treatment options were developed. We used DRG fees from the Danish Health Data Authority and expert opinion based on total surgical costs acquired from our institution to determine all relevant hospitalization costs. We obtained the costs of antibiotics from promedicin.dk. The average wages and weeks missed were obtained from Statistics Denmark and the existing literature. The Disabilities of the Arm, Shoulder, and Hand (DASH) scores were also extracted from existing literature. An economic evaluation was conducted to investigate the cost-effectiveness of each treatment option by use of rollback analysis and Monte Carlo simulation. The results are presented in DKK per meaningful change in DASH score. The Willingness- to-Pay (WTP) threshold was set at DKK300.000 per meaningful change in DASH score (10 points).
Results: Operative treatment is the preferred treatment strategy; it is both more effective and less costly to the patient at 6 months and 1-year follow-up when including lost wages compared to non-operative treatment. The sensitivity analyses show that even when non-operative success is changed to 100%, 6 months and 1-year follow-up with wages still favor operative intervention. Nonoperative treatment is only more cost-effective than operative treatment at or above 96.4% union rate at 1 year follow up not including wage loss.
Interpretation / Conclusion: Operative management is cost-effective at both 6 months and 1 year, compared to non-operative treatment when including wage loss. Level of Evidence: Economic and Decision Analysis Level II

211. Treatment of distal radius fractures in the elderly: a call for national consensus and updated Danish guidelines

Marcus Landgren[1,3], Rasmus Wejnold Jørgensen [2], Robert Gvozdenovic[1,3], Stig Jørring[1], Lars Soelberg Vadstrup[1,4]

1. Dept. of Orthopedic Surgery, Hand Surgery Unit, Copenhagen University Hospital Herlev and Gentofte
2. Dept. of Orthopedic Surgery, Trauma Unit, Copenhagen University Hospital Herlev and Gentofte, Herlev
3. University of Copenhagen, Faculty of Health and Medical Sciences, Institute of Clinical Medicine, Copenhagen, Denmark
4. President, Danish Society for Surgery of the Hand

Background: Treatment of distal radius fractures (DRF) in Denmark has been in accordance with the Danish National Clinical Guidelines (DNCG) on treatment of DRF since published in 2014 (2017). Increasing diversity in interpretation of the emerging evidence on treatment of elderly with DRF amongst orthopedic and hand surgeons has arisen. Most publications on non- surgical vs. surgical treatment have been on patients older than 65 years. Using age as a proxy for function and recommending patients non-surgical treatment merely based on age, is age discrimination, a potential risk of undertreatment, and could result in increased costs if domestic care or corrective surgery is needed.
Aim: We aimed to review the local guidelines in Denmark to investigate if they differed from the DNCG.
Materials and Methods: A review of the hospital guidelines using search words “distal radius fraktur” was performed by searching the intra- and internet from the five different regions in Denmark. Local guidelines were searched in VIP-instruks in the Capital Region of Denmark, the Region Sjællands Dokumentportal in Region Zealand, the Infonet in Region of South Denmark, the e-dok in Central Denmark Region, and the pri in North Denmark Region. The guidelines were reviewed for treatment recommendations for elderly patients.
Results: In total, we found 15 different local hospital guidelines from all 5 Danish regions regarding treatment for DRF. Most guidelines were in accordance with the DNCG for treatment of DRF, in which age is not considered a contraindication for surgical treatment. Amongst the local guidelines, only Zealand University Hospital used age as a strict cut-off for surgical treatment (age >60 years), non- surgical treatment was recommended regardless of the severity of the displacement. Four other hospitals considered age, function, and comorbidity when recommending treatment.
Interpretation / Conclusion: As of 2023, the DNCG are no longer applicable, an increasing diversity in treatment based on geographical differences is troubling. Treatment guidelines for this common injury should be similar nationwide. Hand and orthopedic surgeons should seek not to divide, but to unify. A Short Clinical Guideline in the treatment of elderly with a DRF is warranted.

167. Implementation of Oral Versus Intravenous Antibiotics (OVIVA) into clinical practice at the Orthopedic Department, Herlev University Hospital

Robin Bawer[1], Jakob Bak[1], Hans Gottlieb[1]

1. Department of Orthopaedic Surgery, Herlev University Hospital

Background: In the treatment of bone and joint infections (BJIs), The Oral Versus Intravenous Antibiotics (OVIVA) trail demonstrated that a switch to oral antibiotic therapy after 1 week of initial intravenous antibiotics therapy was noninferior to a switch after 2 or more weeks of intravenous antibiotic therapy.
Aim: Following the OVIVA trail it was decided to implement the trail findings into clinical practice combined with a one-stage surgery setup. This postimplementation study presents our clinical experience with implementing the OVIVA setup allowing for comparison.
Materials and Methods: All patients surgically treated for BJIs between Sep. 2019 and Sep. 2020 were included. Patients were followed with physician consultations 1 and 8 weeks after discharge, a telephone consultation after 6 months and electronic patients journals were reviewed after 1 year. Data was collected on demographic information, type and length of antibiotic regime, switches from intravenous to oral antibiotic therapy, length of stay, microbiological findings, adverse drug reactions, complications and clinical outcome including treatment failure. We compared our results with the OVIVA trail and a study that has demonstrated the reproducibility of the trail findings in a real-world setting.
Results: A total 129 patients were included in the study. 98.4% of the patients (127 out of 129) were switched to a suitable oral antibiotic regimen. The median value for the duration of intravenous antibiotic therapy before switching to an oral antibiotic regimen was 7 days. The most frequent type of oral antibiotic used was penicillins (67.7%). Only 1 patient was treated with oral rifampicin. Definite treatment failure for all patients following the one-stage surgery setup and antibiotic regimen according to the OVIVA trail at 1 year was 12.1% (15 out of 129). The group of patients who remained on intravenous antibiotic treatment after surgery (2 patients) had no failures.
Interpretation / Conclusion: Our experience with implementing the OVIVA trail findings are in concordance with the study that show their reproducibility. By applying one-stage surgery and the OVIVA setup we were able to safely implement the trail findings into clinical practice with sufficient results.

POSTER WALK 2: EXPERIMENTAL AND INNOVATION

15 November 2023

17:00-18:00

Chairs: Jan Duedal Rölfing and Mads Terndrup

152. Machine learning for image segmentation to measure bone volume of ectopic bone formation samples

Kristian Kjærgaard[1,2], Marjan Mansourvar[3], Ming Ding[1,2]

1. Orthopaedic Research Laboratory, Department of Clinical Research, University of Southern Denmark
2. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital.
3. The Maersk Mc-Kinney Moller Institute, University of Southern Denmark.

Background: Experimental bone research frequently generates large amounts of histology and histomorphometry data, and the analysis of these data is often lengthy and trivial. Machine learning provides a suitable alternative to manual analysis, provided that the researcher has access to the know-how and equipment needed.
Aim: To develop a neural network for image segmentation to measure total area of a given type of tissue (e.g. bone tissue), and to determine the accuracy of this network on ectopic bone formation samples.
Materials and Methods: Thirteen tissue slides (summing up to 114 megapixels) of ectopic bone formation were selected for model building. The dataset was splint into training/validation/test samples by proportions 62%/15%/23%. We developed a neural network resembling U-Net with 22,017,012 parameters that takes 512x512 pixel tiles. To improve model robustness, images were augmented with flip, transpose, scale, rotate, or elastic transformations; blur or noise filters; and adjustment of brightness, contrast, or gamma, or shift of RGB or HSV channel values. The network was trained for 3 days (200 epochs) on a NVidia Tesla K80 provided by a free online learning platform against a ground truth annotated by an experienced researcher.
Results: Training and validation loss stabilized (apart from a few drops in validation loss) and were above 95% from epoch 49 and onwards. The accuracy on the test dataset (external, independent dataset) was 96.12%.
Interpretation / Conclusion: Most experiments using ectopic bone formation will yield a between-group difference of significantly more than 4%, so the current approach may be a valid and feasible technique for automated image segmentation for large datasets as an alternative to manual analysis. More meticulously annotated ground truth (such as a consensus-based ground truth) may improve training stability and validation accuracy.

153. Training for technical or non-technical skills: an arbitrary distinction?

Lisa Beicker Salling[1,2,3], Maria Louise Gamborg[1,2], Jan Duedal Rölfing[1,2,3], Rune Dall Jensen[1,2]

1. Corporate HR, MidtSim, Central Denmark Region;
2. Department of Clinical Medicine, HEALTH, Aarhus University;
3. Department of Orthopaedics, Aarhus University Hospital.

Background: Medical education often aims to improve technical skills (TS) and thus patient safety and reduce adverse events. However, human factors have a huge impact on patient safety and has given rise to research into 'non-technical skills' (NTS). The two skill sets are often investigated independently, and little is known about how TS and NTS influence each other.
Aim: In this scoping review, we therefore aim to investigate the association between TS and NTS.
Materials and Methods: Scoping review of four databases in order to summarize, analyse, and collate findings from the included studies.
Results: In total, 192 of 2267 identified papers were included in the final analysis. The first article was published in 1991, but the majority of studies were published in the last decade. The majority were intervention studies including 39 randomized controlled trials. The most common validated assessment of TS was a the objective structured assessment of technical skills (OSATS), but many non-validated variations were used. Conversely, non-technical skills for sugeons (NOTSS) was the most used validated tool for assessing NTS. However, the majority of studies used non-validated self-assessment tools for NTS assessment. The correlation between TS and NTS was assessed in 43/192 studies with 86% of them finding a positive correlation.
Interpretation / Conclusion: Our results echoes previous literature suggesting that empirical literature investigating the interaction between TS and NTS are methodologically weak. In this review we only identified a small group (n =43) of studies investigating this correlation. However, the results strongly indicate a correlation between TS and NTS skills, meaning that improving NTS also improves TS, and thus the distinction between them in learning designs may be arbitrary. While this result is promising, the limited methodological rigour may indicate a lack of proper understanding of NTS and how to properly assess them.

154. Introducing the Centre for Evidence Based Orthopaedics (CEBO) model for implementation of evidence-based orthopaedic practice at a department level

Line Houkjær[1], Dennis Winge Hallager[1], Stig Brorson[1]

1. Centre for Evidence-Based Orthopaedics, Zealand University Hospital, Køge

Background: Effective implementation of evidence-based practice presupposes behavioural changes at both an individual and a collective level. Updating clinical knowledge is a major challenge for performing evidence-based practice. We propose a method to facilitate implementation of updated evidence in clinical decision-making at a department level.
Aim: We aimed to develop a structured and adaptable model for implementation of evidence-based practice in an orthopaedic department.
Materials and Methods: The CEBO model can be divided into four phases. In phase 1 the clinical question is defined and best evidence is compared with current practice. Leadership support is ensured and identification of barriers to change are identified. Phase 2 contains a symposium involving all stakeholders. The relevant high-quality literature identified in phase 1 is presented and discussed. Before closing the symposium, a decision on future practice is made. In phase 3 a local guideline is written and subsequently disseminated repeatedly to end-users. Behavioural designs to facilitate adherence to the guideline are considered. In phase 4 behavioural changes are evaluated by comparing clinical practice in a predefined period before and after the implementation of the local guideline.
Results: The CEBO model has been validated on two occasions. In both cases several barriers were identified and procedural changes to accommodate these were made. Both applications led to substantial changes in behaviour among orthopaedic surgeons in a Danish university hospital.
Interpretation / Conclusion: The CEBO model provides a structured way to align clinical practice with the best available evidence at a department level. We present the model in generic terms and invite fellow physicians to apply the model in cases where alignment of clinical practice to best evidence are warranted.

159. Intraoperative fluoroscopy in distal radius volar locking plate surgery: Exploring validity and setting standards using a novel virtual reality simulator

Marie Sønderup[1], Amandus Gustafsson[1, 2, 3], Kristoffer Borbjerg Hare[4, 5], Mads Emil Jacobsen[1, 2, 3]

1. Faculty of Health and Medical Sciences, University of Copenhagen
2. Center for Orthopaedic Research and Innovation (CORI), Department of Orthopaedics, Næstved, Slagelse, and Ringsted Hospitals
3. Copenhagen Academy for Medical Education and Simulation (CAMES), Rigshospitalet
4. Department of Orthopaedics, Odense University Hospital
5. Department of Regional Health Research, University of Southern Denmark

Background: Intraoperative fluoroscopy is an essential tool in distal radius volar locking plate surgery, and it requires expertise to obtain acceptable images. Fluoroscopy imaging is used to ensure accurate fracture reduction and appropriate implant positioning. Due to the complex bony anatomy of the distal radius, several fluoroscopy views are required. Virtual reality (VR) simulation offers a safe, radiation-free training and testing environment for this critical skill. However, it is fundamental to assess validity and reliability using a respected validity framework before implementing simulator training on a larger scale.
Aim: The aim of this study is to create a test of proficiency in intraoperative fluoroscopy control of a distal radius fracture fixated by a volar locking plate in a VR simulator. Further, we aim to explore validity evidence of this test using Messick's contemporary validity framework.
Materials and Methods: Two groups of physicians; novice interns/residents and experienced traumatologists/hand surgeons are invited to participate in the study. In two individual sessions, participants are asked to perform three repetitions of a VR simulator test in intraoperative fluoroscopic control of a distal radius fracture fixated with a volar locking plate. Automatically measured simulator metrics consist of the exact angles of the surgically treated upper limb for all images, as well as number of images taken and time to complete the procedure. Performance of the two groups will be compared by independent samples t-tests for all metrics . Test reliability will be explored by calculating an intra-class correlation coefficient. A pass/fail standard will be set using the mastery learning principle.
Results: Data collection is ongoing and will be completed by August 2022. Results will be presented at the congress.
Interpretation / Conclusion: This study will explore evidence of validity for a test on a VR simulator for training competence in intraoperative fluoroscopy control of a surgically treated distal radius fracture. The lack of formal, standardized training in this essential skill inherent to fracture surgery is a critical issue that VR simulation has the potential to address.

192. Identification of the most promising stem cell type from microfragmented adipose tissue for the treatment of osteoarthritis

Jasmin Bagge[1], Per Hölmich[1], Jan Nehlin[2], Kristoffer Weisskirchner Barfod[1]

1. Sports Orthopedic Research Center - Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital - Hvidovre, Denmark
2. Department of Clinical Research, Copenhagen University Hospital - Hvidovre, Denmark.

Background: Treatment of knee osteoarthritis (OA) with autologous stem cells from microfragmented adipose tissue (AT) has shown promising but varying results. Multiple stem cells have been identified in microfragmented AT, such as adventitial stem cells (CD31-/CD34+/CD45-/CD146-), pericytes (CD31-/CD34-/CD45-/CD146+), and CD271+ stem cells (CD31-/CD45-/CD271+). These subtypes have shown varying differentiation potential when derived from bone marrow. The patient-dependent heterogeneity of the stem cell population and content of highly potent cells may be determining factors for a successful outcome.
Aim: To identify the most promising stem cell type from microfragmented AT for the treatment of OA.
Materials and Methods: CD34+, CD146+, and CD271+ stem cells from microfragmented abdominal AT from 8 knee OA patients were separated by magnetic activated cell sorting (MACS) and analyzed as subtypes. Efficiency of sorting was measured by flow cytometry. Unsorted cells were used as a control. The immunomodulatory and beneficial secretomes of the cell subtypes, involved in the OA-healing processes, were investigated with and without an OA-simulated inflammatory environment (TNF-α and IL-1β) using Luminex. IL-10 secreting cells (anti- inflammatory) were identified using flow cytometry. The chondrogenic and osteogenic in vitro differentiation performance of the cells were assessed using quantitative Safranin-O staining, pellet size, and qPCR for chondrogenesis, and Alizarin Red S staining and qPCR for osteogenesis.
Results: CD34+, CD146+, and CD271+ stem cells can be successfully separated using MACS. A subset of the patient population has currently been analyzed. Most stem cells secreted anti- inflammatory IL-10, although there might be some differences between subtypes, particularly in response to OA-like spiking with TNF-α and IL-1β. Chondrogenic induced 3D pellets can be made. All the subtypes can undergo osteogenic differentiation.
Interpretation / Conclusion: The results open for selection of suitable OA patients with a high quantity of highly potent stem cells based on a small AT biopsy. Injection of the best stem cell type using recent cell sorting methods might improve stem cell therapy of OA in a personalized manner.

202. The Correlation between Electrical Impedance and Callus Quality. An In Vivo Study of Tibial Fractures in Rabbits

Maria Tirta[1], Markus Winther Frost[1], Ole Rahbek[1], Laura Amalie Rytoft[1], Ming Ding[2], Ming Shen[3], Kirsten Duch[4], Søren Kold[1]

1. Department of Orthopaedics, Aalborg University Hospital, Aalborg, Denmark
2. Department of Orthopaedic Surgery & Traumatology, Odense University Hospital, and Department of Clinical Research, University of Southern Denmark, Odense, Denmark
3. Department of Electronic Systems, Aalborg University, Denmark, Aalborg, Denmark
4. Unit of Clinical Biostatistics, Aalborg University Hospital, Aalborg, 9000, Denmark

Background: Healing after bone fracture is assessed by frequent radiographs, which expose patients to radiation and lacks behind biological healing.
Aim: This study aimed to investigate whether the electrical impedance using electrical impedance spectroscopy correlated to quantitative scores of bone healing obtained from micro-CT and mechanical bending test.
Materials and Methods: Eighteen rabbits were subjected to tibial fracture that was stabilized with external fixator. Two electrodes were positioned, one electrode placed within the medullary cavity and the other on the lateral cortex, both three millimeters from the fracture site. Impedance was measured daily across the fracture site at a frequency range of 5 Hz to 1 MHz. The animals were divided into three groups with different followup time: 1, 3 and 6 weeks for micro-CT (Bone volume/tissue volume (BV/TV, %)) and mechanical testing (maximum stress (MPa), failure energy (kJ/cm3), young modulus (Mpa)).
Results: There was a statistically significant correlation between last measured impedance at 5 Hz frequency immediately prior to euthanasia and BV/TV of callus (-0.68, 95%CI: (-0.87; -0.31)). Considering the mechanical testing with three-point bending, no significant correlation was found between last measured impedance at 5 Hz frequency immediately prior to euthanasia and maximum stress (-0.35, 95%CI: (-0.70; 0.14)), failure energy (-0.23, 95%CI: (-0.63; 0.26)), or young modulus (-0.28, 95%CI: (-0.66; 0.22))
Interpretation / Conclusion: The significant negative correlation between impedance and BV/TV might indicate that impedances correlate with the relative bone volume in the callus site. The lack of correlation between impedance and mechanical parameters when at the same time observing a correlation between impedance and days since operation (0-42 days), might indicate that the impedance can measure biological changes at an earlier time point than rough mechanical testing.

219. First experiences following establishment of a hospital-based 3D printing facility.

Christian Kveller[1], Anders M. Jakobsen[2], Nicoline Hjort Larsen[3], Joakim L. Lindhardt[2], Thomas Baad-Hansen[1]

1. Department of Orthopedics, Aarhus University Hospital
2. Department of Plastic and Breast Surgery, 3D Innovation, Aarhus University
3. Department of Dentistry, Section for Oral and Maxillofacial Surgery, Aarhus University

Background: 3D printing has gained increasing attention as the technology behind has improved. In 2018, a 3D printing center was established at Aarhus University Hospital, widening accessibility.
Aim: To identify the clinical impact and potential benefits of in-house 3D-printed objects through a questionnaire, focusing on three principal areas: (1) patient education; (2) interdisciplinary cooperation; (3) preoperative planning and perioperative execution.
Materials and Methods: Questionnaires were sent to every clinician who ordered a 3D-printed object from January 2021 to August 2022. On questions assessing the clinicians' experiences, participants were directed to rate on a scale from 1-10 – with 1 being 'none' and 10 being 'highly' influenced . One question asked the surveyed to rate from 1-10 – 1 being 'less invasive' and 10 being 'more invasive'.
Results: The response rate was 43%. A majority were affiliated with the Orthopedic or Maxillofacial Surgery Departments. 80% were senior specialists. The results of the rated questions are given as averages. 84% reported using 3D-printed objects in informing the patient about their condition/procedure. Clinician- reported improvement in patient understanding of their procedure/disease was 8.1. The importance of in-house placement was rated 9.2. 96% reported using the 3D model to confer with colleagues. Interdisciplinary cooperation was reported at 8.5. Delay in treatment due to 3D printing lead-time was 1.8. The degree with which preoperative planning was altered was 6.9. The improvement in clinician perceived preoperative confidence was 8.3. The alteration in intraoperative predictability was reported 7.2. The degree with which the scope of the procedure was affected, in regard to invasiveness, was 5.6, wherein a score of 5 is taken to mean unchanged. Reduction in surgical duration was rated 5.7.
Interpretation / Conclusion: Clinicians report the utilization of 3D printing in surgical specialties improves procedures pre- and intraoperatively, has a potential for increasing patient engagement and insight, and in-house location of a 3D printing center results in improved interdisciplinary cooperation and allows broader access with only minimal delay in treatment due to 3D printing lead-time.

168. From Hospital to Home, following a Lower Limb Amputation: A Focus Group Study of Healthcare Professionals views an experience.

Charlotte Abrahamsen[1,2], Ane Simony[1,2], Dorte Dall-Hansen[1], Sarah Køberl[1], Katja Schrøder[3], Chelina Evers[1], Hanne Vase[1]

1. Department of Orthopaedic Surgery, Lillebaelt Hospital Kolding, Denmark
2. Department of Regional Health Research, University of Southern, Denmark
3. IST, University of Southern, Denmark

Background: Major limb amputations is often associated with loss- a loss of a limb but also independence. Patients undergoing lower limb amputations are often patients with multiple comorbidities, requiring care from numerous healthcare professionals (HCP). It is a patient population with complex needs and limited surplus that might benefit from an integrated care model.
Aim: This study aims to explore Health Care Professionals views and experiences during the transition process from Hospital to Home after a lower limb amputation, using the Safe Journey integrated care program.
Materials and Methods: Two focus group interviews were conducted with 13 HCP's from a Danish Hospital and three surrounding Municipalities. Included in both groups were nurses, occupational therapists and one physiotherapists. The interview was based on the following 5 questions, and the data was analyzed based on Braun and Clarke´s reflexive thematic analysis. - Which advantages of the systematic cross-sectoral collaboration did you find? - Which disadvantages of the systematic cross-sectoral collaboration did you find? - What do you consider to be most important issues regarding patients transfer? - What do you consider to be most important issues regarding collaboration? - How can we ensure safety and continuity when working with patient transfer?
Results: Three themes were identified when analyzing the group interviews. - Becoming a team across sectors - Continuity of care as a driver of patients safety - Challenges in achieving safe transitions The Safe Journey integrated care program facilitated the construction of an interdisciplinary team and cross-sectoral communication and professional relations, increasing care continuity and patient's safety. However, HCP's experienced an increased workload, and The Safe Journey integrated care program was time consuming and required coordination and at- home patient's visits.
Interpretation / Conclusion: HCP's found the The Safe Journey integrated care model to be valuable for patients undergoing major lower limb amputation and promotive of cross-sectoral professional relations, communication, continuity and patient safety. However, the model was time- and resource consuming compared to conventional models.

POSTER WALK 3: FOOT / ANKLE

15 November 2023

17:00-18:00

Chairs: Louise Lau Simonsen and Kristian Behrndtz

155. Development and validation of the Copenhagen ankle Range of Motion (ROM) Scale

Saber Muthanna Saber [1,2], Ida Tryggedsson[1], Maj Britt Køhler Astow[1], Anne Marie Halmø Elholm[1], Kenneth Chukwuemeka Obionu[1], Michael Rindom Krogsgaard[1,2]

1. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg and Frederiksberg
2. University of Copenhagen, Department of Clinical Medicine, Faculty of Health and Medical Sciences

Background: Ankle plantarflexion (PF) and dorsiflexion (DF) are important for daily activities and sports, but both are reduced after injuries or with pathological conditions. Ankle range of motion (ROM) can be measured with a goniometer, but it would be advantageous if patients could self- report ROM without physical attendance
Aim: To develop a pictorial questionnaire that can be completed by patients to self-assess ankle ROM
Materials and Methods: Photos of ankles in various degrees of movement were presented to patients and the questionnaire was developed after their inputs. The reliability of patient reported ROM was compared to goniometer measurements performed by a registered nurse and a doctor and analyzed using weighted kappa, Bland- Altman plots and Interclass correlation coefficient (ICC) in agreement analysis. For correlation, we used Pearson correlation coefficient and density curves
Results: After the final version had been developed, 102 patients completed the pictorial questionnaire and had goniometer measurements of ankle ROM. The ICC for measurements by nurse and doctor was 0.77 (95% CI 0.67 to 0.84, P < 0.001) for PF, 0.67 (95% CI 0.54 to 0.76, P < 0.001) for DF with straight knee (DFSK) and 0.76 (95% CI 0.67 to 0.84, P < 0.001) for DF with flexed knee (DFFK). The agreement between patients' reported results and those calculated from mean of the values measured by observers showed a weighted kappa of 0.35 (P < 0.001) in PF, and 0.5 (P < 0.0001)) for DFSK, and 0.42 (P < 0.001) for DFFK. The Pearson correlation coefficient between patients' reported results and the mean goniometer measurements was 0.65 (95% CI 0.52 to 0.75, P < 0.001) for PF, 0.53 (95% CI 0.37 to 0.66, P < 0.001) for DFSK and 0.54 (95% CI 0.38 to 0.66, P < 0.001) for DFFK. The density curves showed obscured thresholds between the categories
Interpretation / Conclusion: The agreement of goniometer measurements between observers was moderate, and it was fair to moderate between patients' choice and the mean observed value. The correlation between patients' choice and goniometer measure was strong, but there were weak thresholds. Therefore, individual measurements by the CARS should be interpreted as rough indicates and the scale is best used for groups

156. “Just a bump in the road” - A grounded theory study on patients’ behaviour after referral to a wound care clinic with a diabetic foot ulcer

Thomas Aagaard[1,2,3], Søren Thorgaard Skou[4,5], Stig Brorson[3,6], Ulla Riis Madsen[2,7]

1. Department of Physiotherapy and Occupational Therapy, Holbaek Hospital 2. Department of Orthopaedic Surgery, Holbaek Hospital. 3. Department of Orthopaedic Surgery, Zealand University Hospital 4. The Research Unit PROgrez, Department of Physiotherapy and Occupational Therapy, Naestved-Slagelse-Ringsted Hospitals 5. Research Unit for Musculoskeletal Function and Physiotherapy, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark 6. Department of Clinical Medicine, University of Copenhagen 7. REHPA, Danish Knowledge Centre for Rehabilitation and Palliative Care, University of Southern Denmark, Odense, Denmark

Background: A diabetic foot ulcer (DFU) constitutes a substantial burden for patients and is one of the most serious complications of diabetes mellitus. Having a DFU often requires patients to refrain from bearing weight on the affected limb, leaving some patients immobile for weeks, months or even years. These requirements can lead to patients being unable to follow guidelines for diabetes, as physical activity is a core element in the rehabilitation and treatment of the disease. Previous research has indicated a gap in our understanding of life with a DFU and short- or long-term repercussions on everyday activities when living with the disorder. Closing this gap could help health professionals have a better understanding of patients’ behaviour when starting DFU treatment and potentially more successful treatment.
Aim: The aim of this study was to construct a grounded theory regarding patients’ activity behaviour over time after referral to an outpatient clinic for diabetic foot ulcer care.
Materials and Methods: A constructivist grounded theory approach was used. Data from observations of and interviews with 5 participants were collected and analysed using the constant comparative method. The grounded theory ‘Just a bump in the road’ was constructed based on this.
Results: Participants considered their ulcers as ‘Just a bump in the road’ in their lives. Four categories are embedded in this core category: Restricting my freedom; Trusting or doubting the system; Feeling no pain or illness and Receiving insufficient information. Together, these categories describe the participants’ behaviour and underlying concerns related to daily activities after referral to an outpatient clinic for the care of their diabetic ulcer.
Interpretation / Conclusion: The grounded theory ‘Just a bump in the road’ describes how participants with a diabetic foot ulcer viewed their condition as merely a passing phase that would end in them regaining what they considered a normal life. Integrating these results in clinical practice could lead to improved care and a focus shift among healthcare professionals from seeing patients as defined by their wounds to seeing them as people who live with a wound.

157. Feasibility of Blood Flow Restriction Exercise in adults suffering from an Achilles tendon rupture

Andreas Bentzen[1], Stian Langgård Jørgensen[2, 3], Per Hviid Gundtoft[1], Sara Birch[4], Louise Mortensen[5], Michael Godsvig Lindvig[6], Marianne Toft[7], Inger Mechlenburg[1]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark 2. Department of Occupational and Physical Therapy, Horsens Regional Hospital, Horsens, Denmark 3. H-HIP, Department of Occupational and Physical Therapy and Department of Orthopedic Surgery, Hor-sens Regional Hospital, Denmark 4. Department of Orthopaedic surgery, Gødstrup Regional Hospital, Herning 5. Department of Occupational and physical therapy, Aarhus University Hospital, Denmark 6. Emergency Department, Gødstrup Regional Hospital, Herning 7. Department of Orthopaedic Surgery, Viborg Regional Hospital, Viborg

Background: Achilles tendon rupture is a common injury followed by a prolonged period of immobilization, resulting in skeletal muscle atrophy, loss of maximal muscle strength and function in the affected lower limb. Blood flow restricted exercise (BFRE), utilizing low load intensities, appears to pro-vide a unique opportunity to preserve i) lower limb muscle mass and strength and ii) function, without violating the load restrictions suggested for optimal tendon healing, in the early phase of rehabilitation.
Aim: To investigate the feasibility of applying BFRE in patients with an Achilles tendon rupture. Additionally, to evaluate thigh and calf circumference, patient-reported ankle function, symptoms, complications, and physical activity following 12-weeks BRFE.
Materials and Methods: Feasibility was measured by adherence to training sessions, completion rate, intervention acceptability, ankle pain exacerbation on a numerical rating scale (NRS) and adverse events. Patients completed the Achilles Tendon Total Rupture Score questionnaire at baseline and 12 weeks follow-up. At the follow-up visit patients' thigh and calf circumference was measured and patients' ability to perform a single-leg heel-rise was tested.
Results: 16 out of 18 patients completed the 12-weeks BFRE program and for those who completed the intervention, adherence to training sessions was 88% (95%CI: 79; 98%). Intervention acceptability was excellent with 94% responding they were likely or much likely to recommend BFRE to others and to choose BFRE if they experienced a new Achilles tendon rupture tomorrow. Mean NRS pain following BFRE sessions was 1 (95%CI: 0.9; 1.2). Three adverse events were registered; two re-ruptures unrelated to the BFRE protocol and one deep venous thrombosis, which occurred in the period following cast-immobilization.
Interpretation / Conclusion: BFRE is feasible in terms of adherence to training sessions, completion rate, intervention accepta-bility, and ankle pain exacerbation. Despite three adverse events, BFRE appears as safe as usual care for this patient group. However, the efficacy and safety of BFRE compared to usual care war-rants further investigation.

198. Bone void filler in the treatment of lower extremity insufficiency fractures – A pilot and feasibility study with clinical outcome of the first five patients

Mette Sørensen Studstrup[1], Peter Larsen[1, 2], Søren Kold[1], Pernille Bønneland[1], Rasmus Elsøe[1]

1. Department of Orthopaedic Surgery, Aalborg University Hospital, Aalborg Denmark
2. Department of Occupational Therapy and Physiotherapy, Aalborg University Hospital, Aalborg Denmark.

Background: Articular and periarticular pain in patients with rheumatoid arthritis may be related to juxta-articular insufficiency fractures. They are often only visualized by MRI. Pain and intraosseous edema and fracture healing assessed by MRI resolves exceedingly slow. To avoid a prolonged period of pain and immobilization a bone void filler may be injected at the fracture site. This may alleviate pain and increase function. Patients are allowed full weight bearing without restrictions immediately postoperative.
Aim: The aim was to report feasibility and the first clinical results of five consecutive patients treated with bone void filler following a lower extremity insufficiency fracture non-responding to conservative treatment.
Materials and Methods: This pilot and feasibility study used a cross sectional design with retrospective follow-up. A predefined feasibility outcome was based on two questions regarding patients experience with the treatment and the absence of any serious adverse events. Clinical results were reported before treatment, 2 weeks after treatment and at follow-up. Patient-reported results were reported by the body-region specific questionnaires, KOOS or FOAS. Overall health related quality of life was reported by the Eq5D-5L questionnaire. Furthermore, pain reactions and adverse events were reported.
Results: Five patients were included. Median age was 70, range 56 to 80. Four patients were female. Fracture sites were proximal tibia (2), distal tibia (2) and distal femur (1). All patients reported high satisfaction regarding patient's perception, indicating that bone filler may be feasible in the treatment of insufficiency fractures. No serious adverse events were observed. High pain intensity and low scores in the KOOS/FAOS and Eq5d-5L questionnaires were observed before treatment. Two weeks after treatment and at the final follow-up all patients reported low pain intensity and better KOOS/FAOS and Eq5D-5L scores.
Interpretation / Conclusion: Treatment with bone void filler to insufficiency fractures in RA patients seems feasible. Patient-reported outcome was satisfactory and considerable decrease in pain reactions after treatment was observed. More research is needed to investigate efficacy of this new treatment.

214. Information needs and preferences of patients with an ankle fracture: User involvement study creating an mHealth solution

Charlotte Myhre Jensen[1,2], Rikke Serritslev [3], Charlotte Skov Abrahamsen[3, 4]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Denmark.
2. Department of Clinical Research, University of Southern Denmark, Odense, Denmark
3. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt – University Hospital of Southern Denmark, Kolding Hospital, Denmark.
4. Department of Public Health, University of Southern Denmark, Odense, Denmark

Background: Following a surgically or non-surgically treated ankle fracture,patients express feelings of uncertainty regarding their ankle symptoms (e.g., swelling and pain), mobility, medication, weight- bearing limitations, and rehabilitation regimes. They additionally face challenges concerning what to expect during rehabilitation which can be linked to a lack of ability to understand and remember oral information. The involvement of users in designing solutions to address information needs has been acknowledged as essential to creating successful solutions.
Aim: The aim of this study was to employ a user-driven participatory design (PD) approach to develop an mHealth solution that addresses patients' information needs after surgical or non-surgical treatment for an ankle fracture.
Materials and Methods: Patients with an ankle fracture and healthcare professionals (nurses, therapists and surgeons) along the treatment pathway in both the hospital and municipality participated in four workshops (WS). In WS 1 and 2, needs and wishes were identified, and in WS 3 and 4, a solution to address the identified needs was developed. Data were analysed using qualitative content analysis and the continuous iterations in PD. User acceptance testing was conducted using alpha and beta testing of the mHealth solution by the development- and research team and a new group of patients and clinicians.
Results: We found that patients with an ankle fracture need information on topics such as "a typical course," "bandages and assistive devices," "what can I feel," "what may I do," "what to usually worry about," "medicine," "tips and tricks," and "contact information." Moreover, patients above all requested diverse modes of dissemination of information, preferably a combination of text, timelines, pictures, animations, and videos.
Interpretation / Conclusion: Involving representatives of future users in creating this mHealth solution using PD demonstrates the benefits of creating a solution that aligns with users' needs.

POSTER WALK 4: UPPER EXTREMITY

15 November 2023

17:00-18:00

Chairs: Rasmus Wejnold Jørgensen and Mikkel Tøttrup

160. Recommendation of precautions is better than recommendation of work absence, after surgery

Bente Schumacher

1. Middelfart Kommune

Background: Surgery often results in a long-term absence from work, dependent on the extent of the operation and the recommendations from the surgeon, often without regard to the nature of the work/work functions. Carpal tunnel operation is, for the surgeon, a small operation but can, for the patient, result in a longer- term work absence. This is highly depending on the recommendations the surgeon gives the patient.
Aim: The purpose of the study is to investigate recommended work absence after carpal tunnel operation.
Materials and Methods: Patient information, available on the internet, from 15 clinics and hospitals i Denmark. Their recommendations for return to work after carpal tunnel operation were evaluated.
Results: The recommended absence from work after carpal tunnel operation ranges from 1-10 weeks. Median value is 4-6 weeks. In several clinics, the absence from work is recommended in relation to the job, with e.g. lighter work such an office job and heavier work as a gardner.
Interpretation / Conclusion: A major reason for the variation in recommendation for work absence is due to the surgeon recommends in relation to different jobs. The work as a gardener or nurse consists of several work functions, and it is possible to adjust the work place or avoid certain work functions by a partial absence from work. A partial absence from work can lead to a quicker return to the job and reduce the likelihood of the patient losing income or losing his job. Based on this it is recommended that the surgeon before operation, instead of recommend the period of work absence, provides information on precautions after operation, functions to avoid and for how long, e.g. no wet or dirty work functions for the first 14 days until the wound is healed, avoid lifting things heavier than 0.5 kilogram, avoid twisting, static or vibration work functions with the operated wrist for a certain amount of weeks etc. If the patients know the precautions after operation, what must be avoided and for how long, the patient can better, with the work place, plan absences or partial start-up, so their return is safe and effective for optimal surgical outcomes.

200. Substantial decrease in operation rate for distal radius fractures in elderly following implementation of evidence-based practice using the CEBO (Centre for Evidence-Based Orthopaedics) model

Emil Østergaard Nielsen[1], Dennis Winge Hallager[1], Stig Brorson[1]

1. Department of Orthopaedics, Zealand University Hospital

Background: Evidence is fundamental in the treatment of patients. It is unclear to what extent evidence translates into clinical practice or implies behavioral changes. Several factors have been identified as barriers or facilitators of change. Taking these into account increase the chance of successful implementation of evidence. The CEBO model has been developed to facilitate adaption of evidence into local practice. Based on recent systematic reviews and meta-analysis of randomized controlled trials, we found, that elderly patients with dorsally displaced distal radius fractures (DRF), on average do not benefit from surgery beyond minimal clinical importance difference in patient reported outcome scores. Since the vast majority of elderly received surgical treatment in our department, we identified an evidence-practice gap.

Aim: This study evaluates behavioral change in orthopedic surgeons at our department following the application of the CEBO model in the treatment of elderly patients with dorsally displaced DRF.

Materials and Methods: After obtaining leadership support, the relevant evidence was disseminated to all colleagues across the department. All stakeholders were invited to a symposium containing a discussion on best evidence and future practice. Conclusions from the symposium were summarized in a local clinical guideline by a team of junior and senior colleagues. The guideline was published in the local guideline repository and repeatedly presented at morning conferences. Smart phrases were prepared to facilitate practice change. To monitor the changes, patient charts regarding patients over 60 years of age with dorsally displaced DRF were retrospectivelyreviewed from February 1st 2019 to January 31st 2020 and compared to a period from February 1st 2022 to January 31st 2023.

Results: In the first period 120 of 95 (79%) were surgically treated compared to 146 of 16 (11 %) in the second period, thus a decrease in operation rate of 68% was observed.

Interpretation / Conclusion: We report a substantial behavioral change following the application of the CEBO model in the treatment of elderly with dorsally displaced DRF.

216. Shared decision-making, a tool to include patients with a Colles fracture in the decision: Surgery or conservative treatment.

Ane Simony[1,2], Katrine Rasch[1], Tord Salomonsen[1], Rasmus Buch Bendtson[1]

1. Department of Orthopedic Surgery, Kolding, Hospital Lillebelt.
2. IRS, University of Southern Denmark

Background: Colles fractures, fractures of the distal radial bone and distal ulna are common fractures that often affects woman > 65 years of age due to low energy trauma. Treatment regime's has consisted of reduction and treatment with a cast for 5 weeks, or surgery with anatomic reduction of the fracture and fixation by a volar plate and screws. After one year, patients report similar outcome, regardless the treatment received.
Aim: The aim of this study was to implement shared decision-making for patients > 65 years, with a Colles fracture and report the patients and doctor satisfaction, while using the tool for choosing the treatment preferred by the patient.
Materials and Methods: A shared-decision making tool for patients > 65 years, diagnosed and treated by reduction and casting at orthopedic department in Kolding was implemented after this process, 1. Literature search (diagnosis, complications, revision rates, outcome) 2. Patient interview, with patients treated with surgery and conservative regime 3. Creating the Shared Decision-making tool with balanced information 4. Pilot test, with interview to ensure patients satisfaction with illustrations, information etc. 5. Education and implementation of Shared Decision-making 6. Survey regarding satisfaction, including both patients and doctors performed 3 months after implementing the tool, in clinical practice. The survey consist of 5 questions (aim of the tool, level of information, patients preference, complications and benefits, guiding the patients to a choice), each item scoring 1-5.
Results: A shared decision making tool is created, and handed out to the patients after reduction of the fracture. The tool is used after 5 days in the outpatient clinic, and patients are encouraged to choose the treatment by their preference. A survey conducted after 3 months including 10 visits in the outpatient clinic, shows high rates of satisfaction patients 22,6 (20-25), doctors 20.7 (10-25).
Interpretation / Conclusion: Patients and doctors, to decide the preferred treatment after a Colles fracture, can use a shared decision-making tool. Patients and Doctors reports that they are satisfied, after using the Materiale.

181. Arthroscopic Supra Capsular Reconstruction (SCR) with an acellular human dermal graft is a promising treatment for patients with irreparable cuff tears. A prospective case series.

Wisam Nafie Youssef Kino[1], Per Hölmich[1], Kristoffer Weisskirchner Barfod[1].

1. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark

Background: Irreparable rotator cuff tears are difficult to treat. Arthroscopic Supra Capsular Reconstruction (SCR) stops the humeral head from migrating proximally, theoretically allowing the muscles related to the shoulder to develop a relevant recruitment and activation pattern in order to optimize the function of the glenohumeral joint. The procedure is increasing popular though only sparsely investigated. SCR was introduced at Copenhagen University Hospital Hvidovre in 2019.
Aim: To monitor range of motion, pain, and patient reported outcomes 3, 6, 12 and 24 months after SCR with an acellular human dermal graft.
Materials and Methods: Patients were offered SCR if they had unacceptable shoulder pain due to an irreparable tear of the supra spinatus tendon, an intact or reparable subscapularis tendon and no osteoartrosis in the gelenohumeral joint. Patients were prospectively followed prior to and 3, 6, 12 and 24 months after surgery. Outcomes were range of active motion in abduction (AROM), pain at abduction (NRS), the Western Ontario Rotator Cuff (WORC) Index, and the shoulder pain and disability index (SPADI). Development over time was investigated using Univariate Analysis of Variance.
Results: 28 patients (mean (SD) age 62 (8), BMI 29 (5), m/k 19/9) were operated from July 2019 to October 2022. 26 patients contributed data at 3 months, 23 at 6 months, 18 at 12 months and 6 at 24 months. AROM improved ($p<0.01$) from mean (SD) 80 (37) prior to surgery, to 92 (39), 105 (46), 127 (44), and 151 (33). NRS pain improved ($p<0.01$) from 7.8 (1.6) to 3.7 (2.6), 2.8 (2.8), 3.3 (3.5), and 1.1 (1.4). WORC index improved ($p<0.01$) from 28 (14) to 38 (18), 46 (26), 58 (32), and 73 (19). SPADI improved ($p<0.01$) from 74 (18) to 60 (24), 52 (28), 41 (34), and 24 (21).
Interpretation / Conclusion: Arthroscopic Supra Capsular Reconstruction with an acellular human dermal graft is a promising treatment for patients with irreparable cuff tears as statistical significant and clinically relevant improvements were seen in ROM, NRS pain, WORC and SPADI. A randomized controlled trial, investigating if the observed improvements can be ascribed the surgical procedure or merely change over time, is needed.

180. Prothesis versus exercise in patients with rotator cuff tear arthropathy who are eligible for reverse total shoulder arthroplasty: The REACT multicenter, randomized controlled trial study protocol

Josefine B. Larsen[1,2], Theis M. Thillemann[1,2], Antti P. Launonen[3], Helle K. Østergaard[2,4], Thomas Falstie-Jensen[1], Aleksi Reito[3,5], Steen L. Jensen[6,7], Inger Mechlenburg[1,2]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
2. Department of Clinical Medicine, Aarhus University, Aarhus N, Denmark
3. Department of Orthopaedic Surgery, Tampere University Hospital, Tampere, Finland
4. Department of Orthopaedic Surgery, Viborg Regional Hospital, Viborg, Denmark
5. Faculty of Medicine and Health Technology, Tampere University, Tampere, Finland
6. Department of Orthopaedics, Aalborg University Hospital, Aalborg, Denmark
7. Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

Background: Reverse total shoulder arthroplasty is an established treatment for patients with rotator cuff tear arthropathy, recently it has gained popularity and the use has expanded. The outcome after reverse total shoulder arthroplasty has been investigated in several studies and national registries; however, the treatment has not been compared to non-surgical treatments.
Aim: The primary aim of this trial is to investigate whether reverse total shoulder arthroplasty is superior compared to exercise in patients with rotator cuff tear arthropathy eligible for reverse total shoulder arthroplasty.
Materials and Methods: In this Nordic multicenter randomized controlled clinical trial, 102 patients with rotator cuff tear arthropathy (Hamada grade 3-5) eligible for surgery will be randomly allocated to either reverse total shoulder arthroplasty followed by usual care or a shoulder exercise intervention. The exercise intervention comprises 12 weeks of exercise with one weekly physiotherapist- supervised session and home-based exercises. The primary outcome is the total Western Ontario Osteoarthritis of the Shoulder index (WOOS) score at 12 months follow-up. Secondary outcomes include Disabilities of the Arm, Shoulder, and Hand score (DASH); changes in pain intensity measures using a Visual Analogue Scale at rest, during activity and nightly pain; the use of analgesics during the previous week; and adverse events.
Results: The end of patient inclusion is expected ultimo 2025, and results are expected in ultimo 2026 . The primary analysis will be blinded and presented to the project group followed by two written interpretations.
Interpretation / Conclusion: To our knowledge, the REACT trial is the first to compare the effectiveness of surgical to non-surgical treatment in patients with rotator cuff tear arthropathy. Treatment decisions, including surgery, for patients with rotator cuff tear arthropathy, will depend on different factors. It remains important to know where there is reliable evidence and where there is uncertainty in making health decisions.

POSTER WALK 5: HIP AND KNEE ARTHROPLASTY

15 November 2023

17:00-18:00

Chairs: Ann Ganestam and Christian Skovgaard Nielsen

161. Description of psychopharmacological treatment in patients planned for hip or knee arthroplasty

Simon Kornvig[1,2], Henrik Kehlet[3,4], Christoffer Calov Jørgensen[3,4], Anders Fink-Jensen[5], Poul Videbech[6], Martin Lindberg-Larsen[7], Kirill Gromov[8], Mathias Bæk Rasmussen[9], Kim Sperling[10], Claus Varnum[1,2]

1. Department of Orthopeadic Surgery, Lillebaelt Hospital - Vejle; 2. Department of Regional Health Research, University of Southern Denmark; 3. Section for Surgical Pathophysiology, Copenhagen University Hospital; 4. Centre for Fast-track Hip and Knee Replacement, Rigshospitalet; 5. Mental Health Center, Frederiksberg and University of Copenhagen; 6. Mental Health Center, Glostrup and University of Copenhagen; 7. Department of Orthopeadic Surgery and Traumatology, Odense University Hospital - Svendborg; 8. Department of Orthopeadic Surgery, Hvidovre Hospital; 9. Department of Orthopeadic Surgery, Aalborg University Hospital - Farsø; 10. Department of Orthopeadic Surgery, Næstved Hospital.

Background: Psychiatric disorders and psychopharmacological treatment (PT) have been identified as important risk factors for increased LOS and readmissions after hip and knee arthroplasty. PT has a prevalence of 11% in these patients and a recent study has shown that PT may be an independent risk factor. Thus, temporary discontinuation of PT in the perioperative period may be beneficial, but carries a risk of discontinuation syndrome and relapse. However, to address this in future studies a description of PTs regarding type, dose, duration, indication and initiating doctor is needed.
Aim: The aim was to describe PT in patients planned for hip or knee arthroplasty.
Materials and Methods: This study was a prospective cohort study of 483 patients planned for hip or knee arthroplasty from 2021 to 2023 in Hvidovre, Næstved, Svendborg, Vejle and Farsø. All patients were in PT for psychiatric disorders at inclusion. Type, dose, duration, indication and initiating doctor (general practitioner, psychiatrist in primary healthcare or department of psychiatry) were registered for each treatment.
Results: 430 (89%) patients were treated with an antidepressant (AD); most frequently either selective serotonin (SSRI; 47%) or serotonin-norepinephrine reuptake inhibitors (SNRI; 21%). The frequency of patients treated with antipsychotics or anxiolytics was 20% and 15%, respectively. The majority received monotherapy (70%); most frequently with either an SSRI (36%) or an SNRI (12%). Most AD treatments and especially SSRI treatments were initiated by general practitioners (71%; 80%) and had lasted more than one year (87%; 89%). The median doses of SSRIs/SNRIs were generally low and the most frequent indication for ADs was depression (77%).
Interpretation / Conclusion: ADs and especially SSRIs/SNRIs were the most frequent PTs in patients planned for hip or knee arthroplasty. Most ADs were initiated by general practitioners and were primarily SSRIs/SNRIs in low doses lasting more than one year. Thus, a study of postoperative outcomes after temporary discontinuation of SSRIs/SNRIs in the perioperative period may be feasible from a psychiatric perspective.

162. Impact of self-reported health on the risk of opioid use after total hip arthroplasty in patients with osteoarthritis

André S Klenø[1], Maaike GJ Gademan[2], Inger Mechlenburg[3], Henrik Sørensen[1], Nina M Edwards[4], Alma B. Pedersen[1]

1. Dept. of Clinical Epidemiology, Dept. of Clinical Medicine, Aarhus University and Aarhus University Hospital, Aarhus, Denmark
2. Department of Orthopaedics, Department of Clinical Epidemiology, Leiden University Medical Center, the Netherlands
3. Dept. of Orthopaedic Surgery, Dept. of Clinical Medicine, Aarhus University Hospital and Aarhus University, Aarhus N, Denmark
4. Dept. of Orthopaedic Surgery, Horsens Regional Hospital, Denmark.

Background: Opioids are commonly used for post-surgical pain management after total hip arthroplasty (THA). Most patients use opioids for a brief period, but some continue to use opioids for up to one year after THA. Continued opioid use has been linked to health inequality, a concept that remains elusive in health research. Patients' perception of their health is reported to be associated with a broad range of health outcomes in general, however, its impact on outcomes after THA is sparsely investigated.
Aim: To examine the association between preoperative self-reported health (SRH) and the risk of continued opioid use after THA in patients with osteoarthritis.
Materials and Methods: We extracted data from several Danish medical registries. Information on SRH (either good or poor) among 4,155 THA patients (2010-2018) was available from the Danish National Health Survey (SRH was collected at a median number of 1082 days before THA). Opioid use was defined as the redemption of ≥2 prescriptions 1-12 months after THA. We calculated prevalences of opioid use with absolute differences and prevalence ratios (aPR) (with 95% confidence interval) using log-binomial regression adjusting for sex, age, comorbidities, and education. We calculated the morphine milligram equivalent (MME) dose as a total dose for the entire year. Analyses were performed overall and by preoperative opioid use (defined as ≥1 opioid dispensing 0-6 months before THA).
Results: 3,283 patients reported good SRH and 872 reported poor SRH. Prevalence of opioid use was overall 13% for good SRH vs. 36% for poor SRH (aPR: 2.37, 2.04-2.76). Among preoperative non-users, 6% for good SRH vs. 14% for poor SRH (aPR: 2.22, 1.63-3.04). Among preoperative users, 31% for good SRH vs. 54% for poor SRH (PR: 1.66, 1.40-1.98). Overall, the median MME dose was 600 (interquartile range: 225-1,200) for good SRH vs. 1200 (450-5807) for poor SRH. For preoperative non-users, the MME dose was 420 for good SRH vs. 651 for poor SRH; for preoperative users, 1000 for good SRH vs. 2454 for poor SRH.
Interpretation / Conclusion: Patients with poor SRH were not only at higher risk of continued opioid use but also tended to consume a noticeably higher MME dose in the year after THA than patients with good SRH.

163. Diagnostic accuracy of a multiplex nucleic-acid-based diagnostic test in patients suspected of prosthetic joint infection (PJI).

Jacob Lund-Andersen[1], Mathilde LH Petersen[2], Krassimir Kostadinov[1], Lennart Friis-Hansen[2,3,4], Henrik Calum[5], Søren Overgaard[1,3]

1. Copenhagen University Hospital, Bispebjerg and Frederiksberg, Department of Orthopedic Surgery and Traumatology, Copenhagen, Denmark
2. Copenhagen University Hospital, Bispebjerg and Frederiksberg, Department of Clinical Biochemistry, Copenhagen, Denmark
3. University of Copenhagen, Department of Clinical Medicine, Faculty of Health and Medical Sciences, Copenhagen, Denmark
4. Center for Translational Research, Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark
5. Copenhagen University Hospital, Amager and Hvidovre, Department of Clinical Microbiology, Copenhagen, Denmark.

Background: Diagnosing periprosthetic joint infection (PJI) can be a challenge. Microbiological culture growth of synovial fluid and/or tissue biopsies is considered the standard for detection of the pathogen causing the PJI. Molecular diagnosis methods such as PCR technology have not yet been included in the proposed PJI definitions, but have the theoretical advantage of a short turnaround time and high sensitivity.
Aim: The aim of this study was to evaluate the diagnostic accuracy (sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV)) of the multiplex PCR based BioFire® Joint Infection Panel (BioFire JI Panel) test against microbiological culture growth in a clinical setting on patients with a total joint arthroplasty.
Materials and Methods: Synovial fluid and/or tissue biopsies were prospectively collected pre- or perioperatively at Copenhagen University Hospital, Bispebjerg and Frederiksberg, Department of Orthopedic Surgery and Traumatology from June 2022 to January 2023 from patients with a total knee or hip arthroplasty and suspected of a PJI. Synovial fluid samples were tested with the BioFire JI Panel and compared with standard culture of the synovial fluid samples and tissue biopsies as reference.
Results: 15 samples were included in our study, seven collected preoperatively and eight perioperatively. Testing for all pathogens the sensitivity of the BioFire JI Panel was 66.7% (0.95 CI; 30.0% to 90.3%) and the specificity was 77.8 % (0.95 CI; 45.3% to 93.7%). With a prevalence of PJI of 40% in our sample, we found a PPV of 66.7% (0.95 CI; 30.0% to 90.3%) and a NPV of 77.8 % (0.95 CI; 45.3% to 93.7%). Testing only for the 31 pathogens in the BioFire JI Panel we found a sensitivity of 100% (0.95 CI; 51.0% to 100%) and a specificity of 81.8% (0.95 CI; 52.3% to 94.7%), giving us a PPV of 66.7% (0.95 CI; 30.0% to 90.3%) and a NPV of 100% (0.95 CI; 70.1% to 100%).
Interpretation / Conclusion: Our results suggest that the BioFire JI Panel has a high accuracy for detecting the pathogens included in its panel. However, the limitation is the pathogens not included in the panel, including common pathogens such as staphylococcus epidermidis, which lowers the sensitivity and the NPV of the test.

165. Exploring rehabilitation experiences following revision hip replacement - a qualitative study

Martin Bækgaard Stisen[1,2], Inger Mechlenburg[1,2], Lindsay Mary Bearne[3,4], Emma Godfrey[4,5], Alma Becic Pedersen[1,6] , Dorthe Sørensen[7]

1. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark
2. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
3. Population Health Research Institute, St George's, University of London, London, United Kingdom
4. Department of Population Health Sciences, School of Life Course & Population Sciences, King's College London, London, United Kingdom
5. Health Psychology Section, Department of Psychology, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdo
6. Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, Denmark
7. Programme for Rehabilitation, Research Centre for Health and Welfare Technology, VIA University College, Aarhus, Denmark

Background: Patients obtain poorer outcomes after revision total hip replacement (THR) than after primary THR. Current evidence on rehabilitation after revision THR is inadequate and the development of rehabilitation interventions is warranted. To inform the design of new interventions understanding patients' experiences of revision THR rehabilitation is crucial.
Aim: This study aimed to explore patients' rehabilitation experiences after revision THR.
Materials and Methods: Using constructivist grounded theory, we conducted semi-structured qualitative interviews with 12 participants (mean age 65.9 years, 58% females) with completed or ongoing rehabilitation after revision THR. Patients were recruited from Aarhus University Hospital and municipal rehabilitation centers in Central Denmark Region. Data collection and analysis were a constant comparative process conducted in three phases; an initial, a focused, and a theoretical phase.
Results: Important perspectives influencing the participants' ability to integrate revision THR into their lives were; need for support, the experience of therapeutic relationship, health authority belief, physical function, and previous experiences with rehabilitation. We generated a substantial theory of the participant's circumstances and ability to integrate rehabilitation into their everyday life after revision THR from the data. Based on patients' experiences in different contexts, four categories were constructed; resignation, low personal drive, high health literacy, and faithfulness.
Interpretation / Conclusion: This study highlighted that patients' expectations, past experiences, attitudes, beliefs, motivation, and circumstances interact to influence engagement and adherence to rehabilitation and described four categories relating to the integration of THR rehabilitation into their everyday life. Clinicians should be aware of and account for these categories during rehabilitation. Tailored individual rehabilitation interventions and clinician approaches to optimize commitment and adherence are needed among patients with revision THR.

164. Effect of an exercise intervention targeting hip strengthening in patients undergoing revision total hip replacement – study protocol for a multicenter randomized controlled trial (The Strong Hip Trial)

Martin Bækgaard Stisen[1,2], Alma Becic Pedersen[1,3], Troels Kjeldsen[1,2], Inger Mechlenburg[1,2]

1. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark
2. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
3. Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, Denmark

Background: Evidence on the effectiveness of pain relief and functional improvement in patients undergoing revision total hip replacement (THR) is sparse, and patients undergoing revision THR achieve markedly smaller improvements in hip pain and function than patients following primary THR. Further, there are no clinical guidelines or consensus on optimal rehabilitation after revision THR.
Aim: To compare the clinical effectiveness of an exercise intervention targeting hip strengthening with standard community-based rehabilitation in patients undergoing revision THR.
Materials and Methods: This multicenter randomized controlled assessor- blinded trial will be conducted at seven hospitals and multiple municipality rehabilitation centers in Denmark. A total of 84 patients undergoing revision THR will be allocated to either an exercise intervention targeting hip strengthening (strength group) or to standard community-based rehabilitation (control group). The primary outcome is change in functional performance measured by the 30s Chair Stand Test, from baseline to 4 months after the start of the intervention. Secondary outcomes include Hip disability and Osteoarthritis Outcome Score; 40m Fast-paced Walk Test; 9-step Timed Stair Climb Test; leg extensor muscle power; Global Perceived Effect; and adverse events. Other outcomes include The International Physical Activity Questionnaires; patient-reported pain intensity at rest; and European Quality of Life - 5 Dimensions. Between-group comparisons of change in the 30s Chair Stand Test from baseline to 4-month follow-up will be analyzed using a repeated measures mixed model.
Results: Expected in ultimo 2025.
Interpretation / Conclusion: This study is the first randomized controlled trial examining different rehabilitation programs, that hopefully will contribute with clinically important evidence about what type of rehabilitation patients undergoing revision THR should be offered to improve their functional performance, physical function, and quality of life, which will be of great importance to patients, relatives, physiotherapists, and decision-makers.

169. Duration of opioid treatment after total knee arthroplasty–A registry-based cohort study of patients in Denmark

Arne Michael Storås[1], Karen Toftdahl Bjørnholdt[1]

1. Department of Orthopaedics, Horsens Regional Hospital

Background: Pain after total knee replacement (TKR) is initially often pronounced, and multi-modal treatment including opioid is used to cover the pain sufficiently. Although opioids are effective against pain, the side effects and addiction potential encourage prescribing a correct amount post operative. Attention to patients using opioids beyond the expected period of treatment, could be helpful in limiting long term use.
Aim: 1. To investigate the duration of need for opioids after TKA so that we can provide relevant patient information and prescribing and reduce over/undertreatment based on an educated estimate of the expected treatment period. 2. To find prevalence and characteristics of the subgroup that continues to use opioids 1 year after the operation.
Materials and Methods: Register-based cohort study, using national, regional and municipal data available in Tværspor. Information on collected prescriptions for opioids can illustrate the number of patients using opioid over time from the day of surgery so that it can be assessed statistically. Comorbidities, BMI, smoking status, alcohol consumption, nutritional status, prosthesis complications, preoperative opioid consumption, dose at discharge and other information can contribute to characterizing the subgroup that continues to use opioids after 1 year.
Results: In a preliminary analysis of 1356 patients in the Horsens Hospital population base undergoing TKR in 2012-2019 in Central Denmark Region, 92 % of patients collected one or more opioid prescriptions within the first month of surgery, 27 % in the second month, 17 % in the third month, 11 % in the 6th month and 9 % in the 12th month. Further analysis is pending.
Interpretation / Conclusion: Based on this study, we hope to improve prescription and phasing out of opioid use following TKR, based on expected duration of necessity. Patients with predictors of long-term opioid use may require further counseling and support both before and after the operation.

170. Patient attitude towards day-of-surgery discharge in hip and knee arthroplasty. A single center study of 5273 cases from 2016 to 2022

Caroline Halken[1], Christian Bredgaard Jensen[1], Cecilie Henkel[1], Kirill Gromov[1], Anders Troelsen[1]

1. Department of Orthopaedic Surgery, Clinical Orthopaedic Research Hvidovre (CORH), Copenhagen University Hospital Hvidovre, Denmark

Background: There has been an increasing interest in outpatient hip and knee arthroplasty, and previous studies have found it to be safe and feasible in selected populations. However, little is known about patients' attitudes towards day-of-surgery (DOS) discharge.
Aim: Therefore, we explored patients' attitudes towards DOS discharge and identified patient characteristics associated with different attitudes.
Materials and Methods: We included 5273 patients scheduled for hip or knee arthroplasty from 2016 to 2022. Preoperatively, patients were asked if they were interested in DOS discharge ("Yes", "Do not know", "No"). We investigated age, body mass index, and sex, and explored patient reported outcome measures (PROMs) such as EuroQol 5-dimensions 3-level (EQ5D-3L) for each attitude group. We also investigated change in attitude in patients who had answered the questionnaire in association with previous hip or knee arthroplasty.
Results: We found that 41.9% of the patients were interested in DOS discharge, 20.7% answered "Do not know", and 37.4% were not interested. Patients who were not interested had a higher mean age ("No" = 70.2 years vs. "Yes" = 65.2 years), with most of them being female ("No" = 72.2% vs. "Yes" = 48.8%). Around 20% of the patients responded "Do not know" regardless of age, sex, and PROM scores. Patients experiencing anxiety/depression based on EQ5D-3L more often answered "No" (55.6%) compared to patients not experiencing anxiety/depression (33.6%). Over 70% of the patients responding "Do not know" before their first surgery, changed their answer to either "Yes" (29.7%) or "No" (40.6%) at their following surgery.
Interpretation / Conclusion: 41.9% of the patients were interested in DOS discharge and 37.4% were not interested. Elderly, female patients and patients with lower– or worse–PROM scores were more likely to respond "No". Even though DOS discharge is used increasingly and is considered safe in selected patients, there seems to be a mismatch as 58.1% of the patients are uncertain or not interested in DOS discharge. Further studies are needed to examine what preoperative information patients find essential for them to decide on being discharged on day-of-surgery.

171. The Oxford Knee Score is missing key concepts for patients with severe knee osteoarthritis; a qualitative study of content validity

Christian Fugl Hansen[1], Michael Krogsgaard[1], Anders Odgaard[2], Søren Overgaard[1,3], John Brandt Brodersen[4, 5]

1. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg
2. Department of Orthopaedic Surgery, Copenhagen University Hospital, Rigshospitalet
3. Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen
4. The Research Unit for General Practice and Section of General Practice, Department of Public Health, University of Copenhagen
5. Primary Health Care Research Unit, Region Zealand.

Background: Since its development in 1998, the Oxford Knee Score (OKS) has been frequently used as an outcome for evaluating patients with knee osteoarthritis (OA), in particular patients treated with a knee arthroplasty. However, the methods used to develop OKS do not ensure adequate content validity - the most important property of a patient reported outcome. The Oxford Hip Score, which was developed like OKS, has been shown not to possess content validity. We hypothesized that this would also be the case for OKS
Aim: To determine the content validity of the Danish OKS in a cohort of patients with severe OA
Materials and Methods: Patients with severe OA scheduled for surgical treatment with total knee arthroplasty (TKA) and patients already surgically treated (3-24 months postoperative) were eligible for the study. The cohort was by intention non-randomly sampled with respect to gender, age, time since treatment and socioeconomical status. By semi- structured group interviews relevance, coverage, comprehensibility, recall period and response options of all items of OKS were qualitatively assessed. Whether any other aspects were missing were further explored within the ICF-model domains of activity, symptoms and participation
Results: Overall, the cohort deemed all items relevant, and most items comprehensible with the exception of two 'double-barreled' items. The response options were also endorsed. Patients treated with TKA questioned the recall period of four weeks as being too long in the early postoperative phase. However, large gaps in coverage were revealed with several key concepts missing. Among these concepts were the impact of lacking participation, feeling like a burden to friends and family, fatigue, and a wider spectrum of physical symptoms
Interpretation / Conclusion: The OKS possessed inadequate content validity for its intended use as a general one- dimensional measure of the disease burden of the target population. This may hamper its responsiveness and thus its ability to detect true changes over time. As a consequence, drawing conclusions from trials using OKS as an outcome carries a high risk of misinterpretation, especially due to false-negative results (type II errors)

172. Retrospective case-series of 180 intraarticular corticosteroid injections in total knee arthroplasty – no documented periprosthetic joint infections

Simon Limbrecht Mogensen [1], Carsten Femhøj Holm [1], Lars Peter Jorn[1], Jacob Beck[1], Morten Vase[1], Jens Rolighed Larsen [1]

1. Elective Surgery Centre, Silkeborg Regional Hospital

Background: Treatment options for effusion and pain in knee joints with an arthroplasty are few. Intraarticular corticosteroid injections (ICI) are commonly used in the osteoarthritic knee but because the supposed risk of infection only rarely used in patients with arthroplasty.
Aim: We report on the use of ICI in knees with an arthroplasty at our institution and screened for occurrences of periprosthetic joint infection and possible effect of ICI on knee symptoms.
Materials and Methods: We retrospectively evaluated electronic health records (EHR) of patients with a knee arthroplasty receiving ICI inside the operating theater under strict aseptic conditions during a 5-year period from 2017-2021. We reviewed patients EHR for periprosthetic joint infections and patient reported effects of the ICI at follow- up.
Results: 180 intraarticular corticosteroid injections in knees were given in 146 patients with either a TKA, UKA or a revision arthroplasty. No infections occurred at a mean follow up period of 23,9 months. 50% reported some to good effect of injections, 22% had no effect of injections and in 27% of the EHR it was not recorded if the injection had an effect.
Interpretation / Conclusion: We found no infections at a mean follow up of 23,9 months when ICI was administrated under strict aseptic conditions. Patients reported effects could indicate a possible favorable effect on effusion and pain in knees with an arthroplasty.

POSTER WALK 6: SPORTS ORTHOPAEDICS

15 November 2023

17:00-18:00

Chairs: Adam Witten and Niels Christian Kaldau

188. Return to badminton play after ACL injury is common, but only 19 % return to previous performance

Niels Christian Kaldau[1], Frederik Flensted Andersen[1], Kristoffer Weisskirchner Barfod[1], Peter Nyby Hersnæs[1], Per Hølmich [1]

1. Sports Orthopedic Research Center Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Copenhagen, Denmark

Background: The return to sport (RTS) rates in badminton after anterior cruciate ligament (ACL) injury are not know.
Aim: The purpose of this study was to report how many badminton players return to badminton after an anterior cruciate ligament (ACL) injury and to which level.
Materials and Methods: Patients in Denmark from 2000-2018 registered in the Danish National Patient Register with a diagnosis of ACL rupture and badminton as primary sport were asked about RTS and return to performance (RTP) after ACL injury. RTP was defined as return to full participation in the same sport, same level and same pre-injury performance. Statistics were performed using the unpaired Student t-test for continuous variables or the chi- square test for dichotomous or categorial outcomes.
Results: Badminton was the primary sport for 900. Only 435 players were injured during badminton, and 626 participants intended to return to performance. RTS was achieved by 63 % (396) and 19 % (117) returned to the same performance as their pre-injury level. However, 44 % (273) returned to full participation at the same level as pre-injury level but did not perform as well. Males had a significantly higher RTS than females (68 % (221) vs. 58 % (175), p=0.007 and RTP was also higher among males, however not significant (23 % (74) vs. 14 % (43), p=0.058).
Interpretation / Conclusion: Return to badminton after ACL injury was achieved by 63 % (396) and 19 % (117) returned to the same performance as their pre-injury level.

189. No differences in re-revision rates and clinical outcome using either single- or two stage procedure of revision after failure of Anterior Cruciate Ligament reconstruction.

Torsten Grønbech Nielsen[1], Ole Gade Sørensen[1], Martin Lind

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark

Background: The surgeons' choice of a single-stage or a two- stage procedure in revision anterior cruciate ligament reconstruction (ACLr) is based on the possibility of reuse of the tibia and femoral bone tunnels after primary ACLr. The advantage of a single-stage revision procedure is the need of only one surgery and rehabilitation period and a shorter period with ACL insufficiency. A two-stage revision due to tunnel malpositioning or tunnel widening requires two surgeries with a 4-6 months' interval to allow adequate bone graft healing.
Aim: The purpose of this present study was to compare failure rates and clinical outcome after either single-stage or two-stage ACL-revisions in a cohort of patients from The Danish Knee Ligament Reconstruction Registry.
Materials and Methods: Patients identified from 2005 to 2022 with ACL- revision and met the inclusions criteria; isolated ACL-revision and >2-years follow-up were included. Primary outcome was ACL-re-revision procedure. Secondary outcomes were knee laxity (side-to-side difference) and pivot shift (rotational stability difference - grade 0-1 or grade 2-3) evaluated at one-year follow up.
Results: 1,574 ACL-revisions were included in the study (1,331=single-stage and 243=two-stage). Baseline characteristics showed no difference in relation to age, gender, knee laxity, meniscus injury, cartilage damage or injury mechanism between the two groups. Significant differences were found in relation to pivot shift and type of graft. No statistical difference in two-years revision rates between single-stage group 2.79 (95%CI 2.03;3.84) and two- stage group 2.93 (95%CI 1.41;6.05) was found. No significant difference was seen in knee laxity and pivot shift between single-stage and two-stage ACL- revision at one-year follow up. Both groups demonstrated significant improvements from baseline to one-year follow up.
Interpretation / Conclusion: The primary finding of the study was that ACL- revision outcome was similar regarding re-revision rates and knee laxity for patients being managed with a single- or a two-stage surgical strategy.

190. Growth disturbances in pediatric Anterior Cruciate LIgament reconstruction. A comparison of two surgical techniques.

Peter Faunø[1,2], Thorsten Grønbech Nielsen[1], Bøge Larsen[2], Michael Bach Hellfritzsch[2], Mette Mølbye Nielsen[2], Martin Lind[1]

1. Section of Sports Trauma, Department of Orthopaedics, Aarhus University Hospital
2. Department of Radiology, Aarhus University Hospital

Background: Anterior Cruciate Ligament Reconstruction (ACLR) in skeletal immature patients can result in growth plate injury, wich may cause growth disurbances in the lower limp.

Aim: To compare radiological tibia and femoral length and axis growth disturbances as well as clinical outcome in age groups below 13 years in skeletal immature ACLR patients treated with a femoral physis sparing technique compared to a transphyseal technique.

Materials and Methods: Thirty patients with ACL injury operated with transphyseal ACLR in the period before 2010 were compared with 20 skeletal immature patients, who were operated with an femoral physis sparing ACLR technique in the period after 2013. All patients were below 13 years of age. Patients were evaluated at follow-up with full extremity radiographs measuring leg length discrepancy and malalignment as well as clinical evaluation with KT1000 measurements and KOOS and Tegner scores after an average 68 (29-148) months follow-up.

Results: In the group operated with transphyseally drilling technique 27% had a 10 mm or more leg length difference whereas only 15% in the physeal sparing technique was seen. In both groups 15% of patients had a 5° or more increased valgus difference in distal femur and in proximal tibia 3% in the transphyseally drilled and 6% in the physeal sparing group had increased varus angulation. None of the differences measured was statistically significant. There were no significant differences seen between the two groups regarding knee laxity or PROM´s

Interpretation / Conclusion: The femoral physis sparing technique resulted in less, but not statistically different growth abnormality compared to the transphyseally drilled femur tunnels. No statistically different outcome scores were seen.

191. Sports-related pain prevalence in TeamGym during normal and reduced training periods: A survey of 579 Danish gymnasts

Charlotte Anker-Petersen[1], Mikkel Bek Clausen[2], Birgit Juul-Kristensen[3], Per Hölmich[1], Kristian Thorborg[1]

1. Sports Orthopedic Research Center-Copenhagen, Department of Orthopedic Surgery, Amager-Hvidovre Hospital, Copenhagen University Hospital, Denmark
2. Department of Midwifery, Physiotherapy, Occupational Therapy and Psychomotor Therapy, Faculty of Health, University College Copenhagen, Copenhagen, Denmark
3. Department of Sports Science and Clinical Biomechanics, Research Unit for Musculoskeletal Function and Physiotherapy, University of Southern Denmark, Odense, Denmark

Background: Gymnastics is a sport demanding high training volume and early specialisation, however, many gymnasts drop out during adolescence due to pain and/or injuries associated with TeamGym. Only few and very small studies have investigated the prevalence and pattern of pain in TeamGym.
Aim: Therefore, the primary aim was to describe the pain prevalence and its regional body distribution in TeamGym gymnasts, and secondly, to describe differences between pain prevalence during a normal training period and a period with reduced training load.
Materials and Methods: Twice during the season 579 competitive TeamGym gymnasts, aged 10-30 years from nine clubs, completed a survey on self-reported history of pain/discomfort. The collected data from the two different training periods included: (1) a normal training period from Aug-Dec 2020; and (2) a period with reduced training load due to COVID-19 restrictions from Jan-June 2021.
Results: In total 65% of the invited gymnasts completed both surveys. Eighty percentage of the gymnasts experienced pain due to gymnastics and the most prevalent pain regions were knee (20% [95% CI 18.1;21.8]), wrist (17% [95% CI 15.5;19.0]), foot (16% [95% CI 14.4;17.8]) and heel (11% [95% CI 9.9;12.9]). Gradual pain onset was more commonly reported (42%) compared with acute or mixed onset (64%). Body regional pain distribution was similar in the two training periods, but with an absolute difference in number of painful musculoskeletal regions, with pain reported in 11.3% [95% CI 10.8;11.8] of all possible body regions in the normal training period compared with 8.4% [95% CI 7.9;8.8] in the reduced training period, corresponding to a 26% decrease.
Interpretation / Conclusion: Pain prevalence among TeamGym gymnasts was experienced by 4 of 5 gymnasts during a full season. Knee, wrist and foot pain were the most common painful regions and gradual pain onset was the most common. A reduced training period did not change the pattern in distribution of pain, but the number of painful regions were lower during this period.

193. Is sleep behavior associated with musculoskeletal symptoms?

Kaja Skare[1, 2], Bjarke Viberg[1, 4], Per Hölmich[2], Stewart Kerr[3], Niels Christian Kaldau[2]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital
2. Sports Orthopedic Research Center - Copenhagen, Department of Orthopedic Surgery, Copenhagen University Hospital, Amager & Hvidovre Hospital, Denmark
3. Life Fit Wellness, Healthcare & Exercise Centre, Falkirk, Scotland, UK
4. Department of Clinical Research, University of Southern Denmark

Background: Sleep inadequacy has previously been associated with increased risk of injury and reduced performance. It is unclear if sleep disorders are associated with musculoskeletal symptoms, which may be a predictor of serious injury and affect performance.
Aim: The aim was therefore to assess sleep behavior in elite junior badminton players and its association to musculoskeletal symptoms.
Materials and Methods: In 2018, players at the World Junior Badminton Championship completed the Athlete Sleep Behavior Questionnaire and a modified version of the World Olympic Association Musculoskeletal Health Questionnaire. Participants were categorized with poor or moderate/good sleep behavior. Relevant musculoskeletal symptoms were defined as pain higher than 30 mm Visual Analog Scale pain score or more than 30 minutes of joint stiffness. Baseline group comparison was performed using chi-square analysis and logistic regression for primary outcome adjusted for age, sex, ethnicity, previous injury, training load, and resting days.
Results: Of the 153 participants, 28% reported poor sleep scores. There was no baseline difference between poor and moderate/good sleep score concerning sex, age, ethnicity, previous injury, training load, and resting days. There were 27% with current musculoskeletal symptoms but with no difference in groups between poor and moderate/good sleep score (p=0.376). This yielded an adjusted OR of 1.23 (95% CI 0.52;2.90).
Interpretation / Conclusion: Twenty-eight percent of the participants reported poor sleep behavior. Twenty-seven percent experienced current musculoskeletal symptoms. We found no statistical differences in reported musculoskeletal symptoms when comparing athletes with poor sleep behavior to athletes with moderate/good sleep behavior.

194. Isolated arthroscopic bursectomy in chronic lateral hip pain patients has a relatively low success rate

Lasse Wedege Penning[1], Jens Kristinsson[1], Jens Erik Jorgensen[2], Carsten Møller Mølgaard[1,3,4]

1. Department of Orthopaedic Surgery, Aalborg University Hospital, Aalborg. Denmark
2. Sofiendal Aalborg Health Team. Aalborg SV. Denmark
3. Department of Physiotherapy and Occupational Therapy, Aalborg University Hospital, Denmark
4. Department of Clinical Medicine, Aalborg University, Denmark

Background: Greater trochanteric pain syndrome (GTPS) is a common syndrome resulting in long term pain and disability. Treatments include i.a. physiotherapy, corticosteroid injection(s), and arthroscopic surgery.
Aim: This study aimed to evaluate the outcome of iliotibial band release and trochanteric bursectomy and identify any patient characteristics that may predetermine the outcome.
Materials and Methods: This retrospective cohort study included 31 patients (26♀ / 5♂) treated for GTPS with arthroscopic iliotibial band release and trochanteric bursectomy from 2016-2020. Comorbidities and basic patient data were extracted, and the Global rating of change score was used as the primary outcome and pooled the patients into two groups, Success or No success. The patients were asked to evaluate their daily function, pain, and overall health. Chi- square test and independent t-test were used for analysis.
Results: 41.9% of patients reported the surgery a Success. All of these were women. The mean duration of symptoms before surgery was 19.8 (±6.5) months for the Success group and 40.2 (±15.9) months for the No success group ($p<0.05$). The patients in the Success group reported less pain, a better level of function, and better overall health ($p<0.001$). No comorbidities were found to predetermine the outcome.
Interpretation / Conclusion: The outcome for the patients of this study is worse than what other studies have found. This may be due to an older cohort and the use of the global rating of change score as to define what constitutes a successful trochanteric bursectomy.

196. Reference values for daily physical activity measured with accelerometers in a Danish background population between 18 and 80 years of age

Christine K. Schrøder[1,2], Lisa U. Tønning[1,2], Marianne Tjur[1], Pia K. Kristensen[1,2], Inger Mechlenburg[1,2]

1. Department of Orthopaedic Surgery, Aarhus University Hospital
2. Department of Clinical Medicine, Aarhus University

Background: Physical activity provides essential information to assess general health and evaluate the outcome of interventions. However, evaluation of physical activity necessitates reference values for comparison.
Aim: The current study aimed to present reference values for accelerometer-based data on physical activity in a background population.
Materials and Methods: We conducted a population-based cross- sectional study using accelerometer-based data on physical activity and self-reported data on demographics and health from a cohort of randomly selected individuals of 18-80 years of age registered in the Danish Civil Registration System (CRS) (n = 242). We presented data according to the FITT model (frequency, intensity, time, and type), including number of steps, cadence, intensity, time spent sedentary, standing, walking, or cycling, as well as number of transfers from sitting to standing.
Results: Participants took an average of 6095 daily steps, had an average cadence of 98.5, spent 3.7 hours standing, 1.4 hours walking, 3.8 minutes cycling, 7.0 hours in sedentary activities, and had 43 sit-to-stand transfers. The results varied when examining sex and individual age groups.
Interpretation / Conclusion: This study provided reference values on physical activity from a Danish background population. Our findings are important to clinical practice and research as they provide sex- and age-specific reference values to enable comparison of daily physical activity levels.

187. Evidence-based first-line treatment for femoroacetabular impingement syndrome: study protocol for a multicenter, randomised, controlled, assessor-blinded trial comparing a 6 month strength exercise intervention to usual care (The Better Hip Trial).

Frederik Foldager[1], Signe Kierkegaard-Brøchner[2], Joanne Kemp[3], Bent Lund[4], Ulrik Dalgas[5], Inger Mechlenburg[1]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
2. Department of Occupational and Physical Therapy, Horsens Regional Hospital, Horsens, Denmark
3. College of Science, Health and Engineering, LaTrobe University, Melbourne, Australia
4. Department of Orthopaedic Surgery, Horsens Regional Hospital, Horsens, Denmark
5. Department of Public Health, Section of Sports, Aarhus University, Denmark.

Background: Femoroacetabular impingement syndrome (FAIS) is considered a motion- or position related clinical condition of the hip often associated with pain, reduced physical function and poor hip-related quality of life. A proportion of patients respond positively to physiotherapy including strength exercise as first-line treatment, where better muscle strength in patients with FAIS has been found associated with less pain, better physical function and quality of life. Currently there is no evidence to support the type, intensity, volume and duration of the exercise offered as first-line treatment.
Aim: We aim to conduct a randomised controlled trial (RCT) investigating the clinical- and cost-effectiveness of a 6 month strength exercise intervention compared to usual care as first-line treatment in patients with FAIS.
Materials and Methods: This trial is a multicenter, randomized, controlled, assessor-blinded trial and will be conducted at hospitals and physiotherapy clinics across Denmark and in Melbourne, Australia. A total of 104 patients diagnosed with FAIS will be randomised to either 6 months of strength exercise or usual care. The primary outcome is change in hip- related quality of life measured with the International Hip and Outcome Tool (iHOT- 33) at the end of intervention. Secondary outcomes include maximal muscle strength, physical function and patient-reported outcomes measuring constructs of pain, pain catastrophizing, quality of life, sports participation and physical activity. Furthermore a health economic evaluation will be conducted. Outcomes will be measured at baseline, after the initial 3 months of intervention, and at 6-month and 12-month follow-up. An intention-to-treat approach will be used for analyzing changes in the primary and secondary outcome measures.
Results: Expected ultimo 2026.
Interpretation / Conclusion: This project will provide high-quality evidence- based knowledge that may contribute to recommendations for first-line treatment in patients with FAIS, relevant for patients, physiotherapists, orthopaedic surgeons and health funding policy decision-makers.

195. Low-load exercises with concurrent blood flow restriction as rehabilitation for unspecific knee pain to a former American football player

Inger Mechlenburg[1], Torsten Grønbech Nielsen[1], Nick Kristensen[2], Troels Kjeldsen[1], Stian Langgård Jørgensen[3]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark
2. Department of Public Health, Section of Sports, Aarhus University, Denmark
3. Department of Occupational and Physical Therapy, Horsens Regional Hospital, Horsens, Denmark

Background: Former American football player, 30 years of age, suffered several months of moderate left knee pain during daily life activities sustained after performing maximal flexion loaded goblet squats. Magnetic resonance imaging showed normal meniscus and cruciate ligaments and no extra joint fluid. The patient was seen by a physiotherapist and introduced to 12 weeks of low-load exercises with concurrent blood flow restriction (LL-BFR) as knee rehabilitation. Reliable evidence suggests LL-BFR to induce significant gains in maximal muscle strength, muscle mass with minimal exacerbation knee joint pain.
Aim: To describe the outcome of 12 weeks BFR-RT as a rehabilitation method for unspecific knee pain.
Materials and Methods: The patient performed 12 weeks of LL-BFR for the lower limbs (goblet squat, knee extensions) with a low amount of supervision after the first week of training. Assessment of muscle strength, single-legged hop test, low-thigh circumference 10 cm above apex patella, The Knee Injury and Osteoarthritis Outcome Score (KOOS) and The Forgotten Knee Joint Score (FJS) was performed at baseline and after 12 weeks of LL-BFR.
Results: The patient completed all planned exercise sessions. Maximal voluntary isometric contraction of knee extension improved from 3.1 to 3.5 nm/kg (31%) on the left leg, and from 3.5 to 3.7 nm/kg (6%) on right leg. Single-legged hop test improved with 26 cm (23%) on the left leg and 3 cm (2%) on the right leg. Low-thigh circumference increased 1.5 cm on the left leg and 2.4 on the right leg. KOOS pain, KOOS quality of life and FJS demonstrated improvements of 11, 6 and 40 points, respectively. After the BFR-RT rehabilitation, the patient was able to return to his usual training regime.
Interpretation / Conclusion: The present case study indicates that even with low amounts of supervision LL-BFR could increase muscle strength, functional performance and improve key patient-reported outcome. BFR-RT seems promising as a transition to help patients back to a healthy lifestyle of training and being physically active.

POSTER WALK 7: SPINE AND TUMOR

15 November 2023

17:00-18:00

Chairs: Dennis Hallager and Michael Bendtsen

206. Plating Assisted Double nail bone Segment Transport (PADST) in the femur with internal lengthening nails

Ulrik Kähler Olesen[1], Klaus Hindsø[1], Michael Mørk Petersen[1], Upender Martin Singh[1], John Herzenberg[2],

1. Rigshospitalet, Department of Orthopedics, Copenhagen, Denmark
2. Rubin Institute of Advanced Orthopedics, Baltimore, USA.

Background: We describe a novel and time saving technique for large bone defects (8-10 cm and greater) using two internal lengthening nails (ILN), one antegrade and one retrograde, working together and aligned inside a custom-made titanium sleeve, augmented by an internal locking plate. An illustrative case that successfully produced 17 cm of regenerate in 3.5 months, is presented.
Aim: Reconstructive orthopedic surgery can be very burdensome for the patient due to long term treatment and rehabilitation, causing absenteeism from the workforce and social life and depression. We aimed at designing a time saving device to cut treatment time in half after large bone defect.
Materials and Methods: A 28-year-old otherwise healthy male presented with a slowly growing mid-diaphyseal mass in the left femur. No generalized symptoms, weight loss, or previous illness were reported. Based on X-rays, PET/CT, and MRI, a malignant bone tumor was suspected. An open biopsy through an anterior incision diagnosed an unspecified low-grade osteosarcoma. There was no evidence of metastases. Wide surgical resection of the 17 cm diaphyseal tumor was performed followed by a 3-stage trifocal bone transport. A 3D model of the bone was used to plan and trial the surgery.
Results: Trifocal bone transport using two counter opposed internal lengthening nails (ILN) in a custom-made slotted tube device and augmented with an internal locking plate for additional stability, filled the 17 cm bone defect in 3.5 months. This was a planned three stage procedure and can be considered a further advanced modification of the previously described Plate Assisted Bone Segment Transport (PABST). No signs of local recurrence or metastases were seen during the 1.5-year follow-up period. The distraction index was 1.6 mm/day. The overall consolidation index was 20 days/cm.
Interpretation / Conclusion: The presented double nail technique successfully solved a challenging clinical problem and is a potential steppingstone for further developments of devices for complex and large bone transport and lengthening.

217. Can machine learning technique be used for prediction of 1-year survival in patients with osteosarcoma?

Christina Holm[1,2,3], Jonathan A. Forsberg[2], Thomas Baad-Hansen[3], Andrea Thorn [1], Michala Skovlund Sørensen[1], Michael Mørk Petersen[1]

1. The Musculoskeletal Tumor Section, Department of Orthopedic Surgery, Rigshospitalet, University of Copenhagen, Denmark
2. Orthopaedics, USU-Walter Reed Department of Surgery, Bethesda, MD, USA,
3. Department of Orthopaedic Surgery, Tumor Section, Aarhus University Hospital, Aarhus, Denmark

Background: Osteosarcoma is the predominant subtype of bone sarcoma. Estimated life expectancy is important in the clinical decision making. There is currently no prognostic algorithms using machine learning technique to predict short- term survival in patients with osteosarcoma.
Aim: The purpose of present study is 1) To develop a Gradient Boosting machine (GBM) model estimating 1-year survival in patients with newly diagnosed osteosarcoma, 2) To describe the relationship between outcome variables and their relative influence on 1-year survival
Materials and Methods: The training cohort comprised 178 patients with newly diagnosed osteosarcoma included from The Danish Sarcoma Registry between January 1 st , 2000 and June 30, 2016. Data extracted for analyses were age, sex, tumor size, tumor location, tumor site, metastasis, pathologic fracture, grade, survival. A GBM model was trained on a training set (n=157). We performed internal validation on the corresponding holdout test set (n=39). The ability of accuracy and discrimination was evaluated by receiver operator characteristic (ROC) analysis and area under the curve (AUC). Validation was considered suitable for clinical usage if the AUC under the ROC curve was greater than 0.7. Overall predictive model performance was evaluated with the Brier score.
Results: We successfully generated a Gradient Boosting Machine learning model. Features with the highest relative importance to 1 year survival were: age, tumor size, metastasis at diagnosis. On internal validation the model demonstrated good accuracy and discrimination by receiver operating characteristic (ROC). Area under the curve (AUC) demonstrated 81% (95%CI: 52%-96%). Overall model performance by Brier score was 0,11 (95%CI: 0.03-0.19).
Interpretation / Conclusion: The developed Gradient Boosting Machine can accurately predict 1-year survival in patients with newly diagnosed osteosarcoma. Age and metastasis at time of diagnosis had the largest prognostic effect on survival. When properly external validated we believe present model can provide the clinician with a useful tool in the clinical decision making

218. Total Hip Arthroplasty (THA) with partiel pelvic reconstruction (PPR) as the treatment for bone metastasis in the hip joint.

Shoresh Moradi [1] Principal supervisor: Prof. Michael Mørk Petersen Co-supervisor: Dr. Afrim Iljazi

1. The Tumor Section, Department of Orthopedic Surgery, Rigshospitalet, Copenhagen University Hospital,

Background: Patients suffering from a pathological fracture or painful bony lesion in hip joint because of metastatic bone disease often benefit from a total joint replacement(THA) with partiel pelvic reconstruction(PPR). However, it is a major operation in patients who are already weak.
Aim: The purpose of the study is to calculate the cumulative incidence of: - Postoperative complications - General revision rate - Revision with removal of a bone-anchored prosthetic component - Patient survival
Materials and Methods: It was an observational cohort study. We identified 42 patients (mean age 67 years, 28 females and 14 males) who received THA with partiel PPR as the treatment for bone metastasis in the hip joint during the period 2008–2019. Clinical and survival data were extracted from patient files, electronic medical records/the Health Platform (SP). Prosthesis-related complications calculated according to the Henderson classification. Kaplan– Meier's analysis was applied to estimate the probability of patient survival.
Results: 18 patients out of 42 patients experienced at least one prosthesis-related complication with a CI of 31% and 44% after 1 and 5 years. 7 (18%) of 18 patients resulted in revision surgery.. But 3 patients (9%) ended up having revision surgery with removal of bone anchored parts. The median survival time was 10,5 (0,5-144) months.
Interpretation / Conclusion: The results show that the incidence of postoperative complications (44% after 5 years) in our patient group is higher compared to the literature. Furthermore, the incidence of revision surgery (22% after 5 years) and prosthesis failure (7% after 5 years) is also higher in our patient group compared to the literature. However, our results are not higher when we compare with other studies that have also examined patients undergoing pelvic reconstruction and THA. The median survival in our patient group is 10,5 months, which corresponds to what can be found in the literature. Therefore, we can highlight that the surgical treatment with THA and PPR for metastatic bone disease does not result in worse patient survival than other forms of surgical intervention.

184. The impact of coccygectomy in chronic coccygodynia cases on sexual and social function, in females.

Albert Lauge Gellert[1], Mikkel Østerheden Andersen[2,4], Leah Yaccat Carreon[2,4], Ane Simony[2,3,4]

1. Department of Orthopedics, Esbjerg and Grindsted Hospital, University hospital of Southern Denmark
2. Department of Spine Surgery & Research, Spine Center Middelfart
3. Department of Orthopaedic Surgery, Lillebaelt Hospital Kolding, Denmark
4. Department of Regional Health Research, University of Southern, Denmark

Background: Coccydynia may greatly impact patients' quality of life and functional level, including sexual health which is important for physiological well-being and relationships. Despite its fundamental role in human life, there are limited data available on sexual function and health in patients undergoing surgery for Coccydynia. Coccygectomy is a definitive treatment option for chronic cases where other therapies have been without pain relief. Several studies has described this procedure to be an effective treatment where the tailbone is removed surgically either total or partially. Earlier studies have not identified factors associated with lesser or better outcome.
Aim: The aim of this study was to investigate the effect of coccygectomy on sexual and social function in patients with persistent coccygodynia
Materials and Methods: The study is a retrospective collected, prospective cohort study performed in a single center Rygcenter Syddanmark, in Southern Denmark. 106 identified participants from the Dane Spine Database with persistent coccydynia who had undergone coccygectomy between 2011- 2022 and where included in the study. Inclusion criteria consisted of, only females, age > 18 years, data availability pre-operative as well as one and two years postoperative of the Oswestry Disability item 8 (ODI8) regarding sexual function, and item 9 (ODI9) regarding Social Function. Patients were excluded if no problems regarding sexual function was present, or patients had previous surgery in the area.
Results: All included patients were female 91 patients (85.8%) with a mean age of 40,4 years. Ethnicity primarily Caucasian. A significant improvement was found (<0.001) in their ODI8 one-year after surgery, from pre-op of 2.01±1.3 to 0.85±1.3 after one year. The ODI9 score for social function also showed a significant improvement from 2.12±1.0 preoperative to 0.99±1.2 postoperative (<0.001). No significant change in ODI8 or ODI9 was observed between one and two years after surgery.
Interpretation / Conclusion: In female patients with persistent coccydynia and impaired sexual function, coccygectomy improves their sexual function. An improvement of social function is also observed.

185. Patient-reported outcome from minimal invasive surgery compared with conventional open surgery for thoracolumbar fractures of the spine

Girts Murans[1,2], Stig M. Jespersen[1], Laurynas Meska[1], Gaurilcikas Marius[1], Martin Lindberg-Larsen[1,2]

1. Department of Orthopedic Surgery and Traumatology, Odense University Hospital and Svendborg
2. Orthopedic Research Unit, Department of Clinical Research, University of Southern Denmark

Background: The treatment guidelines for thoracolumbar spinal fractures are controversial although minimally invasive surgery (MIS) is a popular alternative to the traditional open approach (TOA). Limited data exists about outcomes after MIS fracture treatment. The main aim of our study was to evaluate self-reported disability, health-related quality of life, pain, and satisfaction after MIS compared with TOA.
Aim: The main aim of our study was to evaluate self- reported disability, health-related quality of life, pain, and satisfaction after MIS compared with TOA.
Materials and Methods: Of 173 patients operated from March 2014 to July 2018, 112 patients (64.7%) completed the Oswestry Disability Index (ODI), the EQ-5D-5L, and a tailored clinical follow-up questionnaire on employment status, pain, activity level, and satisfaction with treatment.
Results: Of the 112 patients, 34 had MIS and 78 had TOA. Mean follow-up was 56 months (range 32-82). The two groups were comparable on demographic variables apart from mean age where MIS group was in average 10 years older. The MIS group had better ODI scores than the TOA group (p=0.046), but the groups were similar regarding return to work and disability retirement. The mean and median EQ-5D- 5L index score for the MIS group was marginally (mean -0.033, median +0.04901) lower than the mean Danish population score, while the TOA group showed a greater deviation (mean - 0.12508, median -0.040). The MIS group used less pain medication than the TOA group . Both groups were similarly satisfied with treatment results.
Interpretation / Conclusion: Our data indicates that MIS surgery for thoracolumbar spinal fractures can achieve acceptable self-reported outcomes in terms of disability, health-related quality of life, pain, and satisfaction with treatment. However, a randomized controlled trial is needed to determine whether the MIS approach is superior to TOA.

186. Meropenem and Vancomycin for Empirical Antibiotic Treatment of Pyogenic Spondylodiscitis? Investigations of spinal tissue concentrations in a porcine model

Josefine Slater[1,2,3], Maiken Stilling[1,2,3], Pelle Hanberg[1,3], Sofus Vittrup[1,2,3], Martin Bruun Knudsen[1,2,3], Sara Kousgaard Tøstesen[1,2,3], Josephine Olsen Kipp[1,2,3], Mats Bue[1,2,3]

1. Department of Orthopaedic Surgery, Aarhus University Hospital
2. Department of Clinical Medicine, Aarhus University
3. Aarhus Denmark Microdialysis Research (ADMIRE), Ortho Research Lab, Aarhus University Hospital

Background: Pyogenic spondylodiscitis remains a diagnostic and therapeutic challange for the clinician. The incidence is rising, particularly in high-risk patient populations, and culture-negative cases are increasing. The optimal choice for empirical treatment remains unknown. As in other complex orthopaedic infections, co-administration of meropenem and vancomycin has been suggested for systemic empirical antibiotic treatment of pyogenic spondylodiscitis.
Aim: The aim of this study was, in an experimental model, to evaluate a theoretical treatment target, the percentage of an 8-h dosing interval of co- administered meropenem and vancomycin concentrations above relevant minimal inhibitory concentrations (MICs) (%T>MIC), in spinal tissues using microdialysis.
Materials and Methods: Eight female pigs received a single-dose bolus infusion of 1000 mg of meropenem and 1000 mg vancomycin simultaneously before microdialysis sampling. Microdialysis catheters were applied in the C3 vertebral cancellous bone, the C2-C3 intervertebral disc, paravertebral muscle, and adjacent subcutaneous tissue. Plasma samples were obtained from a central venous catheter for reference. Given the diversity of possible causative bacteria in pyogenic spondylodiscitis, we chose to investigate a range of MIC targets for both meropenem and vancomycin. We considered vancomycin as the relevant drug of choice for coverage against Gram- positive organisms, while meropenem would provide Gram-negative and anaerobic coverage.
Results: The main finding was that for both drugs the %TMIC was demonstrated in plasma, and the lowest %T
Interpretation / Conclusion: When indicated, our findings suggest a more aggressive dosing approach of both meropenem and vancomycin to increase spinal tissue concentrations to treat the full spectrum of potentially encountered bacteria in a spondylodiscitis treatment setting.

POSTER WALK 8: PAEDIATRIC ORTHOPAEDICS

17 November 2023

17:00-18:00

Chairs: Christian Wong and Mathias Bünger

175. Can MRI without sedation or anesthesia distinguish stability in pediatric lateral humeral condyle fractures?

Morten Jon Andersen[1,2]

1. Dept of Orthopedic Surgery, Copenhagen University Hospital - Herlev and Gentofte
2. Dept of Clinical Medicine, University of Copenhagen

Background: Plain radiographs cannot show the chondral epiphysis of the distal humerus and therefore cannot evaluate the stability of pediatric lateral humeral condyle fractures (LHCF).
Aim: The aim of this study was to evaluate an MRI protocol for the pediatric elbow to distinguish the stability of LHCF in children.
Materials and Methods: Children suspected of minimally displaced LHCF were referred for expedited MRI. Exams were performed during daytime hours and with an above elbow splint on. No sedation or anesthesia was administered. Flexible coils and 3 tesla scanners were used. The MRI protocol consisted of three sequences: 3D WATS, T1 coronal and STIR coronal with breaks in between. Total scan time was less than 10 minutes; however, 45 minutes was set aside for each child.
Results: 12 children, 3 girls and 9 boys, with suspicion of minimally displaced LHCF on plain radiographs were referred for MRI. Mean age was 5.5 years (range 3-9). One scan could not be performed due to anxiety in a 3-year-old boy. All scans were evaluated by a musculoskeletal radiologist. 3 scans showed only bone edema and no fracture. 8 scans showed LHCF of which 4 were stable and 4 unstable.
Interpretation / Conclusion: MRI gave a clear overview of the extent of the injury in both the bone and chondral areas of the distal humerus. Evaluating the stability of LHCF is key to choosing the right treatment strategy. In some institutions minimally displaced LHCF are treated with open surgery to prevent secondary dislocation. We believe that MRI can better guide non-surgical treatment.

176. Orthopaedic Surgery Patients' Perspectives on Current Communication Pathways After Hospital Discharge and Evaluation of Team-based Digital Communication

Lili Worre Høpfner Jensen[1], Rikke Emilie Kildahl Lauritsen[1], Søren Kold[1], Ole Rahbek[1]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital, 9000 Aalborg, Denmark

Background: Transition from hospital to home after orthopaedic surgery pose a risk to patient safety. Poor communication and coordination between patients and healthcare professionals from hospital and municipality leads to fragmented care. Digital communication is increasingly used to facilitate easy and accessible asynchronous communication between patients and healthcare professionals across settings. It may provide optimized quality of care in the postoperative period following hospital discharge. No studies have explored the use of team-based digital communication between patients and healthcare professionals after orthopaedic surgery and discharge, even though these patients often have long periods of rehabilitation that involves various healthcare professionals across settings.
Aim: The aim of this study was two-fold; 1) to explore orthopaedic surgery patients' perspectives on current communication pathways at a tertiary hospital in Denmark, and 2) to explore patients' experiences and use of a GDPR-safe team- based digital communication solution following hospital discharge (eDialogue).
Materials and Methods: A triangulation of qualitative data collection techniques was applied with the purpose of obtaining in depth-knowledge of patients' perspectives and the context; document analysis, participant observations (n=16 hours), semi-structured interviews with patients before (n=31) and after (n=24) their access to eDialogue, and exploration of usage data.
Results: Patients expressed difficulties in current communication pathways due to a lack of information and inadequate coordination of care after hospital discharge. eDialogue was used by 83.9% and was perceived as adequate to most patients' communication needs following hospital discharge. They suggested it provided a sense of security, reduced their need for phone calls to the hospital, and that it eased the sharing of knowledge between patients and healthcare professionals across settings.
Interpretation / Conclusion: In conclusion, patients evaluated eDialogue positively and suggested it could support them after returning home following orthopaedic surgery.

177. Children diagnosed with idiopathic toe walking – altered treatment strategy when gait analysis is added to the decision-making

Tina Udemark Pasgaard[1], Sidsel Hald Rahlf[2], Julie Ladeby Erichsen[2], Christian Færgemann[2], Bjarke Viberg[3], Anders Holsgaard-Larsen[2]

1. H.C. Andersen Children's Hospital, Odense University Hospital
2. Department for Orthopaedic Surgery and Traumatology, Odense University Hospital
3. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt – University Hospital of Southern Denmark

Background: Determining the cause and severity of idiopathic toe walking (ITW) can be difficult from clinical examination alone. Gait analysis might provide further description of ITW, potentially altering the treatment strategy.
Aim: To test the hypothesis that the treatment strategy of children diagnosed with ITW and considered candidates for achilles lengthening surgery will change once gait analysis is added to the decision- making.
Materials and Methods: A cross-sectional analysis on baseline data from a prospective cohort (powered for another research question). Inclusion: Children (7-15 years) referred to the pediatric orthopedic outpatient clinic at Odense University Hospital or Kolding Hospital and considered candidates for surgical treatment for ITW based upon parent reported and visual signs of toe-walking and passive ankle dorsiflexion <15˚ with the knee extended. Exclusion: Children with neurological conditions, unilateral toe-walking, previous achilles lengthening surgery, club foot, and not understanding Danish. Following clinical ITW examination children were referred to a confirmatory 3-dimensional gait analysis. Based upon waveforms of the ankle kinematics and kinetics (Vicon, T40, Oxford, England) children were categorized according to Alveraz et al. 2007 into; 1) no – mild signs, 2) moderate – severe signs of ITW.
Results: 23 children (17% girls, age 10 ± 2 years (mean ± sd)) were included. There were 13 children demonstrating moderate - severe signs of ITW whereas 10 children demonstrated no - mild signs of ITW and thus, not considered candidates for achilles lengthening surgery. Differences in dynamic ankle function between the two groups were observed for peak ankle dorsi-flexor degree (4.5 ± 5.8˚ vs 13.4 ± 1.4˚, $p < 0.001$) and delta of the two peak ankle plantar-flexor moments (0.09 ± 0.29 Nm/BW vs 0.68 ± 0.19 Nm/BW, $p < 0.001$) (indicating equinus).
Interpretation / Conclusion: Adding objective and quantitative information from a gait analysis to the decision making of ITW altered the treatment strategy for almost half of the children considered to be candidates for achilles lengthening surgery. Moreover, gait analysis revealed that other causes than equinus should be considered in the treatment planning of ITW.

178. Effect of part-time abduction bracing on developmental dysplasia of the hip in infants age 6 to 12 month

Mathias Hauge Bünger[1], Line Holm Jensen[1], Martin Gottliebsen[1]

1. Department of Children's Orthopaedics, Aarhus University Hospital

Background: Treatment of development dysplasia of the hip (DDH) in infants is often debated. There seem to be consensus that unstable hips require treatment to stabilize the hip in the socket. However, when it comes to treatment of residual dysplasia of the hip at radiographs taken age 6 month opinions are much more diverse and evidence sparse. The effect of bracing after the age of 6 month is unknown.
Aim: The aim of the study was to describe a cohort of children with radiographic DDH at 6 months old treated with part time abduction bracing.
Materials and Methods: The cohort included 50 infants (5 boys/45 girls) with DDH determined as acetabular index (AI) > 30 degrees at age 6 month treated at our institution from 2020-2023. Our treatment regime included a removable abduction brace with parents advised to use it for 12h/24h or more. Children were followed up with radiographs at age 9 and 12 months. 26% were breech babies and 15% had a family history of DDH. 33% had not received any prior treatment, while 24% and 22% had been treated with a Pavlik Harness or a Denis Brown splint, respectively. A further 20% of the children had been treated with closed reduction in a general anesthesia and spica cast.
Results: Good compliance >12h/24h was reported in 90% of the patients at 9 months. This percentage dropped to 54% at 12 month. The mean AI at the beginning of treatment was 29±3 degrees/33±5 (dx/sin) improving to 25±5/28±4 at age 9 month ($p<0.001$ -paired T-test). No further improvement in AI was found at 12 months. Prior to treatment, 40 children had a previous ultrasound hip examination at a mean age of 3.75 months (2-6 months) with a mean alfa angle of 66±4/62±6 (dx/sin) , coverage 64±7/61±12) and pubo-femoral distance of 4±2/6±3.
Interpretation / Conclusion: In the present cohort children treated with part-time abduction bracing showed improvement in acetabular index from age 6 to 9 month of approximately 5 degrees, while no improvements were found after 9 months. These findings suggest that bracing should stop at 9 month. Surprisingly, a large proportion of the dysplastic hips had a normal USS prior to radiograps at 6 months of age. This finding suggests that residual dysplasia cannot be ruled out based on a normal ultrasound.

174. International Field Test of LIMB-Q Kids: a new patient reported outcome measure for lower limb differences

Jan Duedal Rölfing[1,3], Harpreet Chhina[2,3], Anne Klassen[3], Björn Vogt[3], Mohan Belthur[3], Melissa Esparanza[3], David Bade[3], Alicia Kerrigan[3], Jonathan Wright[3], Ashish Ranade[3], Louise Johnson[3], David Podeszwa[3], James Fernandes[3], James Messner[3], Christopher Iobst[3], Sanjeev Sabharwal[3], Jussi Repo[3], Sharon Eylon[3], Anthony Cooper[2,3]

1. Department of Orthopaedics, Aarhus University Hospital, Denmark
2. Department of Orthopaedic Surgery, BC Children's Hospital, Vancouver, Canada
3. International LIMB-Q Kids collaborators

Background: LIMB-Q Kids is a new patient-reported outcome measure (PROM) for children with Lower limb differences (LLDs). A mixed method multiphase approach was used to develop LIMB-Q Kids including a systematic review informing a conceptual framework. Cognitive debriefing interviews (CDIs) with children were performed multiple times.
Aim: The aim of this study was to assess the psychometrical validity of the items and to perform Rasch analysis.
Materials and Methods: We conducted an international field test study where LIMB-Q Kids was completed by children with lower limb differences from several sites across the world. Clinical data was also collected for all children who completed LIMB-Q Kids. The final field-test version consists of 11 scales (159 items) that measure appearance, physical function, symptoms (hip, knee, ankle, foot, and leg), leg-related distress, and school, social and psychological function. This version was rigorously translated into Danish and German. Translations that are in progress include Arabic, Finnish, Hindi, Hebrew, Portuguese and Spanish.
Results: An international field-test study is underway in 15 countries (25 sites with a target recruitment of 150 participants per country). 310 completed LIMB-Q Kids have been received to date with the target of 500 before the final analysis. A preliminary analysis of the available data using Rasch Measurement Theory analysis provided evidence that the scales in the LIMB-Q Kids work as hypothesized.
Interpretation / Conclusion: No internationally applicable PROM exists for children with LLDs. Data from the international field-test study will be used to reduce items and perform psychometric testing of LIMB-Q Kids. The rigorous translation and cultural adaptation process provided versions of LIMB-Q Kids in different languages. Once completed, the LIMB- Q Kids will provide a common metric for outcome assessment for children with lower limb differences internationally.

173. Is CASTING of displaced pediatric distal forearm fractures non-inferior to reduction in general anesthesia: The CASTING trial.

Katrine Rønn Abildgaard[1], Peter Buxbom[1], Ole Rahbek[2], Martin Gottliebsen[3], Per Hviid Gundtoft[3], Bjarke Viberg[4], Stig Brorson[1]

1. Centre for Evidence-Based Orthopedics, Department for Orthopedic Surgery, Zealand University Hospital, Køge, Denmark;
2. Children´s Orthopedics, Department of Orthopedics, Aalborg University Hospital;
3. Danish Paediatric Orthopaedic Research, Aarhus University Hospital
4. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Odense, Denmark.

Background: Treatment of displaced distal forearm fractures (DFF) in children have traditionally been closed reduction and optional pin fixation, although they might heal and remodel without manipulation, with no functional impairment. Earlier studies focus on radiographic outcome or range of motion. No randomized controlled trials (RCTs) have been published comparing the patient-reported functional outcome after non-surgical and surgical treatment of displaced DFF in children.
Aim: To investigate the patient-reported functional outcome after non-surgical versus surgical treatment of displaced DFF in children aged 4-10 years.
Materials and Methods: This is a multicenter RCT on four Danish university hospitals. Children aged 4-10 years with open physes and a displaced DFF (overriding or 20-40° angulation) will be offered inclusion, if the on-duty orthopedic surgeon finds indication for surgical intervention. They will be allocated equally to non-surgical treatment or surgical treatment of surgeon's choice. Follow-up will be 4 weeks, 3, 6 and 12 months for questionnaires, photographs and radiographs. The primary outcome is the between-group difference in 12 months QuickDASH score. A sample of 40 patients will allow us to show a 15- point difference with 80% power and a one-sided type I error rate of 2.5%.
Results: Not yet recruiting. Expected inclusion period is June 2023 to June 2025.
Interpretation / Conclusion: The design of this RCT offers an opportunity to compare patient-reported outcome after non-surgical versus surgical treatment of pediatric displaced DFF. If non-surgical treatment proves non-inferior to surgical treatment, unnecessary anesthesia and surgery may be avoided, and treatment may be carried out with limited radiation exposures, fewer control visits, and less pin-related complications.

179. Ultrasonography as a tool in the diagnostics of nerve entrapment syndrome?

Zakaria Zabane[1], Charlotte Hartig Andreasen [1], Mathias Hauge Bünger [1], Michel Bach Hellfritzsch [1]

1. Department of Orthopaedics, Aarhus University Hospital
2. Department of Radiology, Aarhus University Hospital

Background: Four year old boy, suffers a forearm fracture which is treated with closed reduction and conservatively with an orthopaedic cast for 4 weeks. Immediately postoperatively, the patient is affected by pain and median nerve affection. It was at the time interpreted as neuropraxia. A year later, the patient still has median nerve affection. Ultrasonographic examination of the forearm reveals that the median nerve is trapped in callus at the radius fracture site. The patient undergoes a second operation with neurolysis and nerve grafting.
Aim: To highlight the use of ultrasonography as a tool in the diagnostics of nerve entrapment syndrome. Although nerve entrapment syndrome after closed fracture reduction is a rare condition, it is a serious condition which can lead to nerve damage. In some rare cases, nerve entrapment syndrome can be misinterpreted as neuropraxia. This abstract will also elucidate red flags that a physician must be aware of.
Materials and Methods: The patient's journal was used to describe the background of the abstract. Pictures from the ultrasonography examination and reconstructive surgery were used to describe location of the radius callus fracture and the median nerve entrapment site in the bone. Other case reports about nerve entrapment from public libraries were used to further describe details in the abstract.
Results: Posttrauma x-ray of the patient's forearm presented a fracture of the distal third of ulna and radius. A year later, a new x-ray revealed complete bone healing and bone remodelling. The x-ray also showed a slight bone irregularity which was seen as a bony spike on the distal third of caput radius. Ultrasonography was performed and showed an osseous defect on caput radius at the place of the fracture in which the median nerve was trapped.
Interpretation / Conclusion: Nerve entrapment syndrome in forearm fractures in children is uncommon, however it is a serious condition. Ultrasonography is a non- invasive, quick and an easily accessible diagnostic tool. In the hands of an experienced user, ultrasonography should serve a role in the diagnostics of nerve entrapment syndrome soon after trauma or surgery where symptoms exceed what normally is expected.

213. Intraarticular median nerve entrapment after elbow dislocation with fracture of the medial epicondyle in a 10-year-old boy – a rare case report

Simone Trøst Bylund[1,2], Ali K. K. Al-Hamdani[1,2], Nils Wolfram[3], Morten Jon Andersen[1,2]

1. Dept of Orthopedic Surgery, Copenhagen University Hospital - Herlev and Gentofte
2. Dept of Clinical Medicine, University of Copenhagen
3. Dept of Neurology, Zealand University Hospital - Roskilde

Background: Elbow dislocation in children is not common and constitute only 3-6% of all elbow injuries. Associated injuries are common and fracture of the medial epicondyle the most frequent. Neurological compromise is rare (<5%) and usually transient due to traction neurapraxia. Intraarticular entrapment of the median nerve is described as a very rare complication. The median nerve can be entrapped as described by Fourrier et al. with or without a concomitant medial epicondyle fracture.
Aim: To present this rare but clinically important condition.
Materials and Methods: We present a case together with a literature review.
Results: A 10-year-old boy presented to the ED after a fall complaining of left elbow pain and tingling sensation in the second finger. Vascular status was normal. Plain radiographs showed elbow dislocation with avulsion of the medial epicondyle. The elbow was reduced by closed means in the ED. Post reduction radiographs and CT showed a congruent joint. Sensory deficits and inability to flex first and second finger's distal interphalangeal joint (DIJ) were present. ORIF of the epicondyle was performed. Follow up at six weeks was without clinical improvement. EMG showed severe affection of median nerve function. Ultrasound showed an irregular path of the nerve. Intraarticular entrapment of the nerve was suspected and surgery was performed. The median nerve was identified proximally and followed medially where it was buried under new bone formation. The nerve continued medial to the epicondyle and entered the ulnohumeral joint. To free the nerve, the medial soft tissues were released and the nerve was removed from the joint. Distal to the joint the nerve was further released anteriorly hereafter the nerve followed the anatomical path. 3 months postoperative motor function was partially restored and active flexion over the first and second DIJ was observed. Sensory function was also improved.
Interpretation / Conclusion: Elbow dislocation in children is a rare injury and nerve entrapment a very rare complication. Post reduction median nerve affection should lead to further investigation by ultrasound. If nerve entrapment is suspected urgent surgical exploration is warranted and should not await EMG or spontaneous recovery.

220. The pubo-femoral distance correlates to acetabular inclination and femoral head coverage in hip dysplasia ultrasound.

Hans-Christen Husum[1,2], Michel Bach Hellfritzsch[2,3], Rikke Damkjær Maimburg[2,5], Bjarne Møller-Madsen[2,4], Mads Henriksen[2,3], Natallia Lapitskaya[2,3], Søren Kold[1,2], Ole Rahbek[1,2]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital, Denmark
2. Danish Paedatric Orthopaedic Research, Aarhus University Hospital, Denmark www.dpor.dk
3. Department of Radiology, Aarhus University Hospital, Denmark
4. Department of Children's Orthopaedics, Aarhus University Hospital, Denmark
5. Department of Midwifery, University College of Northern Denmark, Aalborg

Background: The pubo-femoral distance (PFD) ultrasound (US) measurement has been proposed as a more accessible measurement for hip dysplasia (DDH) screening. While PFD US is implicitly correlated to current gold standard US measurements for DDH through its reported high sensitivity for DDH, the exact correlation of these measurements is not clear. The gold standard measurements quantify acetabular morphology and sonographic hip instability by measuring the acetabular inclination angle and coverage of the femoral head by the bony acetabulum. Conversely, the PFD measurement relies on a single distance measurement between the medial femoral epiphysis and the ossification center of the pubic bone while lateralizing stress is applied to the hip joint.
Aim: The present study seeks to investigate the correlation of PFD to the gold standard alpha angle and the femoral head coverage (FHC) at rest and during manual provocation.
Materials and Methods: We prospectively included all newborns referred for follow up hip US at our institution based on primary risk factor-, clinical- and PFD screening. Alpha angles, PFD, FHC and FHC during provocation at follow-up ultrasound for referred newborns were measured and compared using scatter plots, linear regression, t-tests and box-plots.
Results: We included 2,735 newborns of which 754 received a follow-up hip ultrasound within six weeks of age. After exclusion 752 newborns were included for analysis (372 male/380 female), mean age at examination was 36.6 days (range 4-87 days). We found a negative linear correlation of PFD to alpha angles ($p<0.001$), FHC($p<0.001$) and FHC during provocation ($p<0.001$) with a 1mm increase in PFD corresponding to a -2.1 degree (95% CI -2.3;-1.9) change in alpha angle and a -3.4% (95% CI -3.7;-3.0) change in FHC and a -6.0% (-6.6;-5.5) change in FHC during provocation. The PFD was significantly higher with increasing Graf types and in displaceable hips (FHC <50%) ($p<0.001$)
Interpretation / Conclusion: PFD is strongly correlated to both alpha angles and hip displaceability, as measured by FHC and FHC during provocation, in ultrasound of newborn hips. The PFD increases as the hips become more dysplastic and/or displaceable.

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2900 Hellerup
treasurer@ortopaedi.dk

Editor
Associate Professor
Jan Duedal Rölfing
Ortopædkirurgi
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Palle Juul-Jensens Boulevard 99, J801
8200 Aarhus
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