DOS Kongressen
13-15 November 2024
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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 2024

TIME	Wednesday, 13 November 2024				
	Sal A	**Sal B**	**Sal C**	**Skovbrynet**	
09:00-09:30 **09:30-10:00** **10:00-10:30**	**Session 2: Trauma** Mette Rosenstand & Arvind von Keudell	**Session 1: Spine** Casper Dragsted & Haisheng Li	**Symposium UDDU** **Revision af de specialespecifikke kurser**	**Session 3: Knee arthroplasty** Klaus Poulsen & Müjgan Yilmaz	
10:30-11:00	*Coffee in Exhibition Area*				
11:00-11:30 **11:30-12:00**	**Session 4 : YODA Best Paper** - Sal A Christian Bredgaard Jensen & Claus Varnum		**Session 5: Sports orthopaedics** Kristoffer W. Barfod & Kristine B. Haugaard	**Meet the Experts for Specialists** **Infections**	**Forum for UAO**
12:00-12:30 **12:30-13:00**	**Lunch symposium: 12.20-12.50**	*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 and Bubles -** Teatersalen				
18:00 - 18:30 **18:30 - 19:00** **18:00 - 19:30**	**YODA General Assembly**	**Sandwich, Bubles and Warm Up for the Hockey tournament** - Teatersalen			
19:30 - 21:30	**Hockey tournament** - Teatersalen				
21:30 - ?	**YODA Party**				

TIME	Thursday, 14 November 2024			
	Sal A	**Sal B**	**Sal C**	**Skovbrynet**
07.30-08.00 **08.00-08.30** **08:30-09:00** **09:00-09:20**	**General Assembly** - Sal A			
09:30-10:00 **10:00-10:30** **10:30-11:00**	**Clinical Databases - All you need to know!** **Kvalitetsudvalget**	**Session 6: Hip arthroplasty** Rajzan Joanroy & Christian Wied	**Session 7: Shoulder/elbow** Rie Nyholm & Thomas Falstie-Jensen	**Meet the Experts for Junior Doctors** **Acute Sports Traumatology**
11:00-11:30	*Coffee in Exhibition Area*			
11:30-12:00 **12:00-12:30**	**DOS Honorary Lecture** - Teatersalen **Lars Engebretsen - The Ultimate Knee Injury: From Sport Venues to the Operating Theatre**			
12:30-13:00 **13:00-13:30**	**Lunch symposium: 12.50-13.20**	*Lunch in Exhibition Area*		
13:30-14:00 **14:00-14:20**	**Professor lectures** - Teatersalen **Martin Lindberg-Larsen, Claus Varnum, and Kristoffer Weisskirchner Barfod**			
14:20-14:30	*Break*			
14:30-15:00 **15:00-15:30** **15:30-16:00**	**How to get your paper published!** **ACTA Orthopaedica**	**Session 8: Trauma** Rikke Thorninger & Kristoffer Hare	**Session 9: Pediatrics** Peter Buxbom & Julie L. Erichsen	**Session 10: Knee arthroplasty** Anders El-Ghalaly & Thomas Lind-Hansen
16:00-16:30	*Coffee in Exhibition Area*			
16:30-17:00 **17:00-17:30**	**Session 11: DOS Best Paper** - Teatersalen (Ole Rahbek & Lars Engebretsen)			
18:30-02:00	**Congress dinner**			

TIME	Friday, 15 November 2024			
	Sal A	**Sal B**	**Sal C**	**Skovbrynet**
09:00-09:30 **09:30-10:00**	**Danish Orthopaedic Academy**	**Session 12: Hand/wrist** Maiken Stilling & Morten Kjær	**Session 13: Eksperimental/non-clinical** Mats Bue & Jasmin Bagge	**Session 14: Hip arthroplasty** Thomas Jacobsen & Signe Rosenlund
10:00-10:30	*Coffee in Exhibition Area*			
10:30-11:00 **11:00-11:30**	**Guildal Lecture and donations -** Teatersalen **Peter Axelsson - The wrist - a hand surgeons perspective!**			
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**	**Session 15: Sports orthopaedics** Bjarne Mygind-Klavsen & Eva Wetke	**Session 16: Tumors** Christina Holm & Thomas Baad-Hansen	**Session 17: Infection/amputation** Anne-Mette Sørensen & Jonas Andersen	**Session 18: Foot/ankle** Louise Lau Simonsen & Kristian Behrndtz
13:45-14:00	*Coffee in exhibition area*			
14:00-14:30 **14:30-15:00**	**DOS Battle** - Sal A Søren Ohrt Nissen			

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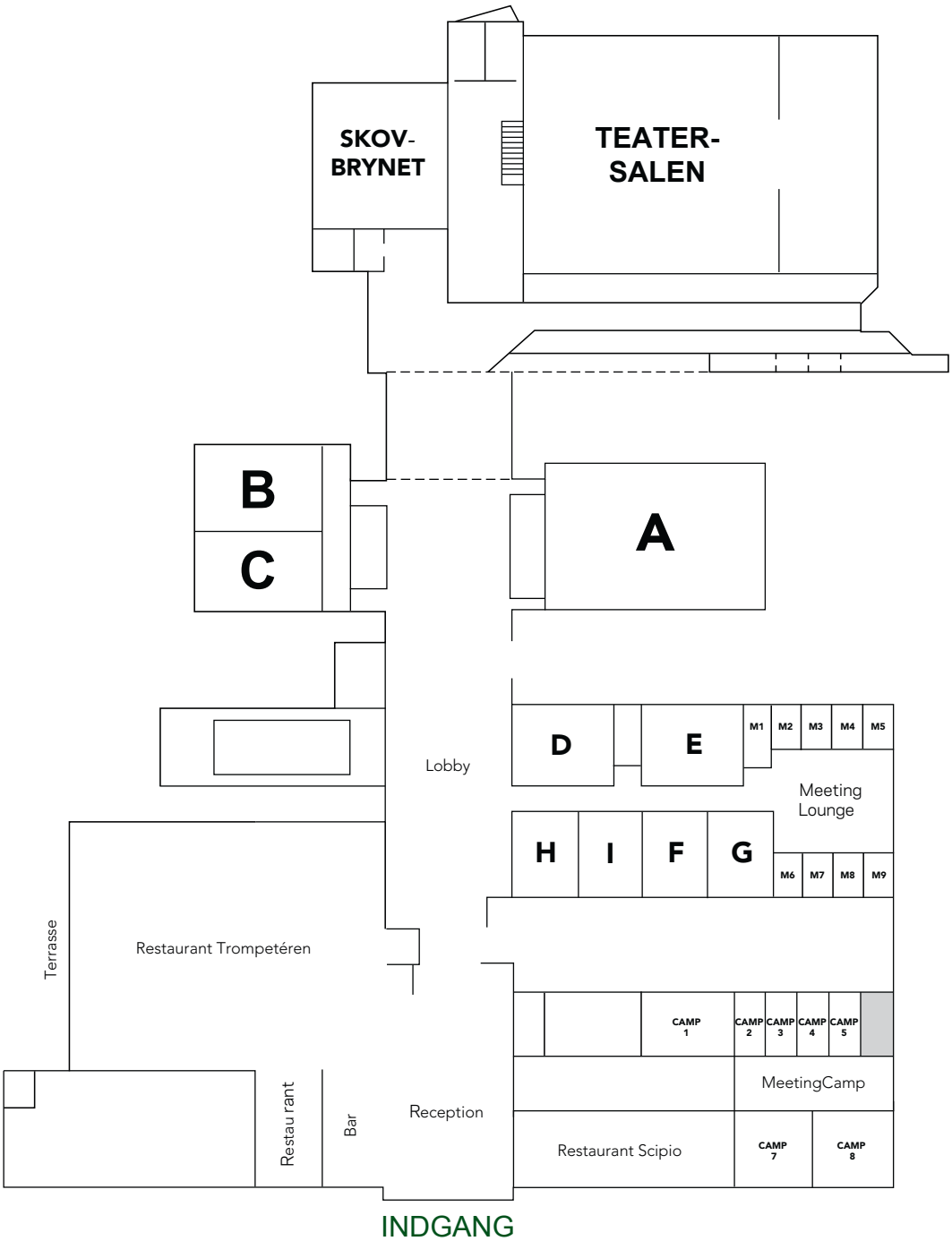

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INDHOLDSFORTEGNELSE

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Sectra Orthopaedics AB
Smith & Nephew A/S
Stryker Denmark
Surgi Team Health Solutions
Swemac Osmedic ApS
Viking Medical Scandinavia
Zimmer Biomet Denmark ApS

Lunchsymposier:

Onsdag kl. 12.20-12.50, Sal A
SECTRA: 3D-planlægning i daglig praksis

Torsdag kl. 12.50-13.20 Sal A
Bonesupport: CERAMENT® G and CERAMENT® V in FRI

Torsdag kl. 12.50-13.20 Sal B
Zimmer Biomet: Anterior approach to the hip in a new perspective

Arrangement i mødelokale "i":

Protesekompagniet: Prøv VELYS robotten til knæalloplastikker.
Tilmelding ved standen eller nb@protesen.dk

Session 1: Spine

13. November

09:00 - 10:30

Lokale: Sal B

Chair: Casper Dragsted & Haisheng Li

1. Instrumented fusion in one level spondylolisthesis causes hypolordosis at two-year follow-up - a secondary analysis of a randomized control trial

Andreas Duch Kiilerich Andersem[1], Niklas Tøndevold[2], Benny Dahl[2], Martin Gehrchen[2]
1. Rygkirurgsik afsnit, Rygcenter Syddanmark, Middelfart sygehus 2. Orthopeadic department U, Copenhagen University hospital, Rigshospitalet

Background: Degenerative spondylolisthesis (DS) is one of the most commonly treated spinal pathologies. In recent years there has been an increased focus on the sagittal balance of the spine; especially in adult spinal deformity. However, as most deformities in the elderly are iatrogenic, special attention should be addressed to first spinal procedure. While instrumentation creates a stable fixation, it may also alter the sagittal profile of the lumbar spine, especially if lordosis is not addressed and further activation of the compensatory mechanisms at the fused levels are compromised.
Aim: Examine the difference in the lordosis at the fused level regardless of fusion method
Materials and Methods: Patients scheduled for one-level fusion due to DS were randomized to either instrumented or un-instrumented in-situ fusion. Patients underwent 36" lateral X-rays before surgery and at one- and two-year follow up. Patient reported outcomes (PROs) were ODI, SF-36, EQ-5D VAS leg and -back. Radiological parameters measured were local lordosis at the spondylolisthesis (LS), Pelvic Incidence (PI), Pelvic Tilt (PT), Sacral Slope (SS) Sagittal Vertical Axis (SVA), Global Lordosis (GL), Segmental Lordosis (SL), lordosis at L4- S1(L4-S1) and Thoracic Kyphosis (TK).
Results: A total of 98 patients were eligible for inclusion, with 51 in the instrumented group. The mean age at surgery was 72 years, there we no preoperative differences in demographics, PROs and radiological parameters. The instrumented group had longer duration of surgery (124 vs 87 min; P <0.001) and increased blood loss (384 mL vs. 238 mL; P<0.0001). Mean LS was 16.8°, with no difference between groups (p=0.978). At two-year follow up, the instrumented group had significantly reduced lordosis at the fused level (LS) -2.6±4.2° vs. 1.3±5.0°, p=0.004. The difference in lordosis did not translate into a difference in PROs at two-year follow up.
Interpretation / Conclusion: We found that one-level instrumented fusion in degenerative spondylolisthesis resulted in hypolordosis at the instrumented level compared to un-instrumented fusion. Long-term studies will show if this increases the risk of developing ASD.

2. ABM/P-15 versus Allograft in Non-Instrumented Lumbar Fusion - 10 Year Follow Up on a Double Blind Randomized Controlled Trial

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 C, Denmark

Background: Lumbar spinal stenosis with degenerative spondylolisthesis is a common cause of disability and decreased function in the elderly. In some patients, fusion in combination with decompression is preferred to maintain segmental stability at the decompressed level. Few studies have investigated the long-term clinical and patient reported outcomes to guide surgeons and patients in shared decision making before surgery.
Aim: The purpose of the current study was to long-term patient reported outcomes (PROs), clinical status and reoperation rates in patients who underwent decompression and non-instrumented fusion.
Materials and Methods: Patients with degenerative spondylolisthesis scheduled for decompression and fusion on one- to two-levels were enrolled in a Randomized Controlled Trial and randomized 1:1 to either ABM/P-15 or allograft bone. Patient reported outcome measures(PROMs) and reoperation rates were collected at 1-, 2-, 5- and 10-year follow-up visits. PROMs included Oswestry Disability Index (ODI), Visual analogue scale (VAS) for back- and leg pain, EuroQol-5D(EQ-5D).
Results: Of 101 subjects enrolled, 78 patients were alive at 10-year follow-up and complete follow-up was available in 57 (73%) patients, 30 in the ABM/P-15 group and 27 in the Allograft. There were no differences in our primary outcome measure ODI (22.8±20.7 vs 28.5±23.3, p=0.337) between the ABM/P-15 group and Allograft at 10 year follow-up We found significant improvements in PROs in both groups, which were still significantly improved from baseline at ten-year follow up. A total of 31 reoperations were performed, 10 in the ABM/P-15- versus 21 in the Allograft-group (p=0.0495), interestingly re-operated patients showed similar improvements at 10-year follow up as non-re- operated.
Interpretation / Conclusion: Although no difference in PROs between the AMB/P-15 vs Allograft group at 10-year follow up were seen, there were significantly more reoperations in the Allograft- compared to the AMB/P-15 group, which may be associated with cost-savings. Our study suggest that patients can expect long-term relief of pain and improvement of function regardless of the need for an additional surgery over a 10-year period.

3. Predicting Two –Year Outcomes of Lumbar Spinal Stenosis Surgery: Utility of the Modic Change Grading Score

Peter Muhareb Udby[1, 2], Søren Ohrt-Nissen[2], Dino Samartzis[3], Leah Carreon [4]
1. Spine Unit, Zealand University Hospital 2. Spine Unit, Rigshospitalet 3. Department of Orthopedic Surgery, Rush University, Chicago, USA 4. Middelfart Spine center - part of sygehus Lillebaelt, Denmark

Background: Modic changes (MC) are a common phenotypic finding on MRI in patients with low back pain (LBP). In patients with LBP and degenerative spine conditions undergoing surgery, MC have been associated with worse patient-reported outcomes (PROs). A clinically relevant MC grading type have been suggested by Udby and Modic et al. No previous studies have evaluated the association between MC grading and PROs following LSS surgery.
Aim: To evaluate the utility of the MC grading score in lumbar spinal stenosis patients
Materials and Methods: Patients from the Danish national spine registry, DaneSpine, scheduled for LSS surgery were identified. MC was defined and graded according to the Udby and Modic et al. classification. In addition, preoperative and two-year postoperative data were collected including demographics (age, BMI, smoking etc.) and PROs consisting of pain scores - Visual Analogue Scale for back pain (VAS-BP) and leg pain (VAS-LP); and physical disability score - Oswestry Disability Index (ODI).
Results: In total, n=208 patients were included, 15% (31 pts) with MC grade A and 85% (177 pts) with MC grade ≥B. There was no significant difference in preoperative age,BMI or smoking between the two groups - 68 vs. 67 years (p=0.746); 27 vs. 28 kg/m2 (p=0.370); 19% vs 18% smokers (p=0.546). There was no significant difference in preoperative pain or disability scores, VAS-back (VAS-BP) or leg pain (VAS-LP) and Oswestry Disability Index (ODI), p>0.1. At two-year follow-up after LSS surgery, patients with MC grade ≥B had significantly worse pain scores, VAS-BP - 32 vs. 44 (p=0.045) and VAS- LP - 27 vs. 45 (p=0.003). Physical disability was significantly worse at two-year follow-up in the MC grade ≥B group, ODI score - 22 vs. 30 (p=0.036).
Interpretation / Conclusion: This is the first study to evaluate the association between the MC grading score and PROs in patients undergoing LSS surgery. MC grade ≥B was associated with significantly worse pain scores and increased disability at two-year follow-up. We suggest, that future studies include the MC grading score in order to investigate the possible impact of MC phenotypes on PROs.

4. Measuring quality of recovery (QoR-15) after degenerative spinal surgery: A prospective observational study

Marianne Lorenzen[1,2], Casper Pedersen[1,2], Leah Carreon[1,2], Jane Clemensen[3,4,5,6], Mikkel Andersen[1,2]

1. Spine Surgery & Research, Spine Center of Southern Denmark, Lillebaelt Hospital, – University Hospital of Southern Denmark, Middelfart, Denmark 2. Institute of Regional Health Research, University of Southern Denmark, Odense, Denmark 3 Hans Christian Andersen Children's Hospital, Odense University Hospital, Odense, Denmark 4 Center for Innovative Medical Technology, Odense University Hospital, Odense, Denmark 5 Centre for Compassion in Healthcare, Clinical Institute/Institute for Regional Health Research, SDU, Denmark 6 Department of Clinical Research, University of Southern Denmark, Odense, Denmark

Background: The Quality of Recovery (QoR-15) score evaluates patient's recovery after surgery and anesthesia. There is a lack of studies focusing on the patients' quality of recovery in the early post-discharge phase after elective lumbar spine surgery.
Aim: We aimed to identify the QoR-15 score in patients who underwent surgery for degenerative low back conditions. Furthermore, we aimed to identify the individual items of the QoR-15 that are crucial for the patients' quality of recovery.
Materials and Methods: The study was conducted at a spine center in Denmark from December 2021 to September 2022. Data were collected, using a mobile health application, preoperatively and at 3 time points after hospital discharge. Descriptive analysis followed by within-subjects longitudinal repeated measures was conducted. The individual items of the QoR-15 score were explored using a heatmap.
Results: Data from 46 patients were analyzed. The mean QoR-15 sum score at baseline was 105.4 ± 18.3. The mean QoR-15 sum scores were 108.1 ± 19.2 on post-discharge day 1, 118.5 ± 17.4 on day 7, and 120.7 ± 20.9 on day 14. The mean QoR-15 score from day 1 to day 7 improved significantly. Eight of the 15 items influenced the overall QoR-15 score.
Interpretation / Conclusion: This study applied the QoR-15 score in lumbar spine surgery patients. We identified specific items from the QoR-15 scale that are crucial to improving patients' recovery after hospital discharge. Further research is needed to identify specific needs in the post-discharge period in this group of patients.

5. Effect of early surgical intervention in traumatic spine fractures: A Retrospective Study

Charlotte Mosbak Festersen[1], Josefine Lysen[1], Peter Muhareb Udby[1], Søren Ohrt-Nissen [1], Line Parst Sørensen[1], Martin Heegaard[1], Martin Gehrchen[1], Benny Dahl[1]

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

Background: Surgical management of spinal fractures is considered if stability, alignment and/or neurological function is compromised. Preoperatively, patients are often immobilized, while full mobilization is permitted after surgical stabilization. In other types of skeletal trauma there is a strong association between surgical delay and postoperative complications, but whether this association exists for spinal trauma is unknown.

Aim: The purpose of this study was to determine if the prognosis and mortality after spinal fractures were related to the timing of surgery, and to investigate factors associated with hospital readmission.

Materials and Methods: This was a single-center retrospective cohort study on patients with traumatic spine fractures undergoing surgical stabilization from October 2016 to April 2022. Patients were identified from the hospital's database. Individual clinical information was collected from journal records including age, gender, time of radiographic diagnosis, time of primary spine surgery, 30-day hospital readmission and two-year survival status.

Results: We included 565 patients (69% males). In the cervical region there was 22% (n=126) of the fractures, 41% (n=231) in the thoracic region, 33% (n=185) in the lumbar region and 4% (n=23) in multiple regions. Of the traumas, 62% (n=352) were low-energy and 38% (n=213) high-energy. Within 30 days, 15% (n=82) of the patients were readmitted. Mean time from trauma to surgery was 9.1 days vs. 13.8 days in the non- readmission and readmission groups, respectively (p=0.117). In the non-readmission group, 19% underwent surgery within 48 hours compared to 17% in the readmission group (p=0.704). In the non-readmission group, two- year mortality was 9% vs. 28% in the readmission group (p<0,001). Mean age was 55.8y vs. 63.1y (p=0.002). There was no significant difference in the distribution of low- vs. high-energy trauma or fracture levels between groups.

Interpretation / Conclusion: This study suggests that late surgery (>48h) in patients with traumatic spine injury is not associated with a significantly higher risk of hospital readmission, however increased age is. The two- year mortality was significantly higher in patients who were readmitted compared to those who were not.

6. Does patients with multiple myeloma and vertebral compression fracture have slower recovery of pain than patients with osteoporosis and vertebral compression fracture?

Line Adsbøll Wickstrøm[1,2], Mikkel Østerheden Andersen[1,2], Leah Carreon[1,2]
1. Centre for Spine Surgery and Research, Region of Southern Denmark, Østre Hougvej 55, DK-5500, Middelfart, Denmark 2. Department of Clinical Research and Institute of Regional Health Research, University of Southern Denmark, Winsløwparken 19, 3, DK-5000, Odense C, Denmark

Background: Multiple myeloma (MM) is a plasma cell cancer and is associated with osteoclastic bone degradation and inhibited osteoblast function, causing increased bone breakdown and inhibited regeneration of new bone. This leads to a high risk of vertebral compression fracture (VCF). Patients with osteoporosis are also in risk of having VCF. However, as bone regeneration is not affected in osteoporotic patients, one might hypothesize that patients with MM experience protracted healing due to inhibition of new bone formation.
Aim: Our objective is to compare pain scores from baseline to week 1 to 4 for MM patients and osteoporosis patients with VCF.
Materials and Methods: The patients consisted of two groups followed in an ongoing and an earlier randomized controlled trial, investigating the effect of vertebral augmentation in patients with MM and patients with osteoporosis, respectively. All patients in the current study had non-surgical treatment, and Visual Analogue Score (VAS) back pain were measured at inclusion and in week 1-4 after inclusion. The data was analyzed in STATA/BE 17.0, using a two-sided t-test for differences between baseline and follow-up within each patient group. It was also used to test for difference in difference between the groups at each subsequent time point.
Results: 22 patients were available for analysis in the MM group and 24 in the osteoporosis group. In the MM group, we saw no statistical significant improvement in VAS back pain from inclusion to week 1 ($p = 0.11$), but a significant improvement was observed in week 2, 3 and 4 ($p = 0,04$, p 0 0,04, $p = 0,03$). In the osteoporosis group there was a significant improvement in VAS back pain from inclusion to all 4 time points ($p < 0.0001$). When comparing the MM and osteoporosis group we see no difference between the groups at baseline ($p = 0,30$). The decrease in VAS back pain relative to baseline was significantly higher in the osteoporosis group than in the MM group in week 1-4 ($p = 0,0035$, $p = 0,0017$, $p < 0,0001$, $p < 0,0001$).
Interpretation / Conclusion: Patients with MM and osteoporosis and VCF experience pain relief in a period of 4 weeks. However, patients with MM improve to a lower extend within the period compared with patients with osteoporosis.

7. Can Coronal Deformity Angular Ratio Predict Progression in Adolescent Idiopathic Scoliosis?

Lærke Ragborg[1,2], David Thornberg[2], Megan Johnson[2], Amy McIntosh[2], Daniel Sucato[2], Martin Gehrchen[1], Benny Dahl[1], Søren Ohrt-Nissen[1]

1 Spine Unit, Department of Orthopedic Surgery, Rigshospitalet, Denmark 2 Texas Scottish Rite for Children, Dallas, Texas

Background: A limited number of studies have examined the relationship between C-DAR and curve progression. C-DAR is calculated as the Cobb angle magnitude divided by the number of vertebrae in the curve, yielding a larger value in short curves. Prior studies have shown curves involving fewer vertebras tend to be less flexible,

Aim: The purpose of this study was to assess whether C-DAR is a useful predictor for progression to surgical magnitude in AIS patients treated with TLSO.

Materials and Methods: Patients diagnosed with AIS, prescribed a full-time TLSO, major curve Cobb between 20-40°, Risser 0- 2, who wore the brace ≥12.9 hours and reached skeletal maturity/surgery were included. The main outcome of this study was to examine the association between C-DAR and the risk of progression to surgical magnitude (>45°). Logistic regression models included sex, curve location, BMI, in-brace correction (IBC) and Risser.

Results: A total of 165 patients with a mean Cobb angle of 30±6° were included. Of these, 46/165 (28%) progressed ≥6° and 26/165 (16%) had reached surgical magnitude at the end of treatment. At baseline, the groups differed significantly on CDAR, pre-treatment Cobb angle magnitude and IBC, but not on remaining variables (Table 1). Multiple logistic regression found that C-DAR was a significant predictor for risk of progression to surgical magnitude with an OR of 1.9 (CI 1.2-2.9) per unit increase in C- DAR. A threshold value of 5.15 was established. C-DAR exceeding 5.15 yielded an OR of 5.9 (CI 2.1-17.9).

Interpretation / Conclusion: C-DAR is an independent predictor for progression to a surgical magnitude in a compliant population even when adjusting for in-brace correction. Patients with a higher C-DAR should be counseled to help set realistic expectations in regard to likelihood of curve progression despite compliance with brace wear.

8. Perioperative opioid consumption in patients who undergo surgery due to spine related pain. -A Danish nationwide cohort study.

Andreas Kiilerich Andresen[1,2], Leah Y. Carreon[1,2], Carsten Bjarkam[3], Rune Bech[4], Simon Skov[5], Louise Møller Jørgensen[6], Rikke Rousing[7], Michael Nielsen[8], 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 C, Denmark. 3. Neurokirurgisk afdeling Aalborg Universitetshospital. 9000 Aalborg 4. Rygklinikken Sjællands Universitetshospital, Køge 5. Ortopædkirurgisk Rygklinik i Silkeborg, 8600 Silkeborg 6. Copenhagen Spine Research Unit at Copenhagen University Hospital – Rigshospitalet, 2600 Glostrup 7. Rygsektionen OUH Odense Universitetshospital, 5000 Odense 8. aCure Privathospital, 2800 Kgs. Lyngby

Background: During the last decade, the use of opioids in management of non-malignant pain has been a topic of interest to surgeons and politicians worldwide with reference to the "opioid epidemic" in the United States. Recent guidelines recommend limiting or avoiding preoperative opioid use, but high preoperative usage prevalence challenges implementation.
Aim: The purpose of the current study is to describe long- term opioid use following lumbar surgery to treat degenerative spine disease, and to characterize the risk factors associated with prolonged opioid use.
Materials and Methods: This is an observational study using the national Danish spine registry (DaneSpine) from 2016-2022, where all data is collected prospectively. Patients who underwent primary lumbar surgery to treat spinal stenosis, spondylolisthesis and disc herniation were included. We included patients from nine public and seven private spine facilities. Statistical analysis included descriptive statistics and Relative Risk analysis for factors associated with one-year postoperative opioid use.
Results: Data on pre- and postoperative use of pain medicine and opioids were available on 14.082 patients who underwent spine surgery due to spinal stenosis (n=7.932), disc herniation (n=4.573) and spondylolisthesis (n=1.577). 36% of patients were on prescription opioids before surgery, at one-year follow up 17.0% of patients were persistent users. ($p<0.001$). Overall, patients with preoperative opioid use had an increased relative risk (RR) of 4.58 ($p<0.001$) of being prolonged opioid users in all patient groups combined, this correlation was strongest for patients with spinal stenosis (RR=5.33, $p<0.001$). Modifiable risk factors for prolonged postoperative opioid use included pain duration, body mass index, smoking and comorbidities.
Interpretation / Conclusion: While opioid use is down overall during the seven- year study period, we found that preoperative opioid use, duration of pain, smoking and high BMI were all predictors for prolonged opioid use. Especially in patients who underwent surgery due to spinal stenosis, who were on opioids before surgery. This questions the current guidelines of prolonged conservative treatment and the prescription of opioids.

9. The effect of night-time versus full-time bracing on the sagittal profile in adolescent idiopathic scoliosis: a propensity score-matched study

Martin Heegaard[1], Lærke Ragborg[1,2], Amy L. Mcintosh[2], Megan E. Johnson[2], Martin Gehrchen[1], Daniel Sucato[2], Benny Dahl[1], Søren Ohrt-Nissen[1]

1. Spine Unit, Rigshospitalet, Copenhagen University Hospital, Denmark 2. Texas Scottish Rite Hospital For Children, Texas, USA

Background: Recent research indicates that brace treatment in adolescent idiopathic scoliosis (AIS) may induce hypokyphosis or even flat back deformity. Whether this effect differs between night-time bracing (NTB) and full-time bracing (FTB) is unknown.

Aim: The current study aims to investigate the impact of NTB and FTB on the sagittal profile in AIS patients.

Materials and Methods: We retrospectively included skeletally immature AIS patients with main curves ranging from 25-45° treated with either NTB or FTB. The two cohorts were propensity-score matched on Risser stage, age, major curve size, and global kyphosis at brace initiation. Coronal and sagittal radiographic parameters were gathered at the initiation and completion of brace treatment.

Results: Two-hundred seventy patients were eligible for inclusion. The matched cohorts included 73 patients in each group. The groups were well- matched although, in the NTB group, 85% were females compared with 69% in the FTB group (p=0.019). In the coronal plane, curve progression >5° was seen in 63% in the NTB group and 43% in FTB (p=0.012). Progression to >50° was seen in 45% vs. 29% (p=0.040), respectively. The global kyphosis increased during bracing from 33±12° to 37±13° in the NTB group compared to a decrease from 32±12° to 30±12° in the FTB group (p=0.001). Ten percent (n=7) were hypokyphotic (global kyphosis <20°) post bracing in the NTB group compared with 25% (n=18) in the FTB group (p=0.016). Pelvic incidence (PI) and sacral slope (SS) were similar post bracing between the two groups, with pelvic tilt (PT) being slightly different (PI: NTB 46° ±10, FTB 44° ±9, p=0.270; SS: NTB 39° ±8, FTB 40° ±9, p=0.530; PT: NTB 7° ±7, FTB 4° ±7, p=0.022).

Interpretation / Conclusion: Patients treated with a NTB were statistically more likely to experience frontal plane curve progression >5° (63%) and progression to a surgical magnitude (45%) when compared to FTB patients. Despite the frontal plane curve progression, the NTB group had more normal sagittal alignment, with fewer patients exhibiting global hypokyphosis (<20°) than the FTB at the completion of bracing.

10. Inter- and intrarater agreement using the AO spine-DGOU Osteoporotic Fracture (OF) Classification system

Shakib Ba-Ali, Rune D. Bech , Dennis W. Hallager
Rygsektionen & Center for Evidensbaseret Ortopædkirurgi Ortopædkirurgisk Afdeling Sjællands Universitetshospital, Køge & Institut for Klinisk Medicin Københavns Universitet

Background: The increasing incidence of osteoporotic vertebral fractures requires a reliable classification system as an integral part of therapeutic decision-making. The AO spine- DGOU Osteoporotic Fracture (OF) Classification system offers a structured approach, yet its reproducibility using different imaging modalities has not previously been investigated.
Aim: The purpose of this study was to assess the inter- and intra-rater reliability of the AO spine- DGOU osteoporotic Fracture Classification system among spine surgeons using radiography and computed tomography (CT).
Materials and Methods: Radiography and CT scans were retrieved from 64 consecutive patients diagnosed with an osteoporotic vertebral fracture having the two imaging modalities performed on the same date. Four spine surgeons used 10 cases for training and then independently classified the 64 fractures twice in a blinded manner. Classifications were made on radiography and CTs separately. After at least one week, the classifications were repeated. Crude agreement (%) and Fleiss' Kappa (k) were calculated for radiography and CT separately and for intra- rater agreement between radiography and CT. The difference in Interrater agreement between radiography and CT was compared by testing the difference in proportion of cases where all raters agreed (concordant cases) using McNamar's test for paired categorical observations.
Results: Inter-rater agreements were 56% with k 0.49 (95% CI: 0.41-0.57) using radiography assessment, and 50% with k 0.51 (95%CI: 0.44- 0.57) using CT scans. Intra-rater agreement ranged 75-81% with k 0.49-0.64 for the two radiography assessments across the four raters, and 64-77% with k 0.42-0.63 for CT scans. Intra-rater agreements between radiography and CT were 50-73% with k 0.2 to 0.53. The proportions of concordant inter-rater observations were not significantly different between radiography (56%) and CT assessments (50%), p=0.37.
Interpretation / Conclusion: Conclusions: The study indicates moderate reliability of the AO Spine-DGOU Classification system across radiographs and CT, which corresponds to previous study findings. Using CT scans does not seem to increase reproducibility of the classification.

Session 2: Trauma

13. November

09:00 - 10:30

Lokale: Sal C

Chair: Mette Rosenstand & Arvind von Keudel

11. Two-year follow-up of the VOLCON randomized controlled trial investigating outcome of volar plating vs casting of unstable distal radius fractures in patients older than 65 years

Daniel Wæver[1], Karen Larsen Romme[1], Jan Duedal Rölfing[2], Rikke Thorninger[2]
1. Department of Orthopaedics, Regional Hospital Randers; 2. Department of Orthopaedics, Aarhus University Hospital.

Background: The treatment of unstable distal radius fractures (DRF) in elderly has been debated in recent years. Several randomized controlled trials (RCTs) conclude similar functional outcomes in non-operative vs. operative treatment after 1 year. Long-term follow-up regarding post-traumatic osteoarthritis are lacking.
Aim: Primary: to compare post-traumatic osteoarthritis in non-operatively vs. operatively treated unstable DRF. Secondary: to compare functional outcome.
Materials and Methods: Two-year follow-up of a single-center, assessor-blinded RCT of unstable DRF. 50 patients: volar locking plate, 2 weeks casting and 3 weeks orthosis. 50 patients: 5 weeks casting. Primary outcome: radiological post-traumatic osteoarthritis according to Jupiter and Knirk was assessed after 5 weeks and 2 years. Secondary outcome: Quick-DASH, PRWHE, range of motion (ROM), grip strength, and pain at 2-year follow-up.
Results: Of the 100 patients included for the primary study, 60 were available for the 2-year follow-up (non-operative: 28, operative: 32). Between the 1- and 2-year follow-up, 25 patients were excluded (death: 5, lost to follow-up: 6, excluded due to other sickness: 14). We found a higher degree of post-traumatic osteoarthritis after 2 years. However, according to two-way ANOVA analysis time accounted for 25% ($p<0.001$), the subject for 47% ($p=0.004$), and treatment only for 0.3% ($p=0.565$) of total variation. We found no statistically significant difference between groups regarding Quick-DASH, PRWHE, ROM, grip strength or pain.
Interpretation / Conclusion: The degree of post-traumatic osteoarthritis and functional outcome was similar between non-operatively and operatively treated unstable DRF in patients >65 years after 2 years.

12. Psychiatric diseases increase the risk of mortality and reoperation among hip fracture patients: a population-based study

Simon Storgaard Jensen[1], Per Hviid Gundtoft[2], Jan-Erik Gjertsen[3], Alma B. Pedersen[1]
1. Department of Clinical Epidemiology, Department of Clinical Medicine, Aarhus University and Aarhus University Hospital, Aarhus, Denmark. 2. Department of Orthopedic Surgery, Traumatology, Aarhus University Hospital. 3. Department of Orthopedic Surgery, Haukeland University Hospital, Norway. Department of Clinical Medicine, University of Bergen, Norway.

Background: Reoperation is a common complication following hip fracture surgery. Despite the rising burden of psychiatric diseases worldwide, these patients are often excluded or deprioritized in studies. Hence, the impact of these diseases on mortality and the risk of reoperation remains unclear.
Aim: To examine mortality and the risk of reoperation after hip fracture surgery, comparing patients with or without psychiatric diseases.
Materials and Methods: Patients undergoing surgery for their first hip fracture were identified in the Danish Multidisciplinary Hip Fracture Registry. The history of psychiatric diseases was collected using diagnose codes in the Danish National Patient Registry for the 10-year period preceding index surgery. Reoperations were identified using surgical procedure codes from the Danish National Patient Registry. Reoperation was defined as any secondary surgical intervention on the same hip within one year of the index surgery. We calculated mortality risk and reoperation rate with 95% confidence intervals (CI), treating death as a competing risk.
Results: We included 110,625 hip fracture patients from 2004 to 2021, of which 15,254 (14%) had any psychiatric diseases. These patients had an increased one-year mortality rate of 35% (CI: 34-36) compared to 25% (CI: 24-25) for patients with non-psychiatric diseases. The reoperation rate within one year was 9.9% (CI: 9.5-10.4) for patients with psychiatric diseases compared to 10.3% (CI: 10.1-10.5) for patients without psychiatric diseases. The most common psychiatric diseases in the cohort were dementia, depression, neurotic disorders, and substance abuse, with reoperation rates of 8.1%, 12.3%, 14.4%, and 15%, respectively.
Interpretation / Conclusion: When compared to patients without psychiatric diseases, hip fracture patients with any psychiatric diseases had markedly increased mortality. Hip fracture patients with or without any psychiatric diseases have similar reoperation rates within one year. However, patients with a history of depression, neurotic disorders, or substance abuse had a higher reoperation rate. These findings underline the importance of targeted prevention strategies for these patients.

13. Time to mobilization in hours after surgery for hip fracture and 30-day mortality – A 6-year nationwide register study on 36,229 patients in Denmark

Morten Tange Kristensen[1,2], Ina Trolle Andersen[3,4], Alma Becic Pedersen[3,4]
1. Department of Physical and Occupational Therapy, Bispebjerg-Frederiksberg Hospital 2. Department of Clinical Medicine, University of Copenhagen 3. Department of Clinical Epidemiology, Aarhus University Hospital 4. Department of Clinical Medicine, Aarhus University

Background: Mobilisation within the first postoperative day is recommended for reducing 30-day mortality. However, no data are available on time in hours for mobilisation and hip fracture outcome.
Aim: We examined whether the time in hours for mobilization within the first 36 hours after surgery for a hip fracture was associated with 30-day post-surgery mortality.
Materials and Methods: 36,229 patients (67.3% women), 65 years or older undergoing surgery for a first-time hip fracture included in the Danish Multidisciplinary Hip Fracture Register from January 2016 through December 2021, were included. Exposure categories were time in hours to mobilisation (≤6, >6-12, >12-18, >18- 24, >24-30 and >36 hours) from start of surgery. Outcome was mortality within 2-30 days of surgery (0.7% died before day 2). Time for mobilisation was missing for 4,401 patients of whom 16.3% died within 30 days. We calculated risks, risk differences (RD) and hazard ratios (HR) with 95%CIs using inverse probability of treatment weighted method to account for confounding; age, sex, surgery year, fracture type, time to surgery, residential status, BMI, pre-fracture mobility (CAS) and comorbidities.
Results: 30-day mortality risk for those mobilized ≤6 (n=1,503), >6-12 (n=4,509), >12-18 (n=8,351), >18-24 (n=12,730), >24-30 (n=2,636) >30-36 (n=254) and >36 (n=1,764) hours post-surgery were respectively 5.18% (4.13,6.39), 5.27% (4.65,5.94), 7.87% (7.30,8.46), 9.16% (8.66,9.67), 10.45% (9.32,11.66), 10.24% (6.89,14.34) and 15.83% (14.16,17.57). The RD and adjusted HR for 30-day mortality for those mobilized >24-36 versus ≤18 hours were respectively 2.26% (1.12, 3.40) and 1.33 (1.16,1.52). Comparing those mobilized >24-36 versus ≤24 hours, RD was 1.63 (0.51,2.76) and adjusted HR was 1.21 (1.07-1.37).
Interpretation / Conclusion: The risk of 30-day mortality increases with the increasing time in hours to mobilisation after surgery for a first-time hip fracture. Thus, we should aim for early mobilisation as soon as possible, not as < or > 24 hours post-fracture.

14. Impact of diabetes on the risk of subsequent fractures in 92,600 patients with an incident hip fracture: A Danish nationwide cohort study 2004-2018

Dennis Vinther[1], Reimar W. Thomsen[1], Ove Furnes[2,3], Jan-Erik Gjertsen[2,3], Alma B. Pedersen[1]
1. Department of Clinical Epidemiology, Department of Clinical Medicine, Aarhus University and Aarhus University Hospital, Aarhus, Denmark 2. The Norwegian Arthroplasty Register, Department of Orthopaedic Surgery, Haukeland University Hospital, Bergen, Norway. 3. Department of Clinical Medicine, University of Bergen, Bergen, Norway.

Background: Diabetes affects skeletal fragility and risk of hip fracture (HF).
Aim: We investigated the cumulative incidence rates of a subsequent HF and fractures other than HF after incident HF in patients with and without diabetes.
Materials and Methods: Using Danish medical databases, we identified 92,600 incident HF patients in the period 2004-2018. Diabetes was examined overall, by type of diabetes (T2D and T1D), and by presence of diabetes complications. We estimated cumulative incidences within two years of the incident HF. Using cause- specific Cox regression, adjusted hazard ratios (aHRs) with 95% confidence interval (CI) were calculated.
Results: Among incident HF patients, 11,469 (12%) had diabetes, of whom 10,253 (89%) had T2D and 1,216 (11%) had T1D. The 2-year incidence rates for a new subsequent HF were 4.8% (95% CI: 4.6-4.9) for patients without diabetes, 4.1% (CI: 3.8-4.6) for T2D, and 4.3% (3.3-5.6) for T1D. aHRs were 1.01 (0.90-1.14) for T2D and 1.17 (0.87-1.58) for T1D compared to patients without diabetes. There was effect modification by sex, as women with T1D had an aHR of 1.52 (1.09- 2.11) for subsequent HF, and by specific diabetes complications (for example, patients with T2D and prior hypoglycemic events had an aHR of 1.75 (1.24-2.42) for subsequent HF, while patients with T1D and neuropathy had an aHR of 1.73 (1.09-2.75), when compared with patients without diabetes). For fractures other than HF, the 2-year incidence rates were 7.3% (7.2-7.5) for patients without diabetes, 6.6% (6.1-7.1) for T2D, and 8.5% (7.0- 10.1) for T1D. aHRs were 1.01 (0.92-1.11) for T2D and 1.43 (1.16-1.78) for T1D compared to patients without diabetes. T2D was only a risk factor for fractures other than HF among HF patients of high age (age 86-89 years: aHR 1.22 (0.99-1.55), age 90+ years: aHR 1.37 (1.08- 1.74)), whereas T1D was robustly associated with increased risk of fractures other than HF in all subgroups.
Interpretation / Conclusion: Among HF patients, we found no strong overall association of T2D or T1D with increased risk of subsequent HF, but diabetes patients with prior hypoglycemic events or neuropathy were at increased risk. In contrast, patients with T1D had a clearly increased risk of subsequent fractures other than HF.

15. Interaction effect and excess risk of infection after hip fracture surgery in multimorbid patients: a nationwide registry-based cohort study of 92,599 patients

Cecilia Majlund Hansen[1], Nadia Roldsgaard Gadgaard[1], Christina M. J. E. Vandenbroucke-Grauls[1,2], Nils P. Hailer[3], Alma Becic Pedersen[1]

1. Department of Clinical Epidemiology, Aarhus University and Aarhus University Hospital, Denmark 2. Department of Medical Microbiology and Infection Control, Amsterdam University Medical Centers, The Netherlands 3. Department of Surgical Sciences, Orthopedics, Uppsala University, Sweden

Background: Infection in general is a common and serious complication after hip fracture (HF) surgery, with pneumonia being the most frequent. Multimorbidity is highly prevalent in HF patients and is associated with elevated risk of infections. It is unclear whether multimorbidity interacts with HF to increase infection risk beyond their individual additive effects.

Aim: The aim of this study is to investigate the interaction effect between multimorbidity and HF surgery on the risk of any kind of post-surgical infection.

Materials and Methods: Using nationwide Danish registries, we identified 92,599 patients ≥65 years surgically treated for HF between 2004 and 2018. Matched on age and sex, a comparison cohort from the general population without HF (n=462,993) was randomly collected. Multimorbidity was defined using the Charlson Comorbidity Index in categories of no (score 0), moderate (score 1-2) or severe (score ≥3) multimorbidity. We computed incidence rates (IR) of any hospital-treated infection within 1 month and 1 year with 95% confidence intervals and estimated the interaction contrast based on the differences in IRs.

Results: The IR of infection within 1 month was 181 (176-186) per 100 person years in HF patients with no multimorbidity and 9 (95% CI 8-9) in the comparison cohort with no multimorbidity. The IRs were 240 (234-246) and 302 (291-313) in HF patients with moderate and severe multimorbidity compared with 17 (16-18) and 31 (30-33) in the comparison cohort with same multimorbidity level. Based on this, 21% and 33% of the IR within 1 month among HF patients with moderate and severe multimorbidity respectively was explained by interaction. Similar interaction was observed for 1 year follow-up.

Interpretation / Conclusion: Multimorbidity and HF surgery interact synergistically, which substantially increases the risk of infection. The interaction effect increased with multimorbidity level. Thus, multimorbid patients undergoing HF surgery are particularly vulnerable, and our findings highlight the potential benefits of implementing more targeted and personalized initiatives for multimorbid HF patients with aim of prevention, early detection, and early treatment of infections.

16. Socioeconomic position and infection risk after hip fracture surgery: a nationwide cohort study of 54,853 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: Infections are among the most frequent and serious complications of hip fracture surgery.

Aim: To investigate the role of socioeconomic position (SEP) on infection risk, and markers of poor health or frailty as effect modifiers.

Materials and Methods: Individual-level data on SEP markers (education, liquid assets, marital status, and cohabitation) were obtained from Danish population-based medical registries for a cohort of hip fracture patients who underwent surgery between 2010-2018. The primary outcome was any hospital-treated infection within one month after surgery. We computed cumulative incidences and used Cox regression to estimate adjusted hazard ratios (aHRs) with 95% confidence intervals for the different SEP categories. Analyses were stratified on pre-fracture comorbidity clusters, body mass index (BMI), pre-fracture mobility, and residence type.

Results: The incidence of hospital-treated infection ranged between 15% and 19% for different SEP markers. All markers of low SEP were associated with increased risk of infection. For instance, the aHRs were 1.10 [1.02-1.18] among patients with low vs. high education, 1.21 [1.15-1.28] for low vs. high liquid assets, 1.24 [1.15-1.32] for divorced vs. married, and 1.16 [1.06-1.28] for living alone vs. cohabiting. Stratified analyses showed that incidence of infection was highest in the diabetic-renal comorbidity cluster, among underweight patients, those with poor mobility, or living in nursing home. Associations between markers of SEP and infections varied when stratified by comorbidity clusters, BMI, mobility, and residence type.

Interpretation / Conclusion: Not cohabiting, any unmarried status, low liquid assets, and low education were associated with 10% to 24% increased risk of infection within one month after hip fracture surgery. Comorbidity clusters, BMI, mobility, and residence type did modify the associations.

17. Is the Tip-Apex-Distance associated with the risk of reoperation after osteosynthesis with DHS in femoral neck fractures?

Jacob Schade Engbjerg[1,2,4], Rune Dall Jensen[2,4], Michael Tjørnild[1], Rikke Thorninger[3], Jan Duedal Rölfing[2,3,4]

1 Department of Orthopaedics, Regional Hospital Randers. 2 MidtSim, Central Denmark Region. 3 Dept. of Orthopaedics, Aarhus University Hospital. 4 Dept. of Clinical Medicine, HEALTH, Aarhus University

Background: Dynamic hip screw (DHS) fixation is a common surgical procedure for femoral neck fractures (FNF). Tip-apex distance (TAD), is a radiographic measurement used to assess the position of the screw in the femoral head. Studies suggest that a TAD > 25 mm is a risk factor for screw cut-out. Failure of the DHS (e.g. cut-out) often results in reoperation and is associated with prolonged pain and mobility.

Aim: This study investigates the association between TAD and postoperative complications following DHS osteosynthesis of FNF.

Materials and Methods: A retrospective review was conducted of all patients undergoing DHS treatment for FNF at Regional Hospital Randers between 2015 and 2021 (n=325). Patients were identified through Central Denmark Region's Business Intelligence-portal using diagnosis code DS720. The primary outcome measure was a composite of complications identified on radiographs (cut- out, non-union, femoral head necrosis), reoperation, or death within one year. Radiographs were evaluated for TAD and postoperative complications / reoperations. Mann Whitney test was applied to assess the data.

Results: The overall complication and reoperation rate was 47 of 325 (14.5%) patients within 1 years, and 52 of 325 patients (16.0%) within 2 years. Mortality after 1 year was 16% and 26% after 2 years. The median TAD was 16.3 mm (IQR 13.8;18.7)), with no statistically significant difference (p = 0.56) between patients with and without complications < 1 year, TAD 16.3 mm (IQR 13.7;18.7) vs. 16.7 mm (IQR 14.1;19.2). No statistically significant difference was found between patients with and without complications < 2 years (p=0.99), TAD 16.3 mm (IQR 13.7;18.7) and 16.6 mm (IQR 14;18.5). Interestingly, there were 53/325 TAD > 20 mm and 6/325 TAD >25 mm in total.

Interpretation / Conclusion: We report no association between TAD and complication rates following DHS fixation for FNF. The relatively few TAD outliers did not result in an increased risk of complications.

18. Complication Rates and Additional Surgery Following Implementation of a New Clinical Guideline for the Treatment of Distal Radius Fractures in Adults

Jens-Christian Vedel[1,2], Stig Brorson[1,3], Dennis Winge Hallager [1,3]
1. Center for Evidensbaseret Ortopædkirurgi Ortopædkirurgisk Afdeling, Sjællands Universitetshospital, Køge 2. Sjællands Universitetshospital, Nykøbing F 3. Institut for Klinisk Medicin Københavns Universitet

Background: Based on randomized trials comparing surgical procedures and implants for dorsally displaced distal radius fractures (DDDRF), Zealand University Hospital implemented a new evidence-based clinical guideline on August 1st, 2020. The guideline recommended closed reduction and percutaneous pinning (PP) as the primary treatment over open reduction and volar locking plate fixation (VLP), provided that acceptable reduction and stable fixation could be achieved with PP alone. Subsequently, the proportion of DDDRF cases treated surgically with VLP decreased from 100% to 44%, while PP increased from 0% to 56% in the year following guideline implementation.
Aim: This study aims to assess whether the increased use of PP over VLP was accompanied by increased complication rates and additional surgery.
Materials and Methods: Adult patients treated surgically for forearm fractures between January 1st, 2019, and December 31st, 2019 (group 1, pre-guideline implementation), and between August 1st, 2020, and July 31st, 2021 (group 2, post-guideline implementation), were screened for inclusion. Patients with DDDRF were included, while exclusion criteria encompassed high-energy or open fractures, prior fractures, concurrent fractures, neurovascular compromise, and patients reliant on walking aids or those who refused data use. The follow-up period extended from the fracture date until March 1st, 2024. Rates of complications and additional surgeries during the follow-up were compared between group 1 and group 2 using Pearson's Chi- squared test.
Results: The analysis included 248 cases. Median follow-up was 57 months for group 1 and 36 months for group 2($p<0.001$). In group 1, 13% (17 out of 136) experienced at least one complication compared to 6% (7 out of 112) in group 2 ($p=0.10$). Within the follow-up period, 13% (17 out of 136) of group 1 patients underwent secondary surgery compared to 8% (9 out of 112) in group 2 ($p=0.3$).
Interpretation / Conclusion: No statistically significant difference was observed in complication rates and additional surgery during the follow-up period before and after the practice change endorsing PP over VLP as the primary surgical approach for DDDRF.

19. Early mobilization following hip fracture surgery and subsequent risk of infection

Thomas Johannesson Hjelholt[1], Ina Trolle Andersen[2], Morten Tange Kristensen[3], Alma Becic Pedersen[2]
1Department of Geriatrics, Aarhus University Hospital 2Department of Clinical Epidemiology, Aarhus University Hospital and Aarhus University 3Department of Physical and Occupational Therapy, Copenhagen University Hospital, Bispebjerg and Frederiksberg and Department of Clinical Medicine, University of Copenhagen

Background: Mobilization within the first day following hip fracture surgery is recommended as gold standard to reduce mortality and postoperative complications. However, an in-depth analysis of the association between early mobilization and risk of infection is lacking.
Aim: To evaluate the association between early mobilization and subsequent risk of infection.
Materials and Methods: Using the Danish Multidisciplinary Hip Fracture Registry, we included 36,229 patients aged 65 years or older undergoing surgery for hip fracture during 2016-2021. Within 2-30 days after surgery, we studied outcomes of any hospital-treated infection, pneumonia, urinary tract infection, and sepsis. Reoperation due to surgical-site infection was studied within 2-365 days. We calculated risks, risk differences (RD) and hazard ratios (HR) with 95% confidence intervals (CIs) using inverse probability of treatment weighted method to account for confounding.
Results: Overall, 27,174 (75%) patients were mobilized <24 hours, 2,890 (8%) were mobilized between 24-36 hours, and 6,165 were mobilized >36 hours of surgery or had no registration of mobilization time. Patients mobilized <24 vs 24-36 hours had similar characteristics. Risk of any infection was 12.9% (CI 11.7%-14.2%) in patients mobilized 24-36 hours of surgery and 10.9% (CI 10.5%-11.7%) in those mobilized <24 hours, corresponding to RD of 2.0% (CI 0.7-3.3) and HR of 1.2 (CI 1.1-1.3). Similar associations were observed for pneumonia, urinary tract infection, and reoperation, but not for sepsis.
Interpretation / Conclusion: Infection is a common complication after hip fracture surgery. Mobilization within 24 hours is clearly associated with reduced infection risk. Our results emphasize the importance of early mobilization and suggest a possible pathway for reducing infection risk thereby possibly reducing mortality.

20. Socioeconomic inequality in infection risk after hip fracture surgery: A nationwide temporal trend from 2010 to 2021

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: Lower socioeconomic position (SEP) is associated with elevated risk of infection after hip fracture surgery.

Aim: To examine whether socioeconomic inequality in infection risk decreased during 2010-2021.

Materials and Methods: Using Danish population-based registries, we identified 74,068 hip fracture patients and their data on SEP markers (education, liquid assets, marital status, living arrangements). We studied any hospital-treated infection and community- treated infection, within 30 days of surgery by four calendar periods. We computed cumulative incidences, and measured inequality over time by estimating adjusted hazard ratios, adjusted relative index of inequality, and adjusted slope index of inequality, all with 95% confidence intervals.

Results: Incidences of hospital-treated infection, ranging between 14% and 21%, and community-treated infection, ranging between 21% and 38%, were higher in patients with low vs high SEP, and increased during 2010- 2021 across all SEP markers. Inequality by education and by liquid assets for both outcomes remained unchanged over time. Inequality by marital status increased for both outcomes over time, while inequality by living arrangements increased for hospital-treated infections only indicating increasing gap in infection risk between unmarried and married patients, and between non-cohabitant or residential-care and cohabitant patients.

Interpretation / Conclusion: Educational and liquid assets inequality in 30- day infection risk after hip fracture surgery remained stable during 2010-2021, whereas an increase in inequality was observed by marital status and living arrangement. Our results indicate a growing health access gap between hip fracture patients with and without social support or those reliant on informal or residential care which could affect infection prevention and treatment.

Session 3: Knee arthroplasty

13. November

09:00 - 10:30

Lokale: Skovbrynet

Chair: Klaus Poulsen & Müjgan Yilmaz

21. Investigation of a medial congruent polyethylene insert on the fixation of anatomical total knee arthroplasty components. A randomized double-blinded controlled radiostereometry trial with 24 months of follow-up

Emil Toft Petersen[1,2,3], Carl Christian Holkgaard Burvil[1,3], Karina Nørgaard Linde[1,2,3], Søren Rytter[1,2,3], Daan Koppens[1,2,3], Jesper Dalsgaard[4], Torben Bæk Hansen[3,4], Maiken Stilling[1,2,3]

1. AutoRSA Research Group, Orthopaedic Research Unit, 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; 4. Department of Orthopedics, Gødstrup Hospital, Gødstrup, Denmark;

Background: The Persona Total Knee System, designed anatomically in multiple sizes, aims to improve patient fit and patient satisfaction. The system provides a classic symmetric cruciate-retaining (CR) polyethylene insert and an asymmetric medial congruent (MC) polyethylene insert. The MC insert's enhanced medial conformity, featuring a taller anterior lip and a posteriorly positioned femoral component dwell point, may elevate arthroplasty constraints, particularly affecting femoral component fixation.

Aim: To evaluate the impact of CR and MC polyethylene inserts on femoral and tibial component migration in the cemented Persona Total Knee System.

Materials and Methods: A study involved 66 knee osteoarthritis patients undergoing surgery with the cemented Persona system, randomized to CR or MC inserts. Femoral and tibial component migration was assessed using static radiostereometric analysis, with the first stereo-radiograph taken supine on the first postoperative day (baseline) and again at 3-, 12-, and 24-month follow-up. Migrations were measured in six degrees of freedom and as maximum total point motion (MTPM).

Results: The mean MTPM for the tibial component was similar with 0.92 mm (CI95% 0.68; 1.15) for the CR group and 0.96 mm (CI95% 0.72; 1.21) for the MC group at 24 months follow-up. Additionally, the tibial component migration pattern in all degrees of freedom (signed migrations) was similar for the MC and the CR group throughout 24 months of follow-up ($p>0.09$). The mean MTPM for the femoral component was similar with 1.39 mm (CI95% 1.12; 1.66) for the CR group and 1.17 mm (CI95% 0.90; 1.44) for the MC group at 24 months follow-up. The signed migration pattern of the femoral components showed 0.18 mm (95% CI: 0.03; 0.32) and 0.20 mm (95% CI: 0.01; 0.39) more medial migration for the patients with the MC than the CR group at 3 and 12 months, respectively.

Interpretation / Conclusion: The tibial components had good fixation regardless of the type of polyethylene inserts (CR or MC). However, the femoral components in the MC group migrated slightly more medially than the CR group up to one year postoperatively. This suggests that the enhanced constraint on the femoral component due to the polyethylene design could impact its fixation.

22. Higher bone mineral density decreases the risk of continuous migration of cementless tibial implants. A prospective clinical cohort RSA study in 364 patients.

Karina Nørgaard Linde[1, 2], Bente Langdahl[1, 3], Søren Rytter[1, 2], Maiken Stilling[1, 2]
1. Department of Orthopaedics, Aarhus University Hospital; 2. Department of Clinical Medicine, Aarhus University; 3. Department of Endocrinology and Clinical Medicine, Aarhus University Hospital

Background: Aseptic loosening of a knee arthroplasty (KA) is a major cause of revision surgery. We hypothesized that systemic low bone mineral density (BMD) is a risk factor for aseptic loosening of tibial implants.
Aim: To study the association between BMD and tibial implant migration.
Materials and Methods: A prospective clinical cohort study in 364 patients (364 knees) operated at Aarhus University Hospital between April 2014 and March 2016 with a unicompartmental KA or a total KA. Cementless tibial implants were used in 193 patients and 171 patients received a cemented implant. Preoperatively, patients were examined with DXA of the spine and hips (the lowest T- score was used). Postoperatively, and at 1 and 2 years follow-up, patients were examined with radiostereometric analysis (RSA). The primary outcome was tibial implant migration measured by RSA. Migration was evaluated by Maximum Total Point Motion (MTPM). Continuous migrating implants were defined as MTPM>0.2 mm between 1 and 2 years of follow-up and stable implants as MTPM<0.2 mm between 1 and 2 years of follow-up. Analyses were stratified by cemented and cementless implants.
Results: For cementless tibial implants, 31 patients had continuous migration and 162 had stable migration. Implants with continuous migration had a lower mean preoperative T- score (-0.98 (CI: -1.31; -0.65)) than stable implants (-0.50 (CI: -0.70; -0.31), p=0.046. A high T-score (OR 0.71 (CI: 0.50; 1.00), p=0.048) decreased the risk of continuous migration (adjusted for sex, age, and BMI: OR 0.68, CI: 0.46; 1.00, p=0.052). For cemented tibial implants, 36 patients had continuous migration and 135 had stable migration. The mean difference in the preoperative T-score between groups was -0.10 (CI: -0.67; 0.46), p=0.71. The T-score did not decrease the risk of continuous migration (adjusted for sex, age, and BMI: OR 0.99 (CI: 0.72; 1.38), p=0.96).
Interpretation / Conclusion: A higher preoperative T-score decreased the risk of continuous migration of cementless tibial implants but not for cemented implants. Results indicate that patients with lower BMD may benefit from a cemented implant or that optimizing the BMD (e.g. by antiresorptives) before surgery could prevent implant migration and subsequent loosening.

23. A bi-cruciate retaining knee arthroplasty design is not better than a singular cruciate retaining design - a five-year follow-up of a randomized controlled trial

Kristian R. L. Mortensen[1], Lina Holm Ingelsrud[1], Omar Muharemovic[2], Morten G. Thomsen[3], Anders Troelsen[1]

1. Clinical Orthopaedic Research Hvidovre, Department of Orthopaedic Surgery, Copenhagen University Hospital Hvidovre, Denmark 2. Functional and Diagnostic Imaging, Copenhagen University Hospital Hvidovre, Denmark 3. Department of Orthopaedic Surgery, Copenhagen University Hospital Hvidovre, Denmark

Background: Bi-cruciate retaining Total Knee Arthroplasty (TKA) proposedly provides stability in the implanted knee due to retainment of the ligaments. However, questions about the treatment quality with this implant led us to compare fixation, knee symptoms and complications to a traditional Cruciate Retaining (CR) design 2 years post-surgery.
Aim: The purpose of this post-analysis was to compare fixation of the Vanguard XP (XP) to a CR design, while also comparing knee function, pain and number of complications 5 years post-surgery.
Materials and Methods: 50 patients with primary knee osteoarthritis were included in this single-blinded RCT and randomized to an XP or a CR TKA. Follow-up visits were 3 months, 1,2 and 5 years post-surgery. Primary outcome was Tibia Maximum Total Point Motion (MTPM) measured with Radiostereometric Analysis (RSA). Secondary outcomes were knee function and pain, measured with the Oxford Knee Score (OKS) and number of treatment-related complications. We analyzed OKS as time-weighted average (TWA) of the change from baseline in OKS and tested differences in the outcomes with a welch t-test.
Results: 43 patients (86%, XP: 21, CR: 22) met for 5 year follow-up, MTPM was available for 42 patients (XP: 20, CR:22). Mean 5y MTPM was 0.91 [95%CI: 0.58 – 1.24] mm in the XP group and 0.71 [95%CI 0.51 – 0.91] mm in the CR group. The difference was 0.2 [95%CI -0.58 – 0.18] mm, and not statistically significant (p-value = 0.29). Mean TWA of OKS change in OKS was 15.8 [95%CI 11.8 – 19.8] in the XP group and 16.1 [95%CI 13.8 – 18.4] in the CR group. The difference was 0.3 [95%CI -4.2 – 4.9] and not statistically significant (p-value = 0.87). 2 complications were registered from 2 to 5 year follow-up in 1 patient (XP group), who underwent arthroscopic synovectomy and was revised 3 months later. Sum of complications was 7 (XP) vs. 0 (CR) (revisions: 2 (XP) vs. 0 (CR)) 5 years post-operatively.
Interpretation / Conclusion: We found no differences between patients operated with XP or CR implants with regards to tibia fixation or knee function and pain 5 years post-surgery. 2 more complications, of which 1 was a revision, were registered in the XP-group, highlighting the potential learning curve related to bi-cruciate retaining TKA.

24. The efficacy of preoperative low-load blood flow restriction exercise on physical function and lower limb strength, 3 months after a total knee arthroplasty: A randomized controlled trial

Stian Langgård Jørgensen[1,2,3], Per Aagaard[4], Marie Bagger Bohn[2.3], Peter Hansen[5], Per Møller Hansen[5], Carsten Holm[6], Louise Mortensen[7], Mette Garval[6], Lisa Urup Tønning[3,8], Inger Mechlenburg[3,8,9,10]

1. Department of Occupational and Physical Therapy. Horsens Regional Hospital, Denmark; 2. H-HIP, Department of Orthopaedic 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 Orthopaedic Surgery, Horsens Regional Hospital, Denmark; 6. Elective Surgery Centre, Silkeborg Regional Hospital; University Research Clinic for Patient Centred Elective Orthopaedic Pathways Silkeborg Regional Hospital; 7. Department of Occupational and Physical Therapy, Aarhus University Hospital; 8. Department of Orthopaedic Surgery, Aarhus University Hospital, Denmark; 9. Department of Public Health, Aarhus University, Denmark; 10. Exercise Biology, Department of Public Health, Section of Sports Science, Aarhus University

Background: Following TKA, patients demonstrate persistent deficits in physical function compared with healthy aged-matched peers. Purpose: To examine the efficacy of preoperative low-load blood-flow restricted exercise (BFR-RT) on physical function, leg muscle strength and self-reported outcomes post-TKA compared with standard preoperative care.

Aim: To examine the efficacy of preoperative low-load blood-flow restricted exercise (BFR-RT) on physical function, leg muscle strength and self- reported outcomes post-TKA compared with standard preoperative care.

Materials and Methods: A randomized controlled trial. Eighty-six patients scheduled for TKA were randomized to 8 weeks preoperative BFR-RT 3x/week or preoperative usual care. Outcomes were collected at baseline, before surgery, and three months after surgery on the 30-s sit-to-stand (30STS), Timed Up & Go (TUG), 40 meter fast paced walk test (40mFWT), 1 repetition maximum (RM) leg press and knee extension, maximal isometric knee extension (knee extensor MVC) and flexion (knee flexor MVC), and the Knee-injury and Osteoarthritis Outcome Score (KOOS) subscales Pain, Symptoms, Activities of Daily Living, Sport&Recreation, and Quality of Life.

Results: Intention-to-treat analysis found no significant between-group changes from baseline to three months postoperatively on 30STS (0.01[95%CI- 1.7;1.7]repetitions), TUG (0.1[-0.8;1.0]seconds), or 40mFWT (0.1[-2.4;2.5]seconds). Significant changes were observed for 1RM leg press strength on the affected (-16.3[-26.2;-6.4]kg) and non-affected leg (-13.2[-26.3;0.00]kg), and 1RM knee extensor strength (-4.7[-8.4;-1.0]kg) three months postoperatively favoring BFR-RT. Significant differences in knee extensor MVC on the affected leg was observed three months postoperatively (-0.51[-0.92; -0.10]Nm/kg) favoring BFR-RT. No changes were observed for KOOS subscales.

Interpretation / Conclusion: Eight weeks of preoperative BFR-RT yielded no superior effects compared with usual preoperative care on physical function or patient-reported outcomes three months after surgery. BFR-RT elicited significant gains in lower limb strength persisting up to three months after surgery.

25. Difference in Knee Injury and Osteoarthritis Outcome Score subscores between cemented and cementless Oxford® Partial Knee Arthroplasties at 10 years follow-up. A randomized RSA study with 5 years static RSA follow-up and 10 years clinical follow-up.

Jonathan Hugo Jürgens-Lahnstein[1, 2, 3], Anders Odgaard[4], Søren Rytter[1, 2, 3], Frank Madsen[1], Lone Rømer, Per Wagner Kristensen[6], Kjeld Søballe[1, 2], Maiken Stilling[1, 2, 3]

1. Department of Orthopaedic Surgery, Aarhus University Hospital, Denmark; 2. AutoRSA Research Group, Aarhus University Hospital, Denmark; 3. Department of Clincal Medicine, Aarhus University, Denmark; 4. Department of Orthopaedic Surgery, Gentofte Hospital, Denmark; 5. Department of Radiology, Aarhus University Hospital, Denmark; 6. Department of Orthopaedic Surgery, Vejle Hospital, Denmark

Background: In recent years, the preferred fixation method for unicompartmental knee arthroplasty (UKA) has changed from cemented to cementless.
Aim: This study compares the 5-year component fixation and the 10-year clinical outcomes of cemented (C) and cementless (CL) UKA.
Materials and Methods: 79 patients (48 men) were randomly allocated to surgery with cementless (CL) hydroxyapatite-coated (n=25) or cemented (C) (n=54) Oxford® Partial Knee tibial trays (ZimmerBiomet) in a multicenter study. Femoral components were either single- pegged or double-pegged in the C group and double-pegged in the CL group. Refobacin bone cement was used. Evaluation of implant migration, and clinical outcomes (OKS and KOOS) was performed at 6 weeks, 3 and 6 months, and 1, 2, and 5 years. At 10 years clinical results were evaluated with the KOOS and OKS.
Results: Tibial component migration up to 5 years was presented at a previous DOS conference (2017). 5-year migration showed CL UKA migrated initially but stabilized at 6 months. Between 2- and 5-years follow-up CL fixation was as good as C fixation. Clinical outcomes at 5 years, displayed mean OKS of 39 (12-48), which was similar between groups (p=0.47), and with comparable improvement from baseline (p=0.18). 91.6% with C and 94.1% with CL were satisfied with the result (p=0.91). OKS did not differ significantly between the CL and C group at 10-years follow-up. KOOS at 10-years, revealed a statistically significant difference for the following KOOS sub-scores between C and CL favoring the C tibial tray: ADL (8.97, 95%CI: 0.51 - 17.42; p=0.04), pain (9.56, 95%CI: 0.67 - 18.46; p=0.04), QOL (16.29, 95%CI: 5.04 - 27.54; p=0.01) and SportRec (18.30, 95%CI: 1.35 – 35.24; p=0.03).
Interpretation / Conclusion: CL UKA migrated initially but stabilized at 6 months. Between 2- and 5-years follow-up CL fixation was as good as C fixation. There was no difference in OKS or KOOS total score between the CL and C group during 10 years-follow up. At 10 years follow-up KOOS subscores favored the C group.

26. Willingness to repeat discharge on day of surgery after hip and knee arthroplasty

Oddrún Danielsen[1,2], Kirill Gromov[1,3], Claus Varnum[1,4], Thomas Jakobsen[1,5], Mikkel Rathsach Andersen[1,6], Manuel Josef Bieder[1,7], Christoffer Calov Jørgensen[1,8], Henrik Kehlet[1,9], Martin Lindberg-Larsen[1,2]

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

Background: The feasibility of implementing day-case surgery in 20-25% of all primary hip and knee arthroplasty patients in a public multicenter setting is well established. However, there is a lack of documentation regarding patients' perspectives on undergoing day-case procedures, which is essential to support its adoption as a standard of care.
Aim: The aim of this study was to investigate whether patients were willing to repeat being discharged on day of surgery if having a second hip or knee arthroplasty procedure.
Materials and Methods: This is a multicentre prospective consecutive cohort study from 6 public arthroplasty centres with a well-established day-case protocol. The study period was from September 2022 to January 2024. Patients undergoing primary total hip arthroplasty (THA), total knee arthroplasty (TKA) or medial unicompartmental knee arthroplasty (mUKA) were screened for day-case eligibility using well-defined in- and exclusion criteria and discharged when fulfilling predetermined discharge criteria. Day-case patients received a survey 30 days postoperatively with the question: If you were to undergo hip/knee replacement on the opposite side, would you prefer to be discharged on the day of surgery again?
Results: Of 8,843 primary hip and knee arthroplasties registered in the database, 2,002 (23%) were eligible and discharged on day of surgery. Baseline characteristics were comparable across all three arthroplasty groups. The survey response rate was 85%. Overall, 90% (95% CI 88-91%) were willing to repeat discharge on day of surgery. Procedure specific willingness to repeat day-case surgery were 91% (88-93%) after THA, 89% (86-92%) after TKA and 90% (86-92%) after mUKA. Patients unwilling to repeat day-case surgery were more often females (55%) compared to patients willing to repeat day-case surgery (47%), otherwise, the groups were comparable.
Interpretation / Conclusion: A total of 90% of patients discharged on the day of surgery after hip and knee arthroplasty were willing to repeat day-case surgery. While this rate appears acceptable for ongoing implementation, gathering qualitative data from patients unwilling to repeat the process could enhance patient selection and refine the day-case pathway.

27. A Single Placenta-derived Mesenchymal-Like Stromal Cell Injection Decelerates Progression of Primary Osteoarthritis – First Preclinical Results from the PROTO consortium

Tazio Maleitzke[1,2,3,4], Sijia Zhou[1,2], Alexander Hildebrandt[1,2], Ali Mobasheri[5,6,7,8], Florian N. Fleckenstein[9,10], Nitsan Halevy[11], Sven Geissler[2,12,13], Georg N. Duda[2], Tobias Winkler[1,2,12]

1. Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Center for Musculoskeletal Surgery, Berlin, Germany 2. Berlin Institute of Health at Charité – Universitätsmedizin Berlin, Julius Wolff Institute, Berlin, Germany 3. Department of Orthopaedic Surgery, Copenhagen University Hospital Amager and Hvidovre, Hvidovre, Denmark 4. Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark 5. Research Unit of Health Sciences and Technology, Faculty of Medicine, University of Oulu, Oulu, Finland 6. Department of Regenerative Medicine, State Research Institute Centre for Innovative Medicine, Vilnius, Lithuania 7. Department of Joint Surgery, First Affiliated Hospital of Sun Yat-sen University, Guangzhou, Guangdong, China 8. World Health Organization Collaborating Center for Public Health Aspects of Musculoskeletal Health and Aging, Université de Liège, Liège, Belgium 9. Department of Diagnostic and Interventional Radiology, Charité – Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Berlin, Germany 10. BIH Charité Clinician Scientist Program, Berlin Institute of Health at Charité – Universitätsmedizin Berlin, BIH Biomedical Innovation Academy, Berlin, Germany 11. Pluri-Biotech Ltd., Haifa, Israel 12. Berlin Institute of Health at Charité - Universitätsmedizin Berlin, BIH Center for Regenerative Therapies (BCRT), Berlin, Germany 13. Charité - Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Berlin Center for Advanced Therapies (BeCAT), Berlin, Germany

Background: Despite the increasing global burden of osteoarthritis (OA), no disease modifying drug has yet advanced to market entry. Market approval is often not reached, because preclinical data for novel OA therapeutics can not be reproduced clinically. Among others, this may be due to the choice of the OA model (primary vs. secondary) and the degree of OA addressed (mild to moderate vs. severe) which do often not match in preclinical and clinical studies.

Aim: With this study, we test the safety and efficacy of placenta-derived mesenchymal like stromal cells (PLX-PAD) for the treatment of mild- moderate primary OA in the Dunkin Hartley guinea pig model, as a basis for the PROTO consortium clinical trial.

Materials and Methods: Thirty sex-matched six-month-old Dunkin Hartley guinea pigs were randomized to receive either a single intra-articular injection of (i) PLX- PAD (1 million), (ii) PLX-PAD (2 million), or (iii) phosphate buffered saline (PBS) into the intraarticular space of both knees. All animals underwent in vivo magnetic resonance imaging (MRI) one and six months post-injection. All animals were sacrificed six months post injection, and samples were harvested for histological (OARSI grading), radiological (µ- CT), and molecular (gene and protein) analysis. Here, we present the histological and clinical data available to date.

Results: No swelling, redness or limping were observed for any of the animals regardless of treatment group throughout the study. At six months post injection, PBS treated animals presented signs of severe OA histologically, while PLX-PAD treated animals only showed a mild progression of the disease (PLX-PAD, 1 million, p=0.007; PLX-PAD, 2 million, p=0.066). No animals showed ectopic bone formation or severe synovial infiltration.

Interpretation / Conclusion: These initial histological and clinical results indicate PLX-PAD is biologically active with no local toxicity observed in this model of mild- moderate primary OA compared to placebo. Further evaluation of radiological and molecular data will enable the PROTO consortium (funded by Horizon Europe Grant Nr. 101095635) to translate these preclinical findings into a human phase I/IIa trial, which matches the disease type and severity of the preclinical model.

28. Impact of obesity on return to work after total knee arthroplasty – A Danish Nationwide Cohort Study on 6162 patients

Julie B. Pajaniaye[1,2,3], Peter Alsing[1,2], Martin B. Stisen[2,4], Erzsébet Horváth-Puhó[1,4], Maaike Gademan[5,6], Alma B. Pedersen[1,4], Inger Mechlenburg[2,4]

1. Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark 2. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark 3. Department of Dentistry and Oral Health, Aarhus University,Aarhus, Denmark 4. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark 5. Department of Orthopaedics, Leiden University Medical Centre, University of Leiden, Leiden, the Netherlands; 6. Department of Clinical Epidemiology, Leiden University Medical Centre, University of Leiden, Leiden, the Netherlands

Background: Total knee arthroplasty (TKA) is an effective and safe treatment of pain and functional impairment in late-stage knee osteoarthritis (OA). In Denmark, 20% of TKAs are performed in patients <60 years of age who can return to work (RTW) after TKA. However, there is limited knowledge about the rate of RTW in this population. Obesity, a major risk factor for TKA complications in terms of incidence and severity, may affect RTW after TKA.

Aim: To investigate the association between body mass index (BMI) and rates of RTW in working-age patients with knee OA undergoing TKA. Furthermore, to explore whether the association varies by sex, age, socioeconomic position (SEP), and history of comorbidities.

Materials and Methods: We combined data from the Danish Knee Arthroplasty Registry and the Danish Registry for Evaluation of Marginalization, for labor market status. BMI was grouped as normal (<25), pre-obesity (25-29.9), obesity class 1 (30-34.9), 2 (35-39.9), or 3 (≥40). RTW was defined as full- or part-time RTW within 2 years of follow-up. We estimated cumulative incidence proportions (CIP) of RTW (overall and by BMI-group), considering death and early retirement as competing events. Cox proportional hazards models were used to calculate Hazard Ratios (HRs) adjusting for selected confounders.

Results: We included 6,162 patients (41% men), median age 55 years (IQR 6.3) and mean BMI 30.8 (95% CI (CI) 30.7;31). The median time to RTW was 69 days (CI 67.6;70). The CIP of RTW at 1 month was 31% (CI: 30;32), at 3 months was 63% (CI 62;65), at 1 year was 92% (CI 92;93), and at 2 years was 96% (CI 95;96). CIPs for RTW in BMI-groups were similar to the overall CIPs, and HRs in BMI-groups were equal to 1. Stratification by age, SEP and comorbidity did not change HRs. Stratification by sex showed no association between BMI and RTW for women, while men in higher BMI-groups had a tendency to lower rate of RTW (HR for obesity class 2 was 0.9 (CI 0.7;1), HR for obesity class 3 was 0.8 (CI 0.7;1) compared to normal BMI).

Interpretation / Conclusion: 31% of TKA patients RTW within 30 days and over 90% RTW within one year. Obesity was not found to affect RTW, but men in obesity class 2 and 3 may need tailored post-TKA rehabilitation to facilitate RTW.

29. Day-case success or why still in hospital after total hip arthroplasty, total knee arthroplasty and medial unicompartmental knee arthroplasty? A prospective multicentre cohort study on 6,142 patients from a public healthcare system

Oddrún Danielsen[1,2], Christian Bredgaard Jensen[1,3], Claus Varnum[1,4], Thomas Jakobsen[1,5], Mikkel Rathsach Andersen[1,6], Manuel Josef Bieder[1,7], Søren Overgaard[1,8,9], Christoffer Calov Jørgensen[1,10], Kirill Gromov[1,3], Henrik Kehlet[1,11], Martin Lindberg-Larsen[1,2]

1. Center for Fast-track Hip and Knee Replacement, Denmark 2. Dept. of Orthopaedic Surgery and traumatology, Odense University Hospital and Svendborg 3. Dept. of Orthopaedic Surgery, Hvidovre University Hospital 4. Dept. of Orthopaedic Surgery, Lillebaelt Hospital – Vejle 5. Dept. of Orthopaedic Surgery, Aalborg University Hospital 6. Dept. of Orthopaedic Surgery, Copenhagen University Hospital, Herlev-Gentofte 7. Dept. of Orthopaedic surgery, Næstved, Slagelse and Ringsted Hospitals 8. Dept. of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg 9. University of Copenhagen, Department of Clinical Medicine, Faculty of Health and Medical Sciences 10. Dept. of Anaesthesia, Hospital of Northern Zeeland, Hillerød 11. Section of Surgical Pathophysiology, Copenhagen University Hospital, Rigshospitalet

Background: Day-case success rates after primary total hip arthroplasty (THA), total knee arthroplasty (TKA) and medial unicompartmental knee arthroplasty (mUKA) may vary and detailed data is needed on causes of not being discharged.

Aim: The aim of this study was to analyse the association of surgical procedure type on successful day-case surgery. Furthermore, to analyse causes of not being discharged on day of surgery when eligible and scheduled for day-case THA, TKA and mUKA.

Materials and Methods: A multicentre prospective consecutive cohort study from September 2022 to August 2023. Patients were screened for day-case eligibility using well- defined in- and exclusion criteria and discharged when fulfilling predetermined discharge criteria. Day-case eligible patients were scheduled for surgery with intended start of surgery before 1 p.m.

Results: Of 6,142 primary hip and knee arthroplasties, eligibility rates for day-case were 34% for THA (95% confidence interval 32-36), 34% for TKA (32-36) and 52% for mUKA (49-55). Surgery before 1.p.m. were achieved in 85% of eligible patients with day-case success rates of 59% (55- 62) for THA, 61% (57-65) for TKA, and 72% (68- 76) for mUKA. Overall day-case success rates (eligible and non-eligible) were 19% (17-20) for THA, 20% (18-21) for TKA and 42% (39-45) for mUKA. Adjusted analysis confirmed higher day- case success in eligible mUKA patients (Odds Ratio 1.9 (1.6-2.3)) compared to TKA and THA patients. Primary causes for day-case failure were mobilization issues (9-12% between procedures), prolonged spinal anaesthesia (4- 9%) and postoperative nausea and vomiting (PONV) (4-14%).

Interpretation / Conclusion: THA and TKA patients showed comparable eligibility (34%) with similar day-case success rates (59- 61%), whereas mUKA patients demonstrated higher eligibility (52%) and day-case success (72%). Mobilization issues, prolonged spinal anaesthesia and PONV were the most frequent causes for not being discharged.

30. The preoperative gait pattern is associated with migration of total knee arthroplasty – an exploratory radiostereometry study with 3 years follow-up

Emil Toft Petersen[1,2,3], Karina Nørgaard Linde[1,2,3], Carl Christian Holkgaard Burvil[1,3], Søren Rytter[1,2,3], Daan Koppens[1,2,3], Jesper Dalsgaard[4], Torben Bæk Hansen[3,4], Maiken Stilling[1,2,3]

1. AutoRSA Research Group, Orthopaedic Research Unit, 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; 4. Department of Orthopedics, Gødstrup Regional Hospital, Gødstrup, Denmark;

Background: Osteoarthritic changes often cause knee malalignment before total knee arthroplasty, altering bone loading compared to non- osteoarthritic knees. This malalignment is corrected during surgery, balancing the ligaments. Nonetheless, preoperative gait patterns may influence postoperative prosthesis load and bone support, potentially affecting component migration.

Aim: Investigating the impact of preoperative gait patterns on postoperative femoral and tibial component migration in total knee arthroplasty.

Materials and Methods: In a prospective cohort study, 66 patients with primary knee osteoarthritis undergoing cemented Persona total knee arthroplasty were assessed. Preoperative knee kinematics was analyzed through dynamic radiostereometry and motion capture, categorizing patients into four homogeneous gait patterns. The four subgroups were labeled as the flexion group (n = 20), the abduction (valgus) group (n = 17), the anterior drawer group (n = 10), and the tibial external rotation group (n = 19). The femoral and tibial component migration was measured using static radiostereometry taken supine on the postoperative day (baseline) and 3-, 12-, and 24-months post-surgery. Migration was evaluated as maximum total point motion (MTPM).

Results: Of the preoperatively defined four subgroups, the abduction group with a valgus-characterized gait pattern exhibited the highest migration for both the femoral (1.64 mm (CI95% 1.25; 2.03)) and tibial (1.21 mm (CI95% 0.89; 1.53)) components at 24-month follow- up. For the femoral components, the abduction group migrated 0.6 mm (CI95% 0.08; 1.12) more than the external rotation group at 24 months. For the tibial components, the abduction group migrated 0.43 mm (CI95% 0.16; 0.70) more than the external rotation group at 3 months. Furthermore, at 12- and 24-months follow-up the abduction group migrated 0.39 mm (95% CI 0.04; 0.73) and 0.45 mm (0.01; 0.89) more than the flexion group, respectively.

Interpretation / Conclusion: A preoperative valgus-characterized gait pattern seems to increase femoral and tibial component migration until 2 years of follow- up. This suggests that the implant fixation depends on load distributions originating from specific preoperative gait patterns.

Session 4 : YODA Best Paper

13. November

11:00 - 12:00

Lokale: Sal A

Chair: Christian Bredgaard Jensen & Claus Varnum

31. The effect of Virtual Reality on pre-procedural anxiety in children – a pilot randomized controlled trial

Julie Hyldgaard Petersen[1], Karen Vestergaard Andersen[2], Line Kjeldgaard Pedersen[1], Stine Fjendbo Galili[3], Claus Sixtus Jensen[3, 4], Marianne Lisby[3], Bjarne Møller-Madsen[1], Jan Duedal Rölfing[1]
1. Children's Orthopaedics and Reconstruction, Aarhus University Hospital, Denmark 2. The Emergency Department, Aarhus University Hospital, Aarhus Denmark 3. Research Center for Emergency Medicine, Department of Clinical Medicine, Aarhus University, Aarhus Denmark 4. Department of Paediatrics, Aarhus University Hospital, Denmark

Background: Virtual reality (VR) is a promising method to reduce procedural anxiety and pain in children without pre-procedural pain.
Aim: The primary aim of this pilot study was to investigate the effect of VR on pre- procedural anxiety in children experiencing acute pain in the setting of an Emergency Department (ED). In addition, this study aimed to test the feasibility of the study procedure.
Materials and Methods: In this pilot randomized controlled trial (RCT) twenty children aged 6-14 years were randomized to standard of care (SOC) or VR+SOC during their visit at the ED. Anxiety was assessed three times using modified Yale Preoperative Anxiety Scale (mYPAS); at baseline, after intervention immediately before the procedure (pre- procedure) and during the procedure. The pain level was at the same time assessed using Numerical Rating Scale (NRS).
Results: Twenty children, median age 11 (7-14) years, were randomized. VR significantly decreased the level of anxiety and pain from baseline to the pre-procedural measurement: -8.33 (95%CI [-15.28; -2.38]) points, p=0.0114 and -1.85 (95%CI [-2.29; -0.78]) points, p=0.0023. A high level of anxiety at baseline was found to be associated with a positive effect of VR to reduce pre-procedural anxiety, spearman's rho: 0.988.
Interpretation / Conclusion: The preliminary results found an effect of VR on reducing pre-procedural anxiety and pain in children with acute pain. An association between anxiety at baseline and the effect of VR was found. This study has been profitable for structuring a large-scale study which, due to the limitation of a pilot study, is needed to confirm the findings.

32. The risk of dislocation in dual mobility vs. 36mm femoral heads in primary total hip arthroplasty for osteoarthritis - A propensity-matched analysis from the Danish Hip Arthroplasty Register

Yousef Hussein[1], Afrim Iljazi[1], Michala Sørensen[1,2,4], Søren Overgaard[3,4], Michael Petersen[1,4]
1. Musculoskeletal Tumor Section, Department of Orthopedic Surgery, Copenhagen University Hospital Rigshospitalet 2. Department of Orthopedic Surgery, Zealand University Hospital 3. Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital Bispebjerg-Frederiksberg 4. Department of Clinical Medicine, Faculty of Health Science, University of Copenhagen, Denmark

Background: Dislocation is a major concern following total hip arthroplasty (THA) for osteoarthritis (OA). Both dual mobility cups (DMCs) and standard cups (SC) with large femoral heads are utilized to reduce the risk of dislocation.
Aim: We investigated whether DMCs are superior to SCs in reducing the two-year risk of dislocation in a propensity-matched sample from the Danish Hip Arthroplasty Register (DHR).
Materials and Methods: This population-based cohort study utilizing data from the DHR and the Danish National Patient Register. We included all patients undergoing primary THA for OA from 2010 to 2019 with either DMC or SC with metal-on- polyethylene or metal-on-ceramic articulations with a 36mm femoral head. The samples were propensity-score matched on patient and implant characteristics. The primary outcome was the difference in the absolute risk of dislocation within two years, with a secondary outcome of the difference in the absolute risk of revision surgery of any cause within the same timeframe. The cumulative incidence of dislocation was calculated using the Aalen-Johansen estimator, while the difference in absolute risk was estimated using absolute risk regression.
Results: We included 4,499 patients with DMC and 4,499 patients with SC after propensity score matching. Both groups had a mean age of 75 years, included approximately 60% females, and had a two-year survival of 95%. The DMC group was 80% less likely to dislocate within two years (ARR 0.20, CI 0.14-0.28, $p<0.01$) with no increased risk of revision surgery (ARR 1.15, CI 0.89-1.48, $p<0.01$).
Interpretation / Conclusion: DMCs are associated with a lower risk of dislocation within two years compared to SCs, with no increased risk of revision surgery.

33. Gait Analysis in Healthy Adults: GAITRite and Xsens

Marianne Frydendal Nielsen[1], Søren Ege Quist[1], Rasmus Elsoe[2], Peter Larsen[2,3], Bjarne Møller-Madsen[1], Jan Duedal Rölfing[1,4]

1. Children's Orthopaedics and Reconstruction, Aarhus University Hospital, Palle Juul- Jensens Boulevard 99, 8200 Aarhus N, Denmark 2. Department of Orthopaedic Surgery, Aalborg University Hospital, Aalborg, Denmark 3. Department of Occupational Therapy and Physiotherapy, Aalborg University Hospital, Aalborg, Denmark 4. Department of Clinical Medicine, HEALTH, Aarhus University, Aarhus, Denmark

Background: Gait analysis by technical means is more objective than clinical observation. Highly specialized 3D motion capture systems are the gold standard. An instrumented walkway system like GAITRite is a validated alternative. GAITRite is a portable carpet for automated measurement of spatiotemporal parameters of the footstep pattern. Inertial measurement units (IMUs) like Xsens are alternative options. IMUs register movement in space. They are portable, less expensive, and increasingly available compared to video-based systems.
Aim: The aim of the study was to evaluate the interrater reliability between Xsens and GAITRite assessing spatiotemporal gait parameters in healthy adults.
Materials and Methods: 42 healthy adults volunteered to participate. Two clinicians examined all participants within one session using the Xsens and the GAITRite gait analyses simultaneously. The spatiotemporal gait parameters were compared with interclass correlation coefficient (ICC) analysis. ICC estimates and their 95% confident intervals (95%-CI) were calculated in Python. We analysed ICC (2, k) and ICC (3, k) to assess both absolute agreement and consistency of the measurements.
Results: The strongest absolute agreements were for cadence, step length, cycle time and stride length. ICC (2, k) ranged from 0.97 [95%-CI: 0.22, 0.99] to 0.98 [95%-CI: 0.88, 0.99]. ICC (3, k) ranged from 0.86 [95%-CI: 0.72, 0.93] to 1.00 [95%-CI: 0.99, 1.00], indicating good to excellent reliability considering a systematic difference. Swing time, stance time and single support time measurements showed insignificant ICC (2, k) values, but significant ICC (3, k) values with good to excellent reliability. There was a systematic difference between duration and step count because of the experimental setup. Distance and percentage measurements (swing, stance, and single support) were not correlated. Neither was bilateral differences between step time, step length or cycle time.
Interpretation / Conclusion: The interrater reliability between GAITRite and Xsens is moderate to excellent for selected gait parameters. For these, both systems may be used interchangeably for gait analysis in healthy adults.

34. A comparison of manual measurements vs 3D-scans of children's foot anthropometry: An evaluation based on 496 Danish children (PANIC Feet Project)

Anne Marie Holt[1], Frederik Hammer[1], Thea Saabye[1], Ales Jurca[5,6], Andreas Balslev-Clausen[1], Steen Harsted[3,4], Christian Wong[1,2]

1. Department of Orthopedic Surgery, Copenhagen University Hospital; Rigshospitalet 2. Department of Orthopedic Surgery, Copenhagen University Hospital; Hvidovre Hospital 3. Center for Muscle and Joint Health, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark 4. Medical Research Unit, Spine Center of Southern Denmark, University Hospital of Southern Denmark 5. Volumental AB, Stockholm, Sweden 6. Jozef Stefan International Postgraduate School

Background: Accurate data collection on children's foot size and shape is crucial due to potential impacts on functionality, pain, and quality of life. The advent of 3D scanning technology offers a novel approach to assessing foot dimensions and deformities.
Aim: This study aims to explore the correlation, agreement, and reliability between manual measurements and 3D scans, along with assessing intra-rater reproducibility for each method.
Materials and Methods: In a cross-sectional design, 3D scans and manual measurements were collected from 496 children aged 6-16 years as part of the PANIC Feet study, covering foot length AND width, hallux valgus angle (HVA), and arch height. Correlations were assessed using Pearson's correlation coefficient, reliability through the intraclass correlation coefficient (ICC), and agreement with limits of agreement (LoA). Intra- rater reliability was examined using re-test data to evaluate correlation, agreement, and reliability for both methods, respectively.
Results: For most subjects, the 3D-scanner measures higher values for foot length and width compared to manual measurements. Between-method reliability was excellent for foot length (ICC>0,99), good for foot width (ICC>0,83), and poor for HVA measurements (ICC>0,42). While there was a correlation for arch height measurements between methods (r > 0,61), a direct comparison was not possible. Between- session reliability was excellent for both methods (ICC>0,97) for foot length measurements. In general, the 3D-scan measurements had a higher between-session reliability than the manual measurements. The between-session reliability for the 3D-scan measurements was excellent (ICC>0,98) for foot width, moderate (ICC>0,68) for HVA measurements, and good (ICC>0,81) for arch height measurements. However, the between-session reliability for the manual measurements was good (ICC>0,76) for foot width, poor (ICC>0,48) for HVA measurements, and poor (ICC>0,28) for arch height measurements.
Interpretation / Conclusion: 3D scanning has higher between-session reliability than manual measurements for assessing children's foot dimensions. However, this study does not address the validity of 3D measurements, highlighting the need for further research in this area.

35. Elbow kinematics with increasing radial head arthroplasty overlengthening evaluated with dynamic radiostereometric analysis

Johanne Frost Teilmann[1], Emil Toft Petersen[1,2,3], Theis Muncholm Thillemann[2,3], Chalotte Hemmingsen[1], Josephine Olsen Kipp[1,2], Thomas Falstie-Jensen[3], Maiken Stilling[1,2,3]
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 used in the treatment of complex elbow fracture dislocations with a risk of overlengthening the radius. Overlengthening of the radius has been associated with elbow joint stiffness and decreased range of motion, but little is known about the detailed kinematics of the elbow joint with an overlengthened radius following RHA.
Aim: This experimental study aimed to evaluate the elbow kinematics following increasing radial head arthroplasty overlengthening by use of dynamic radiostereometry.
Materials and Methods: Eight human donor arms were examined with dynamic radiostereometry during a motor-controlled elbow flexion with the forearm in unloaded neutral position, and in supinated- and pronated position without and with 1kg of either varus or valgus load, respectively. The elbows were examined before and after RHA with stem lengths of anatomical size, +2 mm, and +4 mm length. The ligaments were kept intact using a step- cut humerus osteotomy for repeated RHA exchange. Bone models were obtained from computed tomography and AutoRSA software was used to match the bone models with dynamic radiostereometric analysis recordings. To describe elbow kinematics, anatomic coordinate systems were applied to the humerus, the ulna, and the radius.
Results: The greatest kinematic changes in the elbows were observed with the +4 mm implant imposing: 1) Joint distraction of 2.8 mm (CI 95% 1.6; 4.0) in the radiohumeral joint and of 1.1 mm (CI 95% 0.4; 1.7) in the ulnohumeral joint. 2) Increased varus angle up to 2.4° for both the radius (CI 95% 0.0; 4.8) and the ulna (CI 95% 0.2; 4.5). 3) Radial shift of 2 mm (CI 95% 0.2; 3.1) in the ulnar direction and ulnar shift of 1.0 mm (CI 95% 0.3; 1.6) in the posterior direction.
Interpretation / Conclusion: The kinematics of the elbow joint deviated increasingly from the native joint kinematics with a +2 mm to a +4 mm radial overlengthening. This might affect several other factors, like the joint contact pressure, interosseus membrane tension, and distal radioulnar joint stability and congruency. This study supports the importance of restoring the anatomical radial length in RHA surgery.

36. Change of practice favoring non-surgical treatment of dorsally displaced distal radius fractures in elderly patients - complications and secondary surgeries

Dilay Kesgin Fener[1], Emil Østergaard Nielsen [2], Ottilia Wyon Steenholdt[1], Ali Abdel-Hadi Toma [1], Stig Brorson [3], Dennis Winge Hallager[1,3]

1. Department of Orthopaedic Surgery, Zealand University Hospital, Køge 2. Department of Orthopaedic Surgery, Copenhagen University Hospital, Amager- Hvidovre 3. Center for Evidence-Based Orthopaedics, Zealand University Hospital and Department of Clinical Medicin, University of Copenhagen.

Background: Based on randomized trials and guidelines, non- surgical treatment is recommended for elderly patients with dorsally displaced distal radius fractures (DDDRF). Practice at our institution underwent evaluation in 2020. Using the CEBO model led to a new local guideline favoring non-surgical treatment in patients aged 60 years or older.

Aim: The aim of this retrospective quality assessment study was to investigate whether there has been an increased rate of complications or secondary surgeries following the change in clinical practice.

Materials and Methods: All patients aged 60 years or older treated at our institution for a forearm fracture between February 1, 2019, and January 31, 2020, and between February 1, 2022, and January 31, 2023, were screened for inclusion. Patients with DDDRFs were included. They were stratified based on the practice change in a before (group 1) and an after (group 2) cohort. The diagnosis was confirmed on radiographs. Exclusion criteria were high energy or open fractures, neurovascular compromise, previous fracture on the same side, other fractures, and patients relying on a walking aid in the injured hand or rejected use of data for quality assessment. Data were managed in Redcap according to a predefined protocol. Rates of complications and secondary surgeries within one year were compared between groups using Pearson's Chi squared test.

Results: 689 patients were screened, 213 were included for analysis. Group 1 included 98 patients with a median age of 72 years (range 60-96), 88% female. Group 2 included 115 patients, with a median age of 76 years (range 60-93), 94% female. Surgical treatment was received by 78% in group 1 and 11% in group 2. In group 1, 12% (12 of 98) had at least one complication compared to 13% (15 of 115) in group 2 (p=0.9). In group 1, 4% (4 of 98) had secondary surgery within one year, compared to 6% (7 of 115) in group 2 (p=0.5). Carpal tunnel syndrome was the predominant indication in both groups.

Interpretation / Conclusion: We found no statistically significant difference in rates of complications and secondary surgery within one year of treatment before and after the practice change favoring non-surgical treatment in elderly patients with a DDDRF.

Session 5: Sports Orthopaedics

13. November

11:00 - 12:00

Lokale: Sal C

Chair: Kristoffer W. Barfod & Kristine B. Haugaard

37. Factors influencing the two-year outcome after Bereiter trochleoplasty. Subgroup analysis of a cohort of 374 consecutive cases over a 10-years period (2011-2022).

Christian Dippmann[1], Peter Siersma[2], Anette Kourakis[1], Simone Rechter[1], Peter Lavard[1]
1 Section for Sports Traumatology M51, Department of orthopedic surgery, Copenhagen University Hospital Bispebjerg and Frederiksberg, Copenhagen, Denmark. 2 The Research Unit for General Practice and Section of General Practice, Department of Public Health, University of Copenhagen, Denmark

Background: Since 2011 patients with patellar instability and trochlear dysplasia (TD) have been treated at Bispebjerg Frederiksberg hospital according to a standardized treatment algorithm with Bereiter trochleoplasty (TP). We hypothesized that high body mass index (BMI), young age by the time of first- time dislocation, increased time from symptom debut to surgery and previous patella stabilizing surgery would affect the outcome after TP negatively.
Aim: To test if these factors influenced patient reported outcome 2 years after Bereiter TP.
Materials and Methods: Prospectively collected data from 2011 to 2021 for all patients undergoing patella stabilizing surgery with trochleoplasty and MPFL-reconstruction +/- concomitant procedures as well as preoperative, 1 yr. and 2 yrs. follow-up data including clinical examination and scores from patient reported outcome measures (PROMs) (Kujala, KOOS and Lysholm). were analysed in mixed repeated measurement models regarding differences between the longitudinal effects.
Results: 374 Bereiter TPs were performed on 335 patients (102 males, 233 females). TP was performed median 6 years (range: 0-35) after the first patellar dislocation. The median BMI of patients was 23.6 kg/m2 (range: 14.1-46.3). 92 patients (25%) had previous patella stabilizing surgery. Comparing the two-year outcome, no differences could be seen between patients 12 years of age when they had the first dislocation, between 2 years from first-time dislocation to surgery or whether patients had undergone previous patella stabilizing surgery or not. Patients with a BMI>30 kg/m2 showed larger increase in PROM-scores during the first two postoperative years than patients with a BMI<30 kg/m2 ($p<0.01$, except for KOOS QoL).
Interpretation / Conclusion: Age at the first patella dislocation, time between first dislocation and surgery, and previous patella stabilising surgery did not influence the two-year outcome after Bereiter TP for severe TD. Patients with a BMI>30 kg/m2 seemed to benefit more from patella stabilizing surgery than patients with a BMI<30 kg/m2.

38. No difference in clinical outcome between quadriceps tendon anterior cruciate ligament reconstruction with and without bone block - Results from the Danish Knee Ligament Registry

Martin Lind, Torsten Grønbeck Nielsen
Department of Orthopaedics, Aarhus University Hospital

Background: Quadriceps tendon (QT) has recently gained increased interest as ACL reconstruction (ACLR) graft due to the introduction of minimal invasive harvesting techniques and low donor site morbidity. QT grafts can be used either with patella bone block or as complete soft tissue graft. It is unknown whether QT graft type affects clinical outcomes.
Aim: The purpose of the present study was to use the Danish Knee Ligament Reconstruction Registry (DKRR) to compare revision rates, knee stability and subjective clinical outcomes in patients who underwent ACLR with QT graft with (QT-B) and without block (QT-S).
Materials and Methods: Inclusion criteria were primary ACL reconstruction with QT autograft in DKRR. Two study populations were identified based on QT graft type for ACL reconstruction: patients with QT-B (n = 925); and patients with QT-S (n = 659). Clinical outcome was evaluated by revision rates for the two cohorts. Objective instrumented knee stability and pivot shift tests were performed at one-year follow-up as well as KOOS and Tegner Activity scale scores.
Results: The revision rate at 2 years was similar in both groups at 2.8 %. Postoperative knee laxity was equal between QT-B and QT-S ACLR with 1.5 and1.6 mm side-to-side laxity respectively. QT-B had a 22 % incidence of postoperative positive pivot shift compared to 29 % for QT-S. Subjective outcome was similar for KOOS and Tegner Activity scale scores at one year, but with reduced improvements for KOOS symptoms and KOOS sport for QT-B compared to QT- S.
Interpretation / Conclusion: ACL reconstructions with QT autograft with a bone block or as a complete soft tissue graft resulted in similar low revision rates and achieved similar good sagittal knee stability. A secondary finding was that ACL reconstructions with QT graft with a bone block obtained better rotational stability than ACL reconstructions with complete soft tissue QT grafts.

39. Postoperative joint stiffness after Bereiter trochleoplasty does not seem to influence two-year outcome

Christos Soleas[1], Peter Lavard[2], Anette Holm Kourakis[2], Simone Rechter[2], Volkert Siersma[3], Christian Dippmann[2]

[1]Department of orthopedic surgery and traumatology, Bispebjerg Frederiksberg University Hospital, Copenhagen, Denmark 2 Section for Sports Traumatology M51, Department of orthopedic surgery, Copenhagen University Hospital Bispebjerg and Frederiksberg, Copenhagen, Denmark. 3 The Research Unit for General Practice and Section of General Practice, Department of Public Health, University of Copenhagen, Denmark

Background: Bereiter trochleoplasty (TP) is a well-described treatment for patellar instability due to trochlear dysplasia. Joint stiffness with reduced range of motion (ROM) is a known complication following TP, often requiring arthroscopically assisted manipulation (AAM) with removal of adhesions and scar tissue under general anesthesia. It is unknown if patients who have joint stiffness following TP have an inferior postoperative outcome.

Aim: The purpose of this study was to analyze the two- year outcome following TP with AAM compared to TP patients without postoperative joint stiffness.

Materials and Methods: 374 consecutive knees were followed after TP with clinical examination 3 months, 1 and 2 years after surgery. All had specialized physiotherapy postoperatively. The clinical examination included measurement of range of motion (ROM), and the subjective outcome at 1- and 2- year follow-up was assessed by three patient reported outcome measures (PROMs): Kujala score, KOOS and Lysholm score. There was particular focus on ROM the first 3 months after surgery. The indication for AAM at 3-month follow-up was > 10 degrees extension deficit and/or flexion <120 degrees with no improvement.

Results: 49 (38 females, 11 males) of the 374 knees (13 %) underwent AAM for postoperative joint stiffness. 7 patients had two AAM, while two patients underwent three AMM. The average time from TP to AAM was 12.1 weeks (range 4-24 weeks). Neutral extension and flexion >135 degrees was achieved in 37 cases (76%). In 11 cases, flexion remained reduced, while data on range of motion could not be retrieved in one case. No statistical difference in mean improvement could be seen in patienten undergoing AAM after TP compared to patients without AAM ($p>0.05$).

Interpretation / Conclusion: Joint stiffness is a relatively common complication to Bereiter TP. However, full ROM was achieved in 75% of all cases following AAM and similar improvements in subjective outcome 2 years after TP could be seen.

40. From hip arthroscopy to hip replacement, what do the patient-reported outcomes tell us? A registry-based, national, cohort study.

Bjarne Mygind-Klavsen[1], Bent Lund[2], Jeppe Lange[2], Otto Kraemer[4], David Kocemba[2], Inger Mechlenburg[1,3], Martin Lind[1], Per Hölmich[4], Signe Kierkegaard-Brøchner[2,3]

1 Dept. of Orthopedics, Aarhus University Hospital, Palle Juul-Jensens Blvd. 99, 8200 Aarhus N, Denmark. 2 H-HiP, Horsens Regional Hospital, Dept. of Orthopedics, 8700 Horsens, Denmark. 3 Department of Clinical Medicine, Aarhus University. 4 Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Kettegård Allé 30, 2650 Hvidovre Denmark.

Background: Patients with Femoroacetabular Impingement Syndrome (FAIS) may experience persistent hip problems following arthroscopic FAIS surgery, with total hip replacement surgery (THR) being the last option.

Aim: 1) To investigate the number of patients in the Danish Hip Arthroscopy Registry (DHAR) who underwent conversion to THR after FAIS surgery 2) Patient-reported outcomes of THR converted cases, compared with control groups: non converted FAIS cases, and primary osteoarthritic THR cases, identified in international literature.

Materials and Methods: Patients above 18 years registered with arthroscopic surgery due to FAIS between January 2012 and November 2023 were identified in (DHAR). Cases registered with a positive impingement test, radiological cam and/or pincer morphology on a standing anterior-posterior radiograph, no signs of hip osteoarthritis were eligible. All patients were invited to participate in a REDCap controlled survey. If they responded “yes” to the entry question: Have you had total hip replacement?, they were immediately hereafter asked to complete the Copenhagen Hip and Groin Outcome Score (HAGOS) and Hip Osteoarthritis Outcome Score (HOOS) questionnaires (0- 100 scores, 100 being no problems).

Results: 5118 patients were eligible and received the survey, of whom 2364 (46%) responded. 223 patients (9%) reported, they had a THR at 1 to 10 years after their primary hip arthroscopy. Converted cases reported median HAGOS scores of: Pain: 75, Symptoms: 75, Activities of daily living: 75, Sport: 53, Participation in Sport: 38, Quality of life: 50. HOOS scores were: Pain: 80, Symptoms: 81, Sport: 63 and Quality of life: 50. Compared to patients undergoing primary hip arthroscopy and primary THR, hip-related quality of life was inferior in converted cases.

Interpretation / Conclusion: A low number of conversion to THR (9%) was demonstrated. Converted cases reported good outcomes after THR surgery, similar to those who underwent primary FAIS surgery and primary THR, although an inferior Hip-related quality of life was found in the studied patient group.

41. No correlation between radiological measurements for patellar instability and patient-reported outcome measurements: A study from the Faroese Knee Cohort.

Niclas Højgaard Eysturoy[1,5], Hans-Christen Husum[2], Lina H. Ingelsrud[3], Lars Blønd[4], Kristoffer W. Barfod[5]

1. Department of Orthopaedic Surgery, National Hospital of the Faroe Islands, Torshavn, Faroe Island 2. Interdisciplinary Orthopaedics, Aalborg University Hospital, Denmark. 3. Clinical Orthopaedic Research Hvidovre, Copenhagen University Hospital Amager- Hvidovre, Copenhagen, Denmark 4. Zealand University Hospital, Køge and Aleris Hospital, Copenhagen, Denmark. 5. Sports Orthopaedic Research Center – Copenhagen (SORC-C), Department of Orthopaedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Copenhagen, Denmark

Background: No studies have investigated the relationship between radiological measurements used in patellofemoral instability diagnostics and subjective patient well-being.
Aim: This study aims to investigate this correlation in individuals with previous patellar dislocation.
Materials and Methods: All inhabitants of the Faroe Islands aged 15-19 were invited to answer an online survey. All patients with prior patellar dislocation and no prior surgery to the knee were invited to have X- rays and MRIs of both knees. The radiological measurements were the Dejour classification, the Lateral Trochlear Inclination Angle (LTI), the Trochlear Depth, the Caton-Deschamps index (CD-index), and the Tuberositas Tibia – Trochlear Groove distance (TT-TG). The participants answered the patient-reported outcome measurements (PROMs): Banff patellar instability score 2.0 (BPII), The Kujala score, the Marx score and the EQ-5D-5L score. Continuous data from each radiological measurement was plotted against each PROM to create scatter plots for visual inspection and analysis.
Results: A total of 3,708 individuals were contacted. After excluding participants with prior knee surgery, 102 reported a history of patellar dislocation. 75 underwent X-rays and MRIs of their knees and were included in the study for further analysis. Scatter plots showed no correlation between the radiological measurements and the PROM scores.
Interpretation / Conclusion: This study found no correlation between the most used radiological measurements in patellar instability and PROM scores. The results imply that radiological measurements used in patellofemoral instability diagnostics are not indicative of patient subjective health and well-being.

42. Does hip abductor tendon repair improve functional capacity after one year?

Marie Bagger Bohn[1,2], Jeppe Lange[1,2], Bent Lund[1], Kasper Spoorendong[3], Signe Kierkegaard-Brøchner[2,3]
1 H-HiP, Department of Orthopedic Surgery, Horsens Regional Hospital, Denmark 2 Department of Clinical Medicine, Aarhus University, Denmark 3 H-HiP, Department of Physio and Occupational Therapy, Horsens Regional Hospital, Denmark

Background: Data regarding improvements in functional capacity after hip abductor tendon surgery is lacking.
Aim: The aim of the study was to investigate multiple aspects of hip abduction strength including comparison to matched healthy controls and association to degree of damage evaluated during surgery, and association with performance in the 30 second sit-to-stand (STS) test and Trendelenburg test one year after hip abductor tendon repair.
Materials and Methods: 50 women (mean age 56±11) were included. Inclusion criteria were: MRI verified hip abductor tendon tears, open surgical repair of hip abductor tendons, and maximal hip abduction strength tested with a handheld dynamometer at baseline and at one year follow-up. Patients also completed the STS test and the Trendelenburg test before and one year after surgery and rehabilitation. 25 age and sex matched persons (controls) with no lateral hip pain underwent the same tests.
Results: Patients improved their maximal hip abduction strength from median [25th;75th quartile]: 0.51 [0.34;0.70] Nm/kg to 0.69 [0.54;1.01] Nm/kg, $p<0.001$. At 1-year follow up, patients were weaker than the healthy controls ($p=0.008$), but 62% of the patients reached the 95%reference interval for healthy controls. Neither before nor after surgery was the patients' maximal hip abduction strength associated with their degree of tendon rupture. Patients's maximal hip abduction strength one year after surgery was associated with number of completed STS repetitions (coefficient (95%confidence interval)): 7.4 (5;10), $p<0.001$). Patients with a positive Trendelenburg test at one year follow up had lower maximal hip abduction strength (0.65 Nm/kg vs. 0.87 Nm/kg, $p=0.02$).
Interpretation / Conclusion: Patients undergoing surgical hip abductor tendon repair improved their maximal hip abduction strength at one year follow up approaching healthy reference levels. Interestingly, no association was found between the degree of tendon rupture and maximal hip abduction strength while associations between reduced hip abductor strength and performance in STS and Trendelenburg tests were found.

43. Translation, cross-cultural validity, and reliability of a Danish version of the Anterior Knee Pain Scale (Kujala-DK)

Torsten Grønbech Nielsen[1,2,3], Martin Lind[1], Annette De Thurah[3,4], Pia Kjær Kritensen[3]
1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark; 2. Department of Physiotherapy and Occupational Therapy, Aarhus University Hospital; 3. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark; 4. Department of Rheumatology, Aarhus University Hospital, Aarhus, Denmark

Background: The Anterior Knee Pain Scale (Kujala) is a widely used patient-reported outcome measure designed to assess adults with patellofemoral disorders. It is used for both anterior knee pain and patellar instability patients, and has been translated and validated in most major languages, but not previously in Danish.
Aim: To cross-culturally translate and adapt the Kujala into a Danish Kujala-DK. Secondarily, to determine the face validity and reliability of the Kujala-DK in a consecutive Danish population of patients with patellar dislocation.
Materials and Methods: The study was carried out in 2 stages. First, the Kujala was adapted cross-culturally according to the guidelines of Beaton et al. 2000. Face validity was ensured by think-aloud interviews with 2 health care professionals and 20 patients with anterior knee pain or patellar instability. Secondly, the Kujala-DK was tested for concurrent validity (Spearman Rho), internal consistency (Cronbach alpha) and reliability (intraclass correlation - ICC) in a prospective cohort of patients with patellar dislocation. Tegner activity score, the Victorian Institute of Sport Assessment-Patella (VISA-P), the Banff Patella Instability Instrument (BPII 2.0), and the International Knee Documentation Committee (IKDC) were used to assess convergent validity. The test-retest reliability of the Kujala-DK was evaluated in 50 patients with patellar dislocation. Patients completed the Kujala Score twice, with a 7-day interval between assessments.
Results: Face-validation resulted in only minor revisions to the Kujala-DK. High convergent validity was found with VISA-P (0.73), BPII 2.0 (0.79) and IKDC (0.76). Low convergent validity was found with the Tegner activity score (0.48). The calculated Cronbach alpha sum score was 0.95 and for the individual item, scores ranged from 0.74 to 0.99. A high level of reliability was found (ICC: 0.92 (95%CI: 0.83-0.96)). The individual sum scores ranged from 0.42 to 0.96.
Interpretation / Conclusion: The measurement properties revealed that the Kujala-DK is a reliable and valid tool for patients with patellar disorders.

Session 6: Hip arthroplasty

14. November

09:30 - 11:00

Lokale: Sal B

Chair: Rajzan Joanroy & Christian Wied

44. Progressive Resistance Training or Neuromuscular Exercise for Hip Osteoarthritis. A Multicenter Cluster Randomized Controlled Trial

Troels Kjeldsen[1,2,3], Søren T Skou[3,4], Ulrik Dalgas[5], Lisa U Tønning[1,2], Kim G Ingwersen[6,7], Sara Birch[2,8,9], Pætur M Holm[3,4,10], Thomas Frydendal[1,2,6,11], Mette Garval[12], Claus Varnum[7,13], Bo M Bibby[14], Inger Mechlenburg[1,2,5]

1) Department of Orthopedic Surgery, Aarhus University Hospital, Aarhus, Denmark 2) Department of Clinical Medicine, Aarhus University, Aarhus, Denmark 3) The Research and Implementation Unit PROgrez, Department of Physiotherapy and Occupational Therapy, Næstved-Slagelse-Ringsted Hospitals, Slagelse, Denmark 4) Research Unit for Musculoskeletal Function and Physiotherapy, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark 5) Exercise Biology, Department of Public Health, Aarhus University, Aarhus, Denmark 6) Department of Physio- and Occupational Therapy, Lillebaelt Hospital - Vejle, University Hospital of Southern Denmark, Denmark 7) Department of Regional Health Research, Faculty of Health Science, University of Southern Denmark, Denmark 8) Department of Neurology, Physiotherapy and Occupational Therapy, Gødstrup Regional Hospital, Herning, Denmark 9) Department of Orthopedic Surgery, Gødstrup Regional Hospital, Herning, Denmark 10) Faculty of Health Sciences, University of Faroe Islands, Tórshavn, Faroe Islands 11) Department of Clinical Research, University of Southern Denmark, Odense, Denmark 12) Elective Surgery Centre, Regional Hospital Silkeborg, Silkeborg, Denmark 13) Department of Orthopedic Surgery, Lillebaelt Hospital - Vejle, University Hospital of Southern Denmark, Denmark 14) Department of Biostatistics, Institute of Public Health, Aarhus University, Aarhus, Denmark

Background: Exercise is recommended as first-line treatment for patients with hip osteoarthritis (OA). Interestingly, content and dose of exercise interventions seem to be important for the effect of exercise interventions, but the optimal content and dose is unknown. This warrants randomized controlled trials providing evidence for the optimal exercise program in Hip OA.
Aim: To investigate whether progressive resistance training (PRT) is superior to neuromuscular exercise (NEMEX) for improving functional performance, hip pain and hip-related quality of life in patients with hip OA.
Materials and Methods: This was a multicenter, cluster-randomized, controlled, parallel-group, assessor-blinded, superiority trial. 160 participants with clinically diagnosed hip OA were recruited from hospitals and physiotherapy clinics and randomly assigned to twelve weeks of PRT or NEMEX. The PRT intervention consisted of 5 high-intensity resistance training exercises targeting muscles at the hip and knee joints. The NEMEX intervention included 10 exercises and emphasized sensorimotor control and functional stability. The primary outcome was change in the 30-second chair stand test (30s-CST). Key secondary outcomes were changes in scores on the pain and hip-related quality of life (QoL) subscales of the Hip Disability and Osteoarthritis Outcome Score (HOOS).
Results: The mean changes from baseline to 12-week follow- up in the 30s-CST were 1.5 (95% CI, 0.9 to 2.1) chair stands with PRT and 1.5 (CI, 0.9 to 2.1) chair stands with NEMEX (difference, 0.0 [CI, 0.8 to 0.8] chair stands). For the HOOS pain subscale, mean changes were 8.6 (CI, 5.3 to 11.8) points with PRT and 9.3 (CI, 5.9 to 12.6) points with NEMEX. For the HOOS QoL subscale, mean changes were 8.0 (CI, 4.3 to 11.7) points with PRT and 5.7 (CI, 1.9 to 9.5) points with NEMEX.
Interpretation / Conclusion: In patients with hip OA, PRT is not superior to NEMEX for improving functional performance, hip pain, or hip-related QoL.

45. Similar femoral stem fixation albeit metaphyseal bone preservation with a taper-wedge design and diaphyseal bone preservation with a long and round-tapered design. A 5-year randomized RSA and DXA study of 50 patients.

Peter Bo Jørgensen[1,2], Morten Humilius[2], Daan Koppens[1], Torben Bæk Hansen[1], Maiken Stilling[2]
1. University Clinic for hand, hip, and knee surgery, Department of Orthopaedics, Gødstrup Hospital;
2. Department of Orthopaedics, Aarhus University Hospital

Background: The Tri-Lock bone preserving stem is a new collarless proximal-coated tapered-wedge design providing metaphyseal contact for rotational and axial stability to increase biological fixation and preserve bone. The Summit femoral stem is a classic well-proven collarless proximal-coated with a long and round-tapered design intended to eliminate hoop stress and provide initial stability to ensure biological metaphyseal fixation.
Aim: Our aim was first to compare femoral stem fixation (subsidence) of the newer metaphyseal ultra-porous-coated taper-wedge Tri-Lock stem with the classic metaphyseal porous-coated longer round-tapered Summit stem, and second to compare the change in periprosthetic bone mineral density (BMD) between stem groups.
Materials and Methods: In a patient-blinded RCT, 52 patients at mean age 60 (CI 58 — 62) received Tri-Lock (n=26) or Summit (n=26) femoral stems in combination with a Pinnacle cup, a cross- linked polyethylene liner, and a 32- or 36-mm CoCr head. Patients were followed for 5 years with RSA, DXA, and PROMs.
Results: At 2-year follow-up, the mean difference in stem subsidence was 0.14 mm (95% confidence interval [CI] 0.27 – 0.56). At the 5-year follow-up, mean subsidence for Tri- Lock and Summit was -0.38 (CI 0.72 – 0.04) and -0.24 (CI -0.57 – 0.09) and retroversion was 1.68° (CI 0.80 – 2.55) and 1.53° (CI 0.68 – 2.37), respectively. At 3-month follow-up, periprosthetic bone resorption of 4% - 16% around the stem (Gruen zones 1–6) and 20% in the calcar region was seen for both stems. At 5 years follow-up, the Tri-Lock stem preserved the metaphyseal bone the best whereas the Summit stem preserved or even increased the diaphyseal bone medial to the femoral stem.
Interpretation / Conclusion: The Tri-Lock and the Summit stems are intended for metaphyseal bone fixation and show similar migration until mid-term. However, the wedge-taper design stimulates metaphyseal BMD preservation while the long and round-tapered design preserves or even increases diaphyseal BMD. The long-term effect of this difference is unknown.

46. Representativeness of The Danish National Health Survey for Research in Total Hip Arthroplasty Patients: a population based study

Simon Storgaard Jensen[1], Lei Wang[1], Nadia R. Gadgaard[1], Henrik T. Sørensen[1], Alma B. Pedersen[1]
1. Department of Clinical Epidemiology, Department of Clinical Medicine, Aarhus University and Aarhus University Hospital, Aarhus, Denmark.

Background: Orthopedic registries have provided valuable input about risk for and prognosis after total hip arthroplasties (THA). However, registries are often limited by the lack of data on lifestyle factors, health- related quality of life and behavior, and social background. These data are readily available in surveys.
Aim: We aimed to examine if participants of the Danish self-reported questionnaire-based public health survey "How are you" are representative of THA patients.
Materials and Methods: THA patients were identified in the Danish Hip Arthroplasty Register and combined with survey data (from 2010, 2013, 2017) on the individual-level. Data on age, sex, comorbidity, medication, markers of socioeconomic position, and health-care utilization were assessed from the Danish medical databases. We calculated proportions of a wide range of variables, comparing patients who had and those who had not participated in surveys before THA.
Results: We included 165,416 THA patients, of which 7,824 (4.7%) participated in surveys. Mean time from survey to THA was 3.7 years. Participants and non- participants had similar sex distribution (43%), median age of 71 and 69 years, while proportion of patients aged 75+ years was 32% and 27% respectively. The two groups had similar proportion of patients with no comorbidity (74% vs 76%) and various medications with only minor differences (<2%). The proportion of patients with high income and high educational level was 48% vs 35% and 22% vs 16% for participants vs non-participants, respectively. The participants had a slightly lower number of hospitalizations, outpatients-, and emergency room visits.
Interpretation / Conclusion: The survey data provided a sample that appeared to be representative of the entire THA population based on a number of patient and healthcare characteristics. Thus, the survey data could be a valuable tool for further understanding the risk and outcome of THA patients. Slight difference was observed for socioeconomic markers.

47. Psychopharmacological treatment is not associated with poorer patient-reported improvements after hip or knee arthroplasty

Simon Kornvig[1,2], Henrik Kehlet[3,4], Christoffer Calov Jørgensen[3,4], Anders Fink-Jensen[5], Poul Videbech[6], Thomas Jakobsen[7], Kirill Gromov[8], 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, Aalborg University Hospital - Farsø 8 Department of Orthopeadic Surgery, Hvidovre Hospital

Background: Preoperative psychopharmacological treatment is a potent risk factor for increased length of stay at hospital and readmission rate after hip and knee arthroplasty. However, no studies have investigated the effect of psychotropic drugs on patient-reported outcomes at baseline and several follow-ups in a multicenter fast- track setting.

Aim: The primary aim was to investigate whether preoperative psychopharmacological treatment influences improvements in Oxford Hip/Knee Score (OHS/OKS) 12 months after hip and knee arthroplasty. Secondary aims included evaluating EQ- 5D-3/5L and EQ VAS as well and assessing additional time points (3/6 and 24 months).

Materials and Methods: This consecutive cohort study included 4,020 primary hip and 3,222 primary knee arthroplasties performed from 2016 to 2020 at three fast-tack centers in Denmark. OHS/OKS, EQ-5D-3/5L and EQ VAS were collected at baseline and 3/6, 12 and 24 months after surgery. Exposure status was assigned using dispensed psychotropics obtained from the Danish National Prescription Registry. Marginal mean differences with 95% confidence intervals (CI) were estimated using multilevel tobit regression and adjusted for age, sex and Charlson Comorbidity Index obtained from the Danish National Patient Register.

Results: No significant associations were found between preoperative psychopharmacological treatment and improvements in OHS (-0.5, CI: -1.4; 0.4) or OKS (-0.3, CI: -1.2; 0.5) after 12 months. However, treated patients had significantly decreased baseline OHS (-1.4, CI: -2.2; -0.6) and OKS (-2.1, CI: -2.9; -1.3) and 12 months follow-up OHS (-1.9, CI: -2.8; -1.1) and OKS (-2.4, CI: -3.2; -1.6) compared to untreated patients. Similar patterns were found at other time points and using EQ- 5D-3/5L or EQ VAS.

Interpretation / Conclusion: Psychopharmacological treatment is not associated with poorer patient-reported improvements after hip or knee arthroplasty. However, treated patients have significantly lower baseline and follow-up scores than untreated patients. Nevertheless, this small difference is clinically irrelevant.

48. Discontinuing the recommendation of hip precautions does not increase the risk of early dislocation after primary total hip arthroplasty – A population-based study from the Danish Hip Arthroplasty Register

Afrim Iljazi[1], Michala Skovlund Sørensen[1,2,5], Matilde Winther-Jensen[3], Søren Overgaard[4,5], Michael Mørk Petersen[1,5]

1. Musculoskeletal Tumor Section, Department of Orthopedic Surgery, Copenhagen University Hospital Rigshospitalet 2. Department of Orthopedic Surgery, Zealand University Hospital 3. Department of Data, Biostatistics and Pharmacoepidemiology, Centre for Clinical Research and Prevention, Copenhagen University Hospital Bispebjerg-Frederiksberg 4. Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital Bispebjerg-Frederiksberg 5. Department of Clinical Medicine, Faculty of Health Science, University of Copenhagen, Denmark

Background: Hip precautions have been recommended postoperatively following total hip arthroplasty (THA), however, the evidence supporting this practice is scarce. We conducted a population- based study evaluating if the discontinuation of recommending hip precautions following THA has affected the risk of early dislocation.

Aim: To determine the association between the risk of early post-operative dislocation and the removal of hip precautions from the regional guideline on post- operative mobilization following primary THA for osteoarthritis (OA) in the Capital Region of Denmark.

Materials and Methods: The study is a cohort study from the Danish Hip Arthroplasty Register and The Danish National Patient Register. We included patients receiving THA for OA at public hospitals in the Capital Region of Denmark using the posterior approach. The hip precautions group included patients operated between 2004-2009 (n=5,769). The no precautions group were operated between 2014-2019 (n=9,030). We used absolute risk regression to compare the crude and adjusted dislocation risk within 3 months and 2 years between groups, taking the competing risk of death into account.

Results: The cumulative incidence of dislocation was 2.9% (CI 2.5-3.3) within 3 months and 5.5% (CI 4.9-6.0) within 2 years in the hip precautions group and 3.5% (CI 3.1-3.9) and 5.0% (CI 4.5- 5.4) in the no precautions group. We saw an increased use of 36mm heads, uncemented prosthesis' and patients with comorbidities over time. There was no increased risk of dislocation in the no precautions group within 3 months (ARR: 1.2, 95% CI: 0.88-1.6, p=0.26) or within 2 years (ARR: 1.0, 95% CI: 0.80-1.3, p=0.95). The findings remained consistent after adjusting for femoral head size, age, sex, cementation, dementia, lumbar spinal fusion, neuromuscular dysfunction and alcohol overuse (3 months: ARR: 1.3, 95% CI: 0.96-1.9, p=0.08; 2 years: ARR: 1.2, 95% CI: 0.93-1.5, p=0.17).

Interpretation / Conclusion: We found no increase in the risk of early dislocation after removal of hip precautions from the guideline on post-operative mobilization following THA despite an increased proportion of patients with comorbidities. We speculate that the increased use of 36mm femoral heads mitigates the change in risk.

49. Clinical characteristics and trajectories of opioid use following revision total hip replacement

Martin Bækgaard Stisen[1,2], Alma Becic Pedersen[1,3], Katie Sheehan[4], 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; 4. Bone & Joint Health, Blizard Institute, Queen Mary University of London, London, UK.

Background: Patients who undergo revision total hip replacement (THR) are at higher risk of prolonged opioid use postoperatively compared to those who undergo primary THR. Effective pain management remains challenging, impacting satisfaction and recovery. Prolonged opioid use raises safety concerns due to associated serious adverse effects. However, the risk profile of these patients is not well understood.
Aim: The aim of this study is to identify trajectories of opioid use within 2 years of revision THR and clinical characteristics associated with high and prolonged opioid use.
Materials and Methods: A population-based cohort of 12,435 patients who underwent revision THR between 1995 and 2018. The prevalence of opioid use was calculated across eight quarters (Q1-Q8) post-revision. Group-based trajectory models were used to identify clusters of patients with similar trends of morphine milligram equivalent (MME) values per day over the 2-year follow-up period. Risk ratios were estimated to predict influential factors in trajectory group assignment.
Results: Opioid use prevalence decreased from 71% in Q1 to 29% in Q2, and further to 23% in Q8. We identified three distinct groups of trajectory MME use per day post-revision: Minimal users (77% - mean MME/day at Q1=5.4, Q8=0.6), steady users (18% - mean MME/day at Q1=31.0, Q8=22.3), and high users (5% - mean MME/day at Q1=101.2, Q8=108.7). Patients who were female, younger, had high comorbidity burden, used preoperative opioids and other pain medications, had mental disorders, had low educational levels, lived alone, and had low wealth were more likely to be high users compared to minimal users.
Interpretation / Conclusion: Two years after revision THR, 23% of patients were opioid users, raising concern about potentially related serious adverse events. We identified several clinical characteristics associated with high opioid use during the 2 years post-revision. These characteristics could be used to tailor interventions to optimize pain management and possibly reduce unnecessary opioid use post-revision THR.

50. Return to sport among 1926 patients with hip dysplasia after undergoing periacetabular osteotomy

Lisa Tønning[1,2], Stig Jakobsen[1], Joanne Kemp[3], Michael O'Brien[3], Ulrik Dalgas[4], Inger Mechlenburg[1,2,4]
1. Department of Orthopedic Surgery, Aarhus University Hospital, Denmark 2. Department of Clinical Medicine, Aarhus University, Denmark. 3. La Trobe Sport and Exercise Medicine Research Centre, La Trobe University, Australia 4. Department of Public Health, Sports, Aarhus University, Denmark

Background: Symptomatic hip dysplasia is often treated with periacetabular osteotomy (PAO). Studies investigating the effect of PAO have primarily focused on radiographic measurements, pain-related outcomes, and hip survival whereas evidence related to sport participation is limited.
Aim: The primary aim of this study was to report the rate of participation in sports among patients with hip dysplasia before undergoing PAO compared to up to 20 years after surgery.
Materials and Methods: All patients in our institutional database were deemed eligible for this cohort study if they underwent PAO and had answered at least one question related to sport participation. Patients were asked if they were playing sport preoperatively, 6 months after PAO as well as 2, 5, 10, 15 and 20 years after. In addition, patients were asked if they were able to play their preferred sport, what type and at what level they were playing sport, and if surgery had improved their sport performance.
Results: Among 2398 patients surveyed, 1926 (80%) were included and 56% were playing sport 6 months after PAO. This number was 61% two years after PAO, and remained around that for the following years, before dropping 15 years after PAO. Between 56% and 71% of patients felt that their sporting performance improved following PAO at the different time points. Between 39% (6 months after PAO) and 63% (15 years after PAO) were able to participate in their preferred sport.
Interpretation / Conclusion: The majority of patients undergoing PAO due to hip dysplasia will return to, and maintain, sport after PAO. More than half of patients undergoing PAO believe that the surgery improved their sports performance, and long after the surgery more than half of patients undergoing PAO are able to play their preferred sport.

51. Metabolic syndrome and morbid obesity are not risk factors for revision surgery in patients undergoing hip and knee arthroplasty

Rasmus Reinholdt Sørensen[1], Signe Timm[1,2], Lasse Enkebølle Rasmussen[1], Claus Lohman Brasen[3], Claus Varnum[1,2]

1. Department of Orthopaedic Surgery, Lillebaelt Hospital, University Hospital of Southern Denmark; 2. Department of Regional Health Research, University of Southern; 3. Department of Immunology and Biochemistry, Lillebaelt Hospital, University Hospital of Southern Denmark

Background: The effect of metabolic syndrome (MetS) on the risk of revision after hip and knee arthroplasty is debated. Inconsistent use of MetS definitions, and the predominance of case-control studies in the existing literature, calls for further investigation in this field to provide specific risk assessment of these patients, for clinicians to use in their daily advisory.

Aim: The aim was to investigate the risk of short-term revision due to prosthetic joint infection (PJI) after hip and knee arthroplasty. Secondly, we aimed to investigate the risk of revision due to any cause and the mortality.

Materials and Methods: During May 2017 to November 2019 a cohort of 2,901 patients undergoing a total of 3,024 hip and knee arthroplasties was established. Data from national registries and a local database were used to determine the presence of MetS and revision surgeries with a follow-up of at least two years and eight months. Cox regression was applied to present hazard ratio (HR), associated 95% confidence intervals (CI) and P-values. Survival analyses were presented in a Kaplan- Meier plot.

Results: In the cohort, 62.1% met the criteria for MetS. The risk of PJI (HR 1.6 (0.5 to 4.9) P=0.380), any revision (HR 0.8 (0.4 to 1.3) P=0.295) and death (HR 1.3 (0.8 to 2.1) P=0.282) was not increased in patients suffering from MetS, compared to patients who did not have MetS. There was no PJI in patients not having MetS and receiving a knee arthroplasty. The risk of death was increased in the MetS-group receiving a knee arthroplasty (HR 2.7 (1.3 to 5.9) P=0.010), but not different from the MetS-group receiving a hip arthroplasty. There was no elevated risk of PJI when analyzing morbid obesity (body mass index over 40 kg/m2), male sex or diabetes as the exposure.

Interpretation / Conclusion: Patients suffering from MetS do not have an increased risk of revision caused by PJI. In general, performing hip and knee arthroplasty on patients suffering from MetS seems without increased risk of revision surgery.

52. Persistent pain and satisfaction after total hip arthroplasty: A nationwide cross-sectional survey study

Jens Laigaard[1], Lone Nikolajsen[2], Saber Muthanna Saber[1], Ole Mathiesen[3], Troels Haxholdt Lunn[4], Søren Overgaard[1]

1. Dept. of Orthopaedic Surgery, Bispebjerg University Hospital; 2. Dept. of Anaesthesia, Aarhus University Hospital; 3. Dept. of Anaesthesia, Zealand University Hospital, Køge; 4. Dept. of Anaesthesia, Bispebjerg University Hospital

Background: Total hip arthroplasty (THA) is an effective treatment for patients with hip osteoarthritis when non-opioid analgesics and physiotherapy cannot control their pain. The latest assessment of long-term pain outcomes in patients operated with THA in Denmark was undertaken in 2004. We believe updated numbers are needed to accurately inform patients about postsurgical risks.
Aim: To investigate the satisfaction and incidence of persistent pain after primary THA for osteoarthritis.
Materials and Methods: This was a nationwide cross-sectional survey on satisfaction, pain of unselected patients who underwent TYA for osteoarthritis in March, April, or May 2022 (NCT05845177). Patients were identified from the Danish National Patient Register and Danish Hip Arthroplasty register and invited by Digital Post on 4th September 2023.
Results: We sent survey invitations to 2.764 patients, after exclusion of 86 (3%) patients with revision surgery and 16 (1%) patients with bilateral surgery within the inclusion period. The 2.035 (74%) respondents were similar to the non-respondents in terms of age, sex, BMI, ASA score and length of surgery. Of the respondents, 274 (14%) had moderate or severe persistent postsurgical pain (NRS≥4). Still, 1826 (92%) were 'satisfied' or 'very satisfied' with the result of surgery and 1871 (95%) were willing to repeat surgery.
Interpretation / Conclusion: Fourteen percent of patients had moderate or severe persistent postsurgical pain 1.4 years after THA, yet 91% percent were satisfied with the result of surgery. The incidence of persistent postsurgical pain was consistent with a similar Danish study from 2004.

53. Psychometric Evaluation of the Hip and Knee Decision Quality Instrument (HK-DQI) in a Danish Population with Severe Osteoarthritis

Trine Pedersen Ahlmann [1,2], Karina Dahl Steffensen[2,3], Karen Sepucha[4,5], Martin Lidberg-Larsen[6,7], Charlotte Jensen Myhre[6,7], Christina Nielsen Bræmer[1], Kim Ingwardsen Gordon[2,8], Claus Varnum[1,2]
1 Department of Orthopaedic Surgery, Lillebaelt Hospital, University Hospital of Southern Denmark, Vejle, Denmark 2 Department of Regional Health Research, University of Southern Denmark, Odense, Denmark 3 Center for Shared Decision Making, Lillebaelt Hospital, University Hospital of Southern Denmark, Vejle, Denmark 4 Division of General Internal Medicine, Massachusetts General Hospital, Boston, Massachusetts, USA 5 Harvard Medical School, Boston, Massachusetts, USA 6 Department of Clinical Research, University of Southern Denmark, Odense, Denmark. 7 Department of Orthopaedic Surgery, Odense University Hospital, Odense, Denmark. 8 Department of Physio- and Occupational Therapy, Lillebaelt Hospital, University Hospital of Southern Denmark, Vejle, Denmark

Background: Severe osteoarthritis (OA) significantly affects quality of life, and treatment decisions can be complex. The Hip and Knee Decision Quality Instrument (HK-DQI) is a patient-centred questionnaire specifically designed to evaluate the quality of decision-making for arthroplasty in severe hip or knee OA. Comprising three sections with sum scores, it assesses decision-specific goals and concerns, decision-specific knowledge and the decision-making process.
Aim: This study aims to evaluate the psychometric properties of HK-DQI in a Danish population.
Materials and Methods: Following COSMIN guidelines, the Danish version of HK-DQI underwent translation and psychometric assessment. Content validity was established with 40 patient interviews. Psychometric properties were evaluated in a sample of 236 hip or knee OA patients. Reliability was assessed through a test-retest with 218 patients. IntraClass Correlation (ICC), Limits of Agreement and a Cronbach's alpha (only on section 3 of the HK-DQI) were estimated, and Bland-Altman plots were constructed. Construct validity was evaluated through predefined hypotheses and compared to the questionnaires CollaboRATE and The Shared Decision-Making Questionnaire (SDM-Q-9).
Results: The content validity of HK-DQI was acceptable. The ICC indicated moderate reliability for individual questions in section 1 (ICC 0.62-0.69) and strong reliability for sum-score of sections 2 and 3 (ICC 0.63-0.86). An acceptable level of agreement, with no indications of systematic errors, and acceptable 95% Limits of Agreement on the Bland Altmann plot were found. Cronbach's alpha was 0.74 in section 3. HK-DQI demonstrated acceptable construct validity, confirming 75% of a-priori hypothesized associations and correlations. Ceiling and floor effects was observed in section 1.
Interpretation / Conclusion: The content validity of HK-DQI was acceptable in the Danish context with only minor adjustments. HK- DQI is a valid and reliable measurement tool for assessing decision quality in hip and knee OA patients within a Danish context. These findings support its use in clinical practice and research to enhance decision-making processes for patients with severe OA.

Session 7: Shoulder/elbow

14. November

09:30 - 11:00

Lokale: Sal C

Chair: Rie Nyholm & Thomas Falstie-Jensen

54. One-year follow-up of patients undergoing the Latarjet procedure: A clinical biomechanical study during an apprehension-relocation test measured with radiostereometry

Josephine Olsen kipp[1,2], Theis Mucholm Thillemann[2,3], Emil Toft Petersen[1,2,3], Sepp de Raedt[1], Anna Zejden[4], Rikke Jellesen Åberg[4], Thomas Falstie-Jensen[3], Maiken Stilling[1,2,3]

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

Background: The Latarjet procedure is the preferred choice for patients with anterior shoulder instability and glenoid bone loss. However, the glenohumeral joint (GHJ) kinematics and, thereby, knowledge about the stabilizing effect of the Latarjet procedure in patients are sparse.
Aim: To evaluate the GHJ kinematics during an apprehension and relocation test in patients with anterior shoulder instability one year after their Latarjet procedure.
Materials and Methods: Twenty patients scheduled for the Latarjet procedure were enrolled. The patients were examined preoperatively with bilateral static radiostereometric (RSA) recordings and on the operated shoulder one year after their Latarjet procedure during a repeated apprehension-relocation test. Patient- specific bone models were obtained from computed tomography and were aligned with the RSA images using digitally reconstructed radiographs. The GHJ kinematics were evaluated with two methods: 1) the humeral head center location relative to the glenoid center and 2) the GHJ contact point. Paired differences (mean (95%CI)) between pre- and postoperative unstable shoulders and the contralateral healthy shoulders were calculated.
Results: In the anterior-posterior direction for the apprehension and relocation test, no differences in the postoperative location of the humeral head center or contact point were found compared with the healthy shoulder. Compared to the preoperative shoulder, the postoperative humeral head center was 0.8 mm (0.1;1.4) more superior and 0.5 mm (0.0;1.1) more posterior. In the superior-inferior direction during the apprehension test, the postoperative humeral head center was 0.8 mm (1.0;1.4) more superior compared to the preoperative shoulder.
Interpretation / Conclusion: The Latarjet procedure was able to restore the humeral head center compared to the healthy contralateral shoulder. The Latarjet procedure stabilized the humeral head center in a more superior and posterior direction during the apprehension test compared to the preoperative unstable shoulder. Understanding GHJ kinematics and, thereby, the stabilizing effect following the Latarjet procedure is crucial for identifying failures and optimizing the surgery in the future.

55. Satisfactory results and minimal surgical burden after arthroscopic treatment of degenerative and traumatic conditions of the sterno-clavicular joint in 86 patients.

Anna Normann Rasmussen[1], Martin Wyman Rathcke[1], Tim Houbo Pedersen[1], MICHAEL RINDOM KROGSGAARD[1]

1. Section for Sports Traumatology, Department of Orthopedics, Copenhagen University Hospital Bispebjerg.

Background: Sterno-clavicular arthroscopic surgery offers good visualisation of the posterior part of the sternoclavicular joint (SCJ), minimizing the risk of damaging the structures in the mediastinum posterior to the joint. In literature, results of the procedure have only been reported in few, small series.

Aim: The aim was to present the outcome of SCJ arthroscopic treatment in a large prospective cohort of patients..

Materials and Methods: The SCJ as source of pain was confirmed by reduction of symptoms following an intraarticular injection of analgesics. A two-portal technique and a 2.9 mm arthroscope was used. DASH and Oxford Shoulder Score (OSS) were completed before the operation and after 1, 2 and 5 years. Results of similar open procedures were achieved from literature.

Results: Since 2009 86 patients (56 female/30 male) with a mean age of 45,6 years (17-79) had a SCJ-arthrocopy: Resection of a torn or degenerated disc (55 cases), synovectomy (19), resection of the medial clavicle end (29) and removal of loose bodies (17). 17 cases were converted to open surgery. There were no operative or infectious complications. Mean operation time was 48 minutes (21-89). The DASH-score and the "worst pain", "usual pain" and "pain at night" from OSS had all improved ($p<0.05$) at 1- and 2-year follow-up. Three patients had a re-arthroscopy and one had an interposition arthroplasty with a gracilis tendon for persisting pain despite resection of the medial clavicle end. One case of instability after resection of osteophytes was treated by an open stabilizing procedure.

Interpretation / Conclusion: Arthroscopic treatment of degenerative and traumatic conditions in the SCJ is a safe procedure with minimal surgical burden, and outcomes are as least as good as for open procedures.

56. Comparable low revision rates of stemmed and stemless total anatomic shoulder arthroplasties after exclusion of metal backed glenoid components: a collaboration between the Australian and Danish national shoulder arthroplasty registries

Marc Randall Kristensen Nyring[1], Jeppe Vejlgaard Rasmussen[1], David Gill[3], Dylan Harries[2, 3], Bo Sanderhoff Olsen[1], Richard Page[3, 4]

1. Department of Orthopedic Surgery, Herlev and Gentofte Hospital, Hellerup, Denmark 2. South Australia Health and Medical Research Institute (SAHMRI), Adelaide, SA, Australia 3. Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Adelaide, SA, Australia 4. Barwon Centre for Orthopaedic Research and Education (B-CORE), St John of God Hospital and Deakin University, Geelong, VIC, Australia

Background: The stemmed anatomical total shoulder arthroplasty is the gold standard in the treatment of glenohumeral osteoarthritis. However, the use of stemless total shoulder arthroplasties has increased in recent years. The number of revision procedures are relatively low and therefore it has been recommended that national joint replacement registries should collaborate when comparing revision rates.

Aim: We aimed to compare the revision rates of stemmed and stemless TSA used for glenohumeral osteoarthritis using data from both the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR) and the Danish Shoulder Arthroplasty Registry (DSR).

Materials and Methods: We included all patients registered in the AOANJRR and the DSR from 2012 to 2021 with an anatomical total shoulder arthroplasty used for osteoarthritis. Revision was used as the primary outcome. We used the Kaplan-Meier method to illustrate the cumulative revision rates and a multivariate cox regression model to calculate the hazard ratios. All analyses were performed separately for data from AOANJRR and DSR.

Results: 13066 arthroplasties from AOANJRR and 2882 arthroplasties from DSR were included. The hazard ratio for revision of stemmed TSA with stemless TSA as reference, adjusted for age and gender, was 1.67 (95% CI 1.34-2.09, p<0.001) in AOANJRR and 0.57 (95% CI 0.36-0.89, p=0.014) in DSR. When including glenoid type and fixation, surface bearing and hospital volume in the cox regression the hazard ratio for revision of stemmed TSA compared to stemless TSA was 1.22 (95% CI 0.85-1.75, p=0.286) in AOANJRR and 1.50 (95% CI 0.91-2.45, p=0.109) in DSR. The adjusted hazard ratio for revision of total shoulder arthroplasties with metal backed glenoid components compared to all-polyethylene glenoid components was 2.54 (95% CI 1.70-3.79, p < 0.001) in AOANJRR and 4.1 (95% CI 1.92-8.58, p<0.001) in DSR.

Interpretation / Conclusion: Based on data from two national shoulder arthroplasty registries, we found no significant difference in risk of revision between stemmed and stemless total shoulder arthroplasties after adjusting for the type of glenoid component. We advocate that metal-backed glenoid components should be used with caution and not on a routine basis.

57. The effect of job status on the WOOS score 1 year after shoulder arthroplasty for osteoarthrosis or cuff tear arthropathy – a nationwide cohort study of 2,292 arthroplasties

Marie Louise Jensen[1], Epaminondas Markos Valsamis[2], Alexander Scheller Madrid[1], Bo Sanderhoff Olsen[1], Jeppe Vejlgaard Rasmussen[1]

1. Department of Orthopedics, Herlev and Gentofte Hospital, Denmark 2. Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, Botnar Research Centre, University of Oxford, Oxford, United Kingdom

Background: The use of total shoulder arthroplasties have increased over time as well as improvement in Western Ontario Shoulder Score (WOOS).

Aim: The purpose of the study was to evaluate the association between socioeconomic status and postoperative, patient-reported Western Ontario Shoulder Score (WOOS) at 1 year after shoulder arthroplasty due to osteoarthritis or rotator cuff arthropathy.

Materials and Methods: All patients having a shoulder arthroplasty for osteoarthritis or cuff tear arthropathy were identified using linked data from the Danish Shoulder Arthroplasty Registry and Statistics Denmark between April 2012 and April 2019. Multiple linear regression was used to identify socioeconomic factors associated with patients' WOOS score at 1 year following primary surgery after adjusting for a number of patient, centre and surgical confounding variables. We examined several societal determinants, job status, marital status, education and income.

Results: A total of 2,292 patients were identified with a mean WOOS score of 76.2 (SD 24.1). The mean WOOS score was 53.9 (SD 29.0) for patients who were unemployed, 72.3 (SD 25.0) for patients with a low-level job, 79.4 (SD 20.7) for patients with a high-level job and 77.1 (SD 23.6) for patients who were retired. After confounding adjustments, patients with any employment status (including retired) had a clinically important and statistically significant (coefficients between 14.5% and 19.1%) increased 1-year postoperative WOOS score compared to unemployed patients. Educational level was associated with a statistically significant, but not clinically important difference, while income and marital status were not found to be statistically significantly associated with the outcome.

Interpretation / Conclusion: Unemployment was associated with a clinically important reduction in patient-reported postoperative WOOS score up to 19.1% at 1 year following primary shoulder arthroplasty when compared to patients who were employed or retired. This highlights the need for awareness of specific patient groups before and after surgery.

58. Familial risk of rotator cuff disease: A prospective cohort study of Danish twins

Andreas Kristian Pedersen[1], Jacob von Bornemann Hjelmborg[2], Christian Backer Mogensen[1], Lars Henrik Frich[1,3]

1. Dept. of Regional Health Research, University of Southern Denmark, Odense, Denmark 2. Dept. of Epidemiology, Biostatistics and Biodemography, Institute of Public Health, University of Southern Denmark 3. Department of Orthopedics, Hospital Sønderjylland, Denmark

Background: Rotator cuff disease is a widespread musculoskeletal pathology ranging from tendinopathy to full-thickness tear. The effect of the disease can result in disability and severe pain for the patient. The etiology behind the disease is multifaceted and resulting from an interplay between intrinsic and extrinsic factors. Studies on familial predisposition suggest that genetic plays a role in the pathogenesis of rotator cuff disease. Family members of patients with rotator cuff disease may have a significantly higher risk of rotator cuff tears than the general population. Genetic predisposition may play a role also in clinical presentation and progression of rotator cuff tears. A population-based study of family factors behind rotator cuff disease based on treatment diagnosis and long follow up is there for needed.

Aim: The aim is to study genetic and environmental determinants of rotator cuff diagnosis

Materials and Methods: We included all Danish twin pairs born from 1910–1980 and identified them using the Danish twin registry. The primary outcome was rotator cuff tear and based on the ICD-10 DS460, DS467, DM751 and ICD8 code 90500. To assess familial risk, time-to-event analysis for bivariate twin data was applied taking censoring and competing risk of death into account

Results: This population based study consist of 16749 (24.6 %) monozygotic (MZ) and 51247 (75.4 %) dizygotic twins (DZ). The lifetime familial risk of a rotator cuff diagnosis in a MZ twin, if diagnosed in a co-twin was 10% (95%CI [3.0-16%]). For DZ twins the familial risk of rotator cuff disease was significantly lower at 6.0% (95%CI [3.0- 9.0%]). The lifetime risk of rotator cuff disease for the dizygotic twin was 4.3% (95%CI [4.3-4.8%]). Biometric analyses showed a lifetime heritability of rotator cuff risk at 7.48% (95%CI [-6.8-21.8%]) and the influence of shared environmental factors was 2.74% (95%CI [-11.7%, 17.3%]). Increased genetic influence during 50-70 years of age were indicated

Interpretation / Conclusion: This, largest ever family study show that moderate genetic influence governs the risk of rotator cuff tear while substantial environmental influences are present that could potentially be targeted in prevention strategies

59. Total elbow arthroplasty or hemiarthroplasty for acute distal humeral fractures: A comparative study of 366 consecutive patients

Andreas Falkenberg Nielsen[1], Ali Al-Hamdani[1], Jeppe Vejlgaard Rasmussen[1], Peter Kraglund Jacobsen[3], Theis Muncholm Thillemann[2], Bo Sanderhoff Olsen[1]

1. Department of Orthopeadic Surgery, Herlev & Gentofte Hospital, Copenhagen, Denmark 2. Department of Orthopeadic Surgery, Aarhus University Hospital, Aarhus, Denmark 3. Department of Orthopeadic Surgery, Odense University Hospital, Odense, Denmark

Background: Elbow arthroplasty is an established treatment of distal humeral fractures not amenable to internal fixation. Total elbow arthroplasty (TEA) is the most common modality, but it is still unclear which option produces the best results. We hypothesize that elbow hemiarthroplasty (EHA) leads to a higher revision rate than TEA, due to ulnar erosion.

Aim: The primary aim of this study was to evaluate and compare revision rates after TEA and EHA in the treatment of acute distal humeral fracture. Secondary aims were to describe reasons and risk factors for revision.

Materials and Methods: We identified all elbow arthroplasties nationwide in patients with distal humeral fractures in the period of January 1, 2008 to December 1, 2021. Data was collected retrospectively and audited on the level of individual patients to ensure completeness of data. Kaplan-Meier analyses were conducted to estimate the cumulative implant survival of TEA and EHA. Hazard ratios (HR) were calculated using the Cox-proportional hazards model with mutual adjustment for age, sex, time to surgery, and implant type (TEA or EHA).

Results: 225 primary TEA and 141 primary EHA procedures were included. All TEAs were semi-constrained (136 Coonrad-Morrey [Zimmer], 4 Latitude [Tornier], 37 Nexel [Zimmer], and 48 Discovery [Lima]). All EHAs were of the Latitude Elbow System [Tornier]. The 5- and 10-year revision rates were 8.6% (95% CI 4.4%, 12.8%) and 20.5% (95% CI 9.2%, 31.9%) for TEA, and 9.3% (95% CI 3.0%, 15.6%), and 18.7% (95% CI 4.8%, 32.7%) for EHA. 21 TEAs and 11 EHAs were revised. The most common cause for revision of TEA was aseptic loosening (n=11, 52.4%), where loosening of the humeral component was the cause in 10 cases. For EHA, the most common cause of revision was ulnar erosion (n=5, 45.5%). After adjustment, the HR for male patients was 3.24 (95% CI 1.37, 7.66). The HR for EHA was 0.77 (95% CI 0.36, 1.65).

Interpretation / Conclusion: Revision rates were comparable, with increased risk of revision for males. Although the size of the presented data is small, EHA does not seem to produce inferior results compared to TEA. EHA might bridge the gap between internal fixation and TEA, but results on patient related outcomes are necessary for further evaluation.

60. Differences in Acromial Morphology Between Patients with and without Subacromial Pain Syndrome

Hamzah Ayub[1,2], Dennis Karimi[2], Per Hölmich[1], Adam Witten[1]
1. Sports Orthopedic Research Center - Copenhagen (SORC-C). Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre. 2. Trauma Orthopedic Research Copenhagen Hvidovre (TORCH). Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre

Background: Subacromial pain syndrome (SAPS) is the most common cause of shoulder pain, and mechanical impingement, supposedly linked to acromial morphology, is thought to be an important etiological factor. However, the evidence supporting this theory is lacking. The Copenhagen Acromial Curve (CAC) and the Critical Shoulder Angle (CSA) are two reliable, well-described methods for evaluating acromial morphology on standardized radiographs.
Aim: To investigate the differences in CAC and CSA between patients with and without SAPS.
Materials and Methods: Cross-sectional study of a consecutive cohort of 777 patients recruited during a 27-month period from a secondary care unit. Inclusion criteria: Insidious onset of shoulder pain. Exclusion criteria: Shoulder radiograph lacking or low quality. Patients were divided into two groups: patients with SAPS and without SAPS, according to standardized criteria. Standardized radiographs were used to evaluate CAS and CSA. Linear regression models were used for analyses. Analyses were adjusted for age and sex. Aiming for 90% power, a total sample size of 24 and 60 patients were required for CSA and CAC, respectively.
Results: Results: 301 patients (women: 54%, mean age: 56 years) were included in the analyses: 209 with SAPS and 92 without. Patients with SAPS had a higher CSA in the unadjusted analysis (1.5° [95% CI: 0.4-2.5]) and the adjusted analysis (1.3° [95% CI: 0.2-2.4]) compared to patients without SAPS. There were no significant differences in CAC between patients with and without SAPS. Post-hoc analyses of the subgroup of SAPS-patients with full-thickness supraspinatus tears (n=36) showed a higher CSA compared to patients without SAPS in both the unadjusted (2.1° [95% CI 0.6-3.6]) and the adjusted analysis (1.9° [95% CI 0.4-3.5]). No significant difference for CAC was found in the post-hoc analyses. For all 301 patients, the mean CSA was 33.9°, and the mean CAC was 27.4°.
Interpretation / Conclusion: Patients with SAPS had a higher CSA compared to patients without SAPS. No difference in CAC between patients with and without SAPS was found. The findings do not seem to support acromial morphology being an important etiological factor in SAPS.

61. All-cause mortality and serious adverse events after shoulder arthroplasty: A population-based matched cohort study

Josefine Beck Larsen[1,2], Martin Bækgaard Stisen[1,2], Theis Muncholm Thillemann[1,2], Pia Kjær Kristensen[1,2], Antti P. Launonen[3], Inger Mechlenburg[1,2]

1Department of Clinical Medicine, Aarhus University, Aarhus N, Denmark 2Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark 3Department of Orthopaedic Surgery, Tampere University Hospital, Tampere Finland

Background: Internationally reported rates of serious adverse events after shoulder arthroplasty vary between 0.8- 5.6%. As serious adverse events are rare after shoulder arthroplasty, it is important to know the rates.

Aim: This study aimed to estimate the all-cause mortality and serious adverse events at 30 and 90 days after discharge in patients treated with shoulder arthroplasty compared to the background population.

Materials and Methods: We identified patients who underwent shoulder arthroplasty from 2006-2021 in the Danish Shoulder Arthroplasty Registry . Data from the Danish Shoulder Arthroplasty Registry were linked to data from the Danish National Patient Register and the Danish Civil Registration System and Statistics Denmark . Patients identified in the Danish Shoulder Arthroplasty Registry were matched (1:10) on age, sex, and year of birth to the Danish background population. Data on first serious adverse events and mortality were estimated at 30 and 90 days after discharge.

Results: 14187 patients with a shoulder arthroplasty procedure were identified. This resulted in 141870 controls from the background population. All-cause mortality for shoulder patients within 30 days was 0.6% and within 90 days 1.4%. All-cause mortality for the background population within 30 days was 0.3% and 0.8% within 90 days of the index date. Overall, serious adverse events were 2.6% within 30 days and 3.9% within 90 days of surgery for the patients.

Interpretation / Conclusion: Patients treated with shoulder arthroplasty had an overall 30-day all-cause mortality of 0.6%, which is higher than the rates in the background population. Serious adverse events within 30 days were within the reported rates in international studies. Our results may be used to inform the shared decision- making process and develop a treatment plan.

62. Evaluation of glenohumeral joint kinematics following the Eden-Hybinette procedure with tricortical iliac crest bone graft and the Latarjet procedure. A dynamic radiosteometric cadaver study.

Josephine Olsen Kipp[1,2], Theis Muncholm Thillemann[2,3], Thomas Falstie-Jensen[3], Lærke Borgen[1], Annemarie Brüel[4], Emil Toft Petersen[1,2,3], Maiken Stilling[1,2,3]

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

Background: Patients with anterior shoulder instability typically experience symptoms during active abduction and external rotation of the shoulder. In cases of a glenoid bone lesion, bone grafting procedures such as the Eden- Hybinette procedure with tricortical iliac crest bone graft (EH) and the Latarjet procedure (LP) can be performed to stabilize the glenohumeral joint (GHJ).
Aim: To evaluate the GHJ kinematics throughout an external shoulder rotation following the EH and LP.
Materials and Methods: Eight human specimens were examined with dynamic radiostereometry (dRSA) during an automated 85 o external rotation of the GHJ at a 30- and 60-degree GHJ abduction. The test was performed with anteriorly directed loads of 0, 10, 20, and 30 N in four stages: 1) the native joint, 2) 15% anterior glenoid bone lesion, 3) the EH, and 4) the LP. Specimen-specific bone models from computed tomography scans were aligned with dRSA images using digitally reconstructed radiographs. The GHJ kinematics (maximum differences) were described by anatomical coordinate systems applied to the bone models.
Results: The anterior glenoid bone lesion resulted in an anterior and inferior humeral head translation. Both the EH and LP restored the GHJ kinematics towards the native GHJ. Compared to the glenoid bone lesion, maximum posterior translation was 7.8 mm (95%CI 0.0-15.5) and 9.7 mm (95%CI 0.5-18.8), and maximum superior translation was 7.9 mm (95%CI 0.5-15.6) and 7.4 mm (95%CI 0.3-14.3) with the EH and LP, respectively. Comparing the EH and the LP, the humeral head position was up to 7.6 mm (95%CI 3.6-11.5) more posterior for the LP during the last part of the external rotation at all loads in 60 degrees of abduction.
Interpretation / Conclusion: Following the infliction of anterior shoulder instability with a glenoid bone lesion on human specimens, the EH and LP restored the GHJ kinematics towards the native GHJ kinematics during a loaded external shoulder rotation. However, during the last part of the external rotation with 60 degrees of GHJ abduction, the LP procedure provided more posterior stabilization of the humeral head than the EH, which may be ascribed to the “sling effect” from the conjoined tendon.

63. Non-Invasive Bracing of Acromioclavicular Joint Separations is not Superior to Early Functional Rehabilitation and not Inferior to Surgery in Rockwood type III and V Injuries

Tazio Maleitzke[1,2,3,4], Nicolas Barthod-Tonnot[1], Nina Maziak[1], Natascha Kraus[5], Mark Tauber[6,7], Alexander Hildebrandt[1,2], Jonas Pawelke[1], Larissa Eckl[1], Lukas Mödl[8], Kathi Thiele[1,9], Doruk Akgün[1], Philipp Moroder[1,10]

1. Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Center for Musculoskeletal Surgery, Berlin, Germany 2. Berlin Institute of Health at Charité – Universitätsmedizin Berlin, Julius Wolff Institute, Berlin, Germany 3. Department of Orthopaedic Surgery, Copenhagen University Hospital Amager and Hvidovre, Hvidovre, Denmark 4. Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark 5. Department of Orthopaedics, University Clinic, Greifswald, Germany 6. Department for Shoulder and Elbow Surgery, ATOS Clinic Munich, Munich, Germany 7. Department for Orthopaedics and Traumatology, Paracelsus Medical University Salzburg, Salzburg, Austria 8. Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Institute of Biometry and Clinical Epidemiology, Berlin, Germany 9. Department of Shoulder and Elbow Surgery, Auguste Viktoria Hospital, Berlin, Germany 10. Department of Shoulder and Elbow Surgery, Schulthess Clinic, Zurich, Switzerland

Background: Treatment of acromioclavicular joint (ACJ) separations remains controversial. Yet, conservative treatment has become common even for high-grade injuries. In a recent case report, we introduced the concept of restoring ACJ integrity by non-invasively bracing a RW type V injury.
Aim: The purpose of this study was to prospectively evaluate the clinical and radiological efficacy of a novel ACJ brace and compare it to early functional rehabilitation and surgery for RW III and V injuries after a minimum of 12 months.
Materials and Methods: Patients with acute RW III injuries (n=18) and patients with RW V injuries who refused surgery (n=7) were prospectively enrolled and treated with an ACJ brace and followed up clinically and radiologically for 12 months. Endpoint results were compared to injury grade-, sex-, age-, and follow-up-period-matched patients treated with early functional rehabilitation (n=23) and surgical TightRope® stabilization (n=23). Clinical outcomes included Constant Score (CS), Subjective Shoulder Value (SSV), Taft Score (TS), and modified Acromioclavicular Joint Instability Score (mAJIS) and radiological outcome included coracoclavicular (CC) index.
Results: CS, SSV, TS, and mAJIS improved in RW III and CS and SSV in RW V patients treated with the ACJ brace. Significance was only reached in RW III patients ($p < 0.001$). Radiological indices did not improve over time in RW III and V patients. No differences were found when comparing functional and cosmetic outcomes (CS, SSV, TS, mAJIS) after a minimum of 12 months between bracing, surgery, and early functional rehabilitation in RW III and V patients. The CC index was most improved in patients treated by surgery compared to bracing after a minimum of 12 months ($p=0.0011$ for RW III).
Interpretation / Conclusion: Brace treatment led to comparable clinical and cosmetic outcomes as early functional rehabilitation and surgery in patients with high grade ACJ injuries after a minimum of 12 months. However, no sustainably improved reduction of the ACJ resulted from bracing, when compared to early functional rehabilitation, thus questioning its utility. While surgery ensured radiological improvement compared to bracing, no benefit was seen over early functional rehabilitation.

Session 8: Trauma

14. November

14:30 - 16:00

Lokale: Sal B

Chair: Rikke Thorninger & Kristoffer Hare

64. High mortality among elderly when having surgery for a femoral fracture – a population-based register study.

Michael Houlind Larsen[1,3], Per Hviid Gundtoft[1,2], Bjarke Viberg[1,3]
1. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt Kolding- University Hospital of Southern Denmark 2.Department of Orthopaedic Surgery and Traumatology, Aarhus University Hospital 3. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital

Background: In a world where aging populations strain healthcare and economic resources, effective tools for identifying vulnerable elderly individuals with lower extremity fractures are crucial.
Aim: To study how surgically treated fracture in femur, lower leg, foot/ankle affects 30- and 365-days mortality in individuals above 65 years.
Materials and Methods: We extracted data from the Danish National Patient Register on all patients aged 65 years and above, diagnosed with a lower extremity fracture (S72*, S82*, S92*) and treated with surgical procedures in the period 1998-2017. The primary outcomes were 30- and 365-days mortality. Secondary outcomes were mortality rates by fracture site (femur, lower leg, foot/ankle), sex, age groups (5-year span), and comorbidity level calculated by Charlson Comorbidity Index (none: 0, low: 1-2, and high: ≥3).
Results: There were 182,013 operatively treated lower extremity fractures recorded in individuals above 65 years, and 73% occurred in females. The 30- day mortality rate for the total cohort was 9% and it was 26% for 365 days. The 30-day mortality rate was 10% for femoral fractures in comparison to 2% for lower leg and 1% for foot/ankle. The mortality rates were similar in femoral fractures regardless of location (8-11%). The differences between fractures sites at 30-days mortality were similar for the 365-day mortality with 29% for femoral fractures, 8% for lower leg, and 6% for foot/ankle. Men with a femoral fracture had a higher 30-day mortality rate than women (15% versus 8%) as well as 365-days (37% vs 26%). Generally, the mortality rate significantly increased with the age of the patients and with higher CCI scores. However, the location of the fracture was less important for 365-day mortality rate in age above 85 years as comparable high mortality rates were observed across fracture location groups.
Interpretation / Conclusion: There was an observed higher risk of mortality in surgically treated femoral fractures and the mortality rates seems to rapidly decline when the fracture is below the knee. This could indicate that a femoral fracture, regardless of location, is a fragility fracture and patient care should be accordingly.

65. Frailty Index as indicator of hospital resource utilization in geriatric hip fractures

Alec Friswold, Devon Brameier, Faith Selzer, Liqin Wang, Li Zhou, Michael Weaver, Arvind von Keudell
Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA.

Background: Hip fractures impose substantial mortality, morbidity, and cost. Alternative payment models may control costs; however, patient heterogeneity necessitates potential risk adjustment. Frailty is associated with higher mortality and morbidity and may be a risk factor for higher hospital costs. The Frailty Index (FI) is a tool that quantifies a patient's physiologic reserve, e.g. frailty, based on the accumulated deficits identified by a Comprehensive Geriatric Assessment. The relationship between FI and hospital resource utilization in the hip fracture population has not yet been investigated.
Aim: This study investigates the unadjusted association between Frailty Index and treatment-related cost for hip fractures.
Materials and Methods: Analysis included 326 patients over 65 who underwent surgical repair of femoral neck or intertrochanteric hip fracture between 2018-2020 at a Level 1 Trauma Center. FI was calculated by geriatricians performing a comprehensive history and physical examination. Patients were stratified into Non-frail (FI:0-0.21), Moderately Frail (FI:0.21-0.45) and Severely Frail (FI>0.45). Financial data was obtained for each episode. Primary outcome was a percentage difference in total cost of care, direct cost, and revenue relative to non-frail patients as the comparison group.
Results: Compared to non-frail patients, severely frail patients were found to have, on average, a 20% higher total cost of in-hospital care ($p<.05$), 17% higher direct cost of care ($p<0.05$), and 10% revenue ($p<0.05$). Moderately frail patients were found to have 12% higher total cost of care ($p<0.05$), 11% higher direct cost of care ($p<0.05$), and 5% higher revenue ($p=0.29$) compared to the non-frail group.
Interpretation / Conclusion: Greater degrees of frailty are associated with higher cost of care, suggesting frailty could be used to risk adjust payments. The increase in revenue for moderately frail and severely frail patients does not meet the increase in total or direct cost, suggesting current payment models disincentivize caring for frailer patients.

66. Heterogeneities in hip fracture costs across patient characteristics and types of treatment

Jonas Ammundsen Ipsen [1, 2], Jan Abel Olsen[8], Bjarke Viberg [3,4,5], Lars T. Pedersen [1,2,6], Inge Hansen Bruun [1,2], Eva Draborg[7]

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. Department of Orthopaedic Surgery and Traumatology. Lillebaelt Hospital, University Hospital of Southern Denmark, Kolding 4. Department of Orthopaedic Surgery and Traumatology. Odense University Hospital, Odense 5. Department of Clinical Research, University of Southern Denmark, Odense 6. Department of Health Education, University College South Denmark, Esbjerg 7. Danish Centre for Health Economics, Department of Public Health, University of Southern Denmark, Odense 8. UiT The Arctic University of Norway, Department of Community Medicine, Tromsø

Background: Hip fracture treatment is costly. However, costs may depend on patient characteristics and type of treatment. This should be considered when planning the rehabilitation, but the cost has not been estimated yet, nor has any difference between patient groups been identified.
Aim: To provide new knowledge on how costs of hip fracture treatment differ across subgroups of patients.
Materials and Methods: This is a planned exploratory outcome study from a prospective study. It encompasses a regional hospital and the municipalities of the catchment area. Inclusion criteria were 65+ years old community-dwelling persons cognitively unimpaired after hip fracture. Exclusion criteria were short life expectancy and revision surgery. Healthcare costs were collected from hospitals and municipalities and reported as the median treatment cost. Depending on patient characteristics and treatment, cost differences were reported in medians and assessed with Wilcoxon or Kruskal-Wallis rank tests.
Results: In total, 245 patients participated; mean age of 78 (SD 7), 66% female, 50% lived alone, and mean BMI 24.9 (SD 4). The median treatment cost was 102,236 DKK. Costs differed significantly along the following patient characteristics: age above 85 years cost 49% more (P=0.00) than the median treatment cost; ASA >3 cost 42% more (p=0.00); living alone cost 52% more (p=0.00); patients needing help from others to walk cost 56% more (p=0.00), while sex (p=0.25) and BMI (p=0.24) did not affect costs. Concerning type of treatment, patients with internal fixation (sliding hip screws or intramedullary nails) cost 48% more (p=0.00) than patients with arthroplasty. The main reasons for increased cost were in- hospital stay, outpatient contacts, home care and community nursing. Rehabilitation costs were not associated with patient characteristics or treatment.
Interpretation / Conclusion: The mean cost of treating a hip fracture patient was 102,236 DKK. The cost was significantly higher if patients were older, more comorbid, lived alone, poorly mobilized or treated with internal fixation. The treatment courses offered to these patients are likely the ones we need to improve as their need for rehabilitation is higher.

67. Use of in-cast intermittent pneumatic foot compression to improve healing, in the postoperative treatment of ankle fractures: A prospective study

Henriette Duborg Brink[1], Jesper O. Schønnemann[1]
1. Department of Orthopaedics. University Hospital of Southern Denmark, Aabenraa

Background: Malleolar fractures are prone to poor healing and a higher risk of infection following surgery. Complications include tissue swelling due to soft tissue injury, hemorrhage and secondary inflammation. The skin covering the malleolus lacks significant muscle or fat tissue, posing a unique challenge for skin closure. Studies have demonstrated that intermittent pneumatic foot-compression (IPC) may reduce swelling and promote faster healing, potentially lowering the incidence of superficial infections.
Aim: To investigate if in-cast IPC 24 hours post- surgery could reduce the number of patients with insufficient wound healing.
Materials and Methods: A 2-year prospective study of patients with malleolar fractures (AO type 44-A, 44-B, 44- C) requiring surgery with internal fixation. The first year we treated patients with usual cast-immobilization post-surgery. The following year we treated patients with in- cast IPC 24 hours post-surgery. Patients who were not fitted with an IPC due to a shortage, were automatically moved to the control group. Patients were seen in a postoperative ambulatory follow-up by an orthopedic surgeon at 14 days and 6 weeks. The registration was made in the patients file and based on objective findings. Successful wound healing was defined as removal of all stitches and no wound dehiscence. The amount of major complications was followed up for 6 months.
Results: We included 179 patients with a mean age of 55. 118 was wearing the usual cast-immobilization and 61 was wearing in-cast IPC 24 hours post-surgery. Using monte carlo simulations, by a univariate logistic regression, we calculated that the odds ratio must be at or above 3 to achieve a strength of 80% and a significance level of 0.05. We registered that 49.2% of patients in the IPC group had insufficient wound healing at the 14- day follow-up compared to 39.8% in the control group. At 6-week follow-up 38.3% in the IPC group and 27.1% in the control group, still had insufficient wound healing.
Interpretation / Conclusion: The utilization of in-cast intermittent pneumatic foot compression did not result in significant healing improvements at the 14-day follow-up and did not demonstrate a notable effect in reducing the incidence of wound healing complications.

68. Complications following surgical treatment of patella fractures - a systematic review and proportional meta-analysis

Damgren Vesterager Jeppe [1], Torngren Hannes [1], Elsoe Rasmus[1], Larsen Peter[1]
Department of Orthopaedics, Aalborg University Hospital

Background: Patella fracture is an injury that affects individuals of all age- and gender-groups, accounting for approximately 1% of all fractures in adults with an incidence of 13,1/100,000/year Complications to surgical treatment of patella fractures are commonly reported, Previous reviews, Dy et al, 2011, reported 33.6% re-operations, 3.3% infections, and 1.3% cases of nonunion in surgical treated patella fractures. In recent years several large-scale studies have been added to the literature enables for more accurate information regarding the high risk of complications to surgical treatment of patella fractures. At present, there is a need for a comprehensive literature review to identify the most frequent and severe complications.
Aim: The aim of this systematic review and proportional meta-analysis was to identify complications to surgical treatment of patella fractures and to estimate their incidence. We extend existing knowledge in this topic by including several more recent and large-scale studies.
Materials and Methods: After searching in PubMed, MEDLINE, EMBASE, Cochrane Library, and OpenGrey, all studies from after year 2000, study populations >100 patients, patients >18 years and follow-up >30 days were included. Two independent authors (JV,HT) assessed the literature search and extracted the data. Risk of bias was assessed using Newcastle-Ottawa Quality assessment Scale. Meta-nalysis was performed on complications pooled in infections, nonunion, symptomatic implant removal and fixation failure.
Results: Data of complications were available from 14 studies including a pool of 5659 patients. The most common complication was symptomatic implant removal affecting 29.6% (95%-CI: 21.5 - 37.7). Other complications stated were fixation failure (5.2 %, 95%-CI: 4.0 - 6.3), infections (3.1%, 95%-CI: 1.7 - 4.5) and nonunion (1.7% (95%-CI: 0 – 3.7). All studies were rated with low risk of bias, with NOS ranging from 6 to 8.
Interpretation / Conclusion: Surgically treatment of patella fractures was associated with a high risk of complications. The most common complication was symptomatic implant removal affecting 29.6% of patients. Other complications stated were fixation failure 5.2%, infections 3.1% and nonunion 1.7%.

69. Operative and Nonoperative Treatment of Lateral Compression Pelvic Fractures: A Cost-Effectiveness Analysis

Soham Ghoshal[1], Alex Farid[1], Tynan Friend[1], Michael Gustin[1], Derek Stenquist[1], Nishant Suneja[1], Michael Weaver[1], Arvind Von Keudell[1]

1. Brigham and Women's Hospital, Department of Orthopaedic Surgery, Boston, MA

Background: Lateral compression type 1 (LC1) fractures are the most common type of pelvic fractures, with studies demonstrating that they account for nearly two-thirds of all pelvic fractures. Historically, LC1 fractures have been difficult to manage and there has been controversy over whether patients should be treated operatively or non-operatively. Traditionally, operative management has been reserved for treatment of unstable fractures to prevent displacement. Studies of operative management have demonstrated improved time to mobilization, decreased pain, and improved functional status in patients with LC1 fractures. However, while operative management has shown a trend toward improving quality of life (as measured by EQ-5D), recent systematic reviews have not found any statistical differences in length of hospital stay or complication rates between patients undergoing operative vs nonoperative management for LC1 fractures.

Aim: This study aims to compare the cost- effectiveness of operative treatment with that of nonoperative treatment of LC1 pelvic fractures.

Materials and Methods: We developed a multi-arm decision tree consisting of conservative management, initial exam under anesthesia for suspected unstable fractures, and direct operative treatment. Cost- effectiveness analysis was carried out using two-year EQ-5D utility data from the literature. Surgical costs included the ambulatory surgical fee, physician fee and anesthesia fee. We used rollback analysis to determine the cost- effectiveness of each treatment option, presented as the incremental cost effectiveness ratio (ICER), utilizing a $50,000 willingness-to- pay (WTP) threshold.

Results: Rollback analysis revealed that compared to nonoperative treatment, exam under anesthesia cost $1175.66 more, while operative treatment cost $3722.92 more and yielded comparable EQ-5D scores. The ICER for undergoing exam under anesthesia compared to non-operative treatment was -$127,510 at 2-year follow-up. The ICER for undergoing operative treatment was lower, at -$136,095 at 2-year follow-up.

Interpretation / Conclusion: Nonoperative management was found to be more cost effective than operative management of LC1 fractures.

70. Is Surgery-Delay associated with increased risk of complications and mortality rates within the first two years after surgery in Femoral Neck Fracture Patients?

Jacob Schade Engbjerg[1,2,4], Rune Dall Jensen[2,4], Michael Tjørnild[1], Rikke Thorninger [3], Jan Duedal Rölfing[2,3,4]

1 Department of Orthopaedics, Regional Hospital Randers. 2 MidtSim, Central Denmark Region. 3 Dept. of Orthopaedics, Aarhus University Hospital. 4 Dept. of Clinical Medicine, HEALTH, Aarhus University

Background: Femoral neck fractures (FNF) have a high mortality rate. There is conflicting literature on the association between surgical delay and morbidity and mortality.
Aim: This study investigated the relationship between surgery-delay and the complication and mortality rates within the first two years (y).
Materials and Methods: Retrospective review of FNF patients treated with DHS at Regional Hospital Randers 2015- 2021 (n=325). Patients were identified using Central Denmark Region's Business Intelligence-portal. Primary composite outcome: complications identified on x-rays (cut-out, non-union, head necrosis), reoperation and death within 2 years. Surgery- delay was defined as time from the diagnostic x- ray to operation start. Comorbidities (CCI-score) and mortality were based on chart review. Data are reported as median and IQR and assessed with Mann Whitney test.
Results: The mortality rate was 16% and 26% within 1 and 2 years. The complication rate was 47/325 patients <1 y, and 52/325 patients < 2 y. Overall surgery-delay was 7.9 h (5;14). Delay was significantly associated with 1-y mortality, $p < 0.01$; 10.9 h (7;17) for patients deceased < 1 y and 7.5 h (5;14) for patients still alive. This was still significant after 2 years. Delay was not associated with risk of complications 1 y after surgery for Garden type 1/2, $p = 0.05$, nor Garden type 3/4, $p=0.33$. Delay was associated with risk of complications 2 y after surgery for Garden type 1/2, 13.5 h (8;16) for patients with complications and 7.6 h (5;15) for patients without complications, $p=0.046$. No association for Garden type 3/4, $p=0.31$. CCI-score was not associated with 1-y or 2-y risk of complications, $p = 0.77$; $p=0.74$. CCI-score was significantly associated with both 1-y mortality, $p=0.0003$, 2 (1;3) vs. 1 (0;2) and 2-y mortality, $p<0.001$, 2 (1;2) vs. 0 (0;3).
Interpretation / Conclusion: We report significant association between surgery-delay and mortality rates in FNF even though overall delay is below 24 hours. Further, we report significant association between surgery-delay and the risk of complication/reoperation 2 y after surgery for garden type 1/2 fractures. Unsurprisingly, CCI- score is significantly correlated with risk for death 1y and 2y after surgery.

71. Representativeness of The Danish National Health Survey for Research in Hip Fracture Patients: a population based study

Simon Storgaard Jensen[1], Lei Wang[1], Nadia R. Gadgaard[1], Henrik T. Sørensen[1], Alma B. Pedersen[1]
1. Department of Clinical Epidemiology, Department of Clinical Medicine, Aarhus University and Aarhus University Hospital, Aarhus, Denmark.

Background: Orthopedic registries have provided valuable input about risk for and prognosis after hip fracture. However, registries are often limited by the lack of data on lifestyle factors, health-related quality of life and behavior, and social background. These data are readily available in surveys.
Aim: We aimed to examine if participants of the Danish self-reported questionnaire-based public health survey "How are you" are representative of hip fracture patients.
Materials and Methods: Hip fracture patients were identified in the Danish Multidisciplinary Hip Fracture Register and combined with survey data (from 2010, 2013, 2017), and data from the Danish medical databases on the individual-level. We calculated proportions of a wide range of variables, comparing patients who had and those who had not participated in surveys before hip fracture.
Results: We included 92,600 fracture patients, of which 3,557 (3.8%) participated in surveys. The median time from survey to hip fracture was 3.8 years. Participants and non-participants had sex distribution of 34% and 29%, and proportion of patients aged 75+ years of 77% and 81%. The two groups had similar proportion of patients with no comorbidity (54% vs 55%). Participants used slightly more anticoagulants and statins, but less psychiatric medications. The proportion of patients with high income and high educational level was 17% vs 9% and 14% vs 8% for participants vs non-participants, respectively. The proportion of patients cohabiting was 40% vs 30% for participants vs non- participants.
Interpretation / Conclusion: The survey data provided a sample that appeared to be representative of the entire hip fracture population based on several patient characteristics. Thus, the survey data could be a valuable tool for further understanding the risk and outcome of hip fracture patients. Slight differences were observed for medication and socioeconomic markers.

72. MEASUREMENT PROPERTIES OF THE KNEE INJURY AND OSTEOARTHRITIS OUTCOME SCORE (KOOS) FOR PATELLA FRACTURES

Rasmus Jorgensen[2,3], Rasmus Elsoe[2], Pernille Bønneland[2], Peter Larsen[1,2]
1 Department of Occupational Therapy and Physiotherapy, Aalborg University Hospital, Aalborg, Denmark 2 Department of Orthopaedic Surgery, Aalborg University Hospital, Aalborg, Denmark. 3 Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark.

Background: The Knee Injury and Osteoarthritis Outcome Score (KOOS) is one commonly used knee-specific patient-reported outcome instrument, among several others, to capture the patient-perceived outcomes following patella fractures. However, to the authors' knowledge, none of these instruments have been developed for patients with patella fractures or have been validated adequately for use in patients with patella fractures. Furthermore, the minimal clinical important difference among these instruments is unknown for patients with patella fractures.
Aim: The study aimed to investigate the validity, reliability, and responsiveness and estimate the minimal clinically important difference of KOOS to adult patients with patella fractures.
Materials and Methods: The study design was a prospective cohort study including patients treated conservatively or surgically following a patella fracture (AO-34). The primary outcome measure was the KOOS. The KOOS was repeated at 14 days, 15 days, six weeks, and six and 12 months. Content validity was evaluated by patients ranking the relevance of the 42 items in the KOOS, test- retest reliability by an interclass correlation coefficient, and responsiveness by effect size end estimation of minimal clinically important difference (MCID) by the anchor-base method.
Results: Included were 38 patients with a mean age of 63.3 years (range 24 to 89) with 74 % female gender. Results showed an acceptable content validity of all the KOOS subscales. The test- retest reliability was high for all five subscales, with an interclass correlation coefficient ranging from 0.8-0.9. At the 12-month follow-up, responsiveness showed large effect sizes for all the KOOS subscales (> 0.9). The MCID of the KOOS subscales were Pain 8.7, Symptoms 8.1, ADL 9.3, Sport/Rec 10.3 and QOL 7.1.
Interpretation / Conclusion: The Knee Injury and Osteoarthritis Outcome Score (KOOS) is a valid and useful patient- reported instrument to monitor the status/recovery of patients with patella fractures. The questionnaire showed acceptable content validity, high reliability, and high responsiveness.

73. Clinical Outcomes of Vancouver B2 Periprosthetic Fractures: Open Reduction Internal Fixation versus Revision Arthroplasty

Amakiri Ikechukwu[1], Devon Brameier[2], Taylor Ottesen[1], Audrey Kobayashi[1], Alexander Farid[3], Daniel Gabriel[3], Kishore Konar[2], Angela Mercurio[3], Tyler Warner[3], Michael Weaver[2], Arvind von Keudell[2]
1. Harvard Combined Orthopaedic Residency Program, Harvard Medical School, Boston, MA, USA 2. Brigham and Women's Hospital, Department of Orthopaedic Surgery, Boston, MA, USA 3. Harvard Medical School, Boston, MA, USA

Background: Periprosthetic fractures around total hip arthroplasty implants are challenging injuries to manage and there remains controversy regarding the best treatment. The standard treatment for Vancouver B2 periprosthetic femur fractures (VB2 PPFs) is revision arthroplasty (RA). However, some studies suggest that it might be reasonable to perform open reduction and internal fixation (ORIF) in select patients.
Aim: This primary purpose of this study is to compare the clinical outcomes of patients with VB2 PPFs treated with either ORIF or RA.
Materials and Methods: A retrospective review of patients ≥18 years, with VB2 PPFs, as defined in the primary surgeon operative note, who were treated with either ORIF or RA at a large tertiary institution between January 1, 2005, and April 1, 2022. Exclusion: pathologic fractures, periprosthetic joint infection, or insufficient follow-up. In cases of ORIF, an attempt was made to achieve an anatomic reduction with compression, with cerclage wires. RA involved revision to a modular diaphyseal engaging press-fit stem.
Results: 98 patients underwent either ORIF or RA for VB2 PPFs. 26 patients underwent ORIF, while 72 patients received RA. Patient demographics between the ORIF and RA groups (Table 1) showed no significant differences in age (p=0.40), CCI (p=0.22), BMI (p=0.44), gender (p=0.52), and smoking status (p=0.43), race (p=0.21). ORIF was associated with a shorter median time from injury to surgery in the ORIF group (p=0.02), less estimated blood loss (p=0.004), and operative time (p=0.08). However, there was no difference in transfusion rates (p=0.74), volume transfused (p=0.43), or length of stay (p=0.38). Total complication rates were similar between the ORIF and RA groups (23.1% vs.18.1%, p=0.58). There were no significant differences in 30-day and 1-year mortality (3.9% vs. 4.2%, p=0.94; 11.5% vs. 8.3%, p=0.63) or readmission rate (26.9% vs. 19.4%, p=0.43) between the ORIF and RA groups.
Interpretation / Conclusion: ORIF showed benefits in shorter surgery and less blood loss, but no significant differences in mortality or complication rate compared to RA. Both strategies are viable for managing VB2 PPFs, with choice tailored to patient factors and surgeon expertise.

Session 9: Pediatrics

14. November
14:30 - 16:00
Lokale: Sal C
Chair: Peter Buxbom & Julie L. Erichsen

74. Development of a data-based prediction model for residual dysplasia of the hip using ultrasound screening parameters: A population-based study of 7174 children using natural language processing on radiology reports

Martin Gottliebsen[1], Michel Bach Hellfritzsch[2], Aida Hejlskov Poulsen[3], Anders El-Galaly[4], Mathias Hauge Bünger[1]

1. Department of Orthopaedics, Aarhus University Hospital 2. Department of Radiology, Aarhus University Hospital 3. Data Science Lab, BI office, Central Denmark Region 4. Department of Orthopaedics, Copenhagen University Hospital

Background: Ultrasound screening of the hip in newborns aims to identify those requiring treatment for dysplasia. Residual acetabular dysplasia (RAD) is detected on later radiographs and may exist even after appropriate treatment of neonatal hip dysplasia. It is speculated that RAD can also be a delayed finding in children not identified in the current screening programme. We investigated RAD after ultrasound screening and its association with initial screening parameters.
Aim: To compare the risk for RAD with initial hip ultrasound screening parameters.
Materials and Methods: This is a population-based study on 7174 children using data from their ultrasound screening of the hip in the period 2012 to 2022 at a single center. Utilizing natural language processing (NLP) on radiology reports, we extracted quantitative parameters (alfa-angles, femoral head coverage, pubo-femoral distance) from ultrasounds. Logistic regression models calculated odds ratios for RAD based on these parameters.
Results: Among 7174 children screened, 444 underwent hip radiographs at 11–18 months, with 174 (39%) showing RAD (this was assessed using text-mining on radiology reports). RAD odds ratios were 17.4 for upper pubo-femoral distance quintile, 14.2 for lower alfa-angle quintile, and 11.5 for lower femoral head coverage quintile.
Interpretation / Conclusion: Our findings suggest strong associations between specific ultrasound parameters and RAD, affirming the validity of NLP-based analysis of radiology reports. Further research should explore how general data- based analysis can enhance RAD prediction.

75. A novel plate design for rotational guided growth. An experimental study in immature porcine femurs.

Ahmed Halloum[1], Ole Rahbek[1], Shima Gholinezhad[1,2], Søren Kold[1], John Rasmussen[2], Jan D. Rölfing, Maria Trta[1], Ahmed A. Abood[1,3]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital; 2. Department of Materials and Production, Aalborg University; 3. Department of Orthopaedics, Aarhus University Hospital.

Background: Current treatment of rotational deformities of long bones in children is osteotomies and fixation. In recent years the use of guided growth for correction of rotational deformities has been reported in several pre-clinical and clinical studies. Various techniques have been used and different adverse effects, like growth retardation and articular deformities have been reported.

Aim: The aim of this study was to test a novel plate concept (RotOs Plate TM) intended for correction of rotational deformities of long bones by guided growth, with sliding screw holes to allow for longitudinal growth, in a porcine model.

Materials and Methods: Twelve, 12-week-old female porcines were included in the study. Mean weight at insertion of the plates was 42 kg (38-45), mean duration of intervention was 88 days (83-98). Surgery was performed in the left femur while the right femur was used as control. Plates were placed on the lateral and medial side of the distal femur, spanning the growth plate, to induce external rotation, as longitudinal growth occurred. CT-scans were performed at plate insertion and removal. 3D-models of the left and right femur were made and used for measuring the achieved rotation.

Results: The plates rotated as intended in all 12 porcines. One porcine was excluded due to congenital deformity of the proximal part of the femurs. Two porcines had cut-out of the proximal screw on the lateral side, observed at the end of the intervention. These two porcines were included in the results. We observed a Δrotation of 5.7° ± 2° in external direction (CI: 3.7°- 7.7°). ΔFemur length was -0.4 cm [-0.7 cm – 0 cm] equal to 1.5% shortening of the operated femur. No significant difference was observed in coronal or sagittal plane.

Interpretation / Conclusion: The plate worked as intended and significant external rotation was achieved. While the use of guided growth for correction of rotational deformities is already being used clinically, it is still to be considered an experimental procedure with sparse evidence. This study shows promising results for the feasibility of the method in a large animal model and is an important first step in validating the technique and detecting possible adverse effects, before future clinical studies.

76. A systematic review of staples, tension-band plates and percutaneous epiphysiodesis screws for leg-length discrepancy (LLD) treatment.

Maria Tirta[1], Mette Holm Hjorth[2], Jette Frost Jepsen[3], Søren Kold[1], Ole Rahbek[1]
1. Interdisciplinary Orthopaedics, Aalborg University Hospital 2. Department of Orthopaedics Surgery, Aarhus University Hospital 3. Medical Library, Aalborg University Hospital

Background: Epiphysiodesis, defined as the process of closing the growth plate (physis), have been used for several years as a treatment option of cases where the predicted leg-length discrepancy (LLD) falls between 2 to 5 cm.
Aim: The aim of this study was to systematically review the existing literature on the effectiveness of three different epiphysiodesis techniques with implant usage for the treatment of leg-length discrepancy in the pediatric population. The secondary aim was to address the reported complications of staples, tension-band plates (TBP) and percutaneous epiphysiodesis screws (PETS).
Materials and Methods: This systematic review was performed according to PRISMA guidelines. We searched MEDLINE (PubMed), Embase, Cochrane Library, Web of Science and Scopus for studies on skeletally immature patients with LLD treated with epiphysiodesis with an implant. The extracted outcome categories were effectiveness of epiphysiodesis (LLD measurements pre/post-operatively, successful/unsuccessful) and complications that were graded on severity.
Results: Forty-four studies (2184 patients) were included, from whom 578 underwent TBP, 455 PETS and 1048 staples. From pooled analysis of the studies reporting success rate, 64% (150/234) successful TBP surgeries (10 studies), 78% (222/284) successful PETS (9 studies) and 52% (212/407) successful Blount staples (8 studies). Severe complications rate was 7% for PETS, 17% for TBP and 16% for Blount staples. TBP had 43 cases of angular deformity (10%), Blount staples 184 (17%) while PETS only 18 cases (4%).
Interpretation / Conclusion: Our results highlighted that PETS seems to be the most successful type of epiphysiodesis surgery with an implant, with higher success rate and lower severe complications than TBP or Blount staples.

77. Declining numbers of femoral fractures in children: a Danish nationwide register study of 8885 fractures between 1999 and 2018

Martin Gottliebsen[1], Per Hviid Gundtoft[1], Topi Laaksonen[2], Yrjänä Nietosvaara[3], Bjarke Viberg[4]
1. Department of Orthopaedics, Aarhus University Hospital, Denmark 2. University of Helsinki, Finland 3. University of Eastern Finland, Finland 4. Department of Orthopedic Surgery and Traumatology, Odense University Hospital, Denmark

Background: Femoral fractures in children are often the result of high energy injuries. In younger children associated non-accidental injury needs to be considered. Injury prevention for children has been imposed in our society and general safeguarding for children could be affecting the number of these severe injuries in children. Optimal orthopaedic treatment is based on age and weight of the injured child. Little is known of incidence and age distribution of femoral fractures in children in Denmark.
Aim: To investigate incidence and age patterns for femoral fractures in children aged 0 - 15 year in Denmark.
Materials and Methods: This is a population-based register study with data from 1999 to 2018 retrieved from the Danish National Patient Registry using ICD10 codes (S72*). The primary outcome was incidence and age distribution for femoral fractures in children aged 0 - 15 year.
Results: We identified 8885 femoral fractures, yielding a mean incidence of 0.42 fractures per 1000 children / year. The incidence of fractures decreased from 0.50 in 1999 to 0.36 in 2018. Peak numbers of fractures are observed in children aged 2 (1000 fractures) in comparison to children aged 8 with lowest numbers of injuries (406 fractures).
Interpretation / Conclusion: Femoral fractures in children are relatively rare injuries with a declining incidence. The lesions are more common among the youngest children. These individuals often require non-operative treatment and a possible investigation by child protective service. Our findings should lead to a discussion on planning of optimal treatment of femoral fractures in children in Denmark.

78. Risk factors for developmental dysplasia of the hip at 3 months of age – A systematic review and meta-analysis.

Maria Tirta[1], Ole Rahbek[1], Søren Kold[1], Hans-Christen Husum[1]
1. Interdisciplinary Orthopaedics, Aalborg University Hospital

Background: Selective screening of children at risk for developmental dysplasia of the hip (DDH) is based on clinical examination and risk factor identification. The current use of risk factors in DDH screening is largely reflected by two meta-analyses published in 2012, which found breech presentation, family history of DDH, female sex and primiparity to increase the risk of DDH. However, the definition of DDH, reference tests and age of the examined children vary considerably both between these meta-analyses and for the studies that were included, complicating the translation of those findings to current screening guidelines.
Aim: The aim of the present meta-analysis was to evaluate the association of previously proposed risk factors to the risk of sonographically verified DDH.
Materials and Methods: We searched PubMed, EMBASE and the Cochrane library to identify cohort, RCTs, case-control and cross-sectional studies from 1980 to January 2023 in English language. Eligible studies included participants under 3 months of age, where the diagnosis of DDH was made by hip ultrasound using the gold standard Graf method and reported information on one or more of the proposed risk factors and final diagnosis was available.
Results: Of 5363 studies screened, 20 studies (n=64543 children) were included. Breech presentation (OR: 4.2, 95%CI 2.6-6.6), family history of DDH (3.8, 95%CI 2.1-7.2), female sex (2.5, 95%CI 1.7-3.6), oligohydramnios (3.8, 95%CI 1.7-8.5) and high birthweight (2.0, 95%CI 1.6-2.5) significantly increased the risk of DDH. C-section, primiparity, multiple births, low birthweight and prematurity were not found to increase the risk for DDH, and there was only one study about clubfoot as a risk factor.
Heterogeneity was high (I2 >75%) in all the tested factors except high birthweight (I2 =0%). Subgroup analysis was performed to investigate these heterogeneities
Interpretation / Conclusion: Family history of DDH and breech presentation are associated with a significant increase of the risk of sonographic DDH in children aged 3 months. A similar risk increase was detected for oligohydramnios, which was not detected in previous meta-analyses. Additionally, the DDH risk increase of female sex was found to be lower than previously reported.

79. Incidences and trends in management of paediatric distal forearm fractures 1999-2018. A population-based registry study.

Katrine Rønn Abildgaard[1], Per Hviid Gundtoft[2,3], Stig Brorson[1], Bjarke Viberg[2,4]
1. Centre for Evidence-Based Orthopaedics, Department for Orthopaedic Surgery, Zealand University Hospital, Køge, Denmark 2. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt Kolding- University Hospital of Southern Denmark 3. Department of Orthopaedic Surgery and Traumatology, Aarhus University Hospital 4. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital

Background: Indications for surgery and treatment choice of paediatric forearm shaft fractures has changed during a 20-year period. Our hypothesis was that the same has occurred for distal forearm fractures.
Aim: To report the incidence rate of paediatric distal forearm fractures in Denmark over a 20-year period and report differences in treatment choices stratified by age group.
Materials and Methods: Population-based register study of 0-15 years old children with distal forearm fractures registered in the Danish National Patient Registry (S525+6) from 1999-2018. The primary outcome was the incidence rate of non-surgical (cast) or surgical treatment (surgical procedure code within 1 week from injury). Surgical procedure codes included closed reduction (KNCJ0*), open reduction (KNCJ1*), K-wires (KNCJ4*), or other type of fixation such as external fixation, nail, plate or screws (KNCJ3*,5*-7*).
Results: There were 136,257 fractures yielding an overall incidence rate of 646 per 105 persons/year. Peak incidences for girls and boys were 1236 per 105 persons/year (11 years) and 1341 per 105 persons/year (13 years), respectively. There was a slight increase in incidence due to an increase among 8-15 year old boys. The primary treatment option in all age groups was non- surgical treatment decreasing from 95% in 1999 to 92% in 2018. Closed reduction was the primary surgical treatment, but decreased from 5% to 1.5% during the 20-year period. This decrease corresponded with an increase in K- wire fixation from 0.5% to 6%. When stratified by age groups, the preferred treatment changed in the period 2006-2010 in all age groups (except 0-3 years) from closed reduction to K-wire fixation.
Interpretation / Conclusion: There was a slight increase in overall incidence, predominantly because of an increased incidence among the 8-15 year old boys. Interestingly, while the use of K-wires increased over the investigated period, we saw a decrease in non-surgical treatment and closed reduction. Our study design does not allow for causal explanations, but this knowledge should lead to reflection concerning why there has been a change in treatment.

80. Understanding What Matters to Patients Undergoing Cosmetic Stature Lengthening: A Systematic Scoping Review to Examine Outcome Measures Reported in the Literature to Assess How Well They Reflect Real Patient Experiences

Ali Yalcinkaya[1,2], Maria Tirta[1,2], Michael Skovdal Rathleff[3,4], Christopher Iobst[5], Ole Rahbek[1,2], Søren Kold[1,2]

1. Interdisciplinary Orthopaedics, Aalborg University Hospital, Aalborg, Denmark; 2. Department of Orthopaedic Surgery, Aalborg University Hospital, Aalborg, Denmark; 3. Center for General Practice at Aalborg University, Aalborg, Denmark; 4. Department of Health Science and Technology, Faculty of Medicine, Aalborg University, Aalborg, Denmark; 5. Center for Limb Lengthening and Reconstruction, Nationwide Children's Hospital, Columbus, Ohio, USA.

Background: The literature on cosmetic limb lengthening surgery has many limitations. Studies often provide a low level of evidence, with varying techniques and outcome reporting, with some studies missing important outcomes and others using unvalidated outcome scores. This makes it difficult to compare functional outcomes between the lengthening techniques used.

Aim: The aim of this review was to identify the areas that may play an important role in the treatment process of patients undergoing cosmetic lengthening, but may have been neglected in the current literature.

Materials and Methods: A systematic literature search was performed. All outcome measures reported in the included studies of cosmetic lengthening were extracted and simultaneously mapped to the overarching domains that bundled similar outcome measures. These domains were then further categorized according to the taxonomy developed by Dodd et al.

Results: 24 studies were included in the review. All reported outcome measures were extracted and then grouped into a total of 62 overarching domains. The average number of domains reported in each article was 17. The most common domain covered by the articles was lengthening (82%), followed by deformity correction and complications. Only 21% of all domains covered the impact of treatment on patients' lives, such as physical, social, role, and emotional functioning, quality of life, and patient satisfaction.

Interpretation / Conclusion: The current literature shows the dominance of clinical outcome measures, and we are not sure that the outcome measures used in these studies address what patients who choose to undergo this surgery consider important. The outcome measures studied are mostly limited to the broad domain of "musculoskeletal outcomes", which suggests that the domains of social and physical health and emotional health, which may be more important to patients than to clinicians, are neglected. These limitations in the domains covered by the current literature run the risk of not being relevant to patients. In addition, heterogeneity in the reporting of outcomes may lead to the use of ineffective or even harmful interventions and waste of already limited health care and research resources.

81. Can pin site inflammation be detected with thermographic imaging? A cross-sectional multicenter study of patients treated with external fixators

Marie Fridberg[1], Ole Rahbek[1], Hans-Christen Husum[1], Anirejuoritse Bafor[2], Kirsten Duch[1], Christopher A Iobst[2], Søren Kold[1]

1. Interdisciplinary Orthopedics, Aalborg university hospital, Denmark (Aalborg UH) 2. Nationwide Children's Hospital, Columbus, Ohio, US (NCH)

Background: Patients with external fixators are at risk of pin site infection. A more objective assessment of possible pin site infection is warranted, particularly for future home-based monitoring of pin sites.

Aim: The aim was to determine if thermography can detect signs of inflammation around pin sites by 1) Establishing a maximum temperature cut-off value 2) Investigating the correlation between local temperature and visual signs of inflammation 3) Adjust for anatomical location and ambient room temperature.

Materials and Methods: This was a cross-sectional international multi- center study following STROBE guidelines. All patients with external ring-fixators scheduled for a visit in the out-patient clinic were eligible. Visual signs of inflammation were categorized using the Modified Gordon classification System (MGS, simplified sMGS). Thermographic imaging was done with an infrared camera (FLIR T540) and the maximum temperature within the ROI (MaxTp) was the primary outcome measure. Sample size and reliability were estimated. Cohen-Kappa, ROC-curve/AUC and Poisson regression were used for statistical analysis.

Results: Data from 1970 pin sites were included. Inter-rater reliability of MGS was Kappa=0.79 and for MaxTp ICC=0.99 (95%CI: 0.99;0.99). Overall, a tendency of rising temperature with increasing sMGS was seen. The difference between sMGS=0 and sMGS>0 was significant. The performance of MaxTp as a screening tool to detect inflammation was reasonable with an AUC of 0.71 (95% CI: 0.65- 0.76). The empirically optimal cut-off value was 34.1°C (Sensitivity=65%, Specificity=72%, Positive predictive value=23%, Negative Predictive value=94%). A 1°C increase in MaxTp increased the RR of visual signs of inflammation by a factor 1.5 (95% CI: 1.3; 1.7).

Interpretation / Conclusion: We found a clinical positive association between the temperature at the pin site measured with thermography and visual signs of inflammation. The empirically optimal temperature cut-off value for inflammation screening was 34.1°C. Thermography may be a promising tool for a for a future point of care technology.

82. Extramedullary internal motorized lengthening for reduction defects in children with open growth plates – early experience.

Jan Duedal Rölfing[1], Mathias Bünger[1], Martin Gottliebsen[1]
Children's Orthopaedics and Reconstruction, Aarhus University Hospital

Background: Extramedullary internal motorized lengthening nails (EM-IMLN) for femoral lengthening in children with open growth plates have only been reported in 3 scientific papers, and 13+11+5 = 29 patients in total. The results seem favorable compared with external fixation and thus worthwhile to implement and monitor in clinical practice.
Aim: To provide an early report of our first 3 cases of EM-IMLN and its complications in a cross-sectional study
Materials and Methods: One girl and two boys, age at operation: 5,6; 6,9 and 7.7 years with a body weight of 18, 18, 24 kg underwent EM-IMLN and concomitantly titanium elastic nailing (TEN) (Ø3.0-3.5) of the femur suffering from reduction deficiencies. We report our initial experience in terms of length of hospitalization, distraction phase, complications, and lessons learned.
Results: The first patient was discharged after 5 days, while the subsequent two patients were discharged after 2 days. Distraction phase with 1.0 mm daily was initiated on day 6. One patient stopped lengthening due to a knee flexion contracture of 15 degrees after 35 mm lengthening. The contracture resolved and full weight bearing was allowed 3 months after the initial surgery, and the implants were removed after 5.3 months. One patient had the TEN removed on postop day 28 as it started to migrate proximal into the bone. Distraction phase was completed with 48 mm within 48 days. The third patient completed distraction phase without any complications and achieved 38 mm. All patients tolerated the submuscular lateral femoral EM-IMLN implant rather well. No hardware failure was noticed.
Interpretation / Conclusion: EM-IMLN implementation needs to be introduced in a protocolized fashion and monitored closely, but our initial experience is in line with international case series making it worthwhile to pursue in terms of safety and patient comfort. Longer follow-up and larger cohorts need to be reported.

83. A scoping review to inform core outcome set development: What outcomes have been reported in literature on patients undergoing lower-limb lengthening surgery, and how have they been measured?

Ali Yalcinkaya[1,2], Maria Tirta[1,2], Michael Skovdal Rathleff[3,4], Christopher Iobst[5], Ole Rahbek[1,2], Søren Kold[1,2]

1 Interdisciplinary Orthopaedics, Aalborg University Hospital, Aalborg, Denmark 2 Department of Orthopaedic Surgery, Aalborg University Hospital, Aalborg, Denmark 3 Center for General Practice at Aalborg University, Aalborg, Denmark 4 Department of Health Science and Technology, Faculty of Medicine, Aalborg University, Aalborg, Denmark 5 Center for Limb Lengthening and Reconstruction, Nationwide Children's Hospital, Columbus, Ohio, USA

Background: The heterogeneity of outcomes used in the field of lower limb lengthening surgery (LLLS) affects our ability to synthesize evidence. This hampers robust systematic reviews and treatment recommendations for clinical practice. Ultimately this reduces the impact of research for both patients and healthcare professionals.

Aim: This scoping review aimed to describe the outcomes and outcome measurement instruments (OMIs) used within the field of LLLS.

Materials and Methods: A systematic literature search of WOS, Scopus, Embase, MEDLINE, and the Cochrane Library identified all studies reporting outcomes in children and adults after LLLS. All outcomes and OMIs were extracted verbatim. An iterative process was used to group outcome terms under standardized outcome headings categorized using the COMET Taxonomy of Outcomes.

Results: Data saturation was achieved in 2020. A total of 142 studies were included between 2024-2020, reporting 2964 verbatim outcomes with 663 standardized outcome terms collapsed into 119 outcome headings (subdomains). A total of 29 patient-reported and 26 clinician-reported outcome instruments were identified. The most commonly reported outcome was "Lengthening amount", reported in over 72% of the included studies, while "health-related quality of life" was measured in 16% and all life impact outcomes were reported in 19% of the included studies.

Interpretation / Conclusion: A large number of peer-reviewed publications are available, demonstrating that significant resources are being devoted to research on LLLS. However, reported outcomes for people with LLLS are heterogeneous, subject to reporting bias, and vary widely in the definitions and measurement tools used to collect them. Outcomes likely to be important to patients, such as quality of life and measures of physical function, have been neglected. This scoping review identifies a need to standardize outcomes and outcome measures reported on patients recovering from lower limb lengthening surgery; this can be addressed by creating a core set of outcomes.

Session 10: Knee arthroplasty

14. November

14:30 - 16:00

Lokale: Skovbrynet

Chair: Anders El-Ghalaly & Thomas Lind-Hansen

84. The influence of the arterial tourniquet on functional outcome after total knee arthroplasty - a randomized controlled trial of simultaneous bilateral procedures

Mikkel Andreas Hansen[1], Claus Varnum[1,2], Signe Timm[1,2], Lasse E. Rasmussen[1]
1. Department of Orthopedic Surgery, Lillebaelt Hospital - Vejle, University Hospital of Southern Denmark 2. Department of Regional Health Research, University of Southern Denmark, Denmark

Background: Tourniquet application during total knee arthroplasty (TKA) is a common practice aimed at reducing intraoperative bleeding. However, concerns have been raised about potential tissue damage from ischemia and reperfusion injury.
Aim: This study examines the effects of tourniquet use during TKA on postoperative functional outcomes, including pain, range of motion (ROM), and patient- reported outcome measures (PROMs), specifically the Forgotten Joint Score (FJS) and Oxford Knee Score (OKS).
Materials and Methods: In a fast-track setting, a randomized, single-blinded controlled trial was conducted with patients undergoing bilateral TKA. Tourniquets were applied to one knee, while the contralateral knee served as a control. Evaluations were conducted after two and four weeks, and at three and twelve months postoperatively, employing paired t-tests and mixed- effects linear regression modeling for statistical analysis.
Results: Among the 22 participants who completed the study, no significant differences were observed in pain levels at two weeks or in PROMs at any time point between the tourniquet and control groups. While a modest increase in one-year ROM was noted in the tourniquet group, it was considered a clinically irrelevant difference.
Interpretation / Conclusion: Tourniquet use in TKA does not affect early pain levels or long-term functional outcomes in patients undergoing bilateral TKA, suggesting that its benefits in surgical efficiency do not compromise patient recovery or long-term outcomes.

85. The likelihood of implant survival of multiply revised knee arthroplasties in Denmark 1998-2021: A nationwide register-based study

Julius Tetens Hald[1], Anders Brændsgaard El-Galaly[1], Michael Mørk Petersen[1, 2], Martin Lindberg-Larsen[3], Robin Christensen[4,5], Anders Odgaard[1,2],

1. Department of Orthopedic Surgery, Rigshospitalet, Copenhagen University. 2. Department of Clinical Medicine, University of Copenhagen, Copenhagen. 3. Department of Orthopedic Surgery and Traumatology, Odense University Hospital 4. Section for Biostatistics and Evidence-Based Research, the Parker Institute, Bispebjerg and Frederiksberg Hospital, Copenhagen 5. Research Unit of Rheumatology, Department of Clinical Research, University of Southern Denmark, Odense University Hospital

Background: The use of both primary and revision knee arthroplasties is rising and more patients are expected to undergo multiple implant revisions within their lifetime. These patients represent a complex population with severe complications, disabilities, and healthcare costs. They pose a challenge to both surgeons and healthcare systems in general. Healthcare systems will require increasing resources to address this problem, but most importantly more knowledge is needed. S
Aim: To ascertain the absolute incidence and implant survival rates of knee arthroplasties and those who subsequently underwent multiple revisions in Denmark between 1998 and 2021.
Materials and Methods: A retrospective observational study of several nationwide Danish registers (clinicaltrials.gov identifier: NCT06064318). From the registers, all primary knee arthroplasty procedures performed in Denmark from 1998 to 2021 were identified. From these primary arthroplasties, revision procedures were identified; these were also categorized by the number of previous revisions. Kaplan-Meier plots were used in survival analysis to estimate the likelihood of implant survival.
Results: Between 1998 and 2021, 161,384 primary knee arthroplasties were identified; among these a total of 13,787 (8.5%) revisions were identified. There were 10,638 1st revisions, 2,148 2nd revisions, 624 3rd revisions, 223 4th revisions, and 153 procedures which had been revised more than 4 times; casuistically, the highest number of revisions performed in this period on a single knee was 11. The 10-year survival of primary arthroplasties was 92.3% (95% CI 92.2 to 92.5%). Among primary failures: first-time revisions had a 10-year survival of 75.9% (95% CI 74.9 to 76.9%). The 10-year survival of second- and third-time revisions was 65.1% (95% CI 62.6 to 67.6%) and 57.8% (95% CI 53.4 to 62.5%), respectively.
Interpretation / Conclusion: This study has identified that 0.6% of all primary knee arthroplasties performed in Denmark from 1998-2021 resulted in 3 or more revisions. The implant survival decreased for each consecutive revision, with almost half of the third-time revisions being re-revised within 10 years.

86. Risk and epidemiology of periprosthetic knee fractures after primary total knee arthroplasty. A nationwide cohort study.

Stefan Risager[1], Bjarke Viberg[1], Martin Lindberg-Larsen[1], Kristine Arndt[2], Charlotte Abrahamsen[3], Anders Odgaard[4]

1 Department of Orthopaedic and traumatology, Odense University Hospital 2 Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt, Kolding 3 Department of Orthopaedic Surgery and Traumatology, Rigshospitalet, København

Background: Periprosthetic knee fractures (PPKF) following total knee arthroplasty (TKA) are uncommon, but potentially serious injuries.

Aim: To analyze the risk and risk factors for a PPKF in standard primary TKA patients with osteoarthritis (OA) and a minimally (cruciate retaining TKA's without femoral box cut) or posterior stabilized TKA. In addition, to report the risk for patients with other underlying knee disorders and/or a higher level of TKA constraint.

Materials and Methods: A nationwide cohort study using register data between 1997 and 2022. All primary TKA were identified from the Danish National Patient Register and the Danish Knee Arthroplasty Register. Subsequent fractures were identified through ICD diagnosis code, NOMESCO procedure code or indication for revision TKA.

Results: We included 120,642 standard primary TKA patients with 1,434 PPKF´s. The cumulated proportions were 0.3% (95% CI 0.3-0.3) at 2 years, 0.7% (0.6-0.7) at 5 years and at 10 years it was 1.5% (1.4-1.6) with 1.2% in the femur, 0.2% in the patella and 0.1% tibia. Significant risk factors were (Hazard Ratio (95% CI)); ipsilateral hip arthroplasty (2.5 (2.1-2.8)), female sex (2.0 (1.8-2.3)), osteoporosis (1.4 (1.1-1.7)), age 80+ (1.4 (1.2-1.6)), Charlson Comorbidity Index (CCI) score 3+ (1.4 (1.0-1.8)). Additional 22,624 primary TKA patients with other underlying knee disorders and/or higher level of implant constraint were included with 485 PPKF's. The 10-year cumulated proportion were 5.5% (95% CI 4.4-6.9) when underlying disorder was previous fracture, 2.3% (1.7-2.9) for rheumatic disorders and 3.5% (1.4-8.8) for osteonecrosis. In patients with condylar constrained knees it was 4.3% (2.9-6.3) and 7.3% (4.1-13.1) for hinges.

Interpretation / Conclusion: In standard primary TKA patients, the 10 year cumulated proportion of PPKF's was 1.5% and ipsilateral hip arthroplasty, female sex, osteoporosis, advanced age, and higher CCI increased the risk. Higher risks were observed in non-OA patients and/or patients with higher level of TKA constraint.

87. Does day-case hip and knee arthroplasty lead to more healthcare system contacts?

Abdullahi Abdirisak Hirsi[1,2], Oddrún Danielsen Danielsen [1,2], Claus Varnum[1,3], Thomas Jakobsen[1,4], Mikkel Rathsach Andersen[1,5], Manuel Josef Bieder[1,6], Søren Overgaard[1,7], Christoffer Calov Jørgensen[1,8], Henrik Kehlet[1,9], Kirill Gromov[1,10], Martin Lindberg-Larsen[1,2]

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

Background: Day case surgery following primary hip and knee arthroplasty is feasible in over 20% of patients in a public healthcare setting.The day- case patient rate may increase further,but it is concerning if it results in additional post- discharge healthcare system contacts.
Aim: To investigate whether day-case surgery leads to increased patient-reported healthcare system contacts compared to non day-case surgery within the first 30 days postoperatively.
Materials and Methods: This was a prospective multicentre study from seven fast-track centres between September 2022 to August 2023.Candidates for THA, TKA and UKA were evaluated for day-case eligibility using defined criteria.Patients were surveyed 30 days postoperatively regarding any healthcare system contacts related to surgery.Planned health care visits were excluded.We used day-case eligible patients not discharged on day of surgery (inpatients) as control group.
Results: 2251 day-case eligible patients received the survey and 1960 completed the survey (87%).We investigated 1140 day-case patients (58%) and 820 (42%) inpatients (control group).Baseline demographics were comparable between groups regarding age,gender,BMI,Clinical Frailty Scale,social status and comorbidity profile.Mean age was 68 years,39% were THA,36% TKA and 35% UKA.The overall rate of healthcare system contacts was 46% in day-case patients vs. 50% in inpatients,P=0.030.Specific contacts included 23% contacts to general practitioner (GP) or doctor on call in day-cases vs. 30% in inpatients.Main reasons for contact to GP or doctor on call were wound complications (6.1% in day-cases vs 7.0% in inpatients), prescription renewals (4.7% vs. 5.7%),and pain management (3.3% vs. 6.5%). Emergency Department (ED)contacts were reported by 6.2% of day-cases vs. 6.3% of inpatients,primarily for wound issues (1.7% vs.1.6%),suspected DVT (1.6% vs.0.7%), and swelling (0.8%vs.1.0%).Outpatient clinic or ward contacts were reported by 36% of day-cases vs. 37% of inpatients,mainly for pain management (9.5% vs.10%), wound problems(10% vs.8.3%),and swelling(4.0% vs.5.9%).
Interpretation / Conclusion: Day-case hip and knee arthroplasty was not associated with increased healthcare system contacts within first 30 days postoperatively.

88. Infectious Endocarditis among Periprosthetic Joint Infections of the Hip and Knee – Insight from the Danish health registers

Anders El-Galaly[1], Per Hviid Gundtoft[2], Claus Moser[3], Anders Odgaard[1], Alma Becic Pedersen[4]
1. Department of Orthopedic Surgery, Copenhagen University Hospital - Rigshospitalet 2. Department of Orthopedic Surgery, Aarhus University Hospital 3. Department of Clinical Microbiology, Copenhagen University Hospital - Rigshospitalet 4. Department of Clinical Epidemiology, Aarhus University

Background: Periprosthetic joint infection (PJI) is a severe and potential lethal complication in hip- or knee arthroplasty surgery. Yet, little attention has been giving to the fact that the most common bacteria causing PJI also causes other lethal infections, such as infectious endocarditis (IE). A recent case series reported a mortality of almost 40% in patients with concomitant PJI and IE. Yet, up till now, no studies have investigated the risk of IE in patients with PJI.
Aim: To investigate the risk of concomitant PJI and IE and the 1-year mortality in these patients.
Materials and Methods: The study cohort were defined by patients registered in the Danish Hip - or Knee Arthroplasty Register with revision due to infection between 1996 and 2019. Utilizing the unique Danish social security number, the observations were merged with data from the Danish National Patient Register where IE was defined by ICD-10 codes of DI33, DI38 and DI398, accompanied by a minimum of 14 days hospital admission to ensure the validity. Concomitant PJI and IE was defined as IE diagnosed 3 months before or 6 months after surgery for PJI. The 1-year mortality were calculated from the latter event of either surgery or IE. Risk and mortality were denoted as percentages with 95% confidence intervals. In accordance with Statistics Denmark's guidelines, n<5 was not reported in absolute numbers.
Results: In total, 3,452 PJIs distributed in 2,085 hips and 1,367 knees were included. Among these, 24 had IE 3 months before surgery and 14 within 6 months after surgery. This corresponded to a risk of 1.1% (95% CI: 0.75-1.4). Within 1-year, 5 patients with concomitant hip-PJI and IE died compared to <5 for knee-PJI. Thus, the estimated 1-year mortality ranged between 13% and 24% (95% CI: 2.4-37) (data limitation due to knee-PJI <5).
Interpretation / Conclusion: In Denmark, the risk of IE in patients treated for PJI of the hip or knee is low and we were unable to confirm the exceedingly high mortality reported in the recent case series. Although IE might be under diagnosed in our current practice, it does not seem to be a critical clinical challenge in the treatment of PJI in the hip or knee.

89. The impact of age on patient reported outcome measures after medial unicompartmental knee arthroplasty

Anders Bagge[1], Christian Bredgaard Jensen[1], Christian Skovgaard Nielsen[1], Kirill Gromov[1], Anders Troelsen[1]

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

Background: The usage of unicompartmental knee arthroplasty (UKA) has been on the rise throughout the last decade, accounting for between 11 and 26 percent of all primary knee arthroplasties in national registers. Contemporary evidence-based indications no longer consider age regarding eligibility for UKA, however, some surgeons are still reluctant to perform the procedure on younger patients. As these less strict criteria have led to more UKA candidates, the question of interest is whether or not patients still have satisfactory outcomes after surgery. Furthermore, the impact of age on the short-term improvements after medial UKA lacks evidence.

Aim: This study examines the association between age and the development of patient reported outcome measures (PROMs) after medial unicompartmental knee arthroplasty (mUKA) as well as the achievement of Patient Acceptable Symptom State (PASS) and Minimal Important Change (MIC).

Materials and Methods: 782 mUKAs performed between February 1, 2016 and April 26, 2023 were included. The development from preoperative Oxford Knee Score (ΔOKS), Forgotten Joint Score (ΔFJS) and Activity and Participation Questionnaire (ΔAPQ) was assessed at 3, 12 and 24 months after surgery as well as the achievement of PASS (OKS≥30) and MIC (ΔOKS≥8, ΔFJS≥14) at 12 months. Patients were divided into groups based on age: <55, 55 to <65, 65 to <75 (reference group), and ≥75 years. 432 patients were women (55%), mean age was 67 (SD 9.2) years and mean BMI was 30 (SD 5.7) kg/m2.

Results: Median OKS, from youngest to eldest group, were 34, 35, 36, and 35 (3 months); 40, 39, 41, and 43 (12 months); 42, 41, 43, and 42 (24 months). We found no differences in ΔOKS between groups at follow-up. Patients aged 55 to <65 years had lower 24-month ΔFJS and lower ΔAPQ at 12 and 24 months. Patients aged ≥75 years also had lower 24-month ΔAPQ. We found no association between age and the fraction of patients achieving PASS (range 81-89%) or MIC (ranges 78-81% (ΔOKS); 81-90% (ΔFJS)).

Interpretation / Conclusion: This study found good PROM improvements and satisfactory outcomes after mUKA in all age groups. However, minor differences in activity and participation were present in very young and elderly patients.

90. Contemporary treatment options and risk of reoperation according to fracture site after periprosthetic knee fractures.

Stefan Risager[1], Kristine Arndt[2], Charlotte Abrahamsen[2], Bjarke Viberg[1], Anders Odgaard[3], Martin Lindberg-Larsen[1]

1. Department of Orthopaedic and traumatology, Odense University Hospital 2. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt, Kolding 3. Department of Orthopaedic Surgery and Traumatology, Rigshospitalet, København

Background: Periprosthetic Knee Fracture (PPKF) following Total Knee Arthroplasty (TKA) can be difficult to treat. Treatment options include plating, intramedullary nailing (IMN), other internal fixation (oIF), revision total knee arthroplasty (rTKA) or non-surgical treatment and vary based on fracture site.
Aim: To report contemporary treatment options and assess risk and type of reoperation according to fracture site.
Materials and Methods: A nationwide cohort study based on register data from 1997 to 2022. Cruciate retaining or posterior stabilized primary TKA were identified from the Danish Knee Arthroplasty Register (DKR). Subsequent PPKFs, fracture treatments and later reoperations were identified through ICD-10 diagnosis and procedure codes in the Danish National Patient Register, or indications for rTKA in the DKR. The sensitivity of rTKA as treatment for PPKF was low and was reported, but not included in further analysis.
Results: We included 1,692 PPKFs (1,337 femoral, 203 patella, 152 tibial). Femoral PPKFs were treated non-operatively (16%), with rTKA (2%), oIF (4%), plate (61%) or IMN (17%). The two-year risk of reoperation was 13% (95% CI: 9-18) after non-operatively treatment, 19% (11-31) after oIF, 18% (15-21) after plate and 18% (13-23) after IMN. Patella PPKFs were treated non-operatively (69%), with rTKA (6%) or oIF (25%). The two- year risk of reoperation was 9% (5-15) after non- operatively treatment and 53% (34-92) after oIF. Tibial PPKFs were treated non-operatively (39%), with rTKA (3%), oIF (33%) or with plate (25%), oIF (50) and non-operatively (58). The two-year risk of reoperation was 21% (12-34) after non-operatively treatment, 40% (27-54) after oIF and 25% (14-41) after plate.
Interpretation / Conclusion: The treatment of PPKFs differ between fracture sites. Femoral PPKFs were primarily treated with plate and IMN, patella non-operatively or with oIF, and tibia non-operatively, with oIF or plate. The reoperation risk was highest in surgically treated patella and tibial PPKFs.

91. Persistent pain and satisfaction after total knee arthroplasty: A nationwide cross-sectional survey study

Jens Laigaard[1], Lone Nikolajsen[2], Saber Muthanna Saber[1], Ole Mathiesen[3], Troels Haxholdt Lunn[4], Martin Lindberg-Larsen[5], Søren Overgaard[1]

1. Dept. of Orthopaedic Surgery, Bispebjerg University Hospital; 2. Dept. of Anaesthesia, Aarhus University Hospital; 3. Dept. of Anaesthesia, Zealand University Hospital, Køge; 4. Dept. of Anaesthesia, Bispebjerg University Hospital; 5. Dept. of Orthopaedic Surgery, Odense University Hospital

Background: Total knee arthroplasty (TKA) is considered safe and effective, but previous studies have found that a considerable proportion of patients suffer from persistent pain after surgery. However, these studies are outdated. We believe contemporary data are required to accurately inform patients about postsurgical risks.

Aim: Thus, we aimed to investigate the satisfaction and incidence of persistent pain after primary TKA for osteoarthritis

Materials and Methods: This was a nationwide cross-sectional survey on pain and satisfaction of unselected patients who underwent primary TKA for osteoarthritis from August to November 2022 (NCT05900791). Patients were identified from the Danish National Patient Register and Danish Knee Arthroplasty register and invited by Digital Post on 2nd November 2023.

Results: We sent survey invitations to 3.085 patients after exclusion of 39 (1%) patients with revision surgery and 29 (1%) patients with bilateral surgery within the inclusion period. The 2.167 (70%) respondents were similar to the non-respondents in terms of age, BMI, and length of surgery, but there was a higher proportion of males among the respondents compared to non-respondents (43% versus 36%). Of the respondents, 544 (25%) had moderate or severe persistent postsurgical pain (NRS≥4). Still, 1777 (82%) were 'satisfied' or 'very satisfied' with the result of surgery and 1844 (87%) were willing to repeat surgery.

Interpretation / Conclusion: Twenty-five percent of Danish patients continue to experience moderate to severe pain one year after TKA. Still, 82% are satisfied with the result of surgery. The incidence of persistent postsurgical pain was slightly higher than found in a systematic review from 2012. This could be due to exclusion of the increasing number of unicompartmental knee arthroplasties, who may have a lower incidence of persistent postsurgical pain.

92. External validation of the JS-BACH classification for predicting outcome in periprosthetic joint infections – a cohort of 653 patients

Nicolai Kjældgaard Kristensen[1,2,3], Laurens Manning[4,5], Jeppe Lange [2,3], Joshua Saul Davis[6,7]
1. Center for Planned Surgery, Regional Hospital of Silkeborg, Denmark 2. Department of Orthopedics, Regional Hospital of Horsens, Denmark 3. Department of Clinical Medicine, Aarhus University, Denmark 4. Medical School, University of Western Australia 5. Department of Infectious Diseases, Fiona Stanley Hospital, WA, Australia 6. School of Medicine and Public Health, University of Newcastle, Newcastle, NSW, Australia 7. : Infection Research Program, Hunter Medical Research Institute, Newcastle, NSW, Australia

Background: Periprosthetic Joint Infection (PJI) is a devastating complication in hip and knee joint arthroplasty. The "JS BACH" classification system was developed in 2021 to stratify the complexity of PJI and more importantly to act as a tool to guide referral to specialist centers. The "JS BACH" classification has not been validated in an external cohort.
Aim: This study aimed to externally validate the JS-BACH classification, using a large prospective cohort from Australia and New Zealand.
Materials and Methods: We applied the JS-BACH classification to the Prosthetic Joint Infection in Australia and New Zealand Observational (PIANO) cohort. This prospective study of newly diagnosed PJI collected 2-year outcome data from 653 participants enrolled from 27 hospitals The definition of PJI treatment failure at 24 months was any of the following: death, clinical or microbiological signs of infection; destination prosthesis removed, or ongoing antibiotic use.
Results: Individual cases were classified as per JS-BACH into "1 - uncomplicated" (n=268), "2 - complex" (n=330), and "3 - limited options" (n=55). This cohort were similar to the original JS-BACH population in terms of baseline characteristics. However, there was a difference in complexity, with more DAIR procedures, fewer revision procedures, and a higher proportion of uncomplicated patients in the PIANO cohort. The risk of treatment failure correlated strongly with JS-BACH category, with odds ratio (95% CI) for category 2 versus 1 of 1.75 (1.24 – 2.47), and for category 3 versus 1 of 7.12 (3.42 – 16.02).
Interpretation / Conclusion: Despite the PIANO study population being less complicated than the original derivation cohort, the JS-BACH classification showed a clear association with treatment failure in this large external cohort.

93. Minimal risk of opioid use 12 months after primary knee arthroplasty: a prospective cohort study of 957 patients from Silkeborg Regional Hospital.

Mette Jertrum Hansen[1,2], Mette Garval[1], Charlotte Runge[1,2], Jeppe Lange[2,3], Søren T. Skou[4,5], Nicolai Kjældgaard Kristensen[1,2,3]

1. University Clinic for Orthopaedic Pathways (UCOP), Elective Surgery Centre, Silkeborg Regional Hospital. 2. Department of Clinical Medicine, Aarhus University. 3. Department of Orthopedic Surgery, Horsens Regional Hospital. 4. Research Unit for Musculoskeletal Function and Physiotherapy, University of Southern Denmark. 5. The Research and Implementation Unit PROgrez, Næstved-Slagelse-Ringsted Hospitals.

Background: Research has shown that up to one-in-five patients use opioids for three months or more after total knee arthroplasty (TKA). Long-term opioid use increases the risk of dependence and a complicated recovery. The reason for patient-reported opioid use after knee arthroplasty is not previously evaluated.

Aim: To evaluate the prevalence of patient-reported opioid use and the reason for use 12 months after primary knee arthroplasty among Danish patients.

Materials and Methods: We consecutively included 1225 patients undergoing primary TKA or unicompartmental knee arthroplasty (UKA, n = 200) at Silkeborg Regional Hospital from 2018 to 2020. Prior to surgery and at 12-month follow-up, patients reported their use of opioids using a study specific questionnaire. The cohort was divided into three exposure groups (daily opioid use, non-daily opioid use and no opioid use). The primary outcome was patient-reported opioid use 12 months after surgery, and secondary outcome was patient-reported reason for opioid use.

Results: In total, 996 TKA patients (97 %) completed baseline questionnaire about use of opioids; 13.3 % [95 %- CI: 11.2;15.6] reported a preoperative daily opioid use. 797 patients (80 %) completed 12-month follow-up; 4.9 % [95%-CI: 3.5;6.7] reported a daily opioid use, whereof 61.5 % [95%-CI: 44.7;76.2] reported the reason for the daily opioid use as related to pain in the prosthetic knee. Patients with preoperative daily opioid use had a significantly higher risk of opioid use 12 months after surgery (29.7 %, [95%-CI: 21.2;39.7]) compared to patients with no preoperative opioid use, risk difference = 28.8 % [19.8;37.7]. 199 UKA patients (99 %) completed baseline questionnaire; 8.0 % [4.8;13.0] reported a preoperative daily opioid use. 160 patients (80 %) completed 12-month follow-up; 5 patients (3.5 % [95 %-CI: 1.2;7.5]) reported a daily opioid use; 4 with a preoperative daily opioid use and 1 with a preoperative non-daily opioid use.

Interpretation / Conclusion: There is a low risk of daily opioid use caused by pain in the prosthetic knee 12 months after primary knee arthroplasty. Preoperative daily opioid use, compared to no opioid use, has an absolute increase in the risk of daily opioid use 12 months after TKA of 29 %.

Session 11: DOS Best Paper

14. November

16:30 - 17:30

Lokale: Teatersalen

Chair: Ole Rahbek & Lars Engebretsen

94. Injection of micro-fragmented adipose tissue versus saline in patients with knee osteoarthritis: A placebo-controlled randomized clinical trial with 2-year follow-up.

Kristoffer W Barfod[1,2], Lars Blønd[3], Rasmus Kramer Mikkelsen[1,2], Jasmin Bagge[1], Lisbet Rosenkrantz Hölmich[4], Thomas Kallemose[5], Anders Troelsen[6], Per Hölmich[1]

1 Sports Orthopedic Research Center - Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark. 2Unit of Sports Traumatology, Department of Orthopedic Surgery, Copenhagen University Hospital, Bispebjerg, Denmark. 3 Department of Orthopedic Surgery, The Zealand University Hospital of Køge, Denmark. 4 Department of Plastic Surgery, Copenhagen University Hospital, Herlev and Gentofte, Denmark. 5 Department of Clinical Research, Copenhagen University Hospital, Amager-Hvidovre, Denmark. 6 Clinical Orthopaedic Research Hvidovre, Department of Orthopedic Surgery, Copenhagen University Hospital, Amager-Hvidovre, Denmark.

Background: Point-of-care cell-based therapy of knee osteoarthritis is booming though evidence is lacking.
Aim: To investigate if treatment with a single injection of autologous micro-fragmented adipose tissue improved the patient-reported health compared to a placebo saline injection.
Materials and Methods: A blinded, randomized, placebo-controlled, effectiveness trial with 2-year follow-up. Patients were recruited from January 2019 through February 2022; follow-up was completed February 2024. Eligible patients were aged 18 to 70 years, suffering from pain and functional impairment of the knee and with Kellgren- Lawrence grades 2–3 in the tibiofemoral joint. 238 patients were assessed for eligibility and 120 included in the trial with 60 in each group. Abdominal adipose tissue was harvested by liposuction in all participants. The active treatment group was treated with an intraarticular injection of autologous micro-fragmented adipose tissue. The placebo group received an intraarticular injection of isotonic saline. Participants, investigators, and follow-up personnel were blinded to the intervention. The primary outcome was the Knee injury and Osteoarthritis Outcome Score 4 (KOOS4) evaluated at 6 months. Secondary outcomes were amongst others KOOS at 3, 12, and 24 months, the Tegner activity score, adverse events, and treatment failure.
Results: Data regarding the primary outcome was available for 115/120 (93%). Mean KOOS4 at 6 months was 55.5 (95% CI 51.4 to 59.6) for the active treatment group and 51.5 (95% CI 47.4 to 55.6) for the placebo group, and the between-group difference in change from baseline was 1.7 (-3.6-7.1) (p=0.52). There were no statistically significant differences in any of the secondary outcomes between the active treatment and the placebo group at any time point. Both groups showed statistically significant and clinically relevant improvements in outcomes from baseline to 6, 12 and 24 months. No adverse events were seen in any of the two groups.
Interpretation / Conclusion: This study shows that during the 2-year follow-up, there was no superiority of micro-fragmented adipose tissue compared to a placebo saline injection for the treatment of knee osteoarthritis.

95. 2 year follow up of TKA vs mUKA: A double blinded multicenter randomized trial, comparing total to medial unicompartmental knee arthroplasty in the treatment of isolated anteromedial knee osteoarthritis.

Jacob Fyhring Mortensen[1,2], Paul Blanche[3], Claes Sjørslev Blom[4], Andreas Kappel[5], Per Wagner Kristensen[6], Martin Lindberg-Larsen[7], Snorre Læssøe Stephensen[1], Søren Overgaard[8], Frank Madsen[9], Henrik Morville Schrøder[10], Morten Vase[11], Lasse Enkebølle Rasmussen[6], Svend Erik Østgaard[5], Anders Odgaard[12]

1. Department of Orthopaedic Surgery, Gentofte Hospital 2. Department of Orthopaedic Surgery, Nykøbing Falster Sygehus 3. Department of Biostatistics, University of Copenhagen 4. Department of Orthopaedic Surgery, Randers Sygehus 5. Department of Orthopaedic Surgery, Aalborg Universitetshospital 6. Department of Orthopaedic Surgery, Vejle Sygehus 7. Department of Orthopaedic Surgery, Odense Univesitets Hospital 8. Department of Orthopaedic Surgery, Bispebjerg Hospital 9. Department of Orthopaedic Surgery, Århus Universitetshospital 10. Department of Orthopaedic Surgery, Næstved Sygehus 11. Department of Orthopaedic Surgery, Silkeborg Sygehus 12. Department of Orthopaedic Surgery, Rigshospitalet

Background: Total Knee Arthroplasty (TKA) and Medial Unicompartmental Knee Arthroplasty (mUKA) are prominent options in the treatment of isolated anteromedial osteoarthritis, and it is debated which treatment is better in the short and long term.
Aim: This study compares the effects of mUKA versus TKA with the primary aim to determine the time-adjusted improvement in Oxford Knee Score during the first 2 years. The secondary aims included: The time-adjusted Forgotten Joint Score, Copenhagen Knee ROM scale, clinical ROM KOOS, SF36, EQ5D, and UCLA activity scale; Mean scores at 2 year follow-up including OKS and clinical ROM; Revisions and re-operations rates.
Materials and Methods: This was a double-blinded, multicenter randomized trial including all five regions in Denmark. Analysis was based on an "Intention to treat" method. Secondary outcomes were analyzed in a hierarchical sequential gatekeeping statistical procedure. Time-adjusted measures were determined from measurements at specific time points and calculating the area under the curve.
Results: Between August 2017 and April 2021, 1219 patients were assessed, of whom 350 patients were included in this study and randomly assigned to each arm. The mean time-adjusted OKS improvement differed between the two treatments by of 3.5(CI 2.3;4.7, p<0.001), in favour of mUKA. OKS at 2 years showed a mean difference of 2.7(CI 1.3;4, p<0.001), in favour of mUKA. All secondary outcomes were in favour of the mUKA, except for the EQ5D pain score. Cumulative proportions of re-operations were 2.3% (mUKA) and 6.9% (TKA), and showed a difference of 4.7% CI (0.2%; 9.8%), while revision surgery was 2.8% (mUKA) and 4% (TKA), with a difference of 1.2% CI (-3%; 5.7%), both in favour of mUKA.
Interpretation / Conclusion: The difference between the time-adjusted mean OKS improvement was statistically higher for mUKA compared to TKA, but the difference is below the minimal clinically important difference of approx. 5 OKS points. Most secondary outcomes were in favour of mUKA, along with revision and re-operation rates, which will be interesting to follow in the long term studies. This study weakly favours mUKA , but long term follow-up results are necessary before strong clinical recommendations can be made.

96. Clinical benefit of physical rehabilitation after total hip and knee arthroplasty: A pragmatic, randomized, controlled trial (The DRAW1 trial)

Troels Mark-Christensen[1,2], Kristian Thorborg[3,4,5], Thomas Kallemose[2], Thomas Bandholm[2,4,5,6]

1. Department of Rehabilitation, Centre of Health, Regional Municipality of Bornholm, Rønne, Bornholm, Denmark; 2. Department of Clinical Research, Copenhagen University Hospital – Amager and Hvidovre, Copenhagen, Denmark; 3.Sports Orthopaedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Amager-Hvidovre Hospital, Institute for Clinical Medicine, Copenhagen University, Denmark; 4. Physical Medicine and Rehabilitation Research-Copenhagen (PMR-C), Department of Physical and Occupational Therapy, Copenhagen University Hospital, Amager-Hvidovre, Hvidovre, Denmark; 5. Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark; 6. Department of Orthopedic Surgery, Copenhagen University Hospital, Amager and Hvidovre, Copenhagen, Denmark.

Background: The effectiveness of physical rehabilitation following total hip (THA) and knee (TKA) arthroplasty is questionable, and there is currently clinical equipoise concerning the need for physical rehabilitation after THA and TKA. To address clinical equipoise, fundamental effectiveness needs to be established, using a state-of-the-art randomised controlled trial design.
Aim: To compare the effectiveness of a 6-week program of home-based telerehabilitation, home-based rehabilitation or no physical rehabilitation following THA and TKA in terms of self-reported function.
Materials and Methods: This trial was designed as a 3-arm parallel-group randomized, controlled, superiority trial with blinded outcome assessments. Following discharge, 57 patients were randomized to home-based telerehabilitation, 56 to home-based rehabilitation, and 55 to no physical rehabilitation for 6 weeks. Outcome measures were assessed in an outpatient-setting at baseline (post-discharge), at the end of intervention (6 weeks – primary endpoint), and 3 and 12 months postoperatively. The primary outcome was the Hip disability and Osteoarthritis Outcome Score (HOOS)/ Knee injury and Osteoarthritis Outcome Score (KOOS)-subscale: function in daily living (ADL), where 0 points indicate severely reduced ADL function, and 100 points indicates full ADL function. For the ADL- subscale the minimal clinically relevant difference between treatment groups is 10 points.
Results: Comparing physical rehabilitation (home-based telerehabilitation and home-based rehabilitation) to no physical rehabilitation, the mean group- differences for the primary outcome and end- point were 3.3 (one-sided 95%CI: -10; p = 0.10) KOOS/HOOS ADL points at 6 weeks, and 1.9 (95%CI: -2.8; p = 0.25) and 2.6 (95%CI: -3.2; p = 0.23) points at the 3- and 12-months follow-ups, respectively.
Interpretation / Conclusion: Receiving physical rehabilitation following THA or TKA, is not superior to not receiving physical rehabilitation in terms of improving self-reported function – neither at the primary endpoint at 6 weeks, or at 3- and 12-months follow-up. Trial registration: NCT03750448 (23/11/2018).

97. The effect of perioperative dexamethasone administration on postoperative pain in patients undergoing periacetabular osteotomy: Results from the PAODEX randomized double-blind, placebo-controlled trial

Viktoria Lindberg-Larsen[1,2], Martin Lindberg-Larsen[3,4], Ole Ovesen[3], Stine Thorhauge Zwisler[1], Peter Lindholm[1], Stine Hebsgaard[1], Robin Christensen[2,5], Søren Overgaard[3,6,7]

1. Department of Anaesthesiology and Intensive Care Medicine, Odense University Hospital, Odense, Denmark 2. Section for Biostatistics and Evidence-Based Research, The Parker Institute, Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark 3. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Odense, Denmark 4. Orthopaedic Research Unit, Department of Clinical Research, University of Southern Denmark, Odense University Hospital, Odense, Denmark 5. Research Unit of Rheumatology, Department of Clinical Research, University of Southern Denmark, Odense University Hospital, Odense, Denmark 6. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg Hospital, Copenhagen, Denmark 7. Department of Clinical Medicine, Faculty of Health and Medical Science, University of Copenhagen, Copenhagen, Denmark

Background: Periacetabular osteotomy (PAO) for hip dysplasia is associated with postoperative pain. High-dose dexamethasone (DXMT), known to reduce pain and nausea in various surgeries, might offer similar effects following PAO.
Aim: Primary to compare the effect of one or two high doses of dexamethasone, relative to placebo, on postoperative morphine consumption after PAO.
Materials and Methods: A randomized, double-blind, placebo- controlled trial was conducted in patients aged 18 years or older, undergoing PAO due to hip dysplasia. Patients were randomized (1:1:1) into three groups: group 1 (DXMT/DXMT) received two doses of DXMT (24mg) intravenously (IV) preoperatively and 24 hours later; group 2 (DXMT/placebo) received one dose of DXMT preoperatively; group 3 (placebo/placebo). Placebo consisted of isotonic saline IV at relevant timepoints. The combined analyses of DXMT groups were only separated into DXMT groups if significant difference in the primary outcome was observed. Primary outcome was cumulative postoperative morphine consumption in mg within 48 hours from baseline. Key secondary outcomes included postoperative pain intensity during rest and activity performing Timed-Up and Go, postoperative nausea and vomiting, and antiemetic consumption at 24 and 48 hours postoperatively, and cumulative postoperative morphine consumption from 48 hours to day 14 post-operation. The main analyses were conducted on the Intention-to- Treat (ITT) population, with missing data handled using MCMC multiple imputation.
Results: Ninety patients were included in the ITT population, randomized to DXMT groups (n=60) and placebo (n=30); 58 and 28, respectively, completed trial. Mean age was 31 years and 79% were females. The mean cumulated postoperative morphine consumption was 92.0 mg (SE: 7.0) in the combined DXMT group and 94.8 mg (SE: 9.9) in the placebo group, corresponding to a between-group difference of -2.8 mg (95%CI: -26.6 to 21.1; P=0.82). There were no statistically significant differences observed between groups in any of the secondary outcomes at any time point.
Interpretation / Conclusion: High-dose dexamethasone did not reduce postoperative morphine use or improve any other secondary outcomes after PAO.

98. Total Hip Replacement or Resistance Training for Severe Hip Osteoarthritis. A randomized controlled trial

Thomas Frydendal[1,2,3], Robin Christensen[3,4], Inger Mechlenburg[5,6], Lone Ramer Mikkelsen[6,7], Claus Varnum[8,9], Anders Elneff Graversen[8], Per Kjærsgaard-Andersen[8], Peter Hvidbak Revald[8], Christian Hofbauer[8], Manuel Josef Bieder[10], Haidar Qassim[10], Mohammad Samir Munir[10], Stig Storgaard Jakobsen[5,6], Sabrina Mai Nielsen[3,4], Kim Gordon Ingwersen[1,3,9], Søren Overgaard*[11,12,13]*

1) Department of Physiotherapy, Lillebaelt Hospital – University Hospital of Southern Denmark, Vejle Hospital, Denmark 2) Department of Clinical Research, University of Southern Denmark, Odense, Denmark 3) Section for Biostatistics and Evidence-Based Research, the Parker Institute, Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark 4) Research Unit of Rheumatology, Department of Clinical Research, University of Southern Denmark, Odense University Hospital, Odense Denmark 5) Department of Orthopedic Surgery, Aarhus University Hospital, Aarhus, Denmark 6) Department of Clinical Medicine, Aarhus University, Aarhus, Denmark 7) University Clinic for Orthopaedic Pathways (UCOP), Elective Surgery Centre, Regional Hospital Silkeborg, Denmark 8) Department of Orthopedic Surgery, Lillebaelt Hospital – University Hospital of Southern Denmark, Vejle Hospital, Vejle, Denmark 9) Department of Regional Health Research, University of Southern Denmark, Odense, Denmark 10) Department of Orthopedic Surgery, Næstved Hospital, Næstved, Denmark 11) Department of Orthopedic Surgery and Traumatology, Odense University Hospital, Odense, Denmark 12) Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg Hospital, Copenhagen, Denmark 13) Department of Clinical Medicine, Faculty of Health and Medical Sciences University of Copenhagen, Copenhagen, Denmark

Background: Total hip replacement (THR) is routinely recommended and increasingly used for severe hip osteoarthritis. No randomized trial has compared the effectiveness of this procedure to non-surgical treatment such as resistance training.
Aim: We aimed to evaluate whether total hip replacement provided superior improvements in self-reported hip pain and function compared with progressive resistance training.
Materials and Methods: This was a multicenter, randomized, controlled trial performed at one of four public orthopedic departments (Vejle, Odense, Aarhus, and Næstved) in Denmark. Patients aged 50 or older with hip pain, a clinical presentation and symptoms consistent with hip osteoarthritis, verified on radiographic imaging (joint space width narrowing below 2 mm), and with indication for THR assessed by a specialist in orthopedic surgery were considered eligible for trial enrollment. The resistance training program was delivered by physiotherapists in one-hour, individual, supervised sessions twice weekly for 12 weeks. The primary outcome was mean change in self- reported hip pain and function from baseline to 6 months after treatment was initiated measured by using the total score on the Oxford Hip Score (OHS). Secondary outcomes were a panel of self-reported pain, symptoms, function in activities of daily living, hip-related quality-of-life among others. Continuous outcomes were analyzed using repeated measures mixed effects linear models
Results: We enrolled 109 patients in the intention-to-treat population with a mean age of 68. 53 patients were randomly assigned to THR and 56 to resistance training. The improvement in the OHS was 15.9 points in patients assigned to total hip replacement and 4.5 points in patients assigned to resistance training, with a between-group difference of 11.4 points (95% confidence interval 8.9 to 14.0). All secondary outcomes had the same consistent trajectory pattern. At 6 months, 5 (9%) patients assigned to THR had not undergone surgery, and 12 (21%) assigned to resistance training had undergone THR.
Interpretation / Conclusion: THR provides clinically important superior improvements in self-reported hip pain and function compared with resistance training at 6 months. *co-senior authorship

99. Excess mortality after lower extremity amputation in a Danish nationwide cohort: The mediating role of postoperative complications

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

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, Odense University Hospital and University of Southern Denmark 4. Department of Orthopedics and Traumatology, University Medical Center Freiburg

Background: Patients who undergo major lower extremity amputation (MLEA) have the highest post-operative mortality among orthopedic patient groups. The co- morbidity profile for MLEA patients is often extensive and associated with elevated postoperative mortality.
Aim: This study primarily aimed to investigate the excess short- and long-term mortality following first and subsequent major lower extremity amputation. Secondarily, to examine the mediation role of post- amputation complications.
Materials and Methods: With data from the National Danish Patient Registry, 11,695 first-time MLEAs in patients aged >50 years were identified between January 1, 2010 and December 31, 2021, along with 58,466 controls matched 1:5 by age, sex, and region of residence. Mediators were identified through diagnosis codes (ICD-10) present in 6 months following MLEA.
Results: Excess mortality following MLEA was highest in the month following MLEA,HR 38.7 (95% CI (Confidence interval) 30.5-48.9) in women and HR 55.7 (CI 44.3-70.2) in men). Subsequent amputation resulted in an increased mortality the month after a subsequent amputation (overall HR 3.2 (CI 2.8-3.7) in women and HR 3.2 (CI 2.8-3.6) in men) and almost normalized after the first year. Sepsis explained the largest proportion of the association between MLEA and mortality with 16% (CI 11.7- 20.3) in women and 16.9% (CI 13.4-20.4) in men, although pneumonia also was a contributing factor, with 10.5% (CI 7.1-13.9) in women and 14.9% (CI 11.6-18.2) in men.
Interpretation / Conclusion: We found a notable high excess mortality in the month following MLEA, which persisted at elevated levels for years compared to controls. A subsequent amputation results in excess mortality in the following year, but declines after and normalizes after the first year. Sepsis and pneumonia arising after the amputation appeared to be significant factors that contributed to the increased mortality among MLEA patients

Session 12: Hand/wrist

15. November

09:00 - 10:00

Lokale: Auditorium

Chair: Maiken Stilling & Morten Kjær

100. Predictors of functioning in patients with hand-related disorders – an exploratory, prospective cohort study

Hans Tromborg[1], Søren Moller[2], Alice Ørts Hansen[1]
1 Department of Orthopaedic Surgery, Odense University Hospital, Odense C 2 OPEN – Odense Patient data Explorative Network, Odense University Hospital, Odense C

Background: The purpose of this study was to identify patients at risk of experiencing reduced functioning (Disabilities of the Arm, Shoulder and Hand short-form questionnaire (Q-DASH)) three and twelve months after hand surgery.
Aim: The hypothesis was that patients' baseline sense of coherence (SOC-13) and scores on the Pain Catastrophizing Scale (PCS) influence functioning at 3 and 12 months post-surgery.
Materials and Methods: This study followed patients from referral to scheduled hand surgery through one year post-surgery. The primary outcome, was measured using the Q-DASH. Demographic information was collected at baseline along with the SOC-13 and PCS. We applied penalized lasso regression for model selection, evaluating change in Q- DASH from baseline to 3 and 12 months, as well as QDASH level at baseline, 3 months, and 12 months. Additionally, logistic regression was employed for the dichotomous outcome of Q-DASH not having improved at 3 and 12 months, to explain association with functioning.
Results: 421 patients aged 18-70 participated, baseline age was 50.6 (SD 13.5); 58% were women. Even the most parsimonious model, incorporating clinical characteristics along with SOC-13 and PCS questions, could not reasonably explain total variation in Q-DASH change after 3 and 12 months Item 2, 3, and 7 from SOC-13, along with item 3, 7, and 11 from PCS, were included in most models. Being an early retiree (4.53), having a whiplash (14.06) or other diseases (7.13) had negative effects on functioning, while long tertiary education (-5.27) and employment at referral (-8.17) are positive predictors. Investigating the dichotomous outcome of Q- DASH not improving from baseline to 3 months, the most parsimonious model predicts non-improvement in Q-DASH at 3 months with 70% accuracy. The SOC-13 scale alone predicts with 61% accuracy. Our models couldn´t predict Q-DASH not having improved from baseline to 12 months any better than the overall prevalence of non-improvement in the cohort.
Interpretation / Conclusion: Variables explaining 51% of the variation in Q- DASH score three months post-surgery have been identified SOC is a valuable factor indicating patients who have not improved three months after surgery

101. Reoperations after Percutaneous Needle Fasciotomy for Dupuytren's Contracture – A retrospective, single-center, cohort study

Laura Houstrup Matthiesen[1,3], Simon Toftgaard Skov[1,3,4], Jeppe Lange[2,3]
1. Elective Surgery Centre, Silkeborg Regional Hospital, Denmark; 2. Department of Orthopedic Surgery, Horsens Regional Hospital, Denmark; 3. Department of Clinical Medicine, Aarhus University; 4. Department of Orthopedic Surgery, Aalborg University Hospital

Background: The risk of recurrence after Percutaneous Needle Fasciotomy (PNF) for Dupuytren's Contracture is a main point of criticism and has been reported up to 85% after just five years. A recent British study estimated the reoperation rate due to recurrence to be 34% within 10 years post PNF. The reoperation rate following PNF has not yet been assessed in a Scandinavian context.
Aim: The aim of this study was to estimate the reoperation rate due to recurrence in a large Danish cohort of PNF-treated patients.
Materials and Methods: This is a register-based, follow-up study on PNF-treated patients at Silkeborg Regional Hospital, Denmark, between 2007 and 2015. The first PNF procedure during the study period was defined as index procedure. Succeeding data were extracted from the Danish National Patient Registry and the Danish Civil Registration System in 2018 to identify possible reoperation procedures. Medical records were reviewed to validate reoperations performed at Silkeborg Regional Hospital (Silkeborg cohort). We evaluated the "true" reoperation rate based on the Silkeborg cohort with further best/worst case scenario on the total cohort.
Results: A total of 2,257 unique patients (3,331 PNF- treated fingers) were identified. Of those, 1,724 (76%) patients (2,511 (75%) fingers) were included in the Silkeborg cohort. The reoperation rate in the Silkeborg cohort was 28% at a median follow-up time of 6.8 (IQR: 4.6-9.3, min-max: 1.0-11.7) years. The reoperation rate in the total cohort was estimated to be between 21% and 46% at median follow-up time of 7.2 (IQR: 4.9-9.5, min-max: 1.0-11.7) years.
Interpretation / Conclusion: This study provides valuable information on reoperations after PNF in a large Scandinavian cohort. This yields important new information for patients and doctors about treatment options and risks.

102. Life after major hand injury: function and quality of life

Karina Liv Hansen[1,2,]

1) Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Denmark 2) Department of Orthopaedic Surgery, Rigshospitalet Denmark

Background: Each year, approximately 25 Danes experience a major hand injury requiring replantation or revascularization. These injuries significantly impact everyday life.

Aim: Explore the functioning and quality of life 1- 4 years after a replantation or revascularization of one finger, several fingers, or the hand.

Materials and Methods: A cross-sectional study of Danish-speaking participants aged 18 and above, who underwent a replantation or revascularization of fingers or hand between July 2018 and August 2022. Data regarding injury, function, work, symptoms, sense of coherence (SOC), and quality of life (EQ5D) is collected through phone interview and questionnaires. Functioning is measured with the Disability of the Arm, Shoulder and Hand questionnaire (DASH). The severity of the injury was determined from patient's medical records using the MHISS score. Results are analyzed statistically to identify differences and correlations between variables.

Results: Sixty out of 83 patients participated (72%). Most were male (85%) with an average age of 48 and had a vocational education or medium-cycle higher education. Half of the participants were on sick leave for less than six months. The median DASH score was 15.8 and the medium Eq5D-VAS score was 80.The most common issues were cold intolerance and stiffness. Results show no significant correlation between injury severity and DASH (rs=0.1), although a significant correlation between SOC and DASH (rs=0,43) was found.

Interpretation / Conclusion: Functioning and quality of life are slightly affected 1-4 years post-injury, with cold intolerance and stiffness being common issues. SOC and DASH show significant correlation.

103. Incidence rates of Complex Regional Pain Syndrome (CRPS) after Distal Radius Fracture: A Population-based Register Study

Pernille Melbye[1,3], That Minh Pham[1,3], Niels-Peter Brøchner Nygaard[4], Carsten Hanshelge Kock-Jensen[4], Per Hviid Gundtoft[1,2], Bjarke Viberg[1,3]

1) Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt Kolding- University Hospital of Southern Denmark 2) Department of Orthopaedic Surgery and Traumatology, Aarhus University Hospital 3) Department of Orthopaedic Surgery and Traumatology, Odense University Hospital 4) CRPS center Region of South Denmark, Hospital of South West Jutland

Background: Distal radius fractures (DRF) are the most common fractures with a rising incidence due to the growing elderly population. One of the most severe complications to DRF is development of Complex Regional Pain Syndrome (CRPS). The incidence rate of CRPS following DRF varies widely in the literature, ranging from 1%-51%, usually with small sample sizes. The diagnostic criteria known as the The Budapest criteria, were established in 2004 and revised in 2007 to avoid overdiagnosis.
Aim: To report the incidence rate of CRPS in patients diagnosed with DRF and assess development of CRPS based on age, sex, choice of treatment, and time period.
Materials and Methods: Data was extracted from the Danish National Patient Register on patients above 18 years diagnosed with a DRF (S525) in the period 1997-2018. The primary outcome was incidence rate of CRPS diagnosis (M890, G564, T796B). Secondary outcomes were CRPS incidence rates divided by age (5-year groups), sex, treatment (surgery or no surgery within 21 days) and time.
Results: There were 276,145 DRF in that period with a median age of 64 (interquartile range 51- 71) and 75% were females. The total incidence rate of CRPS was 0.23% during the 22 years. The time to diagnosis was median 82 days (interquartile range 53-291 days). The incidence rate ranged from 0.04% to 0.51% with the 30-65 year olds having a significantly higher percentage that the average (p=0.000). There was a slight difference between men (0.19%) and women (0.25%) (p=0.002). There was a slightly higher percentage in the surgical treated group (0.33%) in comparison to the non-surgical group (0.21%) (p=0.000). There was a slight decrease in incidence rate after introduction of the Budapest criteria from 0.28% to 0.21% (p=0.000).
Interpretation / Conclusion: There was a low incidence rate of CRPS diagnosis after DRF treatment. However, there may a significant underreporting from undiagnosed patients but the incidence rate is definitely not high.

104. Wrist stabilising properties of four different short-arm splinting materials: A mechanical three-point bending test and cadaveric radiography study

Hans Christian Rasmussen[1,2], Maya Bang[1,2], Johanne Gade Lilleøre[1,2], Kipp Olsen Josephine[1,2], Lars Lindgren[1,3], Annemarie Brüel[4], Mats Bue[1,2], Mads Kristian Duborg Mikkelsen[1,2], Jesper Skovhus Thomsen[4], Maiken Stilling[1,2]

1. Orthopaedic Research Laboratory, Aarhus University Hospital, Aarhus N, Denmark; 2. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark; 3. Department of Radiology, Aarhus University Hospital, Aarhus, Denmark; 4. Department of Biomedicine, Aarhus University, Aarhus, Denmark.

Background: Several wrist immobilisation techniques and materials exist; however, documentation of their actual wrist stabilising effect and mechanical properties is warranted to support evidence- based recommendations in clinical practice.

Aim: This study aimed to assess the wrist stabilising properties of volar and dorsal short-arm splints made from four different materials and to evaluate their mechanical properties.

Materials and Methods: Dorsal and volar short arm splints made of plaster of Paris (8 layers), Woodcast (2 mm, rigid vented), X-lite (classic, 2 layers), or a 3D-printed material (polypropylene) were sequentially applied to ten cadaveric arm specimens and fixed in a radiolucent fixture. The maximum wrist flexion and extension relative to the neutral wrist position under an orthogonal load of 42 N was evaluated using radiographic imaging. In addition, a three-point bending test was performed on ten sheet duplicates of each splinting material.

Results: Plaster of Paris demonstrated better wrist stabilising properties when applied as a volar short arm splint, followed sequentially by Woodcast, X-lite, and 3D-printed polypropylene. However, when applied as a dorsal splint, Woodcast exhibited lower wrist flexion and similar wrist extension compared to plaster of Paris. The dorsal splints exhibited a mean wrist flexion of ≥ 27° (95%CI: 23°–30°) compared to ≤ 25° (95%CI: 22°–29°) for the volar splints. The mean wrist extension for the dorsal splints was ≤ 13° (95%CI: 10°–17°) compared to ≥ 22° (95%CI: 19°– 26°) for the volar splints. The mechanical properties of the Woodcast, X-lite, and 3D-printed splinting materials were surprisingly similar. Plaster of Paris exhibited a distinct stiffness of 146 (95%CI: 120–173) N/mm and a deflection at Fmax of 0.6 (95%CI: 0.5–0.7) mm compared to ≤ 7.7 (95%CI: 7.4–7.9) N/mm and ≥ 20 (95%CI: 18–22) mm for the other materials.

Interpretation / Conclusion: Irrespective of the splinting material, the dorsal splints showed better resistance to wrist extension, while the volar splints exhibited better resistance to wrist flexion. Plaster of Paris displayed better wrist stabilising properties and material stiffness than Woodcast, X-lite and 3D- printed polypropylene.

105. Patient's experiences of shared decision-making, when choosing treatment for their distal radius fracture; A qualitative study.

Louise Marie Nøhr[1], Ane simony[1,2], Charlotte Abrahamsen[1,2]
1. Department of Orthopedic Surgery, Kolding, Hospital Lillebelt 2. Institute for regional Health Services, University of Southern denmark

Background: Shared decision making (SDM) was introduced in hospital Lillebelt in 2019 and research reports that patients are more satisfied with their treatment, if they play an active role in choosing treatment. A Decision-Helper was constructed and introduced in the treatment for Colles fractures, and this was the first Decision-Helper introduced to patients choose treatment for an acute illness.
Aim: This study aimed to understand how patients experience shared decision-making (SDM) for an acute illness, and how it affects them when making decisions about the treatment of their distal radius fracture.
Materials and Methods: An exploratory, qualitative study design was performed to understand the patient's experience, during the choice of treatment with SDM. Twelve patients were recruited when they came to their first follow-up 5 days after the injury, in the outpatient clinic. Of them, ten were interviewed; three face to face and seven by telephone. All were women aged 57-87 years and all had a displaced Colles fracture, which had been reduced in the Emergency Room.
Results: When analyzing the interviews three themes emerged: 1) Acute situation. Patients was positive towards SDM, but found it demanding to participate in. Patients was still in crisis, 5 days after suffering from a fracture. Patients were unable to remember the information given in the ER, regarding the use of the Decision helper. Few had prepared themselves for the consult in the outpatient clinic. 2) Influence on treatment choice. It was unclear to the majority of patients, that cast or surgery, resulted in similar clinical outcomes. 3) The treatment decision was based on personal factors, more than the information received during the consult.
Interpretation / Conclusion: Patients primarily want to be included in the treatment decision. It is important to highlight that booth treatments are equal in clinical outcome, before introducing the Decision- Helper. The doctor´s demeanor is of great importance to the patient's experience. Introducing SDM in the clinical setting requires training and repeated observations, to succeed.

106. Characteristics of Intravenous Fluid Infiltration and Factors Associated with Adverse Events: A Multicenter Retrospective Study

Jessica Duggan[1], Aron Lechtig[2], Ian Watkins[2], Jonathan Lans[2], Arvind von Keudell[3], Dafang Zhang[3]
1. Harvard Medical School, Boston, MA 2. Harvard Combined Orthopaedic Residency Program, Boston, MA 3. Department of Orthopaedic Surgery, Brigham and Women's Hospital, Boston, MA

Background: Peripheral intravenous (PIV) infiltration and extravasation are common complications of IV fluid administration. They commonly result in mild symptoms, but the risk of serious injury should not be overlooked.
Aim: Here, we aim to investigate risk factors associated with major adverse events following PIV infiltration, which may help risk stratify those who require early surgical consultation.
Materials and Methods: Retrospectively, patients were identified who had a documented PIV infiltration or extravasation event at three academic hospitals between 2015 and 2022. Surgical consultation notes were obtained through medial record review. A major adverse advent was defined as a full-thickness injury requiring operative management (deep infection, compartment syndrome). A minor adverse event was defined as superficial injury (cellulitis, superficial thrombosis).
Results: 160 patients with PIV infiltration events were included (37.5% male), with an average age of 64.1 years. A surgical consult for a hand specialist was placed 35% of the time: orthopaedic surgery in 46.4% of cases and plastic surgery in 42.9%. Among these consults, 87.5% recommended supportive treatment (elevation, warm/cold compresses, serial exams). Major adverse events occurred in 4.4% (n=7) of patients, and minor adverse events occurred in 11.3% (n=18). Both ICU admission and current intubation status (i.e., intubated, sedated, and non-examinable) at the time of infiltration were significantly associated with adverse events (p=0.02, p=0.03, respectively). Current intubation status was significantly associated with operative management (p=0.001). The type of infiltrate (vesicant vs. non-vesicant) was not associated with adverse events or the need for surgery.
Interpretation / Conclusion: Robust characterization of PIV infiltration events may facilitate early identification of patients at risk of serious complications while also reducing the volume of surgical hand consultations. We found ICU admission and current intubation both to be associated with adverse events following PIV infiltration. Further work should be done to evaluate the risk of infiltration with different fluid types (vesicant, non-vesicant).

Session 13: Eksperimental/non-clinical

15. November
09:00 - 10:00
Lokale: Sal C
Chair: Andrea René Jørgensen & Jasmin Bagge

107. A Comparative Study of Fracture Fixation Stability and Bone Healing in an In Vivo Ovine Complex Phalangeal Fracture Model: Evaluating a Novel Fixation Technique versus Conventional Metal Plating

Thomas Colding-Rasmussen[1,2], Nanett Kvist Nikolaisen[3], Peter Horstmann[4], Michael Mørk Petersen[1], Daniel John Hutchinson[5], Michael Malkoch[5], Stine Jacobsen [3], Christian Nai En Tierp-Wong[1]
1. Department of Orthopaedic Surgery, Rigshospitalet, University Hospital. 2. Department of Orthopaedic Surgery, Hvidovre University Hospital. 3. Department of Veterinary Clinical Sciences, Faculty of Health and Medical Sciences, University of Copenhagen. 4. Department of Orthopaedic Surgery, Gentofte University Hospital 5. Department of Fibre and Polymer Technology, KTH Royal Institute of Technology, Stockholm, Sweden.

Background: Certain fractures, especially in osteoporotic bone, may benefit from patient specific implants to enhance fragment reposition and healing. A novel in situ customizable fracture fixation platform (Bonevolent™ AdhFix) has shown promising biomechanical properties in ex vivo ovine phalanx fracture models. Accordingly, AdhFix might be an adjuvant in the surgical management of complex fractures.
Aim: To evaluate stability and clinical applicability of AdhFix compared to conventional metal plates in a complex fracture model in vivo.
Materials and Methods: Seven skeletally mature Texel sheep underwent a midline osteotomy with a 4.5 mm circular unicortical defect on the lateral proximal phalanx of both front limbs. Fractures were treated with either AdhFix or a locking plate (DePuy Synthes 1.5) and bandaged with a custom-made wooden block under the medial phalanx and either a cast or elastic bandage. Free movement was allowed post-surgery. Bone healing and implant stability were assessed via weekly x- ray evaluations and post-euthanasia dual- energy x-ray absorptiometry (DXA) with measurement of bone mineral density (BMD). Descriptive statistics and Wilcoxon signed-rank test were applied to assess differences in BMD between the two groups using RStudio.
Results: All initial intraoperative x-rays confirmed satisfactory reduction and hardware placement. All AdhFix patches had failed at the 1-week mark; complete fracture (n=6) or screw dislodgement (n=2). All metal plates were intact at the 1-week mark, except for one case of screw loosening. Subsequently, a total of four screw failures were observed in the plate side, but without loss of osteotomy reduction. Callus formation was observed in all samples starting at 6 weeks. Mean BMD in the fracture gap was 0.45 g/cm2 and 0.60 g/cm2 for AdhFix and plates, respectively (p=0.078) and in the distal tuft 0.36 g/cm2 for AdhFix and 0.41 g/cm2 for plates (p=0.016).
Interpretation / Conclusion: AdhFix demonstrated inadequate biomechanical properties for this fracture model, suggesting limited clinical application in its current form to treat weight-bearing fractures. Additional in vivo studies are warranted to further characterize the clinical applicability of this osteosynthesis technique.

108. In-house 3D printed porous implants: in-vivo study of osseointegration.

Anna Bertoli Borgognoni[1], Michael Melchior Bendtsen[1], Jørgen Baas[1], Jeppe Skinnerup Byskov[2], Thomas Baad-Hansen[1]

1. Department of Orthopaedics, Aarhus University Hospital; 2. Danish Technological Institute, Aarhus

Background: Total tumour removal is the primary factor of consideration in surgical resection. Several techniques exist for tumour reconstructive surgery in musculoskeletal oncology: allografts, autografts, recycled bone and endoprosthesis. Recently, 3D printing has undergone tremendous development and now has important applications in various fields of medicine. A major improvement is the possibility to print prosthesis, which are custom made for the single patient. Currently, when a customized 3D printed prosthesis is needed, an outside order must be placed, and the procedure is usually time consuming, making almost impossible to fall within the time interval of the law A collaboration between a 3DP centre in Aarhus University Hospital (AUH) and the Danish Technological Institute (DTI), allow us to manufacture custom-made 3D printed metal implant in-house.
Aim: Aim of this study was to assess the osseointegration of 3D-printed titanium implants through a validated randomized animal study.
Materials and Methods: 20 stable, non-weight-loaded, 6*10 mm cylindrical implants were 3D printed by DTI: 10 with a rough and 10 with a smooth surface. Implants were randomized and implanted into the left humerus of 20 skeletally mature sheep. After 4 weeks of observation all sheep were euthanized. The specimens were collected and cut into blokes, each containing an implant and surrounding tissue. Each block was then cut into a 3 mm block for mechanical test, closest to the surgical entry site, and a 6 mm block for future histomorphometrical evaluation. Biomechanical testing was performed as failure by push-out test on an Instron Universal Test Machine.
Results: Implants with a smooth surface demonstrate complete absence of osseointegration, as they fall out of the bone during sample preparation. Testing this group was therefore not possible. Porous implants showed macroscopic integration and breaking point at implant ´s surface. We measured a median Ultimate Shear Strength of 0,06 MPa (IQR:1,14), a median Apparent Shear Stiffness of 0,16 MPa/mm (IQR:0,48) and a median Energy Absorption of 19,98 J/m2 (IQR:25,80).
Interpretation / Conclusion: Our study shows superior osseointegration in 3DP implants with a porous surface.

109. Usability and Biomechanical Variability of a Novel In Situ Customizable Fracture Fixation Platform

Thomas Colding-Rasmussen[1,2], Peter Schwarzenberg [3], Peter Horstmann [4], Casper Bent Smedegaard Ottesen [1], Jorge Garcia [5], Daniel John Hutchinson [5], Michael Malkoch[5], Peter Varga [3], Christian Nai En Tierp-Wong [1]

1. Department of Orthopaedic Surgery, Rigshospitalet, Copenhagen 2. Department of Orthopedic Surgery, Hvidovre University Hospital, Hvidovre 3. AO Research Institute Davos, Davos, Switzerland. 4. Department of Orthopedic Surgery, Gentofte Hospital, Gentofte. 5. Department of Fibre and Polymer Technology, KTH Royal Institute of Technology, Sweden.

Background: A novel osteosynthesis platform (Bonevolent™ AdhFix) has shown promising biomechanical properties in preliminary ex vivo studies. As this technique relies on an unconventional surgical approach that involves the light curing of a viscous compound adhered to bone via metal screws, an evaluation of clinical usability is warranted. Furthermore, as AdhFix is customizable in situ, potential variability in biomechanical stability is anticipated.

Aim: To assess inter- and intra-surgeon biomechanical variability and usability of the AdhFix osteosynthesis platform.

Materials and Methods: Six surgeons, ranging from interns to consultants, reviewed a written instruction manual and were subsequently supervised in one trial osteosynthesis before each conducting ten consecutive procedures on a synthetic cylindrical (12 x 30 mm) bone model (Synbone, Switzerland), with a reduced midline osteotomy. Subsequently, all constructs underwent 4-point bending at a quasi-static loading rate. Maximum bending moment (BM) and bending stiffness (BS), as well as AdhFix cross-sectional area (CSA: mm^2), were recorded for each sample. A linear mixed effect model were used to calculate and describe differences in BM and BS between and within surgeons (SPSS v. 27).

Results: All constructs exhibited a consistent appearance and suitability for biomechanical testing. The mean BM was 2.64 ± 0.57 Nm, and the mean BS was 4.35 ± 0.44 Nm/mm. Statistically significant differences were observed among surgeons in both BM ($p < 0.001$) and BS ($p = 0.004$). Across ten trials, only one surgeon demonstrated an increase in BM ($p < 0.025$), and one surgeon showed increased BS ($p < 0.01$). A larger CSA correlated with higher BM ($p < 0.001$), but not BS ($p = 0.594$)

Interpretation / Conclusion: Conclusion: Consistent biomechanical stability was observed within surgeons, suggesting that AdhFix can be learned and applied with minimal training, regardless of prior surgical experience. Although statistically significant variability was noted in maximum bending moment (BM) and bending stiffness (BS) among surgeons, we anticipate that these differences are unlikely to have a clinically significant impact. Further investigations are warranted to validate these findings.

110. Chondrogenic and osteogenic differentiation performance of CD34+, CD146+, CD271+, and unsorted stem cells derived from microfragmented adipose tissue from knee osteoarthritis patients

Bagge Jasmin[1], Mahmood Haider[1], Nehlin Jan[2], Hölmich Lisbet[3], Blønd Lars[4], Barfod Kristoffer[1,5], Hölmich Per[1]

1. Sports Orthopedic Research Center - Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital - Hvidovre 2. Department of Clinical Research, Copenhagen University Hospital - Hvidovre 3. Department of Plastic Surgery, Copenhagen University Hospital – Herlev and Gentofte 4. Department of Orthopedic Surgery, Zealand University Hospital – Køge 5. Unit of Sports Traumatology, Copenhagen University Hospital - Bispebjerg

Background: Treatment of knee osteoarthritis (OA) with autologous stem cells from microfragmented adipose tissue (MFAT) has shown promising, but varying results. Multiple stem cell types have been identified in MFAT, such as CD34+ (adventitial stem cells), CD146+ (pericytes), and CD271+ stem cells. 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 treatment outcome.
Aim: To identify the most promising stem cell type from MFAT for the treatment of OA.
Materials and Methods: CD34+, CD146+, and CD271+ stem cells from MFAT of 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 chondrogenic and osteogenic in vitro differentiation performance 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 doubled using MACS with a mean sorting efficiency on 84% (CD34), 60% (CD146), and 33% (CD271). All subtypes were able to undergo osteogenic differentiation with a significant difference between induced and non-induced controls when using Alizarin Red S staining for calcium deposits ($p \leq 0.001$). CD146+ stem cells showed significantly higher osteogenic Alizarin Red S performance compared to CD34+, CD271+ and unsorted stem cells ($p \leq 0.03$). All subtypes were able to make 3D chondrogenic pellets. CD271+ stem cells showed significantly higher chondrogenesis when measuring proteoglycans with Safranin-O staining compared to CD34+ and CD146+ stem cells ($p \leq 0.02$), but no difference compared to unsorted. No significant difference was seen in chondrogenic pellet size between cell types. qPCR is under analysis.
Interpretation / Conclusion: CD146+ stem cells showed highest osteogenic differentiation performance. CD271+ stem cells showed highest chondrogenic differentiation performance. Composition of stem cell types might be important to their clinical effectiveness when treating OA.

112. Evaluation of three different X-lite cast types commonly used for conservative treatment of scaphoid fracture – an experimental cadaveric radiography study

Mads K. D. Mikkelsen[1,2], Maya Bang[1,2], Hans Christian Rasmussen[1,2], Johanne G. Lilleøre[1,2], Josephine O. Kipp[1,2], Lars Lindgren[1,3], Janni K. Thillemann[1,2], Annemarie Brüel[4], Mats Bue[1,2], Maiken Stilling[1,2]
1. Orthopaedic Research Laboratory, Aarhus University Hospital; 2. Department of Orthopaedic Surgery, Aarhus University Hospital; 3. Department of Radiology, Aarhus University Hospital; 4. Department of Biomedicine, Aarhus University

Background: In Denmark, it is recommended to treat stable scaphoid fractures in a short arm cast without including the thumb. However, this recommendation is supported by sparse evidence. Thus, the treating clinician's preference and individual patient needs may favour other cast types.
Aim: To evaluate the immobilizing properties of three different cast types commonly used for wrist immobilisation in the treatment of scaphoid fractures.
Materials and Methods: Ten fresh frozen human arm-and-elbow specimens without radiological or clinical signs of pathology were included. Three different cast types (X-lite) were applied to the specimen's wrists: 1) a dorsal half cast (DHC) not including the thumb, 2) a radial half cast (RHC) including the thumb, and 3) a circular cast (CC) including the thumb. Anterior-posterior and lateral radiographs were taken in neutral position. Next, the immobilised wrists were fixed in a radiolucent fixture and loaded in extension, flexion, radial, and ulnar deviation by applying an orthogonal load of 42 N. The mean angle (CI95%) of deviation was defined as the difference between the radiologically measured loaded wrist angle and the neutral position.
Results: The mean angle of deviation allowed with CC was 11° (7-14) flexion, 7° (4-11) extension, 12° (8-15) radial deviation, and 11° (8-14) ulnar deviation. Compared to CC, the DHC allowed for an additional 26° (23- 30) flexion, 7° (3-10) extension, 16° (12-20) radial deviation, and 13° (9-17) ulnar deviation. Compared to CC, the RHC allowed for an additional 23° (21-28) flexion, 24° (21-28) extension, 16° (12-20) radial deviation, and 17° (13-21) ulnar deviation. CC allowed for significantly less wrist movement in all directions. RHC and DHC stabilised the wrist equally in radial deviation.
Interpretation / Conclusion: Casting of nondisplaced scaphoid fractures using a dorsal half cast without thumb immobilisation or a radial half cast including the thumb may be used for initial immobilisation. However, significantly better wrist stabilisation was observed using a circular cast including the thumb. This supports exchanging the cast throughout the remaining healing period when the fracture swelling is reduced and a circular cast can be tolerated.

113. The Myotendinous Junction: Bridging Muscle and Tendon – 3D Exploration of Nuclei Organization

Christian Hoegsbjerg[1,2], Peter Schjerling[1,2], Michael R. Krogsgaard[3], Michael Kjaer[1,2], Arvind von Keudell[4,5], Abigail L. Mackey[1,2]

1 Institute of Sports Medicine Copenhagen, Department of Orthopaedic Surgery, Copenhagen University Hospital - Bispebjerg and Frederiksberg, Copenhagen, Denmark 2 Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark. 3 Section for Sports Traumatology M51, Department of Orthopaedic Surgery, Copenhagen University Hospital - Bispebjerg and Frederiksberg, Copenhagen, Denmark 4 Orthopaedic Trauma Section, Department of Orthopaedic Surgery, Copenhagen University Hospital - Bispebjerg and Frederiksberg, Copenhagen, Denmark 5 Brigham and Women's Hospital, Department of Orthopaedic Surgery, Havard Medical School, Boston

Background: The interface between the muscle and tendon, i.e. the myotendinous junction (MTJ), presents a crucial anatomical region for the force transmission between these two distinct tissues. Despite the optimization for an environment of high stress and strain, the MTJ remains the predominant site of injury within the musculoskeletal unit. It can be assumed that cells on the tendon and muscle sides of the MTJ contribute to tissue repair and yet the number of these cells is unknown.
Aim: To perform a fibre type-specific and 3D analysis of both the muscle (myonuclear) and tendon cell populations at the MTJ in single human myofibre.
Materials and Methods: We isolated 10 type I and 10 type II single myofibres with an intact MTJ from waste gracilis graft tissue from 6 patients undergoing anterior cruciate ligament reconstruction surgery (age: 30.5 ± 7.6 SD). We then employed confocal imaging to generate a model of the single human myofibres with known 3D coordinates of all nuclei. Data were analysed by a Wilcoxon signed rank and Friedman signed rank statistical test.
Results: We observed a surprisingly large aggregation of cells at the MTJ, with fibre type differences in numbers ($p<0.05$); median of 29 (range: 16-63) cells for type I and 16 (range: 9-23) cells for type 2 myofibres. Density of myonuclei at the MTJ was similar for fibre types. However, we found a gradual increase ($p<0.05$) in myonuclear number and density from the main portion of the myofibre to the tip for both fibre types, with both type fibre types displaying an excess of 10 myonuclei at the MTJ (range: 6-15).
Interpretation / Conclusion: These results highlight fibre type differences in MTJ nuclear organization both on the muscle and tendon sides of the MTJ. The high concentration of cells at the MTJ is unexpected given the current thinking on maximising the amount of contact area between muscle and tendon for resisting damage during force transmission. Future work could explore the capacity of these cells to rebuild the MTJ after rupture.

Session 14: Hip arthroplasty

15. November

09:00 - 10:00

Lokale: Skovbrynet

Chair: Thomas Jacobsen & Signe Rosenlund

114. The association of Laminar vs. Turbulent airflow on Prosthetic Joint Infections in the Hip: A prospective nationwide study using Danish registers.

Jacob Moflag Svensson[1], Anne Helms Andreasen[2], Espen Jimenez Solem[3], Søren Overgaard[1]
1. Department of Orthopedic surgery, Bispebjerg and Frederiksberg Hospital 2. Center for Clinical Research and Prevention, Frederiksberg Hospital 3. Department of Clinical Pharmacology, Bispebjerg and Frederiksberg Hospital

Background: Prosthetic joint infection is a rare but feared complication of total hip arthroplasty, causing severe suffering for the patient with increased morbidity and mortality, and increased costs for the healthcare system. Cleanliness in the operating room is known to affect the risk of infection. To achieve a cleaner environment, laminar airflow ventilation was introduced, which reduces the number of bacteria in the air during surgery. Despite this, most previous studies comparing laminar airflow with conventional, turbulent airflow show no difference between the two.
Aim: To evaluate the association between theatres equipped with laminar airflow (LAF) ventilation or turbulent airflow (TAF) ventilation and prosthetic joint infection (PJI) in primary total hip arthroplasty (THA).
Materials and Methods: 119,899 primary THAs with at least 365 days follow- up were registered in the Danish hip arthroplasty register (DHR) between 2010 and 2020. 27,747 THAs were excluded from the study, due to other diagnoses than osteoarthritis or errors in registration. Data from DHR and the Danish microbiology register were linked using the patients' unique personal number. The primary outcome was revision due to PJI within 365 days after surgery. This was defined as the diagnosis PJI registered in DHR after revision surgery or 2 or more positive identical bacterial cultures in perioperative biopsies.
Results: Out of the 92,152 patients included, 2,328 (2.53%) had revision surgery within 365 days of which 843 (0.91%) were due to PJI. After adjusting for patient related risk factors, surgery related risk factors and year of surgery there was no significant difference in the effectiveness of LAF and TAF operation rooms on the primary outcome (HR=0.99; 95% CI: 0.78- 1.26).
Interpretation / Conclusion: No association was found between theatres with LAF versus TAF on the risk of PJI in THA after 365 days. This finding contradicts previous findings that were using colony forming units as a surrogate marker for PJI, which showed an increased risk in theatres with TAF ventilation. It may support the decision to equip new hospitals with TAF ventilation systems instead of LAF.

115. Psychopharmacological treatment is a risk factor for new chronic opioid use after hip and knee arthroplasty

Simon Kornvig[1,2], Henrik Kehlet[3,4], Christoffer Calov Jørgensen[3,4], Anders Fink-Jensen[5], Poul Videbech[6], Alma Becic Pedersen[7,8], 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, Copenhagen and University of Copenhagen 6 Mental Health Center, Glostrup and University of Copenhagen 7 Department of Clinical Epidemiology, Aarhus University Hospital 8 Department of Clinical Medicine, Aarhus University

Background: Chronic opioid use is of great concern worldwide. Thus, identification of risk factors for new chronic opioid use after hip and knee arthroplasty is imperative to target preventive strategies. Even though many patients are receiving psychopharmacological treatment, the impact of these drugs on new chronic opioid use remains unclear.

Aim: The aim was to investigate whether any and different subgroups of preoperative psychopharmacological treatment are risk factors for new chronic opioid use after hip and knee arthroplasty.

Materials and Methods: This population-based cohort study included 35,037 primary hip and 31,109 primary knee arthroplasties from 2015 to 2022 identified from the Danish Hip/Knee Arthroplasty Registries. Patients with at least one redeemed opioid prescription within one year before surgery were excluded. Dispensings of psychotropics and opioids were obtained from the Danish National Prescription Registry. Preoperative psychopharmacological treatment was defined as one dispensing of psychotropics within 99 days before surgery, whereas new chronic opioid use was defined as at least two opioid dispensings within at least two quarters during the last three quarters of the first year following surgery. Relative risks of new chronic opioid use were estimated with 95% confidence intervals using binary regression and adjusted for age, sex and Charlson Comorbidity Index obtained from the Danish National Patient Register.

Results: Among hip and knee arthroplasty patients in any psychopharmacological treatment, 4.7% and 8.7% became new chronic opioid users, whereas 2.3% and 4.3% of patients not in psychopharmacological treatment became new chronic opioid users corresponding to adjusted relative risks for new chronic opioid use of 1.8 (1.6; 2.1) and 1.9 (1.7; 2.1), respectively. Sensitivity analyses of exposure subgroups, including antidepressants, serotonin reuptake inhibitors and antipsychotics, showed similar results.

Interpretation / Conclusion: Hip and knee arthroplasty patients in any psychopharmacological treatment have an almost 2-fold increased risk of new chronic opioid use. This underlines the importance of targeted prevention strategies in these patients.

116. In hip and knee arthroplasty, missing patient-reported outcome is associated with markedly increased mortality

Kornvig Simon[1,2], Signe Timm[1,2], Thomas Jakobsen[3], Kirill Gromov[4], Claus Varnum[1,2]
1 Department of Orthopeadic Surgery, Lillebaelt Hospital - Vejle 2 Department of Regional Health Research, University of Southern Denmark 3 Department of Orthopeadic Surgery, Aalborg University Hospital - Farsø 4 Department of Orthopeadic Surgery, Hvidovre Hospital

Background: Patient-reported outcome measures (PROMs) are essential in patient-centered arthroplasty research. However, missing data is a practical and statistical challenge that may introduce bias.
Aim: The aim was to investigate whether missing baseline PROM data was associated with 1-year follow-up scores as well as 1-year mortality and revision rate after hip and knee arthroplasty; secondarily, whether missing 1-year follow-up was associated with baseline scores.
Materials and Methods: This population-based study included 5,285 primary hip and 4,100 primary knee arthroplasties from three fast-tack centers in Denmark from 2016 to 2020 using the Danish Arthroplasty Registries. Oxford Hip/Knee Score (OHS/OKS), EQ- 5D-3/5L and EQ VAS were collected routinely before and 1 year after surgery. Scores were presented as medians and compared using Wilcoxon-Mann- Whitney test with a significance level of 5%. Unadjusted relative risks of death and revision within 1 year were estimated with 95% confidence intervals using binary regression.
Results: In hip arthroplasty, missing baseline scores were associated with lower OHS at follow-up (43 vs. 44, $p<0.01$) but not EQ-5D-3/5L and EQ VAS. In knee arthroplasty, missing baseline scores were associated with lower OKS at follow-up (38 vs. 40, $p<0.01$) and EQ VAS (80 vs. 81, $p<0.05$) but not EQ-5D- 3/5L. Hip and knee arthroplasty patients with missing baseline scores had relative risks of death within one year of 7.1 (3.9; 12.7) and 6.3 (3.5; 11.2), respectively. Missing baseline was not associated with revision rate the following year. Finally, missing 1-year follow-up were associated with lower baseline OHS/OKS as well as EQ-VAS and EQ- 5D-3/5L in both hip and knee arthroplasty ($p<0.05$).
Interpretation / Conclusion: In hip and knee arthroplasty, missing patient-reported outcome is associated with markedly increased mortality but not revision rate. This underscores the need for closer clinical follow-up of non-responders and the inherent risk of bias in studies with missing PROM data.

117. Associations between exercise-induced changes in leg extensor muscle power and physical function in patients with hip osteoarthritis. Secondary analysis from the Hip Booster Trial

Troels Kjeldsen [1, 2, 3], Ulrik Dalgas[5], Søren T Skou[3, 4], Frederik N Foldager[1, 2], Bo M Bibby[6], Inger Mechlenburg[1, 2, 5]

1) Department of Orthopedic Surgery, Aarhus University Hospital, Aarhus, Denmark 2) Department of Clinical Medicine, Aarhus University, Aarhus, Denmark 3) The Research and Implementation Unit PROgrez, Department of Physiotherapy and Occupational Therapy, Næstved-Slagelse-Ringsted Hospitals, Slagelse, Denmark 4) Research Unit for Musculoskeletal Function and Physiotherapy, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark 5) Exercise Biology, Department of Public Health, Aarhus University, Aarhus, Denmark 6) Department of Biostatistics, Institute of Public Health, Aarhus University, Aarhus, Denmark

Background: Clinical guidelines recommend exercise therapy as first-line treatment for hip osteoarthritis (OA) because of its effectiveness for improving physical function and reducing pain. To optimize the effect of exercise therapy on physical function, it is important to identify and understand the underlying mechanisms of that effect. LEP appears to be a stronger determinant of physical function in hip OA compared to muscle strength. However, there seems to be no longitudinal studies on the relationship between changes in LEP and changes in physical function in patients with hip OA.
Aim: To investigate associations between changes in leg extensor muscle power of the affected limb (ΔLEP) and changes in performance-based and patient-reported measures of physical function after 12 weeks of progressive resistance training (PRT) or neuromuscular exercise (NEMEX) in patients with hip osteoarthritis.
Materials and Methods: Secondary analyses of a randomized controlled trial. From 160 participants enrolled in the clinical trial and cluster randomized to PRT (n=82) or NEMEX (n=78), a total of 147 (92%) had complete follow-up data and were included in the analyses. Simple linear and multivariate linear regression models estimated the crude and adjusted associations between ΔLEP normalized to body weight (watt/kg) and changes in a range of physical function outcome measures.
Results: Adjusted estimates [95% confidence intervals] showed associations between ΔLEP (watt/kg) and changes in 30-second chair stand test (β: 2.34 [1.33; 3.35], R2: 0.13), 9-step timed stair climb test (β: -1.47 [-2.09; -0.85], R2: 0.38), 40- meter fast paced walking test (β: -2.20 [-3.30; -1.11], R2: 0.09), Activities of Daily Life function (β: 8.63 [3.16; 14.10], R2: 0.23) and Sport and Recreation function (β: 10.57 [2.32; 18.82], R2: 0.21) subscales from the Hip disability and Osteoarthritis Outcomes Score. Group allocation to PRT did not lead to greater regression coefficients than in NEMEX.
Interpretation / Conclusion: Changes in leg extensor muscle power are consistently associated with changes in physical function across performance-based and patient- reported measures. These associations seem to be independent of allocation to PRT or NEMEX.

118. Periprosthetic joint infection diagnosed by culture-independent histopathology – introducing a new Danish standard?

Mats Bue[1,2], Steen Bærentzen[3], Thomas Greve[4], Martin Lamm[1], Thomas Falstie-Jensen[1], Daan Koppens[1], Johanne Gade Lilleøre[2], Christen Ravn[1]

1. Dept. of Orthopaedic Surgery, Aarhus University Hospital 2. Dept. of Clinical Medicine, Aarhus University 3. Inst. of Pathology, Aarhus University Hospital 4. Dept. of Clinical Microbiology, Aarhus University Hospital

Background: Periprosthetic joint infection (PJI) is a common indication for total joint arthroplasty (TJA) revision. In 2021, the European Bone and Joint Infection Society (EBJIS) published the definition of PJI including positive histopathology as a confirmatory diagnostic criterion. In Denmark, histopathology, as a culture-independent modality, is not used in orthopaedic revision surgery as it is regarded as a complicated procedure with a long learning curve.

Aim: As part of a European multicentre study for prospective validation of the EBJIS PJI definition, this study aims to evaluate the use of histopathology in a cohort of consecutive TJA revisions in a Danish setting.

Materials and Methods: By 01.10.2023, the collection of 3 histopathology tissue samples (formalin-fixed) from the periprosthetic membrane was introduced in all TJA-revisions at our institution. Our clinical pathologists followed international protocols without prior training for PJI evaluation. The diagnostic threshold is ≥5 neutrophils in ≥5 high- power fields. The diagnostic protocol also incl. microbiology, synovial fluid leukocyte count and clinical findings.

Results: Inclusion after 5.5 months has resulted in 74 revisions, of which 25 cases (34%) were preoperatively suspected as PJI by the treating surgeon. All 25 cases were confirmed as PJI by the EBJIS definition: 88% with pos. microbiology, 88% with pos. histopathology and 86% with elevated synovial fluid leucocyte count. In 2 cases, pos. histopathology but no other signs of PJI were found. These cases may be seen as false positives, leading to a specificity of 96%. In 16 PJI cases with ongoing or very recent (<5 days) antibiotic treatment, 94% were pos. in histopathology but only 75% in microbiology. With continuous inclusion until 30.09.2024, we expect data from approximately 150 revisions to be available for presentation after one year.

Interpretation / Conclusion: Being the first Danish centre to introduce histopathology as part of the standard diagnostic work-up in PJI settings, we report high levels of agreement between conventional culture methods and histopathology. Histopathology appears as an applicable diagnostic tool and may particularly be valuable in patients treated with antibiotics prior to surgery.

119. Pre- and postoperative residual urine in 796 men 65 years or older, undergoing elective orthopedic surgery: A single-center, prospective cohort study

Inger Markussen Gryet[1], Charlotte Graugaard-Jensen[2], Asger Roer Pedersen[3], Simon Toftgaard Skov[4]
1. Research Unit, Elective Surgery Center, Silkeborg Regional Hospital, Denmark 2. Pelvic Floor Unit, Department of urology, Aarhus University hospital, Denmark 3. University Research Clinic for Innovative Patient Pathways, Diagnostic Centre, Silkeborg Regional Hospital, Central Region Denmark, Denmark 4. Department of Orthopedic Surgery, Aalborg University Hospital, Denmark

Background: Post-void residual urine (PVR) can be a preexisting or an unknown chronic disorder, but it can also occur after surgery. A pilot-study initiated in Elective Surgery Center, Silkeborg Regional Hospital led to a collaboration with a urologist to develop a flowchart to handle men with residual urine after elective surgery. Depending on the severity, men with significant PVR volumes were either recommend follow up by the general practitioner or referred to a urology outpatient clinic for further diagnose and/or treatment.
Aim: To determine the prevalence of pre- and postoperative PVR in men >65 years undergoing common elective orthopedic surgeries (hip, knee or shoulder arthroplasty or spine surgery) and associated risk factors.
Materials and Methods: A single-center, prospective cohort study. Male patients were consecutively included during one year from April 25 2022. Data was extracted from the electronic patient files: age, lower urinary tract symptoms (LUTS), co-morbidity (e.g. diabetes or neurological disease), type of surgery and anesthesia, opioid use, pre- and postoperative PVR.
Results: 796 men were included; 316 knee-, 276 hip-, 26 shoulder arthroplasties and 178 lower back spinal surgeries. 95% (n=755) were bladder scanned preoperatively. 12% (n=89) had PVR 150-300ml, and 3% (n=23) had PVR >300ml. There was a higher risk of preoperative PVR ≥150ml in patients reporting LUTS, OR 1.97(1.28;3.03), having known neurological disease, OR 3.09(1.41;6.74), and the risk increased with higher age, OR 1.08 per year (1.04;1.12). Diabetes and the type of surgery was not associated with higher risk of PVR. 72% (n=569) had a postoperative bladder scan. 15% (95%CI: 12-19%) (n=70) patients without PVR preoperatively had PVR ≥150ml postoperatively.
Interpretation / Conclusion: Approximately 15% of the men had PVR ≥150ml preoperatively. Neurological disease was the most severe risk factor and secondary if reporting LUTS. As expected, the risk increased with age. Interestingly, neither diabetes nor the type of surgery was associated with a higher risk. 15% of the men without preoperative PVR had PVR after surgery. It is not possible to conclude if it is transient or chronic but further studies are ongoing.

120. Return to work after total hip arthroplasty in patients with osteoarthritis: A nationwide population-based cohort study on 9,431 patients

Peter Alsing[1,2], Julie Pajaniaye[1,2,3], Martin Bækgaard Stisen[2,4], Søren Overgaard[5,6], Erzsébet Horváth-Puhó[1,4], Inger Mechlenburg[2,4], Alma Becic Pedersen[1,4]

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 Dentistry and Oral University, Aarhus University; 4. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark; 5. Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital, Bispebjerg, Denmark; 6. Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen

Background: An increasing proportion of younger patients are undergoing total hip arthroplasties (THA). Therefore, it is important for clinicians, patients, and society to understand how THA affect patients' ability to return to work (RTW). Evidence on the role of socioeconomic status (SES) in RTW after THA is limited.

Aim: To investigate time to RTW after primary THA overall and the relation to markers of SES, including education, income, and cohabitation.

Materials and Methods: Using the Danish Hip Arthroplasty Registry, we identified 9,431 patients aged 18 to 59 years who underwent primary THA for osteoarthritis between 2008 and 2018. Information on RTW was obtained from the Danish Register for Evaluation of Marginalization and was defined as full or partial RTW. We used competing risk analysis to calculate the cumulative incidence with 95% confidence interval (CI) of RTW at 1, 6, 12, and 24 months, both overall and by markers of SES.

Results: In our cohort, 19% of patients had low education, 33% had an annual income <73,593 euro, and 21% were living alone. Overall, the median time to RTW within 24 months was 54 days (interquartile range: 77) and the incidence of RTW was 31.9% (CI: 30.9%; 32.8%) at 1 month, 86% (CI: 85%; 87%) at 6 months, 90% (CI: 89%; 91%) at 12 months and 93% (CI: 93%; 94%) at 24 months. In patients with low vs. high education, 28% vs. 39% RTW within one month, and 88% vs. 97% RTW within 24 months. In patients with low vs. high income, 26% vs. 43% RTW within one month and 85% vs. 98% RTW within 24 months. In patients living alone vs. cohabiting, 27% vs. 33% RTW within one month and 87% vs. 95% within 24 months.

Interpretation / Conclusion: Overall, 86% of patients who underwent THA RTW within 6 months, increasing to 93% within 24 months. Patients with low education, low income, and living alone had experienced delayed RTW or did not RTW within 24 months. These results highlight the importance of considering SES markers in clinical decision-making, as they can have health and financial implications.

Session 15: Sports orthopaedics

15. November

12:45 - 13:45

Lokale: Sal A

Chair: Bjarne Mygind-Klavsen & Eva Wetke

121. Reoperation Rate and Predictive Factors for Healing Following Meniscus Repair - A Retrospective Analysis of 2492 cases

Bjørn Christensen[1], Christopher Holst Hansen[1], Martin Lundorff[1], Thomas Egendal[1], Anders El-Galaly[2], Martin Lind[3]

1. Department of orthopedic surgery, Horsens Regional Hospital; 2. Department of orthopedic surgery, Rigshospitalet; 3. Department of orthopedic surgery, Aarhus University Hospital

Background: Meniscal injuries are common in orthopedic practice, with conservative treatment, surgical repair or resection being the standard treatments. Resection of the meniscus can lead to the development of early arthritis and there is an increasing focus on saving the meniscus. However, the reoperation rate following meniscus repair remains a concern, impacting patient outcomes and healthcare resources.

Aim: This retrospective study aimed to evaluate the reoperation rate after meniscus repair and identify potential risk factors associated with reoperation.

Materials and Methods: We conducted a retrospective analysis of 2492 cases undergoing meniscus repair between 2011 and 2023 in the Central Denmark Region (6 different hospitals) . Data on patient demographics, including age at operation, sex, BMI, type of injury, number of sutures, concomitant ACL injury, age of injury, and smoking status, were collected. Reoperation due to failure of the meniscus suture were recorded. Kaplan- Meyer analysis was performed and multivariate Cox regression adjusted for confounders.

Results: A total of 2492 meniscus repairs were analyzed. The reoperation rate following meniscus suture at 1 year was 13,2% CI [11.9 , 14.6], at 2 years 22,4% CI [20.7 , 24.0] and at 5 years 30% CI [25.0 , 31.8]. The mean time until reoperation was 1.68 years (SD±1.62). We found no significant correlation between reoperation rates and age of patient (p=0.28), age of injury (p=0.47), BMI (p=0.78), or sex (p=0.23). Smokers had a 5% increased risk of reoperation (p<0.05).

Interpretation / Conclusion: A reoperation rate of 30% after meniscus suture is relatively high and the lack of correlation to age of injury, age of patient and BMI is noteworthy. Previous assumptions of better clinical outcome in young patients with a normal range BMI and an acute injury, are not supported by the findings of this study.

122. Anterior Cruciate Ligament Reconstruction Decreases the Risk of Meniscus Repair Failure

Bjørn Christensen[1], Christopher Holst Hansen[1], Martin Lundorff[1], Thomas Egendal[1], Anders El-Galaly[2], Martin Lind[3]

1. Department of orthopedic surgery, Horsens Regional Hospital; 2. Department of orthopedic surgery, Rigshospitalet; 3. Department of orthopedic surgery, Aarhus University Hospital

Background: ACL injuries are often accompanied by meniscus injuries. Meniscus repair is mostly performed with ACL reconstruction, but not necessarily. Some surgeons prefer to repair the meniscus and perform ACL reconstruction in a subsequent surgery, and some patients opt for meniscus repair due to locking of the knee, but decline ACL reconstruction.
Aim: To investigate the effect of ACL reconstruction on the reoperation rate of meniscus repair
Materials and Methods: A retrospective analysis of 1227 cases of combined ACL injury and meniscus repair was conducted. The patients were treated between 2011 and 2023 in the Central Denmark Region (6 different hospitals). Data on age at operation, sex, BMI, age of injury, and smoking status, were collected. Reoperation due to failure of the meniscus suture were recorded. Kaplan-Meyer analysis was performed and multivariate Cox regression adjusted for confounders.
Results: 1116 patients were treated with ACL reconstruction and meniscus repair (group 1) and 111 patients were treated with meniscus repair and had their ACL injury treated conservatively (group 2). In group 1, the reoperation rate due to failed meniscus repair at 1 year was 8.5% CI [6.9 , 10.1], at 2 years 18% CI [15.7 , 20.3] and at 5 years 26.7% CI [21.5 , 26.7]. In Group 2, the reoperation rate due to failed meniscus repair at 1 year was 17.0% CI [18.3 , 34.8], at 2 years 40.8% CI [30.8 , 49.3] and at 5 years 53.3% CI [42.6 , 62.0]. Patient age in group 1 (25.2 years) was slightly lower than in group 2 (32.5 years), and patient BMI in group 1 (24.5) was slightly lower than in group 2 (26.6).
Interpretation / Conclusion: Treating an ACL injury conservatively while repairing the meniscus results in a 62.3% increased risk of failure and reoperation (RR 5 years 1.623). Patients should be informed of this increased risk before opting out of ACL reconstruction, and If possible surgeons should perform ACL reconstruction and meniscus repair in the same procedure.

123. No differences between 4-strand semitendinosus or semitendinosus/gracilis grafts in revision rates, knee stability and patient-reported outcomes after anterior cruciate ligament reconstruction.

Torsten Grønbech Nielsen[1,2,3], Martin Lind[1]
1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark; 2. Department of Physiotherapy and Occupational Therapy, Aarhus University Hospital; 3. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark

Background: The semitendinosus/gracilis (ST/G) graft has been the main choice for Anterior Cruciate ligament reconstruction (ACLr) in the recent years. The 4-strand semitendinosus (4-ST) graft is not widely used, but shows promising results in terms of revision rates, knee stability and patient satisfaction. With the 4-ST, it is easier to achieve an optimal graft diameter while maintaining the hamstring strength, which protects the knee from recurrent ACL injury. Only studies with small sample sizes have been published and only one study has compared ST/G and 4-ST grafts in ACLr patients, without looking at revision rates.
Aim: The aim of this study was to compare revision rates, knee stability and patient-reported outcomes after ACLr using either ST/G or 4-ST grafts identified in the Danish Knee Ligament Reconstruction Registry.
Materials and Methods: ACLr patients from 2014 to 2021 who met the following criteria: minimum two-year follow-up, isolated ACL with either ST/G or 4-ST grafts. The primary outcome was ACL revision surgery assessed at two-year follow-up. Secondary outcomes were knee laxity (side-to-side difference) and pivot shift (rotational stability difference - grade 0 or grade 1-3), and patient-reported outcomes; Knee Osteoarthritis and Outcome Score (KOOS) subscales and Tegner activity scale assessed at one-year follow-up.
Results: 6,750 ST/G and 1,321 4-ST patients were included in the study. There was no statistical difference in two-year revision rates between the groups (ST/G; 1.73 (95%CI 1.44;2.07), 4-ST; 1.40 (95%CI 0.88;2.21)). A small significant difference was seen in knee laxity (1.3 mm vs. 1.1 mm), but no other significant differences were seen in pivot shift or patient-reported outcomes at one year. Both groups showed significant improvement from baseline to one year.
Interpretation / Conclusion: The use of ST/G or 4-ST in ACLr patients shows similar results in terms of revision rates, knee laxity and patient-reported outcomes.

124. Translation, cross-cultural adaptation and validation of the Danish version of the Knee Outcome Survey - Activities of Daily Living Scale

Kamilla Arp[1,2], Claus Varnum[1,2], Ulrik Dalgas[3], Bettina Mølri[4], Signe Timm[1], Bjarke Viberg[5,6], [7]

1. Department of Orthopedic Surgery, Lillebaelt Hospital - University Hospital of Southern Denmark, Beriderbakken 4, 7100 Vejle, Denmark 2. Department of Regional Health Research, University of Southern Denmark, Campusvej 55, 5230 Odense M, Denmark 3. Exercise Biology, Department of Public Health, Aarhus University, Dalgas Avenue 4, 8000 Aarhus C, Denmark 4. Center for Shared Decision Making, Lillebaelt Hospital, University Hospital of Southern Denmark, Vejle, Denmark 5. Orthopaedic Surgery and Traumatology, Odense University Hospital, J. B. Winsløws Vej 4, 5000 Odense C, Denmark 6. Orthopaedic Surgery and Traumatology, Hospital Lillebaelt - University Hospital of Southern Denmark, Sygehusvej 24, 6000 Kolding, Denmark 7. Department of Physio- and Occupational therapy, Lillebaelt Hospital - University Hospital of Southern Denmark, Beriderbakken 4, 7100 Vejle, Denmark

Background: The Knee Outcome Survey - Activities of Daily Living Scale (KOS-ADLS) is a patient-reported outcome measure (PROM) developed to assess functional abilities in patients with various knee disorders. The original version of KOS- ADLS has shown to be reliable, valid and responsive to change in patients with various knee disorders.

Aim: We aimed to translate and culturally adapt the KOS-ADLS to Danish and to evaluate the psychometric properties of the Danish version (KOS-ADLS- DK) in patients with anterior cruciate ligament (ACL) injury.

Materials and Methods: The KOS-ADLS was translated and culturally adapted to Danish in accordance with recommended guidelines. To evaluate psychometric properties 117 patients with ACL injury completed KOS-ADLS-DK, Knee Injury and Osteoarthritis Outcome Score (KOOS), Lysholm and UCLA at baseline and 14 days later. A sub-population (79 patients) completed the KOS-ADLS- DK before and after 3 months rehabilitation. Internal consistency (Chronbach's alpha), factor analysis, test-retest reliability (Intraclass Correlation Coefficient [ICC]), test-retest agreement (Bland-Altman [BA] plots with 95% limits of agreement [LOA]), Standard Error of Measurement (SEM), Smallest Detectable Chance (SDC), construct validity (hypothesis testing), responsiveness (construct approach with hypothesis testing) and floor/ceiling effects were assessed.

Results: No major problems were revealed in the cross-cultural adaptation process. The factor analysis supported the unidimensionality of KOS-ADLS-DK and showed a high internal consistency (Chronbach's alpha = 0.90). Test-retest agreement showed equal distribution on the BA plot with SEM of 7.1%, SDC of 19.7% and good reliability (ICC = 0.88). However, construct validity was not satisfactory as only 5 of 7 hypotheses were confirmed. Hypotheses testing on change scores revealed the KOS-ADLS-DK to be responsive and there were no floor/ceiling effects.

Interpretation / Conclusion: The Danish version of KOS-ADLS is a valid, reliable and responsive PROM for assessing symptoms and functional limitations in patients with ACL injury. However, it may have some limitations in its construct validity.

125. Medial collateral ligament as a pulley in the reconstruction of the medial patellofemoral ligament for children with lateral patellar instability

Maria Frøkjær Harders[1], Magnus Winther Knudsen[1], Uggi Balle[1], Jens Christian Poerneki[2], Knud Gade Freund[3], Niels Maagaard[1], Bjarke Viberg[1]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital 2. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebælt 3. Department of Orthopaedic Surgery and Traumatology, Hospital of South West Jutland

Background: Lateral patellar instability in children is challenging and the initial treatment is often non-operatively. If that fails, surgery can be indicated and the gold standard is medial patellofemoral ligament (MPFL) reconstruction. This usually is performed with a screw close to the epiphyses but we present an alternative option.

Aim: To assess our non-anatomical MPFL reconstruction using the medial collateral ligament (MCL) as a pulley in children with lateral patellar instability.

Materials and Methods: This was a multicenter retrospective cohort study on children up to 16 years with primary MPFL reconstruction performed between January 1st 2014 and December 31st 2020 in three hospitals (Odense University Hospital, Hospital Lillebælt, Hospital of South West Jutland). The patients were identified through administrative databases and all health records were reviewed for demographics, symptoms, comobordities and surgical informations. The primary outcome was complications (dislocations of the patella, re-operations to the MPFL graft, arthroscopy, and infection) with follow-up of 1 and 2 years post-operatively.

Results: There were 145 knees (119 patients) included with a median (range) age of 15 (7- 15) years old, 76% female, and 63% had a normal BMI. The gracilis tendon was primarily used (93%) as graft, and 35% had additional surgery such as lateral release (10.3%), cartilage debridement (15.2%), and synovectomy (15.9%). At the 6-weeks follow-up, 22% had recorded medial tenderness. Within one year postoperatively there were a total of 5.5% (n=8) with complications; 2 had a new MPFL reconstruction, 3 had tightening of the MPFL graft, and 3 had an arthroscopy without MPFL involvement. After 2 years there were 10.3% (n=15) with complications; 3 had a new MPFL reconstruction, 5 had tightening of the MPFL graft, 1 had a dislocation, and 6 had an arthroscopy without MPFL involvement.

Interpretation / Conclusion: Lateral patellar instability can be treated effectively with a low medial tenderness and complication rate using a non-anatomical functional MPFL reconstruction with the MCL as a pulley in children.

126. Three-year results of surgical or conservative treatment of proximal hamstring avulsion using a shared decision strategy

Kasper Spoorendonk[1], Marie Bagger Bohn[2], Bent Lund[2], Signe Kierkegaard-Brøchner[1]
1. Department of Physio and Occupational Therapy, Horsens Regional Hospital 2. Department of Orthopedic Surgery, Horsens Regional Hospital

Background: Proximal hamstring avulsion is a rare injury and happens with hyperextended knee and hyperflexed hip. Studies evaluating mid- term follow up of treatment of proximal hamstring avulsion are lacking.
Aim: The aim was to evaluate patients undergoing surgical or conservative treatment for proximal hamstring avulsion three years after initiation of treatment.
Materials and Methods: Patients were included in the study when they reached three-year follow up after either surgical or conservative treatment for proximal hamstring avulsion. Magnetic Resonance Imaging was used to visualize proximal hamstring avulsions. Treatment allocation to either 1) open surgical proximal hamstring avulsion repair and rehabilitation or 2) rehabilitation alone (conservative group) was based on a shared decision between the patient, a physiotherapist, and a surgeon. The decision was based on factors related to the injury. All patients followed a standardized rehabilitation program in different levels supervised by a physiotherapist. At baseline, one- and three-year follow-up, patients answered the Perth Hamstring Assessment Tool (PHAT) (0-100 scale with 100 corresponding to no problems) and Hip Sports Activity Scale (HSAS) (0-8 with 8 corresponding to an elite athlete).
Results: The cohort included 24 patients: 11 patients (5 women) had surgery (mean±SD age of 50±16 years) and 13 patients (4 women) had conservative treatment (mean±SD age of 50±17years). At baseline, the surgical group had median 3 ruptured tendons and a tendon retraction of median 3 cm. Surgery was performed median 15 days after injury. The conservative group had median 2 ruptured tendons and a retraction of median 2 cm and treatment was initiated median 64 days after injury. Patient reported outcomes improved in both groups from baseline to three-year follow-up ($p<0.05$): In the surgical group, the median PHAT: score increased from 43 to 87, overall health from 53 to 88 and their HSAS: 0 to 4. In the conservative group, the PHAT increased from 53 to 80, overall health improved from 70 to 90, and HSAS went from 0 to 3.
Interpretation / Conclusion: At three-year follow-up of either surgery or conservative treatment after proximal hamstring avulsion, both groups had good clinical outcomes.

127. All-inside Anterior Cruciate Ligament Reconstruction (ACLR) demonstrates improved sagittal and rotational knee stability compared to conventional ACLR

Simone Elmholt[1], Torsten Nielsen[1], Martin Lind[1]
Department of Othopaedic Surgery, Aarhus University Hospital

Background: All-inside anterior cruciate ligament reconstruction (ACLR) is performed with inside-out drilling and adjustable suspensory graft fixation in both the femur and tibia. This technique has several surgical advantages. Precise anatomical placement of the ACL footprint, less tunnel widening and improved graft-bone healing. However, these advantages have not been shown to improve clinical outcomes compared to conventional ACLR.
Aim: This study aimed to compare clinical outcomes between all-inside ACLR and conventional ACLR with screw fixation.
Materials and Methods: This study was performed as a retrospect cohort study. Data were obtained from the Danish Knee Reconstruction Registry (DKKR). After inclusion, 877 patients were included in the all-inside group and 9033 patients in the conventional ACLR group. The primary outcome was sagittal knee laxity. Secondary outcomes included rotational laxity (pivot shift), patient reported outcomes (PROMs) and revision rates.
Results: ACLR performed using the all-inside technique demonstrated improved sagittal knee stability compared to conventional ACLR (0.8mm vs. 1.3mm, $p < 0.01$) at one year follow-up. Furthermore, fewer patients in the all-inside group had a positive pivot shift compared to conventional ACLR (8.2% vs. 15.9%, $p < 0.01$). Both groups demonstrated similar PROMs and similar risk of surgical revision at two years follow- up.
Interpretation / Conclusion: Compared to conventional ACLR the all- inside technique for ACLR demonstrated improved clinical outcomes regarding both sagittal and rotational knee stability. In addition, PROMs and revisions rates were similar compared to conventional ACLR.

Session 16: Tumors

15. November
12:45 - 13:45
Lokale: Sal B
Chair: Christina Holm & Thomas Baad-Hansen

128. Effect on Survival after Implementation of Danish Cancer Patient Pathways in Deep-Seated High-Grade Soft Tissue Sarcomas in the Extremities and Trunk Wall: A Retrospective Observational Study

Andrea Thorn[1], Kristoffer Seem[1], Michala Skovlund Sørensen[1], Ninna A. Pedersen[2], Thomas Baad-Hansen[3], Michael Mørk Petersen[1]
1. Rigshospitalet – University of Copenhagen, Department of Orthopaedic Surgery 2. Aarhus Universitetshospital, Department of Oncology 3. Aarhus Universitetshospital, Department of Orthopaedic Surgery

Background: Soft tissue sarcomas (STS) are rare cancers originating in the body's connective tissues, presenting diagnostic challenges due to diverse and unspecific symptoms. Efforts to improve diagnostic processes, such as the implementation of Danish Cancer Patient Pathways (CPP) in 2009, have shown promise in reducing sarcoma size and diagnostic time intervals. However, the direct impact of CPPs on sarcoma patient survival remains uncertain.
Aim: We aim to assess changes in overall survival between national cohorts of STS high-grade patients pre- and post-CPP implementation.
Materials and Methods: We included all patients above the age of 18 years in Denmark with biopsy confirmed diagnosis of high malignant STS (Trojani grade 2+3). Only patients with MR conform deep-seated sarcoma in the extremities or trunk wall, diagnoses from January 1, 2000, to December 31, 2016, were included. Patients diagnosed in the year 2009 were excluded due to different startup points with the implementation of CPP between the two sarcoma centers in Denmark, resulting in a pre-and post-CPP implementation cohort. Patients were followed until death or end of study (01-01-2024)Statistics: Kaplan Meir Survival analysis, log-rank test, and Mann– Whitney test.
Results: A total of 615 adult patients diagnosed with localized deep-seated high malignant STS in the extremities and trunk wall, were identified (Before 2009 (BF): n= 314, After 2009 (A): n=301). 306 patients died during the follow-up (BF: n= 138, A: n= 168). The 5-year overall survival rates were 44% (CI-95: 39-49%) and 59 % (CI-95: 50-61%) for respectively BF and A ($p< 0.001$). Median tumor size BF: 10 cm (0.5-30) and A: 9.5 cm (1-40), ($p=0.4$).
Interpretation / Conclusion: A statistically significant increased survival was observed after the implementation of CPP in patients with high malignant deep-seated STS. Despite prior studies indicating reduced tumor size with CPP, we have not been able to verify this finding.

129. Elevated cobalt levels in metal-on-polyethylene knee megaprostheses: a prospective 1-year cohort study of 56 patients with hip and knee megaprostheses

Sarah Stammose Freund[1], Andrea Pohly Jeppesen Thorn [2], Ajay Puri [3], Michael Mørk Petersen[2], Thomas Baad-Hansen [1]

1 Department of Orthopedic Oncology, Aarhus University Hospital, Denmark; 2 Department of Orthopedic Surgery, Rigshospitalet - University of Copenhagen, Denmark; 3 Surgical Oncology, Orthopedic Oncology, Tata Memorial Centre, HBNI, Mumbai.

Background: Concerns have emerged regarding elevated levels of cobalt and chromium in patients with metal-on-metal megaprostheses, however few studies on metal-on-polyethylene megaprostheses exists.

Aim: This prospective study aims to identify systemic cobalt and chromium levels in metal-on-polyethylene knee and hip megaprostheses and their associations with other factors.

Materials and Methods: 56 patients underwent knee or hip megaprosthesis surgery at 2 sarcoma centers. Serum cobalt and chromium levels were measured preoperatively and thrice within the first year using Inductively Coupled Plasma Mass Spectrometry.

Results: Following knee megaprosthesis surgery, there was a significant increase in serum cobalt levels (1.4 ppb; 95% CI 0.0–3.3) at 1-year compared to preoperative levels. Conversely, chromium levels in the same group showed no significant change after 1 year compared to preoperative levels (0.05 ppb; CI 0.0–0.8). Additionally, none of the other megaprostheses groups showed elevated cobalt or chromium over time. Associations were observed between younger age, higher eGFR, and elevated cobalt levels. However, no significant correlations were found between ion levels and resection length or the number of modular connections.

Interpretation / Conclusion: Our findings demonstrate elevated serum ion levels in metal-on-polyethylene knee megaprostheses, contrasting with metal-on- polyethylene hip megaprostheses. Furthermore, positive correlations between cobalt and chromium levels, as well as cobalt and eGFR, were noted, along with a negative correlation between cobalt and age, indicating that younger patients with higher activity levels and better eGFR tend to exhibit higher metal ion levels. Notably, contrary to previous suggestions by other authors, we did not observe any association between metal ion levels and resection length. This study highlights the importance of monitoring systemic cobalt and chromium levels in patients with knee megaprostheses.

130. Effect of repeated bolus and continuous doxorubicin administration on bone and soft tissue concentrations – a randomized tumour-free porcine model

Andrea René Jørgensen [1,2], Mats Bue[1,2,3], Pelle Hanberg [1,2], Christina Harlev[1,2], Elisabeth Krogsgaard Petersen[1,2], Rasmussen Hans Christian [1,2], Jakob Hansen [4], Thomas Baad-Hansen[2,3], Akmal Safwat [2,5], Maiken Stilling [1,2,3]

1. Aarhus Microdialysis Research Group, 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 Forensic Medicine, Aarhus University Hospital, Aarhus N, Denmark; 5. Department of Oncology, Aarhus University Hospital, Aarhus N, Denmark;

Background: Doxorubicin is a central part of many chemotherapeutic regimens, here amongst osteosarcoma. Despite being applied clinically for decades, very little is known about local tissue concentrations of doxorubicin as pharmacokinetic knowledge regarding dosing regimens are almost solely based on plasma concentrations.

Aim: The aim of this study was to evaluate plasma and bone- and soft-tissue concentrations of doxorubicin following two administrations of either bolus or continuous infusion administered at a three- week interval.

Materials and Methods: Eighteen female pigs were included in the study and randomized into two groups of nine. Based on mean body weight, animals received a doxorubicin dosage of 132 mg (2 mg/kg) on day 1 and a dosage of 150 mg on day 22, as either bolus or continuous infusion. From day 1 to 10, doxorubicin concentrations, as well as kidney and liver function, were monitored with plasma samples (total concentrations). On day 22, doxorubicin was measured in plasma samples (total concentration) and microdialysates (unbound concentrations) from subcutaneous tissue, muscle, synovial fluid of the knee joint, cancellous bone, and intravenously.

Results: On day 22, the pharmacokinetic profiles were comparable between the two groups except for plasma AUC0-12h, which was higher after continuous infusion, and intravenous Cmax, which was higher after bolus infusion. Bone- and soft tissue concentrations were below 0.10 ug/mL. With the exception of mean plasma (total) concentration after 6 h on day 1 and 22 in the continuous group which was higher after the first administration (p=0.037), no differences in plasma concentrations were found between the two administrations.

Interpretation / Conclusion: Low mean tissue doxorubicin concentrations and similar pharmacokinetic profiles were found between the bolus and continuous infusion groups. Thus, similar anti-neoplastic efficacy is to be expected with both administration types.

131. Injectable sustained local release doxorubicin depot technology – a promising adjuvant to systemic treatment?

Andrea René Jørgensen [1,2], Anders Elias Hansen [3], Jonas Rosager Henriksen [3], Maiken Stilling[1,2,4], Hans Christian Rasmussen[1,2], Johanne Gade Lilleøre[1,2], Magnus Andreas Hvistendahl[1,2], Josefine Slater[1,2], Elizabeth Serrano-Chávez[3], Jakob Hansen[5], Mats Bue[1,2,4]

1. Aarhus Denmark Microdialysis Research (ADMIRE), Orthopaedic Research Unit, Aarhus University Hospital, Aarhus N, Denmark; 2. Department of Clinical Medicine, Aarhus University, Aarhus N, Denmark; 3. Department of Health Technology, Section for Cell and Drug Technologies, Technical University of Denmark, Lyngby, Denmark; 4. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus N, Denmark; 5. Department of Forensic Medicine, Aarhus University Hospital, Aarhus N, Denmark.

Background: The local application of drug depot technologies releasing chemotherapeutics in cancerous tissues presents an interesting strategy for enhancing treatment outcome by increasing and sustaining high local chemotherapeutic concentrations.
Aim: This study aimed to assess the feasibility, delivery capacity, and therapeutic efficacy of a doxorubicin-loaded carbohydrate-ester- based (CarboCell) depot technology as a localized drug delivery system.
Materials and Methods: CarboCell was investigated in three experimental setups: A) Release kinetics were evaluated in mice (non-tumour model) 24 h and 48 h after a subcutaneous injection of depot. B) Efficacy in terms of tumour growth control and survival was evaluated in mice carrying large syngeneic CT 26 colorectal cancer. A volume of 50 µl CarboCell containing 1 mg/mL or 4 mg/mL doxorubicin was injected in the tumours twice at 5 days intervals. C) Local and distant release of doxorubicin CarboCell 2 mg/mL (2 mL or 4 mL) injected into tibial metaphysis was evaluated with microdialysis in nine tissue compartments in ten female pigs.
Results: A) Subcutaneous CarboCell depots displayed a continuous release of doxorubicin with 36±13% (mean±SEM) and 48±20% of the loaded dose being released at 24 h and 48 h time points. B) Intratumoral injection demonstrated robust tumour growth control and significantly prolonged median survival time compared to the control group. C) In the porcine model, irrespective of volume injected (2 or 4 ml), doxorubicin could be measured at least 10 mm from the application site in cancellous bone indicating a good metaphyseal distribution. The systemic spill-over was minimal, and only measurable in three out of ten animals.
Interpretation / Conclusion: Doxorubicin-loaded CarboCell proved easily administrable with maintained antitumoural activity and was able to provide much higher local doxorubicin concentrations when injected in metaphyseal bone compared traditional systemic administration. Importantly, minimal systemic spill-over was observed, supporting further exploration of efficacy and tolerability in combination therapies.

132. Physical function following megaprosthesis surgery in the lower limb - a prospective cohort study of 38 patients.

Sarah Stammose Freund[1], Michael Melchior Bendtsen[1], Bjarne Hauge Hansen[1], Henning Andersen[2], Thomas Baad-Hansen[1]

1 Department of Orthopedic Oncology, Aarhus University Hospital, Denmark; 2 Department of Neurology, Aarhus University Hospital, Denmark

Background: Limited knowledge exists on early outcomes post-megaprosthesis surgery. Yet, in counseling of patients understanding these outcomes is crucial.

Aim: This prospective study investigates physical function outcomes in lower limb megaprosthesis surgery patients, employing both objective and subjective measures, while also identifying their associations.

Materials and Methods: 38 patients underwent treatment with a proximal femur, distal femur, or proximal tibia megaprosthesis. Muscle strength tests, range of motion evaluations, the Timed Up and Go test, and the Musculoskeletal Tumor Society score were conducted at 4, 8, and 12-18 months post-surgery. Repeated measurements analysis was performed along with a comparison between treated limb, untreated limb, and predictive values.

Results: : Bilateral muscle strength reduction, especially in regions subjected to surgical intervention, was observed, with the proximal tibia group showing the most pronounced deficits. None of the groups exhibited statistically significant changes in strength over time. All groups had decreased joint flexion in the treated limb compared to the untreated limb 12-18 months post-surgery. Timed Up and Go performance improved in all groups but remained below average compared to reference values. An association was observed between a lower Timed Up and Go Test and higher Musculoskeletal Tumor Society scores, with the latter being lowest in the proximal tibia group.

Interpretation / Conclusion: The study provides data from comprehensive testing the first year following megaprosthesis surgeries providing knowledge in order to inform and guide patients. Markedly reduced strength in both treated and untreated limbs compared to predicted normal values was observed. The significant deficit in walking capabilities showed clear association to patients' reported outcomes.

133. Survival and local recurrence of patients with leiomyosarcoma in the extremities and trunk wall in Denmark from 2000 to 2016.

Ingrid Frederikke Gottlieb[1], Andrea Pohly Jeppesen Thorn [1], Thomas Baad-Hansen [2], Ninna Aggerholm-Pedersen[3], Michael Mørk Petersen[1],
1. Department of Orthopedic Surgery, Rigshospitalet, Copenhagen; 2. Department of Orthopedic Oncology, Aarhus University Hospital; 3. Department of Oncology, Aarhus University Hospital.

Background: Leiomyosarcomas are rare malignant tumors originating from mesenchymal cells, and these tumors can develop anywhere in the body from blood vessels or smooth muscle cells. The overall 5- year survival probability of patients with leiomyosarcomas in previously published larger European studies is around 60%.
Aim: In this study, we aimed to determine the survival and risk of local recurrence among patients treated for leiomyosarcomas in Denmark between 2000 and 2016.
Materials and Methods: The study involved a thorough analysis of patient data obtained through national databases. A total of 309 patients were initially registered with leiomyosarcoma. The patients were then screened based on the following exclusion criteria: treatment before the year 2000, age below 18 years, and a tumor localization other than either the extremities or trunk wall. The collected data were categorized and analyzed statistically using Kaplan-Meier estimation with calculation of the probability of 5- year survival with 95% confidence interval (CI- 95).
Results: 290 patients (female/male=115/175, median age(range) = 63(18-96) years) diagnosed with leiomyosarcoma were included in the study, and the 5-year overall survival probability was 67% (CI-95: 62-73%). 5-year survival was 81% (CI- 95: 71-90%) for tumors located in the upper extremities, 61% (CI-95: 53-69%) for lower extremities, and 67% (CI-95: 56-79%) for tumors in the trunk wall. Stratification by tumor grade revealed 5-year survival probabilities of 88% (CI-95: 81-96%) for grade 1, 81% for grade 2 (CI-95: 73-89%), and 46% (CI-95: 38-55%) for grade 3. 5-year survival was 80% (CI-95: 74-86%) and 43% (CI-95: 34- 52%) for tumor size below 5 cm and above 5 cm. A total of 52/290 (18%) of the patients experienced a local recurrence and their 5-year survival was 50% (CI-95: 36-64%) compared to 71% (CI-95: 65-76%) for those without local recurrence.
Interpretation / Conclusion: Our findings suggest that Danish patients exhibit survival probabilities consistent with the European standard. This indicates that the treatment of Danish patients with leiomyosarcoma is satisfactory.

134. Vascularized Fibular Grafting for Reconstruction After Tumor Resection in Denmark from 2009 to 2023

Christian L. Nielsen[1.], Daniel T. H. Dybdal[2.], Peter Vester-Glowinski[3.], Lisa Lyngsie Hjalgrim[2.], Henrik Hasle[4.], Birgitte J. Kiil[5.], Michael M. Bendtsen[1.], Michael M. Petersen[6.], Thomas Baad-Hansen[1.]

1. Department of Orthopedic Surgery, Aarhus University Hospital, Denmark 2. Department of Paediatrics and Adolescent Medicine, University Hospital Copenhagen, Denmark 3. Department of Plastic Surgery and Burns Treatment, University Hospital Copenhagen, Denmark 4. Department of Paediatrics and Adolescent Medicine, Aarhus University Hospital, Denmark 5. Department of Plastic and Breast Surgery, Aarhus University Hospital, Denmark. 6. Department of Orthopedic Surgery, University Hospital Copenhagen, Denmark

Background: Vascularized fibula grafting following tumor resection is an important component in limb salvage surgery.

Aim: The purpose of this study was to determine both surgical and oncological outcomes of patients treated in Denmark between 2009 and 2023.

Materials and Methods: We describe a retrospective review of 27 consecutively treated patients who underwent surgery between the 1st of January 2009 and the 1st of November 2023 at Aarhus and Copenhagen University Hospitals. Patients were identified from the national Danish Sarcoma Database. There were 12 cases of osteosarcoma, 13 cases of Ewing's sarcoma and 2 cases of Giant cell tumor. Mean age at the time of surgery was 15.1 years (range: 2.4-38.9). Mean follow-up was 74.8 months (range: 12-138). Patients were analyzed overall and stratified on basis of tumor location in an upper and a lower extremity group.

Results: During the follow-up period, 18 patients attained graft union (66.7 %) with a mean time to union of 13.9 months (range: 7-28.5). 6 patients developed nonunion (22.2 %) and 20 patients (74.1 %) had to undergo one or more reoperations in relation to the primary surgery. Patients in the upper extremity group were more likely to attain graft union (91.7 % vs. 46.7 %, RR=5.5, 95 % CI=1.3- 31.5, p=0.02) and less likely to undergo multiple reoperations (16.7 % vs 60 %, RR=0.3, 95 % CI:0.1-0.9, p=0.047) compared to patients in the lower extremity group. 6 patients died during follow-up. Five-year overall survival was 81.2 % (95 % CI: 60.5-91.7). 8 patients (29.6 %) experienced relapse with distant metastases. Among these patients, 5 also developed local recurrence (18.5 %). Mean time to metastasis was 10.3 months (range: 1-18) while mean time to local recurrence was 13.2 months (range: 7-17).

Interpretation / Conclusion: Biological reconstruction with VFG after tumor resection remains a reasonable option, despite the low rate of graft union and the need for multiple reoperations, particularly in lower extremity cases.

Session 17: Infection/amputation

15. November

12:45 - 13:45

Lokale: Sal C

Chair: Anne-Mette Sørensen & Jonas Andersen

135. Dynamic distribution of systemically administered antibiotics in orthopedically relevant target tissues and settings

Maria B. D. Nielsen[1, 2], Andrea R. Jørgensen[1, 2], Maiken Stilling[1, 2, 3], Mads K. D. Mikkelsen[1, 2], Nis P. Jørgensen[4], Mats Bue[1, 2, 3],

1. Department of Clinical Medicine, Aarhus University,; 2. Aarhus Denmark Microdialysis Research (ADMIRE), Orthopedic Research Laboratory, Aarhus University Hospital; 3. Department Of Orthopedic Surgery, Aarhus University Hospital; 4. Departments of Infectious Diseases, Aarhus University Hospital.

Background: Accurate antibiotic treatment is crucial for managing and preventing orthopedic infections due to their complexity and high risk of treatment failure. Previous reviews on antibiotic target tissue concentrations have primarily focused on static measurements, which may not accurately reflect the dynamic pharmacokinetic/pharmacodynamic (PK/PD) changes encountered in clinical settings.

Aim: This review aimed to comprehensively summarize the current literature on antibiotic distribution in orthopedically relevant tissues and settings using dynamic sampling.

Materials and Methods: Following PRISMA guidelines, a literature search was conducted with a scientific librarian's assistance. PubMed and Embase databases were systematically searched using relevant MeSH terms, entries, and keywords. English-published studies between 2004 and 2023 involving systemic antibiotic administration and dynamic measurements were included. 4467 titles were identified, with 676 duplicates. After title and abstract screening, 77 eligible studies remained.

Results: The studies covered clinical and pre-clinical studies on both healthy and infected tissue. Dynamic measurements were presented from various tissues including bone, intervertebral discs, joints, muscles, and subcutaneous tissue. Microdialysis was the predominant sampling method. Antibiotics like cefuroxime, linezolid, and vancomycin were extensively studied. Fluoroquinolones, tetracyclines, and most beta- lactams typically presented good tissue penetration in relation to relevant PK/PD- targets. In contrast, glycopeptides, macrolides, and flucloxacillin exhibited poorer penetration.

Interpretation / Conclusion: This review provides valuable insights of antibiotic distribution in orthopedically relevant target tissues and settings, which may help improve dosing recommendations and treatment outcomes. Our findings are limited to the investigated dosing regimens and administration methods and depend on the chosen PK/PD target. Many antibiotics still require further research to address the significant knowledge gaps, such as the lack of dynamic evaluations for certain antibiotic types and further investigation across various orthopedic settings and tissues.

136. Mortality after major lower extremity amputation and association with index level: Insights from Danish nationwide data

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, Odense University Hospital and University of Southern Denmark 4. Department of Orthopedics and Traumatology, University Medical Center Freiburg

Background: Mortality after major lower extremity amputations (MLEA) is high and many factors contribute when the initial amputation level is decided.
Aim: This study aimed to examine the mortality risk after major lower extremity amputation over time and based on level of amputation.
Materials and Methods: This observational cohort study used data from the Danish Nationwide Health registers. A total of 11,212 first-time MLEAs were included from January 1, 2010, to December 31, 2021, compromising of 3,923 transtibial amputations (TTA) and 7,289 transfemoral amputations (TFA).
Results: The mortality after TTA was 11.2 % (95% confidence interval (CI) 10.2-12.2) vs. 23 % (22.0-23.9) after TFA ≤30 days, 17.4 % (16.2-18.6) vs. 33.9 % (32.8- 35) ≤90 days, and 29.1 %(27.7-30.5) vs. 47.6% (46.4-48.7) at ≤1 year. The 30-day and 1-year mortality for TTA declined from 9.7 % and 30.9% in 2010 to 6.8 % and 20.5% in 2021. For TFA the 30-day and 1-year mortality declined from 27% and 54.8% in 2010 to 21.8% and 46.2% in 2021. When adjusting for age, sex and comorbidities the risk of mortality remain increased for TFA compared to TTA; HR 1.8 (1.7-2.1) ≤30 days, HR 1.8 CI (1.6- 1.9) ≤90 days and HR 1.6 (1.5-1.7) ≤1 year.
Interpretation / Conclusion: The mortality after a TFA (23%) was almost twice as high as after a TTA (11.2%) in the first month after amputation. We observed a declining mortality risk over a 12-year period following both TTA and TFA. Additionally, in adjusted analysis, the mortality risk remained higher after TFA compared to TTA, confirming that the TFA procedure as well as the indications to perform a TFA may be associated with increased mortality.

137. Length of stay and readmissions after major lower extremity amputation – A Danish nationwide registry study

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, Odense University Hospital and University of Southern Denmark 4. Department of Orthopedics and Traumatology, University Medical Center Freiburg

Background: Major lower extremity amputation (MLEA) is a high-risk intervention with significant implications for the patients' quality of life, as well as pre and post-operative healthcare resource utilization.

Aim: The aim of the study was to examine the length of hospital stay and risk of early readmissions after a major lower extremity amputation in Denmark.

Materials and Methods: This is an observational registry study with data from the Danish National Patient registry. We included first time MLEA patients ≥50 years with either a primary transtibial amputation (TTA) or transfemoral amputation (TFA). In total, 11,205 MLEAs were included, divided in 3,921 TTAs and 7,284 TFAs. The total length of stay (LOS) was defined as both pre- and postoperative nights. The first readmission ≤30 days and ≤90 day were reported and included for analysis if it resulted in ≥1 overnight stay at any department/hospital in Denmark.

Results: The median total LOS after a TTA was 19 days (Interquartile range, 11-30) vs. 13 days (8-22) after a TFA. The median total LOS for TTA decreased from 28 days (17-41) in 2010 to 14 days (9-23) in 2021. For TFA median total LOS decreased from 16 days (9-27) in 2010 to 11 days (7-18) in 2021. The 30 days post discharge readmission risk was 29.7% (95 % Confidence Interval 28.2- 31.4) % for TTA vs. 27.8% (26.6-28.1) for TFA, whereas the 90 days readmission risk was 44.6 % (42.0-46.3) for TTA vs 41.5 % (40.2-42.7) for TFA. The risk of readmission did not decrease during the study period for both procedures. Stump complications were the main course of readmission for both TTA (42%) and TFA (31 %).

Interpretation / Conclusion: We observed that MLEA surgery was associated with lengthy hospital admissions lasting 2-3 weeks and a high readmission risk (28-30%) within 30 days post-discharge. Although the length of hospital stay decreased over the study period, the risk of readmission remained consistently high. Our findings underscore the significant impact of MLEA patients on hospital resource consumption and highlight the need for improvement in perioperative patient pathways.

138. Readmission and mortality after Major Lower Limb Amputions, before and after implementation of the Safe Journey Program

Charlotte Abrahamsen[1,2], Inge Hansen-Bruun[2,3], Chelina Deleuran-Evers[1], Dorte Dall-Hansen[1], Ines Willerslev Jorgensen[1], Ane Simony[1,2]

1. Department of Orthopedics and Traumatology, Hospital Lillebelt, Kolding 2. Institute for Regional Health Services, University of Southern Denmark 3. Department for occupational and physiotherapy, Hospital Lillebelt, Kolding

Background: It is well known, that patients discharged after a Major Lower Extremity Amputations are in high risk for readmissions and that 1 year mortality is high. The patients are fragile and suffering from a variety of comorbidities like diabetes, arteriosclerosis, cardiovascular disease and the majority are receiving anticoagulation therapy. The Safe Journey Program was implemented at hospital Lillebelt in 2019, an integrated care program offering the patients to be followed home, by the hospital nurse, daily visits from the home care nurses the first week and additional visits from the acute team members for objective evaluation of the patient de first 2 weeks after discharge.
Aim: In this study we will explore the readmission rate and mortality, before and after implementation of the Safe Journey Program for Major Lower Extremity Amputation patients.
Materials and Methods: Medical charts from amputee patients was reviewed from 2015-2016 and compared to the data from the Safe Journey database. 142 patients was included in the study, and 81 patients received the Safe Journey intervention, in the study period. Patient demographics, amputation levels, comorbidities, readmission and mortality were evaluated and data was analyzed using STATA.
Results: 130 patients was discharged after a Major Lower Extremity Amputation from 2015-2016. 142 patients was discharged after a Major Lower Extremity Amputation from 2019-2021 and 81 of them received the Safe Journey Intervention. Patient demographics, including the indication for surgery was similar, from the 2 periods. The 30 days readmission rate before the program was 14% and during the program 16%. Mortality rates was also found to be similar.
Interpretation / Conclusion: Patients discharged after a Major Lower Extremity Amputation are complex patients, with a high need observation. Implementing the Safe Journey program at discharge was costly, but beneficial to the patients, on a psychological level. The program was unable to reduce the 30-day readmissions rate and reduce mortality, compared to a data-set from 2015.

139. Analgesics consumption increases after major lower extremity amputation

Jeppe Marinus Mortensen[1, 2], Anna Trier Heiberg Brix[1, 2], Kristine Bollerup Arndt[3], Tine Nymark[1, 2], 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. Department of Orthopedic Surgery, Kolding Hospital

Background: Major lower extremity amputations (MLEA) in Denmark are often performed with the indication of ischemic pain relief.
Aim: This study aims to investigate analgesic consumption before and after MLEA and identify predictors for postoperative long- term opioid use.
Materials and Methods: Data from the Danish National Patient registry was used to identify 7,069 first-time MLEA patients ≥50 years, divided in 3,120 below knee amputations (BKA) and 3,949 above knee amputations (AKA). The patient had to be alive 1 year post-operatively to be included. Prescription reimbursement data served as a surrogate marker for analgesic consumption, and patients with one or more redeemed prescription of opioids in all quarters post-surgery were defined as long- term opioid users. Patients who did not have a long-term use pre-surgery, but a long-term use post-surgery were defined as new long-term users.
Results: The amount of long-term opioid users increased after MLEA. In the year prior to surgery, 17.0% of the BKAs and 22.8% of the AKAs were long-term opioid users compared to 23.7% and 32.6% postoperatively. The use of analgesics for nerve pain also increased in the first two quarters after surgery. 23.1% of the BKAs and 31.2% of the AKAs used nerve pain analgesics before surgery compared to 45.6% and 57.6% postoperatively. The use of the other analgesics was stable for both groups before and after surgery. 13.2% and 18.4% became new long-term opioid users after BKA and AKA, respectively. Risk factors for postoperative new long-term opioid use were index AKA surgery Odds ratio (OR) 1.6 CI(1.4; 1.7), female sex 1.7 (1.6; 1.9), or a Charlson Comorbidity Index score ≥3 1.3 (1.2; 1.5).
Interpretation / Conclusion: An increased number of long-term opioid users was observed in the year following MLEA and over 50 % reimbursed prescriptions for nerve pain postoperatively. Risk factors for becoming a new long-term opioid user after MLEA was initial AKA, female sex, and a Charlson Comorbidity Index score of 3 or more. This indicates that analgesics consumption increases rather than declines after MLEA, and should be considered, when possible, in a shared decision-making process prior to amputation.

140. One-year mortality following Necrotizing Soft Tissue Infections

Lauritz Walsøe[1], Rehne Lessmann Hansen[1], Anette Marianne Fedder[2], Mikala Wang[3], Per Hviid Gundtoft[1]

1. Department of Orthopaedics, Aarhus University Hospital 2. Emergency Medicine, Aarhus University Hospital, Denmark 3. Department of Clinical Microbiology, Aarhus University Hospital, Denmark

Background: Necrotizing Soft Tissue Infections (NSTI) are rapidly progressing infections with high mortality. Patients with NSTI undergo multiple surgeries and are often discharged in a weakened state.
Aim: To estimate the one-year mortality of NSTI.
Materials and Methods: In this retrospective study, we used data from the Aarhus University Hospital NSTI database, where all inpatients with NSTI are recorded. A NSTI diagnosis is always made by a consultant at the hospital, and the diagnoses in the database have been validated through a review of the medical record. To identify the one-year mortality we used data from medical records, which is linked to the Danish Civil Registration System. Furthermore, clinical, laboratory, and surgical data were collected and analysed using the electronic medical record.
Results: A total of 130 patients (77 men and 53 women) with a mean age of 59 were included. 32 of the patients had uncomplicated diabetes and 9 patients had diabetes with complications. The in-hospital mortality was 17% (n=22), which increased to 19.2% (n=25) after 3 months and the 1-year mortality at 23.1% (n=30). When surgery included amputation, we found an increased in-hospital mortality of 40% at 3 months and 50% at 1 year. Patients infected with Group A Streptococcal (GAS) were grouped into two groups depending on Intravenous Immunoglobulin G (IVIG) treatment: IVIG treated patients (n=14) had an in-hospital mortality of 14% and no additional deaths after one year, whereas patients not treated with IVIG (n=21) had a higher mortality of 19% (n=4), which increased to 29% n(=6) after one year. The bacteria most prevalent were GAS and anaerobes (Bacteroides spp., Fusobacterium spp., Prevotella spp. and Peptostreptococci).
Interpretation / Conclusion: We found a high in-hospital mortality, which increased by 6% at 1-year follow-up. Diabetes was a high-risk factor for in-hospital and 1-year mortality. IVIG treatment was a protective factor for in-hospital mortality and 1-year mortality if NSTI with GAS was identified. Amputation was a major risk factor for in-hospital death and 1- year mortality.

141. Long-term Dalbavancin Concentrations in Target Tissues Relevant for PJI Treatment: A 5-week Experimental Porcine Setup Utilizing Microdialysis

Johanne Gade Lilleøre[1,2,3], Andrea René Jørgensen[1,2,3], Mads K. D. Mikkelsen[1,2,3], Elisabeth Krogsgaard Petersen[1,4], Hans Christian Rasmussen[1,2], Slater Josefine[1,2,3], Alex Soriano[1,5], Maiken Stilling[1,2,3], Nis Pedersen Jørgensen[1,3,6], Mats Bue[1,2,3]

1. Aarhus Denmark Microdialysis Research Group (ADMIRE), Aarhus University Hospital, Aarhus N, Denmark 2. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark 3. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark 4. Department of Internal Medicine, Gødstrup Hospital, Herning, Denmark 5. Department of Infectious Diseases, Hospital Clínic of Barcelona, University of Barcelona, Barcelona, Spain 6. Department of Infectious Diseases, Aarhus University Hospital, Aarhus, Denmark

Background: Gram-positive bacteria remain the primary aetiology of prosthetic joint infections (PJI). Dalbavancin may be a valuable future antibiotic for treating PJI due to its uniquely long half-life and bactericidal activity against most Gram-positive bacteria, including methicillin-resistant Staphylococcus aureus (MRSA). Currently, no long-term target tissue pharmacokinetic data exists for PJI treatment settings.

Aim: We aimed to investigate dalbavancin concentrations in a 5-week setup in tibial cancellous and cortical bone, subcutaneous tissue, and synovial fluid of the knee joint in pigs using microdialysis.

Materials and Methods: 21 female pigs (Danish landrace, weight 72-95 kg) were included. A bolus of 1.5 g of dalbavancin was administered intravenously over 30 minutes on day 1 and day 8. In groups of 3, the pigs were allocated to surgery on days 1, 3, 5, 7, 10, 26, and 35 followed by euthanasia. Microdialysis catheters were placed to sample dalbavancin concentrations in tibial cancellous and cortical bone, subcutaneous tissue, and synovial fluid of the knee joint. Microdialysis samples were obtained for 4 hours, and blood samples were taken for reference.

Results: All pigs completed the study. The full data-set analysis is incomplete upon the abstract deadline. Data based on the 5-week protocol in relation to dalbavancin minimal inhibitory concentrations (MIC) for three strains of Staphylococcus aureus: 0.03 µg/mL (low), 0.06 µg/mL (intermediary), and 0.125 µg/mL (high) will be presented at the conference.

Interpretation / Conclusion: This study is the first to establish dalbavancin concentrations measured over a 5 week period. This much-needed insight can potentially guide and optimize future gram-positive PJI treatment regimens.

Session 18: Foot/ankle

15. November

12:45 - 13:45

Lokale: Skovbrynet

Chair: Louise Lau Simonsen & Kristian Behrndtz

142. "Wide Awake Local Anesthetic No Tourniquet" used in forefoot surgery: Patient-reported pain and anxiety during administration, surgery and post-surgery.

Ane Linde[1], Niels Frederik Breum Jakobsen[1], Torben Bæk Hansen[1,2]
1. University Clinic for Hand, Hip and Knee Surgery. Department of Orthopedics, Regional Hospital Gødstrup 2. Department of Clinical Medicine, Aarhus University

Background: Wide Awake Local Anesthetic No Tourniquet (WALANT) is used as a local anesthetic procedure in hand surgery with high satisfaction rates and is now considered as a safe and effective surgeon- based anesthesia. The procedure is less invasive than regional block or general anesthesia (GA) and there is no need for a tourniquet, reducing postoperative pain, hospital stay and economical costs.
Aim: As most publications have been based on hand surgical procedures, the aim of this study was to test the feasibility of WALANT as an anesthetic procedure during forefoot surgery.
Materials and Methods: Ten patients scheduled for cheilectomy of the first metatarso-phalangeal joint were enrolled into this pilot study. All had normal sensation and palpable foot pulses. WALANT is a mixture of lidocain with adrenalin, bicarbonate, NaCl, and ropivacain. 35-40ml was administrated to the forefoot as a combination of a nerve block to the first ray and infiltration of the incision site. The patients rated their highest perceived pain and anxiety on a Numeric Rating Scale (NRS 0- 10) during administration of WALANT, during surgery and one hour post-surgery. For comparison, five patients scheduled for forefoot surgery in regional Saphenous block, rated their highest perceived pain and anxiety during administration.
Results: The mean (range) NRS pain-score was 3,2 (1-7) during administration, 0,3 (0-1) during surgery and 0,1 (0-1) post-surgery. The mean anxiety-score was 0,8 (0-5) during administration, 1,0 (0-5) during surgery and 0 post-surgery. None of the patients were converted to GA or required additional local anesthesia. There was no need to apply a tourniquet. The five regional block patients had a mean (range) pain-score of 5,6 (4-8) and mean anxiety-score of 2,0 (0-8)during administration.
Interpretation / Conclusion: This pilot study suggests that WALANT is a reliable anesthesia, well tolerated in cheilectomies, with low patient-reported pain and anxiety. Further studies may expand its suitability in other forefoot surgeries, like hallux valgus surgery.

143. Feasibility of rehabiliation following total ankle arthroplasty

Louise Mortensen[1], Gustav Færch Ussing[1], Kristian Henrik Brink Behrndtz[2], Nanna Rolving[1],
1, Department of Physiotherapy and Occupational Therapy, Aarhus University Hospital, Denmark 2, Department of Orthopedic Surgery, Aarhus University Hospital, Denmark

Background: Ankle injuries increases the risk of ankle joint arthritis (AJA), and 70-90% of AJA is post-traumatic. One treatment of AJA is total ankle arthroplasty (TAA), preserving some range of motion in the ankle. The use of TAA has risen, but postoperative treatment and rehabilitation varies nationally and internationally.
Aim: Evaluate stepwise TAA rehabilitation program and explore the patients' self-reported physical function, symptoms and objectively measured functional capacity three and six months after TAA.
Materials and Methods: A single-group feasibility study at Aarhus University Hospital with AJA patients undergoing TAA. Rehabilitation started six weeks post-surgery, lasting 18 weeks. Patients' satisfaction was evaluated with two anchor questions, scored on a 5-point Likert Scale. Compliance and pain responses were evaluated through an exercise diary. Furthermore, patients answered three patient- reported questionnaires; The European Foot and Ankle Society(EFAS), the American Orthopedic Foot and Ankle Society(AOFAS) and the Visual Analog Scale(VAS) and went through the functional tests; 30-second sit to stand, 2 minute-walking test and 11 step stair test before surgery(baseline), three and six months post-surgery.
Results: 17 of 18 patients participated, 15 completed the rehabilitation program and follow-up. Preliminary analysis of 13 patients show high satisfaction and compliance with no adverse events related to the rehabilitation. The EFAS score improved from (mean (SD)) 15.9 (4.8) to 25.1 (6.9) from baseline to three months' follow-up, the AOFAS improved from 56.3 (16.3) to 72.3 (14.3), VAS decreased from 67.6 (21.0) to 33.9 (22.8), and patients continued to improve at six months. All functional outcome measures improved from baseline to three months' follow-up, except 2- minute walking test, but at six months' follow-up all tests had improved.
Interpretation / Conclusion: A two phase stepwise rehabilitation program is feasible in patients with a TAA. Early results (< one year) of patient-reported outcomes and functional capacity after TAA have not been reported before. These results show that patients with a TAA can expect great improvements 6 months after surgery.

144. Time trends in incidence and treatment of ankle fractures in Denmark from 1997 to 2018: A national population-based cohort study

Per Gundtoft[1], Alma Becic Pedersen[2,3], Bjarke Viberg[4, 5]
1: Orthopedic Department, Aarhus University Hospital 2: Department of Clinical Epidemiology, Aarhus University Hospital 3: Department of Clinical Medicin, Aarhus University 4: Department of Orthopaedic Surgery and Traumatology, Odense University Hospital 5: Department of Clinical Research, University of Southern Denmark

Background: Previous studies showed large variation in the incidence of ankle fractures as they are often based on single center or regional data alone. A nationwide data are necessary to gain knowledge of the current trends and burden on the health care system.
Aim: To assess the incidence of ankle fractures in Denmark, overall and by age and sex during 1997-2018.
Materials and Methods: Ankle fractures in patients >18 years old were identified in the Danish National Patient Register using the diagnosis codes S82.5, S82.6, S82.7A, S82.7B, S82.8B, and S82.8D. Surgical treatment of ankle fracture was identified using surgical procedure codes for plate (KNHJ6*), screws alone (KNHJ7*), nail (KNHJ5*), wire, rod, cerclage or pin (KNHJ4*), external fixation (KNHJ2*) and other. The positive predictive value of the ankle fracture diagnosis code is 0.89 and for surgical procedure code it is 0.82. Incidence rates per 100,000 and Incidence Rate Ratio (IRR) are reported with 95% confidence interval.
Results: We identified 155,740 ankle fractures, with the lateral malleolus fractures as most common (71%). The overall mean incidence rate during 1997-2018 was 164 [163; 165] per 100,000, 154 [152; 155] for men and 203 [202; 205] for women. The incidence rate increased from 155 [131; 179] during 1997-2006 to 173 [147; 199] during 2007-2018, corresponding to an IRR of 1.12 [1.10; 1.12]. Thiis increase was primarily driven by the incidence increase for women, with an IRR of 1.21 [1.20; 1.23] and for patients above 50, with an IRR of 1.22 [1.08-1.10). The proportion of patients surgically treated increased from 21% in 1997-2006 to 25% in 2007-2018, and most common surgical treatment used were plates.
Interpretation / Conclusion: The incidence of ankle fracture increased over the study period. The increasing incidence was primarily due to an increased incidence in women and in the elder population. Therefore, a greater burden to the health care system can be expected in the future, especially as more patients are treated surgically in the later years.

145. The challenges of physical activity in the presence of a diabetic foot ulcer; a search for evidence-based guidance

Birgit Rasmussen[1,2], Lisbeth Uhrenfeldt[1,2]
1. Department of Orthopaedic Surgery, Lillebaelt Hospital, Kolding 2. Department of Regional Health Research, Southern Danish University;

Background: For patients with a diabetic foot ulcer (DFU) off-loading regimens are key to promoting healing. Inactivity as a direct consequence of the treatment is a challenge for the health and well-being of all, however, especially for diabetic patients. With treatment lasting for months and even years, loss of physical capacity and functioning and individual suffering can be the result. With appropriate off-loading some physical activity seems to be acceptable; however the positive outcome from physical activity in the presence of a DFU received little attention in research.
Aim: The aim is to explore the derived positive meaning of physical activity in patients with imposed mobility restrictions due to a DFU and to offer new evidence-based guidelines for patient treatment.
Materials and Methods: Based on the Joanna Briggs Institute guiding framework, we conducted two comprehensive, systematic reviews. Search terms were related to 1) patients with DFU being imposed limitations on their mobility and 2) changes in physical activity, wound size, physical fitness and functioning, and experiences of well-being. We searched MEDLINE, Embase, and CINAHL for all types of studies.
Results: After screening of 2886 studies, 11 studies were included. Screening of reference lists yielded two additional studies. Of the 13 included studies, 11 were quantitative, one was qualitative, and one was a case report study. A major focus is on training and healing of the wound. In that context, training is safe, and muscle function seems to improve. Patients' own and preferred physical activity and their well-being in daily life are poorly understood. Five systematic reviews gave rise to the construct of an umbrella review, the highest level of evidence to guide practice, concerning how and why physical activity interventions work and how they are experienced by the patients.
Interpretation / Conclusion: Findings from the study raised knowledge gaps. Training is a possibility and can support the healing of DFU. However, research is still lacking that provides evidence for giving patients evidence-based restrictions in, or specific directions for their choices of physical activity adding well-being to their daily life.

146. Wound complications and risk factors following calcaneal fracture surgery using sinus tarsi approach - A multicenter study

Bjarke Viberg[1], Louis Domino Borbye[1], Morten Schultz Larsen[1], Upender Martin Singh[2], Marianne Lind[2], Jeannette Østergaard Penny[3], Lauritz Walsøe[4], Per Hviid Gundtoft[4]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital; 2. Department of Orthopaedic Surgery and Traumatology, Righospitalet; 3. Department of Orthopaedic Surgery and Traumatology, Zealand University Hospital; 4. Department of Orthopaedic Surgery and Traumatology, Aarhus University Hospital.

Background: Surgical treatment calcaneal fractures (CF) are often associated with a high complication rate but the relatively new Sinus Tarsi Approach (STA) have lower risk of complications. However, even though the STA have a lower risk of complications, wound complications are still a concern.

Aim: The aim was to assess risk factors for wound complication after surgical treatment of CF with STA or similar minimal invasive approach.

Materials and Methods: This multicenter retrospective study identified patients through the administrative databases of four hospitals (Aarhus, Køge, Odense, Rigshospitalet) treating CF in the period of July 2018-June 2022 with one-year of follow up using the diagnosis code S920. The electronic medical records of all identified patients were reviewed for relevant data including wound complications and CT-scans were assessed by experienced traumatologists. Patient with ELA (n=10), tongue-type fracture (n=13) and missing data on wound assessment (n=2) were excluded.

Results: The final cohort consisted of 148 CF (143 patients), median age was 50 (range 11-78), 72% were male, and 36% had good health (ASA group 1). Of the 148 CF, 13 (9%) had postoperative wound complications, however 12 were treated non-operatively (4 without antibiotics) and 1 was treated operatively for deep infection. There following factors were associated with a higher risk for wound complications: open fracture (p=0.032), psychiatric disorder (p=0.012), and other injuries (p=0.021). There was a tendency for more severe fractures (p=0.063), type of implant (p=0.054), and heart disease (p=0.079). Non-significant risk factors were age, sex, ASA score, cohabitation, smoking, alcohol, substance abuse, diabetes, dementia, trauma mechanism, and time to surgery.

Interpretation / Conclusion: There were 9% with postoperative wound complications but only 6% needed antibiotics or surgery. There were a higher proportion in patients with open fractures and patients with psychiatric disease or had sustained other injury. A differentiated, preventive wound care regime based on patient and fracture characteristics might benefit patients with CF in the future.

147. Pathologies in Children's Feet. A cross-sectional evaluation of foot pathologies across age.

Søren Bødtker[1], Camilla Hedegaard Larsen[2], Andreas Balslev-Clausen[3], Lisa Bomark[4], Christian Wong[5]
1;2; 3; 5; Dep. Orthopedic Surgery, University Hospital Rigshospitalet 4; The Association of Danish Podiatrists. Denmark

Background: Caregivers often seek medical assistance when their child experiences podiatric ailments. Podiatric diseases such as ingrown toenails, callosities, warts, metatarsus varus and hallux valgus frequently occur in children and adolescents. However, treatment, prevention and rehabilitation are often based on empirical experiences, thus as a first endeavour clinical, epidemiological mapping of podiatric diseases in children's feet is warranted. In this study, we set out to describe the prevalence of foot pathologies among Danish school children at different ages.
Aim: We want to describe the physiological conditions and the occurrence of foot diseases among Danish schoolchildren of different ages.
Materials and Methods: In this cross-sectional study, we evaluated children's feet for podiatric diseases. The clinical status of the feet was examined by teams consisting of two podiatrists each. Specifically, we evaluated deformities of the foot, foot pathologies and their anatomical localization
Results: We evaluated 501 children (1002 extremities). Four hundred and seventeen children had one or more of the investigated foot deformities or pathologies. We found a total of 266 various foot pathologies among the Danish schoolchildren. Callosities and metatarsus varus were the most frequently occurring foot conditions detected in 54% and 46% of Danish children, respectively. The prevalence of foot pathologies of ingrown toenails and warts was 14 and 12 percent, respectively. The mean hallux valgus angle was 3.7° (SD: 4.8), 5.6° (SD: 5.4) and 7.4° (SD: 5.5) in first, fifth and ninth grade, respectively. The prevalence of callosities, ingrown toenails, metatarsus, and hallux valgus increased with age.
Interpretation / Conclusion: In conclusion, this study has shown that foot pathologies such as warts and ingrown toenails. Conditions such as Metatarsus varus and callosities are common in Danish primary school children. Our findings of high prevalences of foot pathologies and conditions motivate future research projects to clarify how this impacts general health and subsequently the relation to pain, health challenges, socioeconomics, and quality of life.

148. Patient-reported outcome following surgical treated ankle fractures not influenced by comorbidities - A cross-sectional study of 122 patient with 5-year follow-up

Christian Grundtvig Refstrup Rasmussen[1], Peter Larsen[2], Christian Pedersen[1], Rasmus Elsoe[1]
1. Department of Orthopaedics, Aalborg University Hospital 2. Department of Psyiotheraoy, Aalborg University Hospital

Background: Ankle fractures are common injuries, 25-30 % of patients are surgically treated. The patients show a bi-modal distribution, with peaks in younger individuals and older women. Consequently the patients characteristics are heterogenous. The current literature is inconclusive on the possible associations between patient characteristics & comorbidities and patient reported outcome.
Aim: The aim of this cross-sectional study was to investigate the basic characteristics and comorbidities of patients with surgically treated ankle fractures and the associations to patient reported outcomes.
Materials and Methods: This study was a retrospective cross-sectional study including basic characteristics of surgically treated ankle fractures. Patient-reported outcome was derived by an online survey performed 5-6 years following surgery. All adult Danish patients treated surgically for an ankle fracture during 2017-2018 in the North Denmark Region were identified and their basic characteristics, fracture classification and treatment were described. Furthermore their level of comorbidities was established using the Charlson Comobidity Score (CCS) based on electronical medical records. Finally they were invited, via E-boks, to complete the Foot and Ankle Outcome Score (FAOS).
Results: We identified 280 adult Danish patients, with a mean age of 54.2 years (18-96). Ninety percent of the patients had a CCS of 0, 1 or 2. Among the 280 patients 122 completed the FAOS (38 did not have E-boks, 120 did not respond after two invitations). The age distribution and fracture classification were similar between FAOS responders and non-responders. The proportion of non-responding males is markedly larger. The 122 patients reported mean FAOS subscales scores, pain 77.0 (95% CI 3-100); symptoms 67.4 (95% CI 5-100); Activities of daily living 80.1 (95% CI 0-100); Sports & recreation 57.7 (95% CI 0-100) and quality of life 61.2 (95% CI 0-100). Using a one-way ANOVA analysis the differences in comorbidities did not explain the differences in patient reported outcome.
Interpretation / Conclusion: We did not find an association between comorbidities and patient reported outcome in patients who were surgically treated for an ankle fracture.

POSTERS

13 NOVEMBER 2024

17:00-18:00

Poster Walk 1: Hip and Knee Arthroplasty 1

Poster Walk 2: Hip and Knee Arthroplasty 2

Poster Walk 3: Infection/Amputation and Experimental

Poster Walk 4: Upper Extremity

Poster Walk 5: Paediatric Orthopaedics

Poster Walk 6: Sports Orthopaedics

Poster Walk 7: Trauma

Poster Walk 8: Spine and Tumor

Poster Walk 1:

Hip and Knee Arthroplasty 1

Chair: Ann Ganestam & Christian Skovgaard Nielsen

165. Cross-cultural validation of the Oxford Hip and Knee Scores in patients undergoing hip and knee replacement

Lina Holm Ingelsrud[1], Shiraz A. Sabah[2], Eric Bohm[3], Karl Bang Christensen[4], Anders Troelsen[1,5], Andrew J. Price[2], Anneke Spekenbrink-Spooren[6], Anne Lubbeke[7], Christoph Barea[7], Jasper Most[8], Conrad Harrison[2], J. Mark Wilkinson[9]

1 Department of Orthopaedic Surgery, Copenhagen University Hospital – Hvidovre, Denmark 2 University of Oxford, United Kingdom 3 University of Manitoba, Canada 4 Department of Public Health, University of Copenhagen, Denmark 5 Department of Clinical Medicine, University of Copenhagen, Denmark 6 Dutch Arthroplasty Register (LROI), The Netherlands 7 Geneva University Hospitals, University of Geneva, Switzerland 8 Zuyderland Medical Center, Sittard-Geleen, The Netherlands 9 University of Sheffield, United Kingdom

Background: The cross-cultural validity of the Oxford hip score (OHS) and Oxford knee score (OKS) across different language versions is not known.

Aim: To evaluate the cross-cultural validity of the English, Dutch, Danish and French OHS and OKS in patients undergoing hip and knee replacement.

Materials and Methods: Patients undergoing primary hip or knee replacement for osteoarthritis between 2019 to 2022 answering OHS or OKS preoperatively and at 6 or 12 months postoperatively were included from the United Kingdom National Joint Registry (English), the Dutch Arthroplasty Register (LROI) (Dutch), the Copenhagen University Hospital Hvidovre's local arthroplasty database (Danish), and the Swiss Geneva Arthroplasty Registry (French). Analyses were performed separately for each registry dataset. Unidimensionality of the constructs was evaluated with confirmatory factor analysis (CFA), with root mean square error of approximation (RMSEA) <0.06, Standardized Root Mean Square Residual (SRMR) ≤0.08, Comparative Fit Index (CFI) >0.95, and Tucker-Lewis Index (TLI) >0.95. Monotonicity was indicated by Loevinger's H coefficient >0.3 and item local independence with the Yen Q3 residual correlations <0.2.

Results: The mean age ranged from 67 to 71 years, female proportion from 54% to 63%, mean BMI from 27 to 30, and proportions with ASA score ≥3 from 17% to 29%, across hip and knee cohorts where English (n=21,108 and 28,230), Dutch (n=36,792 and 29,651), Danish (n=815 and 1,015) and French (n=590 and 459) instruments were utilised. Preoperative mean OHS ranged from 18 to 23 and OKS from 19 to 24. For the OHS, RMSEA ranged from 0.072 to 0.092. For OKS, RMSEA ranged from 0.057 to 0.061. For both OHS and OKS, SRMR, CFI and TLI were acceptable in all languages. Monotonicity was indicated for all items besides Night pain in the Dutch and Danish OKS. Item independence was confirmed for all items besides OHS Dressing and Washing in the Dutch and Danish versions and Sudden pain and Night pain in the Danish version.

Interpretation / Conclusion: Structural validity of the English, Dutch, Danish and French versions of the OHS and OKS was acceptable. Further analyses will inspect measurement invariance across languages.

191. Development and Field-Testing of In-Consult Patient Decision Aids for Hip and Knee Osteoarthritis: A Collaborative Approach

Trine Pedersen Ahlmann [1,2], Charlotte Jensen Myhre[3,4], Martin Lidberg-Larsen[3,4], Claus Varnum[1,2], Karina Steffensen Dahl[2,5]

1 Department of Orthopaedic Surgery, Lillebaelt Hospital, University Hospital of Southern Denmark, Vejle, Denmark 2 Department of Regional Health Research, University of Southern Denmark, Odense, Denmark 3 Orthopaedic Research Unit, Clinical Institute, University of Southern Denmark, Denmark 4 Department of Orthopaedic Surgery, Odense University Hospital, Odense, Denmark. 5 Center for Shared Decision Making, Lillebaelt Hospital, University Hospital of Southern Denmark, Vejle, Denmark

Background: Severe osteoarthritis (OA) affecting the hip or knee commonly results in joint arthroplasty, with notable rates of dissatisfaction post-surgery (7% for total hip arthroplasty and 11-18% for total knee arthroplasty). This points at the importance of well-informed decision-making in treatment decisions, highlighting the necessity for patients to understand various options. While shared decision-making (SDM) and patient decision aids (PtDA) are recognized as beneficial tools in consultations, their use in OA consultations remains limited.

Aim: This study aims to develop and field-test an in- consult PtDA tailored for patients with hip or knee OA.

Materials and Methods: Following the International Patient Decision Aid Standards, we conducted an iterative PtDA development process. This involved a systematic literature search, fifteen field observations, two focus group discussions with patients (n=11) and relatives (n=4), and two discussions with orthopaedic surgeons (n=12). Alpha testing was carried out with orthopaedic surgeons (n=12) and newly recruited patients with hip or knee OA (n=15) to assess acceptability and usability.

Results: Field observations and focus group discussions provided valuable insights into the consultation process and dynamics of shared decision- making. Patients emphasized themes such as weighing treatment options, considering quality of life and the pivotal role of the patient-surgeon relationship. In contrast, surgeons expressed scepticism and apprehensions about PtDAs, focusing on concerns about individual practices, information-sharing and potential imbalances in decision-making responsibilities. Patients and surgeons expressed a preference for joint-specific PtDAs leading to the development of distinct editions tailored for hip and knee OA patients. Both patients and surgeons found the PtDAs acceptable and useful in the decision-making process.

Interpretation / Conclusion: Two in-consult PtDAs tailored for severe OA in the hip or knee were successfully developed and tested. They were found to be useful and acceptable by both patients and surgeons, underscoring their potential to enhance the decision-making process for OA treatment.

151. Starting up a medial unicompartmental knee arthroplasty practice – a prospective cohort study of 200 knees.

Annika Gottholt Hansen[1], Kristina Ifigenia Bunyoz[1], Cecilie Henkel[1], Mette Mikkelsen[1], Kirill Gromov[1], Anders Troelsen[1]

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

Background: Medial unicompartmental knee arthroplasty (mUKA) has for many surgeons become the treatment of choice in patients with anteromedial osteoarthritis (AMOA) of the knee. Despite the widespread use of mUKA, data on outcomes during the adoption phase are scarce.

Aim: To investigate the learning curve and the clinical and radiological outcome during the implementation of mUKA by 2 knee arthroplasty surgeons.

Materials and Methods: The first 200 mUKA (uncemeted, mobile bearing, microplasty instrumentation) performed by two arthroplasty surgeons, were evaluated to determine whether there was an association between outcomes and the cumulative number of cases performed. The primary outcome was the learning curve of surgery duration. The secondary outcomes were patient reported outcomes (PROMs), including the Oxford Knee Score (OKS), Forgotten Joint Score (FJS), and Activity & Participation Questionnaire (APQ), evaluated at 3, 12, and 24 months postoperatively, the survival rate and implant positioning. The learning curve was estimated using the cumulative summation analysis (CUSUM).

Results: The mean follow-up was 5.8 ± 1.1 years and the mean age at the time of surgery was 64.9 ± 10.4 years. The CUSUM curve reveals a learning curve in surgery duration, with a turning point at the 55th patient, after which the operation duration decreases. Postoperatively PROMs remained consistently good with minimal fluctuation across the initial 200 cases. The median OKS at 12- and 24-months post-surgery was 41 and 43. The implant survival rate was 97.5% at 5 years, with 6 re-operations (3.0%) and 8 revisions (4.0%). Radiographic assessments in the coronal plan revealed 86.5% of patients had tibial placement within 5 degrees of neutral position. No patient exhibited a tibial overhang > 2 mm.

Interpretation / Conclusion: The implementation of medial UKA appears to be safe and efficient, with no compromise in PROM outcomes. Surgical duration decreased after 55 cases, and surgical precision appeared high already in the early phase of adoption.

156. Factors associated with undergoing knee arthroplasty– a two-year prospective cohort study of patients with knee osteoarthritis consulting an orthopaedic surgeon

Lina Holm Ingelsrud[1], Søren T Skou[2,3], Anne Møller[4], Thomas Bandholm[1,5,6,7], Henrik M Schrøder[8,9], Simon M Bruhn[1], Jakob Kjellberg[10], Anders Troelsen[1,7]

1. Department of Orthopaedic Surgery, Copenhagen University Hospital – Hvidovre, Denmark; 2. Research Unit for Musculoskeletal Function and Physiotherapy, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark; 3. The Research and Implementation Unit PROgrez, Department of Physiotherapy and Occupational Therapy, Næstved-Slagelse-Ringsted Hospitals, Region Zealand, Denmark; 4. Center for Research and Education in General Practice, Department of Public Health, University of Copenhagen, Copenhagen, Denmark; 5. Physical Medicine & Rehabilitation Research Copenhagen (PMR-C), Department of Physical and Occupational Therapy, Copenhagen University Hospital - Hvidovre, Denmark, 6. Department of Clinical Research, Copenhagen University Hospital - Hvidovre, Denmark; 7. Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark; 8. Department of Regional Health Research, University of Southern Denmark, Odense, Denmark; 9. Department of Orthopaedic Surgery, Næstved-Slagelse-Ringsted Hospitals, Region Zealand, Denmark; 10. The Danish Center for Social Science Research (VIVE), Copenhagen, Denmark

Background: Patients encounter diverse treatments for knee osteoarthritis (OA) before undergoing knee arthroplasty.

Aim: To describe 1) the proportions of patients with knee OA who undergo knee arthroplasty within the first two years after consulting an orthopaedic surgeon and 2) which factors are associated with surgery.

Materials and Methods: Patients with primary referral to orthopaedic surgeons for knee OA were included at two high- volume Danish outpatient orthopaedic departments from October 2018 to December 2020. Patients answered questionnaires about prior treatment of knee OA at inclusion and after 6 months and 2 years. Information about knee arthroplasty was extracted from the Danish Knee Arthroplasty Register. Patient characteristics were compared descriptively among those undergoing arthroplasty or not within 6 months and 2 years. Trial ID: NCT03746184.

Results: We included 3,507 of 5,251 eligible patients (67%). Within 6 months, 28% had a knee arthroplasty, with an additional 16% within 2 years. Those operated at 6 months and 2 years were on average 5 and 3 years older and had 3- and 5-points lower Oxford knee scores than non- operated patients. Proportions with Kellgren Lawrence Score 3-4 were 58% in the non- operated, 72% in those operated at 6 months and 78% at 2-years. Knee problems lasting <1 year were reported by 39% of non-operated patients, compared to 15% and 19% in patients operated at 6 months or 2 years. Amongst those who had surgery within 6 months and 2 years, 88% and 82%, responded preferring surgery before the initial consultation, while 47% of non- operated patients preferred surgery. Among respondents at both 6-month and 2-year follow- up (68%, n = 2385), 38% (n = 290) of those operated within 6 months had both performed exercise and received education before surgery, increasing to 60% (n = 249) in those operated at 2 years, compared to 26% in non-operated patients.

Interpretation / Conclusion: Whether undergoing knee arthroplasty or not, within two years after the initial consultation with an orthopedic surgeon, is associated with subtle distinctions in patient characteristics and prior knee OA treatments. Patients' initial preference for surgery may weigh more when deciding on having surgery.

157. The association between arthroplasty center type and day-case surgery implementation and feasibility

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

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

Background: Hip and knee arthroplasties as day-case procedures can reduce bed occupancy and enhance cost-effectiveness, which is needed to accommodate the future demands for arthroplasty surgeries.
Aim: We aimed to investigate the association between different arthroplasty center setups and the rate of day-of-surgery (DOS) discharge before and after implementation of a day-case setup.
Materials and Methods: We included unilateral primary hip and knee arthroplasty patients from 7 fast-track arthroplasty centers with identical day-case eligibility and discharge criteria initiated in September 2022 under the Center for Fast-track Hip and Knee Replacement. The centers were categorized into three types: Satellite arthroplasty center (SAC): only primary arthroplasties, separate logistics. Elective arthroplasty center (EAC): complex primaries, revisions, separate logistics. Arthroplasty unit orthopedic department (AUO): primary and revision procedures, integrated into general orthopedic department. DOS discharge rate in the study period (September 2022-September 2023) was compared to a control period (July 2019-December 2019) before implementation. The likelihood of DOS discharge for day-case surgery eligible patients was compared between center types using a logistic regression model.
Results: We included 6718 hip and knee arthroplasty patients (1357 from SACs, 4309 from EACs, 1052 from AUOs), and 3974 patients in the control period. The overall DOS discharge rates increased in all three center types after implementation of the day-case surgery setup (SACs; control=3.9%, study=30%. EAC; control=5.5%, study=23%. AUO; control=7.4%, study=14%). Successful DOS discharge was more likely in day-case eligible SAC patients (54%, [OR: 2.3 (CI 1.7-3.1)]) and EAC patients (60%, [OR: 3.1 (CI 2.4-4.1)]), compared to AUO patients (36%).
Interpretation / Conclusion: After implementation of a day-case setup, the overall DOS discharge rates were higher in satellite arthroplasty centers and elective arthroplasty centers, compared to arthroplasty units at orthopedic departments. DOS discharge was also more likely for day-case eligible patients operated in satellite arthroplasty centers and elective arthroplasty centers.

174. When do patients resume driving after day-case hip and knee arthroplasty

Oddrún Danielsen[1], Jens Lauritsen[1], Martin Lindberg-Larsen[1]
1. Dept. of Orthopaedic Surgery and traumatology, Odense University Hospital and Svendborg

Background: Following surgery, patients are eager to return to their regular activities, with the timing of resuming driving being a significant concern. Being fully capable of operating a vehicle involves various factors, including anesthesia, opioids, and immobilized joints. While doctors can offer advice, the legal requirements are imprecise. Currently, there is only limited data on the post-operative driving timeline for hip and knee arthroplasty patients.
Aim: The aim was to estimate variation in time to resume car driving after hip and knee arthroplasty, including the influence of patients' and surgical factors on resumption.
Materials and Methods: This prospective single-centre study, includes patients undergoing primary total hip arthroplasty (THA), total knee arthroplasty (TKA) and unicompartmental knee arthroplasty (UKA) in a day- case setup at Odense University hospital Svendborg, Denmark from September 2022 to August 2023. Eligible patients received an electronic survey 3 to 12 months after being discharged, with the question "How many weeks after the surgery did you drive a car again?"
Results: A total of 427 day-case eligible patients received the survey and 373 patients (87%) responded to the survey. The proportion who resumed driving at two weeks was 13% (CI: 7-18%) for THA, 11 % (6-19%) for TKA and 24% (16-35%) for UKA. At six weeks 76 (68-83%) for THA, 65% (55-74%) for TKA and 75% (65-84%) for UKA. Female patients had increased risk of delayed car driving resumption compared to males (OR 2.8, CI: 1.6 – 4.8). TKA surgery, psychiatric disorder medication, and clinical frailty scale (CFS) ≥4 where found to have increased risk of delayed car driving, but were not significant.
Interpretation / Conclusion: More than twice as many UKA patients resumed driving during the first two weeks compared to THA and TKA. Overall, 65%-76% of patients resumed driving within 6 weeks. Female gender was a significant predictor of delay in resuming car driving six weeks post-surgery.

181. Translation and cross-cultural adaptation into Danish of the Oxford Arthroplasty Early Recovery Scale (OARS) and the Oxford Arthroplasty Early Chance Scale (OACS)

Mette Garval[1], Lone Ramer Mikkelsen[1], Søren Thorgaard Skou[2,3], Jeppe Lange[4,5], David Høyrup Christiansen[1,5]

1. University Clinic for Orthopaedic Pathways (UCOP), Elective Surgery Centre, Regional Hospital Silkeborg 2. The Research and Implementation Unit PROgrez, Næstved-Slagelse-Ringsted Hospitals 3. Research Unit for Musculoskeletal Function and Physiotherapy, University of Southern Denmark 4. Department of Orthopaedics, Regional Hospital Horsens 5. Department of Clinical Medicine, Aarhus University

Background: Until recently, Danish-language validated patient- reported outcome measures (PROMs) to assess early postoperative recovery following hip or knee arthroplasty have been absent. The Oxford Arthroplasty Early Recovery Scale (OARS) and the Oxford Arthroplasty Early Chance Scale (OACS) are PROMs designed to assess joint-related and systemic symptoms and health status during weeks 0-6 following a knee or a hip arthroplasty in a UK population.
Aim: To translate and cross-culturally adapt the OARS and OACS into Danish.
Materials and Methods: The OARS and OACS comprise 14 items measuring patient health status and changes in the patient's health and symptoms during the first 6 post-operative weeks. The scores can be used simultaneously but are independently interpreted. In collaboration with Oxford University, the OARS and OACS were translated and cross-culturally adapted into Danish using a forward-backward translation method in accordance with international guidelines. The translated versions were pilot tested through qualitative interviews with 6 participants conducted 2-3 weeks post-surgery at Regional Hospital Silkeborg. Verbatim transcriptions of the interviews were analysed to evaluate the understanding, relevance and comprehensiveness of the instructions, items and response options (cognitive debriefing).
Results: All 6 participants (3 undergoing hip arthroplasty and 3 knee arthroplasty) found the OARS and OACS to be easy to understand, and quick to complete (the average time to complete both measures was 5 minutes and 22 seconds). All items were considered relevant, and no important topics were reported as missed. There were no suggestions for alternative wording. Overall feedback on the OARS and OACS was positive, supporting the face and content validity of the measures.
Interpretation / Conclusion: The translated versions of OARS and OACS seem suitable for measuring recovery in Danish patients undergoing hip or knee arthroplasty. However, further evaluation of measurement properties is necessary to determine utility when evaluating or comparing the efficacy of perioperative interventions.

Poster Walk 2:

Hip and Knee Arthroplasty 2

Chair: Lasse Enkebølle Rasmussen & Mats Bue

185. Characteristics of eligible patients with knee osteoarthritis accepting versus declining participation in a randomized trial investigating the effect of weight loss vs. knee arthroplasty to explore generalizability: A cross sectional study.

Saber M. Saber[1,2,3], Robin Christensen[2,4], Marius Henriksen[2,3], Henning Bliddal[2,3], Troelsen Anders[3,5], Boesen Mikael [3,6], Asbjørn Seenithamby Poulsen[2,3], Camilla Toft Nielsen[2,3,6], Kristine Ifigenia Bunyoz[2,3,5], Søren Overgaard[1,3]

1. Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital - Bispebjerg & Frederiksberg, Copenhagen, Denmark; 2. The Parker Institute, Copenhagen University Hospital - Bispebjerg & Frederiksberg, Frederiksberg, Denmark; 3. Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen Denmark; 4. Research Unit of Rheumatology, Department of Clinical Research, University of Southern Denmark, Odense University Hospital, Odense, Denmark; 5. Department of Orthopedic Surgery, Copenhagen University Hospital – Hvidovre & Amager, Hivdovre, Denmark; 6. Department of Radiology, Copenhagen University Hospital - Bispebjerg & Frederiksberg, Copenhagen, Denmark .

Background: The Intensive Diet vs Knee Arthroplasty (INKA) trial is a randomized trial assessing weight loss as an alternative to knee arthroplasty (KA) in obese patients with severe knee osteoarthritis awaiting KA (NCT05172843). The external validity of the INKA trial may be hampered if the patients who participate differ from those who decline participation.

Aim: To compare baseline characteristics between patients who enroll in the INKA trial and those who decline participation (i.e., the non-INKA group, abbreviated as nINKA)

Materials and Methods: We applied a cross-sectional study design, collecting and comparing baseline characteristics among all patients eligible for enrolment in the INKA trial from 2 clinics in Copenhagen. Imbalance between accepting (INKA) and declining (nINKA) groups was assessed using standardized differences (StdD). We prespecified that StdD values <0.20 would indicate a clinically insignificant imbalance between groups, whereas values >0.80 indicate incomparability.

Results: Of 913 patients scheduled for KA, 888 were screened for INKA trial eligibility. Of the 217 eligible patients, 92 (42%) were enrolled in the INKA trial, while 37 (17%) participated in the nINKA cross-sectional sample only. Patients enrolled in INKA had on average a less severe Oxford Knee Score of 22.0 (SD: 6.7) compared to declining participants in nINKA with 18.6 (7.2), corresponding to an StdD of 0.50, and an absolute difference of 3.45 (95% Confidence interval 0.64 to 6.26, p=0.017). A consistent similar pattern was noted across all secondary patient-reported outcomes applied in the INKA trial.

Interpretation / Conclusion: We observed discrepancies in patient-reported outcomes, with those who declined enrollment reporting more severe symptoms.

183. The Influence of Comorbidity, Anxiety, and Depression on Postsurgical Referral to Municipal Rehabilitation: A Cross-Sectional Study of Knee Arthroplasty Patients

Ahmed Kurmasha[1], Torben Hansen[1,2], Jens Hansen[3]

1. Department of Orthopaedics, University Clinic for Hand, Hip and Knee Surgery, Gødstrup Hospital, Herning 2. Department of Clinical Medicine, Aarhus University 3. The Faculty of Social Sciences, Department of Sociology, Environmental and Business Economics, University of Southern Denmark

Background: Our Cross-Sectional Study follows the completion of osteoarthritis treatment, utilizing through either unicompartamental or total knee prostheses. In the period from May 2020 to December 2021, 235 patients underwent knee arthroplasty followed by either supervised municipal rehabilitation, or home-based rehabilitation based on individual assessment of the patients by the physiotherapist.

Aim: To investigate the impact of comorbidity, anxiety, and depression on postsurgical referral to supervised municipal rehabilitation of knee arthroplasty patients.

Materials and Methods: 109 (mean 71Y), (64F/45M), received supervised municipal rehabilitation, while 126 (mean 70Y), (59F/67M), underwent home-based rehabilitation. Data were gathered through telephone interviews conducted 12-24 months post-operation, with an 83% response rate. The binary outcome variable indicates whether patients were referred to supervised municipal rehabilitation or home-based rehabilitation. Exposure variables include comorbidity, measured by Charlson Comorbidity Index (CCI) and anxiety and depression levels, categorized as either "no problems" or "not without problems."

Results: The study shows a significant association between comorbidities and referral to supervised municipal rehabilitation, with a risk ratio of 1.35 (CI 1.18-1.54) in the multivariate model, controlling for various factors. Anxiety and depression levels also influence referral, with a higher prevalence (24%) in the supervised municipal rehabilitation group compared to the home- based group (9.5%). The risk ratio for referral with reported anxiety and depression issues is 1.43 (CI 1.05-1.94) in the multivariate model.

Interpretation / Conclusion: The study suggests that patients are often referred based on factors unrelated to knee conditions but rather on general and mental well-being. The implications underscore the potential need for standardized criteria for referral to supervised municipal rehabilitation, recognizing the multifaceted influences on patient outcomes.

175. Anteromedial knee osteoarthritis (AMOA) evaluated with magnetic resonance imaging (MRI): a cohort study of 100 patients

Kristine Bunyoz[1], Joseph Dixon[2], Jason Patel[3], Anders Troelsen[1], Abtin Alvand[2], Will Jackson[2], Andrew Price[2], Nickolas Bottomly[2]

1Department of Orthopaedic Surgery, Copenhagen University Hospital Hvidovre, Kettegård Alle 30, 2650 Hvidovre, Copenhagen, Denmark 2Nuffield Orthopaedic Centre, Windmill Rd, Oxford, OX3 7LD, UK 3Bart's Bone and Joint Health, Royal London Hospital, Whitechapel Rd, London E1 1FR, UK

Background: The clinical use of MRI scans for assessing knee osteoarthritis and aiding preoperative planning before a unicompartmental knee arthroplasty (UKA) is increasing. Therefore, an MRI-based depiction of AMOA holds value for both the research community and orthopaedic surgeons. Such a description will enhance understanding of the disease pattern, patient selection, and preoperative planning.

Aim: Describe the MRI findings in patients with AMOA, who meet current indications for medial UKA.

Materials and Methods: We analysed MRI scans from 100 knees evaluated for UKA between 2006-2013. Inclusion criteria comprised full-thickness medial compartment loss and intact lateral compartment joint space on preoperative radiographs. The assessment included cartilage lesions, osteophytes, meniscal damage, and anterior-cruciate ligament (ACL) status. Final decision to proceed with UKA relied on intraoperative findings, independent of MRI.

Results: Complete anteromedial tibial and femoral cartilage loss preserved posterior cartilage rims was evident in all cases. Cartilage thinning occurred in the lateral compartment in 34% of cases. While 62% displayed lateral osteophytes, only 6 exhibited small areas of full-thickness cartilage loss. ACL abnormalities varied: 27% normal, 3% ruptured, and 70% had intrasubstance high signal. Larger osteophytes in the medial ($p = 0.012$) and lateral ($p = 0.002$) intercondylar notch correlated significantly with ACL damage. All underwent medial UKA, with no evidence of full lateral compartment cartilage loss intraoperatively.

Interpretation / Conclusion: Isolated ACL high signal does not consistently indicate significant dysfunction. The presence of lateral osteophytes or small areas of cartilage loss shouldn't preclude UKA if full cartilage loss in the weight-bearing area isn't evident intraoperatively. The findings record the range of MRI scan findings in patients who meet current indications for medial UKA, aiding preoperative assessment, if an MRI scan is requested to evaluate the state of the ACL.

159. The one-year trajectories of patient reported outcomes are better for medial unicompartmental knee arthroplasty compared with total knee arthroplasty – A matched cohort study

Anne Louise Elkjær Christensen[1], Christian Bredgaard Jensen[1], Cecilie Henkel[1], Lina Holm Ingelsrud[1], Kirill Gromow[1], Andrew J Price[2], Anders Troelsen[1]

1.Clinical Orthopedic Research Hvidovre, Department of Orthopeadic Surgery, Copenhagen University Hospital Hvidovre, Denmark 2.Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Science, Nuffield Orthopaedic Centre, Oxford, UK.

Background: Whether medial unicompartmental knee arthroplasty (mUKA) or total knee arthroplasty (TKA) is more suitable for patients with end stage antero-medial osteoarthritis is an ongoing debate. Quality of life, pain relief and functional restoration are important outcomes for these patients.
Aim: We aimed to compare the development over time in patient reported outcome measures (PROMs) between patients receiving medial unicompartmental knee arthroplasty (mUKA) and total knee arthroplasty (TKA).
Materials and Methods: We included patients receiving either TKA or mUKA between March 2018, and February 2020. Included TKAs were performed by surgeons using mUKA in less than 1% of their knee arthroplasties in the study period. PROMs (Oxford Knee Score (OKS), Forgotten Joint Score (FJS), and the Activity and Participation Questionnaire (APQ)) were completed preoperatively, 3, 6, and 12-months postoperatively. Missing values, were handled with multiple imputation, using predictive mean matching. The patients were propensity score matched in a variable 1:2 ratio using BMI, sex, age, and preoperative PROM-scores. We calculated the area under the curve (AUC) using the trapezium rule to quantify the change from the preoperative PROM scores to scores at 3, 6 and 12 months postoperatively. Between-group differences in AUC were analyzed using linear regression adjusted for pre-operative scores.
Results: A total of 536 patients (236 mUKAs and 300 TKAs) were included. AUC was significantly lower for TKA patients compared to mUKA patients for all three PROM scores; (OKS: ΔAUC of -21%, CI: [-31%; -11%], FJS: ΔAUC of -24% , CI: [-35 % ; -14 %], APQ-27%, CI: [-38 % ; -15 %]). The median PROM scores at 3 months were 35 and 30 for OKS, 50 and 41.67 for FJS, 43.75 and 28.13 for APQ, for the mUKA and TKA groups, respectively. At 6 months median PROM scores increased to 39 and 35 for OKS, 60.21 and 48.96 for FJS and 50 and 37.5 for APQ.
Interpretation / Conclusion: AUC for PROMS during the first year was 21-27% lower for TKA compared with mUKA. This contrast in development trajectories is present especially in the early recovery 3-6 months after surgery and may be relevant for surgeons to consider, when discussing surgical treatment options with patients.

170. Weight change and the risk of chronic pain following hip and knee arthroplasty: A nationwide registry-based cohort survey study

Saber M. Saber[1,2,3], Jens Laigaard[1,3], Martin Lindberg-Larsen[4], Søren Overgaard[1,3]

1. Department of Orthopedic Surgery and Traumatology, Copenhagen University Hospital - Bispebjerg & Frederiksberg, Copenhagen, Denmark; 2. The Parker Institute, Copenhagen University Hospital - Bispebjerg & Frederiksberg, Frederiksberg, Denmark; 3. Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen Denmark; 4. Department of Orthopaedic Surgery and Traumatology, Odense Hospital, Odense, Denmark

Background: Few studies investigated changes in body weight following total hip, total knee and unicondylar knee arthroplasty (THA, TKA and UKA) for osteoarthritis. As many surgeons may recommend weight loss after arthroplasty, we found it important to invistigate it's potential effect.
Aim: To investigate whether an increase or decrease of 5% or more in BMI is associated with a concurrent increase or decrease in persistent postoperative pain (PPP), defined as numeric rating scale (NRS) [0-10]) ≥4 following arthroplasty, across non-obese and obese patients (BMI≥30)
Materials and Methods: Nationwide, register-based cohort survey study. We obtained data on BMI prior to surgery from the Danish Hip and Knee Arthroplasty Registers and sent surveys to patients 15-18 months following arthroplasty, which included patient- reported weight, height, NRS, frequency of pain, use of analgesics, satisfaction [1-5] and pain interference of daily activities (PIDA)
Results: Mean response rate was 71.4%. There was 10- 12% weight-gainers and 18%-20% weight losers following all types of arthroplasties. BMI prior to arthroplasty was 30-32 for weight-losers, 27-29 for weight-gainers, and 27-30 for the rest. For obese weight-losers following THA, 20% had PPP compared to 13% for those without weight change, this gave an Odd Ratio (OR) [95% Confidence Interval] for having PPP of 1.7 [1.0;2.8], being satisfied 0.5 [0.7;0.9], experience frequent pain 1.7 [1.0;2.7], PIDA 2.6 [1.5;4.6], use of analgesics 2.3 [1.00;5.4]. No such association was found for TKA and UKA.
Interpretation / Conclusion: Weight loss was associated with increased incidence of PPP in obese patients following THA. Nevertheless, it is crucial to interpret this association with caution.

153. Indications for lateral unicompartmental knee arthroplasty – a systematic review

Kristine Bunyoz[1], Kirill Gromov[1], Anders Troelsen[1], Andrew Price[2]
1: Department of orthopaedic surgery, Copenhagen University Hospital Hvidovre 2: Nuffield Orthopaedic Centre

Background: While evidence-based indications are established for medial UKA, the optimal indications for lateral UKA have not received as much attention. Significant differences exist between medial and lateral UKA. The indications for the two procedures may therefore not be identical.
Aim: This review aims to access the indications and contraindications in published cohort studies on lateral UKA, to assess if consensus exists.
Materials and Methods: In July 2023, a systematic review was carried out following the Preferred Reporting Item for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We included cohort studies on lateral UKA with a clear report of indications. Data on indications and contraindications were extracted systematically to evaluate consensus. Further, outcomes specifically related to expanding or testing indications for lateral UKA were also obtained.
Results: 38 studies were included. Lateral UKA was most frequently performed for primary lateral osteoarthritis. The most reported indications were moderate to severe lateral osteoarthritis, with full-thickness cartilage in the medial compartment, intact ligaments, a correctable valgus deformity, and a flexion contracture less than 10-15 degrees. The most reported contraindications were inflammatory arthritis and severe patellofemoral involvement.
Interpretation / Conclusion: While the literature suggests that some agreement does exist regarding indications for lateral UKA, a strong consensus was not found, indicating that well-defined and consensus-based indications for lateral UKA do not yet exist.

Poster Walk 3:

Infection/Amputation and Experimental

Chair: Hans Gottlieb & Johanne Gade Lilleøre

172. Does plate positioning affect fracture stability in complex tibial plateau fractures using Finite Element Analysis and Sensitivity Analysis

Simon Comtesse[1], Alexander Crotta [1], Thomas Zumbrunn [2], Stephen Ferguson [1], Arvind von Keudell[(2,3,4)]
1. Institute for Biomechanics, ETH Zurich, Switzerland; 2. CustomSurg AG, Switzerland; 3. Brigham and Women's Hospital, Harvard Medical School, Boston, USA; 4. Bispebjerg Hospital, Copenhagen, Denmark;

Background: The surgical treatment of tibial plateau fractures is complex and subjective, resulting in complication rates up to 28% . Hence, an objective method for the optimization of tibial plateau fractures by means of Finite Element Modelling (FEM) has been introduced. However, while simulation parameters are chosen based on best practice, they introduce uncertainties to the model.
Aim: Therefore, a sensitivity analysis was performed where the modelling parameters were varied to quantify the influence thereof on the simulation results.
Materials and Methods: The CT scan of a cadaveric tibial plateau fracture was segmented, and the bone fragments were aligned to achieve the fracture reduction and further fixed with a medial plate and several locking screws. Hounsfield Units (HU) derived bone material properties based on a phantom-less calibration method as well as joint and muscle forces from subject-specific musculoskeletal gait models were integrated. Modelling parameters were changed systematically and the results were compared relative to the standard simulation in terms of maximum displacement of fracture fragments and von Mises screw stresses.
Results: The following parameters had no or minimal influence on the results (< 5 %): Linear instead of non-linear geometry Linear instead of quadratic elements Frictional coefficient of plate-bone interface Frictional coefficient of bone-bone interface The results for the parameters determining the material properties (hardware and bone) are shown in figure 1.
Interpretation / Conclusion: Although the contact in-between bone fragments and the bone and the plate seems to be an important modelling parameter, their actual frictional coefficient is irrelevant. A much larger impact on the result arises from the parameters directly determining the material properties of the hardware or the bone. However, according to the manufacturers indications, the Young's Modulus of the plate can be checked precisely. Moreover, the magnitude of applied joint reaction forces has a direct influence on the results in that the maximum fragment displacement and von Mises stresses in the screws increase proportionally to the applied load.

180. Assessment of basic orthopaedic surgical skills in a low-cost simulation-based setting

Jacob Juul Pedersen[1], Anders Bo Nielsen[2], Amandus Gustafsson[3], Bjarke Viberg[2]
1. University of southern Denmark, Odense, Denmark 2. Odense University Hospital, Odense, Denmark 3. University of Copenhagen, Copenhagen, Denmark

Background: Basic orthopaedic surgery skills (BOSS) in drilling and handling instruments have previously been assessed as one of the most prioritized areas in a simulation-based residency curriculum. Still, simulation training in BOSS has yet to be developed and is usually very costly.
Aim: To develop a low-cost simulation-based test to assess BOSS, gather validity evidence for the tests, establish credible pass/fail scores, and explore the consequences of the pass/fail score.
Materials and Methods: Five practical skill stations were developed from a previous published work using pilot testing and interviews: S1) Depth of plunging S2) 2-dimensional drilling S3) Drilling through the center of a long bone by feel S4) Fracture reduction with clamps S5) Fluoroscopy The stations were made of standard items from hardware- and electronic stores. Messick's framework was used to gather validity evidence for the test. A novice group of doctors with no surgical experience (n=11), an expert group of specialized traumatologists (n=9), and a novice group for training to pass (n=7) were included. All scores were measured in millimeters, and each station's test was repeated until a plateau score, defined as no improvement in three subsequent repetitions. Levene's test and students' t-test compared performances. The pass/fail score was established using the contrasting groups method (CGM).
Results: The simulation setup estimated costs were less than 8.300 DKK. There was moderate to high internal consistency reliability using the interclass correlation coefficient for the 5 stations (0.40 to 0.95). The mean plateau scores when comparing the novice and expert groups for each station were all statistically significantly different (p scores 0.002-0.022). This led to pass/fail scores using CGM for S1: 12mm, S2: 8mm, S3: 4mm, S4: 2mm, and S5: 8mm. The average time and no. of attempts to pass the tests were S1: 5.1 minutes, 8 attempts, S2: 17.6 minutes, 24 attempts, S3: 3.8 minutes, 6 attempts, S4: 6.5 minutes, 5 attempts, S5: 32 minutes, 11 attempts.
Interpretation / Conclusion: We developed a low-cost, simulation-based practical test to assess BOSS with solid validity evidence. This enables a standardized, objective, evidence-based approach to assessing BOSS.

192. Trends in medical healthcare complaints in 2 Danish orthopedic departments - A descriptive study

Oliver Lyndrup[1], Charlotte Juhl Lorentsen[1], Ane Simony[1]
1. Department of Orthopedic Surgery and Traumatology. Lillebaelt Hospital, University Hospital of Southern Denmark, Kolding

Background: Medical healthcare complaints are a frequent encounter at departments of orthopedic surgery. Consequently, the heads of departments spend a valuable amount of time handling the complaints through dialogue with all parties involved. Being in risk of receiving a complaint is stressful to younger doctors, thus supervision from experienced colleagues is crucial to ensure a safe learning environment.
Aim: This study aimed to report the trends in medical healthcare complaints at two different orthopedic departments at Lillebaelt Hospital, both taking care of acute and elective patients
Materials and Methods: This descriptive study included all medical healthcare complaints at two orthopedic departments at Lillebaelt Hospital, Region of Southern Denmark, during 2023. Outcomes were number of complaints for each medical staff group, in elective/acute setting, for each ground and distribution between the two hospitals.
Results: 58 complaints were registered during the study period, and 16 of these involved more than 1 staff group. In total, 39 (67%) complaints involved a consultant and 16 (28%) involved a resident in training. 28 (48%) complaints was in an elective setting, 19 (32%) was in an acute setting, and 11 (20%) had missing data. In terms of grounds of complaint, 42 (72%) patients complained of treatment, 5 (9%) of behavior, 1 (2%) of the examination, 6 (10%) of a combination of these and 4 (7%) for other reasons. The complaints were distributed between 22 (38%) from the department in Vejle and 36 (62%) from the department in Kolding.
Interpretation / Conclusion: Few complaints involved residents and most of these were aimed at more than 1 group of staff, indicating that fear of complaints amongst young doctors should be low. The department in Vejle had fewer complaints than Kolding, most likely caused by the higher proportion of residents with great responsibilities in clinical practice.

186. Assessing Prosthetic Compatibility in Major Lower Limb Amputees: A Comparative Study of Pre- and Post-Amputation Prosthetic Suitability

Markus Mogensen[1], Charlotte Abrahamsen[1,2], Inge Hansen Bruun[2,3], Ane simony[1,2]
1. Department of Orthopedics, Kolding, Hospital Lillebelt 2. Institute for Regional Health Services, University of Southern Denmark 3. Department for physical therapy and occupational therapy, Kolding, Hospital Lillebelt

Background: Major lower limb amputation are performed in patients suffering from arteriosclerosis, diabetes and infections. Amputations are a procedure making permanent change in a patients' physical capability and has an impact on mental wellbeing. A prosthesis can be a useful tool to regain mobility and increase quality of life.
Aim: In this study we examined the change of prosthetic suitability assessment given at time of admission with the prosthetic suitability given at time of discharge comparing the findings with impactful risk factors.
Materials and Methods: Data from amputees was extracted from the KOKO database from Orthopedic Department Kolding, Hospital Lillebelt. Patient demographics and variables were examined, according to assessment of prosthetic suitability. Data was analysed using STATA.
Results: A total of 249 patients underwent a LEA in this study period, of which 107 did not meet the inclusion criteria; 107 patients was excluded due to age < 50 years, missing data, transferred to other hospitals and mortality. A total of 142 (57%) patients were eligible to further analysis, mean age 72 y (60-79), 62 % males. 54 % was active or previous smokers, 43 % had diabetes and 66% arteriosclerosis. 31 was found suitable for prosthesis at the time of admission for surgery, 81 patients was considered maybe and 30 was not candidates for prosthesis. 46 patients changed prosthesis evaluation during the admission period, 3 patients improved and 3 patients declined.
Interpretation / Conclusion: This study highlights there is a difference in prosthetic compatibility from time of admission to time of discharge. 61% of the patients assessed maybe prosthetic suitable at time of admission are equally distributed between prosthetic suitable and not prosthetic suitable at time of discharge. 90% of prosthetic suitable and not prosthetic suitable remains unchanged from admission to discharge. Age, civil status, new mobility score, mobility aids, previous amputation, and accommodation at time of admission were of significance comparing the suitable and the not suitable patients. While BAMS and amputation level were of significance between the maybe prosthetic suitable patients.

190. Tell me, so I understand"? A nurse-led nutritional intervention to improve wound healing in patients with leg ulcers – A feasibility study

Christine Krogsgaard Schrøder[1, 2], Vibeke Nørholm[2], Ingrid Poulsen[2, 3], Pia Søe Jensen[1, 2, 3]
1. The Research Unit of Orthopaedic Nursing, Department of Orthopaedic Surgery, Copenhagen University Hospital, Hvidovre, Denmark; 2. Department of Clinical Research, Copenhagen University Hospital, Hvidovre, Denmark; 3. Department of People and Technology, Health Promotion Research Center, Roskilde University, Denmark.

Background: Integrating nutritional dialogue and education into leg ulcer treatment in the outpatient clinic may enhance wound healing and prevent leg ulcer progression to amputation.
Aim: This study examines the feasibility, acceptability, and fidelity of a nurse-led nutritional intervention including a dialogue tool, patient information, and protein supplement.
Materials and Methods: An observational cohort study, at Hvidovre Hospital's wound clinic using mixed-methods. The intervention comprises 1) a dialogue tool, presenting the correlation between nutritional status, the immune system, and wound healing; 2) an information brochure detailing wound healing, treatment recommendations, and supportive behaviours; and 3) an introduction to protein drinks along with the distribution of a "green" prescription. Eligible participants are patients with first-time referrals for assessment of ulcers or amputation wounds in the lower extremities. Specialized wound nurses will administer the intervention. Following inclusion, patients will receive two follow-up calls after their subsequent clinic visits. The first follow-up will collect patient characteristics, wound information using the Wound-QoL, and closed-ended questionnaire responses assessing the feasibility of the intervention's three components. The second follow-up will involve interviews evaluating the acceptability of the intervention. Feasibility will be determined by predefined criteria for each intervention component, with compliance thresholds set at 80% for feasible and below 30% for non-feasible. The overall feasibility will be assessed through the synthesis of these criteria and thematic analysis of the interviews. Additionally, focus group interviews with nurses will be conducted. The study is registered at Clinical Trials (NCT06255288). Patients will be recruited between 01.02.2024 and 31.05.2024.
Results: The feasibility, acceptability, and fidelity will be reported for each component of the intervention.
Interpretation / Conclusion: This is the first project to provide a three-part nutritional intervention engaging both patients, their relatives, and the nurses regarding lower extremity wound care. The study will be used to inform the development of a subsequent RCT study.

194. Tissue concentrations of azithromycin after both systemic and local treatment: a patient case with mycobacterial tenosynovitis of the hand

Mads K. D. Mikkelsen[1,2], Andrea R. Jørgensen[1,2], Victor N. Dahl[3], Christian M. Wejse[3], Mats Bue[1,2], Maiken Stilling[1,2]

1. Orthopedic Research Laboratory, Aarhus University Hospital; 2. Department of Orthopedics, Aarhus University Hospital; 3. Department of Infectious Diseases, Aarhus Unioversity Hospital

Background: Extrapulmonary nontuberculous mycobacteria (NTM) infections are notoriously hard to treat, which may partly be due to inadequate tissue concentrations of antimicrobials
Aim: We aimed to evaluate local tissue concentrations of azithromycin in a patient treated for Mycobacterium heraklionense tenosynovitis of the flexor tendons of the index finger.
Materials and Methods: Using microdialysis, we evaluated the local tissue concentrations of azithromycin during three tendon and pulley reconstructive surgeries of the right index finger in a patient treated with an all-oral azithromycin- ethambutol-rifabutin regimen for 11 months. We sampled from the brachioradial muscle, subcutis, and flexor tendon sheaths of the palm and forearm. To increase infection control, we installed local antibiotics in the surgical field of the index finger and distal forearm during surgery 2 in the form of STIMULAN® calcium sulfate beads prepared with azithromycin.
Results: At submission, analysis is complete for the first and second surgery. Plasma concentrations ranged from 0.1-1.1 µg/mL throughout all surgeries and resembled the tissue concentrations, ranging from 0.5-1.8 µg/mL during surgery 1 and 0.3-1.7 µg/mL during surgery 2. Plasma concentrations reached Cmax targets of >0.2 ug/mL from previous studies of pulmonary NTM. During surgery 2, the azithromycin concentrations in the compartments in direct contact with the beads ranged from 56-151 µg/mL during a sampling period of 5 hours. The beads had to be surgically removed after 10 days due to continuous drainage and wound infection with Enterococcus faecalis. One month after the final reconstructive surgery the patient has not shown signs of relapse and is in good recovery.
Interpretation / Conclusion: Azithromycin concentrations in the targeted hand tissues resembled the steady-state concentrations found in plasma following long-term oral azithromycin treatment. When applying azithromycin locally mixed in calcium sulphate beads, high target site concentrations can be achieved. However, calcium sulfate beads should be used with caution under thin skin flaps due to risk of drainage and delayed wound healing. More evidence is needed to challenge current recommended treatment regimens of NTM infections.

198. Patients with chronic limb-threatening ischemia, experience of their disease, treatment and care in a cross-sectorial setting..A scoping review.

Susanne Friis-Søndergaard[1,2], Ane Simony[3,4], Johanne Christensen [5], Marie Dahl[2,6]

1. Lovisenberg, University of Applied Science. Norway; 2. Vascular Research Unit, Department of Vascular Surery, Hospital Viborg; 3. Department of Orthopedic Surgery, Hospital Lillebelt; 4. Institute for Regional Health Services, University of Southern Denmark; 5. Department of Culture and Language, University of Southern Denmark; 6. Cardiac thoracic and vascular Research Unit, University of Southern Denmark.

Background: Chronic limb-threatening ischemia (CLTI) is accompanied by high utilization of healthcare services, with multidisciplinary professionals providing care in primary and secondary settings. CLTI is a progressive disease that induces physical, emotional, and social burden on the patients, but also requires high patient adherence to avoid severe complications. To our knowledge, no previous studies has focused on the patient perspectives related to this topic.

Aim: The objective of this review was to systematically identify, examine, and conceptually map the existing literature on patients who have CLTI in the context of living with the condition, and explore their experiences of living with CLTI and their treatment and care within a cross-sectoral setting.

Materials and Methods: A systematic search was conducted and completed on September 18th, 2023, without methodological or format restrictions. We identified Population, Concept, and Context to pinpoint the focus of this review process. The JBI methodology for scoping reviews and the PRISMA-ScR checklist were followed.

Results: Based on our search, we found ten relevant scientific qualitative and/or quantitative and one non-scientific sources. We identified four main maps: 1) Dependency on others is my new life condition; 2) I'm more than the sum of my conditions, 3) I'm lost in chaos, be alert to all of me, and 4) Give me more time, my body and mind are under attack.

Interpretation / Conclusion: This scoping review describes how patients' life is affected by the CLTI and their perception of both shared decision-making alongside treatment and care, emphasizing the need for more person-centered care. To nuance person- centred care further, it is necessary to consider the impact of patients' cultural values and preferences, about which there is a notable gap in research.

188. Incidence of reoccurrence and risk factors following partial matrixectomy of ingrown nails

Nawfal Khalid-Rasheed Al-Attar[1], Mykola Horodyskyy[1], Jacob Fyhring Mortensen[1], Kenneth Chukwuemeka Obionu[2], Søren Overgaard[2],

1. Department of Orthopaedics, Sjællands Universitets Hospital - Nykøbing Falster 2. Department of Orthopaedics, Bispebjerg Hospital

Background: Ingrown nails present a common and debilitating issue, and while partial matrixectomy is deemed an effective approach for treating ingrown nails, recurrence rates have been observed ranging from 10-50% in the literature. While it can manifest at any age, the most typical age range is 15 to 40 years old, with a male-to- female ratio of 3:1 (1), and factors contributing to recurrence are many. Our study identifies a significant association between complications, including panaricium, abscess, and claw formation, in the postoperative periode and the recurrence of ingrown toenails.

Aim: The aim of this study is to examine the incidence of reoccurrence and risk factors following partial matrixectomy of ingrown nails.

Materials and Methods: This was a retrospective cohort study, including patients aged 18 years and above. The electronic health records from Copenhagen university Hospital, Bispebjerg , department of orthopaedic surgery and traumatologywere reviewed between 2017-2020. Data was analysed using descriptive statistics, while chi-square analysis was performed to analyze the determinants of recurrence.

Results: Of 159 participants, 52% (n=83) were female, and 48% (n=76) were males. The age distribution was: 18-28 years (43.4%), 29-40 years (22%), 41-60 years (15,7%), 61-90 years (18,2%). Among all participants, 72.7% (n=115) were active smokers. Age [OR 1.02, 61-90 (0%); 18-28 (29%); 51-60(38%); 41-50 (60%); 29- 40(64%)], and muscoskeletal disorders (OR 1.06) manifested slightly high recurrence, however with a non-significant association (Age, p=0.07, MSD, p=0.402). Although there was a significant association of recurrences with Smoking (OR 0.24, 95% CI, p=0.000) and gender (OR 0.34, 95% CI, p=0.016), both smokers and males demonstrated lower odds. Furthermore, the incidence of complications was remarkably higher (OR 4.35, 95% CI, p<0.000) among patients with recurrence.

Interpretation / Conclusion: The study identified elevated complication rates among relapsed patients, and highlighted other factors that could lead to recurrence of ingrown toenails.

Poster Walk 4:

Upper Extremity

Chair: Liv Vesterby & Dennis Karimi

169. Anatomic total shoulder arthroplasty using hybrid glenoid fixation with a porous coated titanium post. Two to ten years follow-up of 256 cases with primary glenohumeral osteoarthritis.

Adriano Axel Ceccotti[1], Tøttrup Mikkel [2], Morch Anica[1], Husum Hans-Chresten[1], Jensen Steen Lund[1]
1. Department Orthopaedics, Aalborg University Hospital 2. Department Orthopaedics, Aarhus University Hospital

Background: Anatomic total shoulder arthroplasty (aTSA) is the recommended surgical treatment for severe glenohumeral osteoarthritis providing good pain relief and function. Aseptic loosening of the glenoid component, however, is a major cause for revision. Hybrid components have been introduced combining cemented fixation with bone ingrowth to improve fixation.
Aim: The purpose of this study was to report our mid- term to long-term experience using such a component including clinical outcomes and implant survival.
Materials and Methods: We reviewed all patients who were operated for primary osteoarthritis during the period 2011-19 leaving a minimum of 2 years follow-up. Clinical outcomes included WOOS index. Postoperative radiographs were analyzed for radiolucent lines. Patient records were studied for complications including revisions. Kaplan-Meier estimates for implant survival were calculated.
Results: A total of 256 arthroplasties in 224 patients were included (mean age: 69 years ± 9 years, 149 females). Mean follow-up time was 49 months (range 24 - 127). The response rate for patient reported outcomes was 91%. The median WOOS index was 94% (81%-99%), the median EQ-5D-5L was 0.87 (0.69-0.95), and the mean CMS was 75 (SD 17.7). 13 cases (6%) had a WOOS index below 50%. 8.2% had complications related to surgery. A radiolucent line had developed around the central post in six cases, and at the bone-cement interface in three cases at follow-up. Six cases had been revised (2.3%); three due to aseptic loosening of the glenoid. The 10-year survival estimate was 95.6 % (95% CI: 87.9% - 98.5%).
Interpretation / Conclusion: Anatomic total shoulder arthroplasty with hybrid glenoid fixation provides excellent clinical outcome with a low complication rate in patients with primary glenohumeral osteoarthritis. The 10-year survival rate is high and comparable to that reported for the best performing all-polyethylene components. Longer observation is needed to see if hybrid fixation will outperform standard all-cemented components.

179. Patient-reported outcome measures for adhesive capsulitis. Recommendations based on analyses of 16 existing questionnaires

Gustav Kalle Mølbak Vangsgaard[1], Michael Rindom Krogsgaard[1], Christian Fugl Hansen[1]
1. Section for Sports Traumatology, M51, Bispebjerg and Frederiksberg Copenhagen University Hospital

Background: Patient reported outcome measures (PROMs) are essential to express the patient's subjective perspective in clinical studies. Like any measurement instrument PROMs should be valid, reliable, and responsive. Inadequate PROMs induce a high risk of type-II errors. There is no thorough analysis of the PROMs that have been used in the clinical research regarding adhesive capsulitis (AC).
Aim: The aim was to evaluate the quality of these PROMs and identify which are the most useful for future studies on AC.
Materials and Methods: Relevant PROMs used to evaluate patients with AC were identified through PubMed searches and a catalogue of PROMs, and subsequently, validity studies were identified for selected PROMs. Quality assessment involved evaluating development and validation processes, utilizing a rating system. Development quality was assessed based on guidelines emphasizing content validity. Validation studies were rated based on modern test theory models and the psychometric assessments undertaken. Aggregated scores considered both content and construct validity, with the "lowest score counts" principle.
Results: 16 different musculoskeletal PROMs that had been used 160 times in total (range 1- 43) were identified. None of the PROMs were developed specifically for patients with AC. Four PROMs had some degree of patient involvement in the developmental process, but the patients represented broader conditions or other diseases than AC. 39 articles on measurement properties were identified through PubMed, analyzed, and assessed together with 40 articles from the catalogue. Five PROMs have had their psychometric properties validated with an MTT model. However, all five possessed inadequate content validity as none of them had patients involved in the development process. Hence, this study was not able to identify any PROM with adequate content and construct validity for patients with AC.
Interpretation / Conclusion: A new and condition-specific PROM for AC is urgently needed. The current PROMs should be used with significant reservations and results obtained by them should be interpreted with caution.

196. Variations in treatment practice of patients with scapula alata- A national survey across public hospitals in Denmark

Kirstine Lyngsøe Hvidberg[1], Cecilie Rud Budtz[2], Grethe Aalkjær[1], Søren Riis Villumsen[3], Brian Elmengaard[3], David Høyrup Christiansen[2], Helle Kvistgaard Østergaard[1]
1. Department of Orthopaedics, Viborg Regional Hospital 2. University Clinic for Orthopaedic Pathways (UCOP) Elective Surgery Centre , Silkeborg Regional Hospital 3. Department of Elective Surgery Centre, Silkeborg Regional Hospital

Background: Scapula alata (SA) is a condition characterized by medial winging and decreased upward rotation of the scapula during elevation of the arm, often causing impairment of the shoulder function. There is currently no evidence regarding the most optimal treatment for this condition.
Aim: This study aimed to assess the current treatment approaches used for SA in public hospitals in Denmark.
Materials and Methods: A cross-sectional survey was undertaken using a self-administered questionnaire to healthcare professionals across departments in all public hospitals in Denmark. The survey investigated local treatment guidelines, as well as diagnostic practices with referral to electroneurography(ENG), the use of International Classification of Diseases 10th Revision (ICD10) coding, and the annual number of patients.
Results: In total, 20 hospital departments completed the questionnaire. Treatment approaches included exercise therapy in various contexts, brace treatment, surgery, and, in some cases, a waiting approach. Only four hospitals reported the use of written local guidelines for SA treatment and diagnostics practices. Five hospitals use ENG as part of their diagnostic practice, while five others do so selectively based on specific indications. Seven different ICD-10 codes were reported for SA. The annual patient number ranged from none to 20, with four hospitals accounting for most of the patients. Doctors and physiotherapists are the primary healthcare providers involved in the diagnostic and treatment process.
Interpretation / Conclusion: This survey revealed large national variations in the treatment of SA in Denmark. This emphasizes the need for further research and standardized guidelines for the treatment and diagnostics of patients with SA.

205. Corrective osteotomy with volar plate fixation of radius malunion using 3D-modelling based on mirroring of the contralateral healthy arm: A case series of 4 patients.

Carl Christian Holkgaard Burvil[1, 3], Emil Toft Petersen[1, 2, 3], Janni Kjærgaard Thillemann[1, 2, 3], Jan Duedal Rölfing[2, 3], Maiken Stilling[1, 2, 3]

1 AutoRSA Research Group, Orthopaedic Research Unit, 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

Background: Radius malunion is a common complication of diaphyseal and distal radius fractures and frequently leads to reduced forearm rotation and ulnar wrist pain. The underlying deformity is often multiplanar and corrective "free hand" osteotomies are thus difficult.

Aim: To evaluate outcomes of patient-specific, 3- dimensional (3D) surgical planning for radius malunions.

Materials and Methods: 4 patients with symptomatic radius malunions underwent corrective osteotomies (3 received individually manufactured plates) and 2 cases received a simultaneous triangular fibrocartilage complex (TFCC) reinsertion. Pre- and postoperative data were collected including 1) CT scans of both forearms to plan the osteotomies and to evaluate the achieved correction by bone mirroring of the contralateral forearm, 2) standard AP and LA radiographs (ulna variation, radius angulation and inclination), 3) bilateral dynamic radiostereometry (dRSA) to compare the kinematics of the distal radioulnar joints (DRUJ) at the maximum applied force during a press-test and a rotation-test, 4) physical examination (range of motion (ROM), hand grip strength), and 5) patient reported outcome measures (qDASH, PRWE, and overall satisfaction).

Results: Postoperative bone mirroring and radiographs showed that all 4 radial bones were corrected towards the planned correction. However, the planned ulnar variance was only fully achieved in 1 of 4 cases. Kinematics of the DRUJ improved in 2 patients, were unchanged in 1 patient, and worse in 1 patient during the press-test. The ROM and grip strength changed minimally, except for 1 patient with significant improvement in ROM. The qDASH score improved in 3 of 4 patients (1 was clinically significant) while PRWE improved for all 4 patients (2 were clinically significant). 2 patients reported to be "very satisfied" and 2 reported to be neither satisfied nor dissatisfied with surgery.

Interpretation / Conclusion: Specific 3D-planning using the contralateral healthy arm as a template is of great value when planning radius malunion corrective surgery. Sufficient lengthening of the radius to correct positive ulnar variance is challenging to achieve, but crucial for a good clinical outcome.

206. MR-skannings rolle i diagnosticeringen af triangulære fibrokartilaginøse kompleks (TFCC)-skader af det ulnar håndled

Ditte N. Schreiner[1], Gvozdenovic Robert[2, 3],
1. Medicin, Det Sundhedsvidenskabelige Fakultet, Københavns Universitet 2. Afdelingen for Led- og Knoglekirurgi, Klinik for Skulder-, Albue- og Håndkirurgi, Københavns Universitetshospital - Herlev-Gentofte Hospital 3. Institut for Klinisk Medicin, Det Sundhedsvidenskabelige Fakultet, Københavns Universitet

Background: Wrist arthroscopy is a gold standard in the diagnosis of triangular fibrocartilage complex injuries. Although minimally invasive, this surgical procedure has the disadvantage of being technically advanced, needing high skills, and the interpretation of the findings might be variable among the observers. Even though the ulnocarpal and distal radioulnar joints are not as large as articular spaces of the knee or shoulder, recent studies reveal MR scan could be an alternative diagnostic tool.
Aim: The purpose of this literature review is to investigate the role of Magnetic Resonance Imaging (MRI) in diagnosing triangular fibrocartilage complex (TFCC) injuries in the ulnar wrist. The methodology is interpreted using the STARD standards for diagnostic studies. Additionally, it aims to analyze the clinical utility of the studies.
Materials and Methods: 25 articles were selected through systematic reading of available papers in the databases PubMed, Embase, and Cochrane Library, as well as reference lists from selected articles, using a set of exclusion criteria.
Results: The predictive values of MRI in identifying TFCC lesions vary considerably. However, this study highlights some advantages of using specific sequences, field strengths, post-processing techniques, and specific "pathological markers" alongside MRI. It is also concluded that magnetic resonance arthrography (MRA) shows more promising results than MRI, although the method is more expensive and associated with surgical risks. Additionally, this study addresses the issue of the need for extensive experience in image analysis for both MRI and MRA in diagnosing TFCC lesions.
Interpretation / Conclusion: Although the predictive values of MRI have shown promising results, those are largely based on retrospective studies where the patient groups have been selected among those having ulnar-sided pain, without controls. Therefore, it is concluded that MRI should not be relied upon as an independent diagnostic tool for painful TFCC lesions. There is a need for more well-designed studies to further determine the clinical relevance of this diagnostic modality.

Poster Walk 5:

Paediatric Orthopaedics

Chair: Jens Svendsson & Mathias Bünger

152. Prevalence and regional differences in migrated hips in Danish children with cerebral palsy from 2008 to 2021 – a comparison of ambulant vs non-ambulant children

Muhammed Bakhtiyar, Afrim Iljazi, Michael Mørk Petersen, Anders Oddgaard, Christian Wong
Department of Orthopedic Surgery, Rigshospitalet, Copenhagen, Denmark

Background:
Aim: This study aims to assess the incidence of hip displacement and dislocation (denominated as hip migration) among ambulant and non-ambulant Danish children with cerebral palsy (CP) by estimating their cumulative incidence of migrated hips. A secondary objective is to compare the prevalence across different Danish regions.
Materials and Methods: Data were obtained from the Danish Cerebral Palsy Follow-Up Program (CPOP) from the years 2008 to 2021. This population-based cohort study included 1,388 children with CP (58% male, 42% female) as subjects, aged 0-15 years, with an average age of 5.4 years at their last follow-up. The children were categorized according to their Gross Motor Function Classification System level (GMFCS) into ambulators (GMFCS I-III) and non-ambulators (GMFCS IV-V). The Kaplan-Meier estimator was employed to calculate the cumulative incidence of migrated hips from birth until the date of their last radiographic follow-up. Differences between ambulatory and non-ambulatory children and regional differences were assessed with the Log- rank test.
Results: Median radiological follow-up for ambulators was 51 months and 94 months for non-ambulators. The cumulative incidence of hip dislocation was 0.3% (95% CI: 0-0.8 %) and 22.0% (95% CI: 9.2 -34.8 %) for ambulators and non-ambulators, respectively ($p<0.0001$), whereas the incidence for hip displacement were 21.1% (95% CI: 16.3-25.9 %) and 76.7% (95% CI: 68.6-84.7 %) for ambulators and non-ambulators respectively ($p<0.0001$). There were no significant regional differences in the incidence of hip dislocation among ambulators, but there were significant differences for non- ambulators. Moreover, significant regional differences were detected in hip displacement for both ambulators and non-ambulators.
Interpretation / Conclusion: The prevalence of hip migration in Danish children with CP is significantly higher among non- ambulators, who are at an increased risk of hip migration compared to their ambulant counterparts. However, the low frequency of radiographic follow- up for ambulators might cause the incidence of hip migration to be underestimated. This study highlights the necessity of continued targeted surveillance and interventions in Danish non- ambulators.

195. Incidence of Protrusio Acetabuli Among Children Diagnosed with Osteogenesis Imperfecta at Aarhus University Hospital During the Period 2018-2023

Maria Lund Gjættermann[1,2], Jan Duedal Rölfing[1,2], Jannie Dahl Hald[3,4], Bjarne Møller-Madsen[1,2]

1. Danish Paediatric Orthopaedic Research, www.dpor.dk, Aarhus University Hospital, AUH, Denmark; 2. Department of Children's Orthopaedics and Reconstruction, Aarhus University Hospital, AUH, Denmark; 3. Department of Endocrinology and Internal Medicine, Aarhus University Hospital, AUH, Denmark; 4. Center for Rare Disorders, Department of Paediatrics, Aarhus University Hospital, AUH, Denmark

Background: Osteogenesis Imperfecta (OI) is a rare genetic connective tissue disorder characterised by increased bone fragility, bone deformities, and increased risk of fractures. One among other radiographic findings in OI patients is Protrusio Acetabuli (AP), in which the acetabulum and femoral head migrate into the pelvic cavity.

Aim: This study aims to investigate the incidence and severity of AP in children with OI, as well as the OI types in which it occurs. Additionally, we aim to investigate the clinical consequences to AP and elucidate potential risk and protective factors.

Materials and Methods: Medical records and pelvic radiographs of 16 children (7 F, 9 M), aged 2-18 years (mean age: 10,5 years), with OI, followed at Department of Children's Orthopaedics at Aarhus University Hospital between 2018 and 2023, were retrospectively evaluated. Demographic and anthropometric information, along with Sillence and Glorieux classification were registered. The severity and presence of AP were determined utilising the following radiographic criteria: the appearance of the teardrop configuration, the center-edge angle of Wiberg, and the acetabulum's location relative to the Kohler and iliopectineal line.

Results: 4 of the 16 OI patients had AP. One third of the cases had type III or IV. None of the patients had severe AP with the acetabulum progressing medial to the iliopectineal line. The median age of the AP patients was 13,5 years. 3/4 were female. 3/4 had anisomelia, and 2/4 had scoliosis. 2/4 were dependent on mobility devices. 2/4 experienced pain in the same hip where AP was present, and 1/4 experienced knee pain. Patients over 12 years of age (OR: 2, 95%-CI: 0,2-19,9), with a BMI exceeding 25 (OR: 33, 95%-CI: 1,6-698, $p < 0,05$), of female gender (OR: 6, 95%-CI: 0,5-77,8), and suffering from scoliosis/anisomelia (OR: 3, 95%-CI: 0,3- 31,6; OR: 3, 95%-CI: 0,24-37,7) had higher odds of developing AP. None of potential protective factors were identified.

Interpretation / Conclusion: OI patients often present with AP. Hence, it may be beneficial to investigate the incidence of AP in adults and its clinical consequences to offer improved management, if not to provide advice on how to prevent AP.

197. 10-years Patient Reported Outcome Follow-up of Children with Cerebral Palsy Treated with Tibialis Posterior Tendon Transfer

Prajahi Ketheeswaran [1,2], Line Kjeldgaard Pedersen[1,2], Polina Martinkevich[1,2], Bjarne Møller-Madsen[1, 2]
1. Department of Children's Orthopedics, Aarhus Universitet; 2. dpor.dk, Aarhus, Denmark, Denmark

Background: Cerebral Palsy (CP) is a motor function disorder due to damage in the immature brain. One motor function difficulty seen amongst patients with CP is a spastic varus foot deformity caused by an overactivation of the tibialis posterior muscle (TP) or a weakening of the peroneus muscle group. This contributes to several problems in the daily life of these patients. The dynamic characteristic of the disease makes it difficult to treat. One treatment option is tibialis posterior tendon transfer (TPT).
Aim: This study aims to investigate the life quality of patients with CP treated with TPT for spastic varus foot.
Materials and Methods: In this retrospective single-centre follow-up study 24 patients were included of which 19 patients with a total of 26 operated feet answered the patient reported outcome measure (PROM). The mean follow-up time was 2.6 years ± 2.14. PROMs were collected using the validated Danish translation of the Oxford Ankle and Foot Questionnaire (OxAFQ-C). OxAFQ-C investigates four main domains; Physical activity, School and Play, Emotional outcome, and Footwear and Clothing. Answers given by the patient, or a proxy were collected using REDCap or through phone calls.
Results: OxAFQ showed that patients were most satisfied regarding School and Play. As seen in (Fig 1) the majority answered 'Never' in three out of four questions asked in this domain, which implies that they were not troubled regarding these events. Patients were least satisfied concerning some aspects of physical activity (Fig 1). In this domain patients answered that they were "Often" or "Always" hindered when running or standing for a longer period.
Interpretation / Conclusion: Results indicate that TPT is valuable to patients with CP and spastic varus foot. The study suggests that patients who underwent TPT experience satisfaction especially concerning School and Play. However, patients were generally satisfied in all four invastigated domains. Information on patient satisfaction of TPT for patients with CP is still scarce. This study invites to consider TPT as a simple soft tissue procedure in spastic varus foot with weakening of the peroneus muscle group or overactivation of TP.

202. Long-term functional follow-up of pediatric orthopedic sarcoma patients treated with brachytherapy

Christian Kveller[1], Thomas Baad-Hansen[1]
1. Department of Orthopaedic, Aarhus University Hospital

Background: Sarcomas are rare and aggressive tumors, affecting all age groups, accounting for approximately 1% of all adult malignancies and over 10% of pediatric malignancies. A majority of these tumors are treated with a combination of surgery, chemotherapy, and radiation therapy. Radiation near growth zones can result in abnormal or stunted development, as well as the risk of induction of malignancy secondary to the radiation. Brachytherapy allows delivery of high doses of radiation to the tumor or tumor-bed, while sparing surrounding tissue and treatment duration is shortened compared to external beam radiotherapy, while avoiding radiation- related side effects.
Aim: To assess the functional outcome and long-term effects on extremity function following brachytherapy treatment in all pediatric patients having received brachytherapy at our institution.
Materials and Methods: Pediatric patients having received brachytherapy were identified through internal hospital records and patients were recruited during regular follow-up appointments, during which they were interviewed and completed PROMs.
Results: 3 patients were recruited. None had experienced recurrence during follow-up. Time since treatment ranged from 5-9 years. 66% were treated at or near a physis and 100% of these experienced limb-length discrepancy, while only the patient with lower extremity length discrepancy was symptomatic. 66% had experienced progressive functional deterioration inversely correlated with growth due to unyielding cicatricial tissue, more pronounced in patient with lower extremity affection. 66% had undergone pronounced muscle excision during treatment and experienced decreased endurance in the affected limb. None reported neural deficits despite having received surgery and radiation adjacent to significant peripheral nerves.
Interpretation / Conclusion: Brachytherapy is a viable treatment modality for pediatric sarcomas with good functional results. However, the dynamic growth of the patient poses challenges in securing the best possible functional outcomes. Closer cooperation with oncological late effects clinics and pediatric orthopedic surgeons may be beneficial as the brachytherapy patient's post-operative conditions mimic growth abnormalities.

Poster Walk 6:

Sports Orthopaedics

Chair: Adam Witten & Cecilie Køllner Olsen

160. The use of osseous risk factors and patient reported outcome measures in studies investigating treatment of patellar dislocation: a scoping review

Ebrahim Rahdi[1], Catarina Anna Evelina Malmberg[1], Tue Smith Jørgensen[2], Rafal Yahya[1], Adam Witten[1], Lars Blønd[2], Per Hölmich[1], Kristoffer Weisskirchner Barfod[1,3]

1 Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Denmark 2 The Zealand University Hospital of Koege 3 Unit of Sports Traumatology, Department of Orthopedic Surgery, Copenhagen University Hospital, Bispebjerg-Frederiksberg

Background: Treatment of patellar dislocation is based on the absence or presence of osseous risk factors.

Aim: To map the literature regarding the use of osseous risk factors, patient reported outcome measures (PROM's), and treatment methods in studies investigating treatment of patellar dislocation.

Materials and Methods: This was a scoping review following the PRISMA guidelines extension for scoping reviews (PRISMA-ScR). Studies published between January 1, 2013, and April 3, 2023, were eligible for inclusion if investigating the treatment of patellar dislocation and mentioning an osseous risk factor. Case series with fewer than 10 patients, reviews, and meta-analyses were excluded.

Results: A total of 8,923 records were identified, 1,007 were full text-screened, and 300 articles were included. A two-fold increase of articles investigating the treatment of patellar dislocation was observed from 2013 to 2022. Across the included articles, 160 osseous risk factors and 56 PROM's were identified. 131 (44%) of the included articles used osseous risk factors as in- or exclusion criteria. 26 (9%) articles used a PROM developed for evaluation of patellar instability (the Banff Patellar Instability Instrument or the Norwich Patellar Instability score) to evaluate the treatment effect. The most frequently investigated treatment was medial patellofemoral ligament reconstruction (231 articles, 77%) followed by tibial tubercle osteotomies (87 articles, 29%). A threefold increase of articles investigating these methods was observed from 2013 to 2022, and the same was observed for trochleoplasties.

Interpretation / Conclusion: Since 2013, a two-fold increase in studies investigating treatment outcome after patellar dislocation and mentioning osseous risk factors was seen, but less than half of the studies defined the study population based on the absence or presence of osseous risk factors. Only one out of ten studies used a PROM developed for evaluation of patellar instability to evaluate the treatment effect. The most frequently investigated treatment was medial patellofemoral ligament reconstruction.

163. Cross-cultural validity and reliability of the Danish version of the Banff Patella Instability Instrument (BPII 2.0)

Torsten Grønbech Nielsen[1,2], Martin Lind[1], Simon Damgaard Petersen[3], Pia Kjær Kristensen[2]
1. Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus, Denmark; 2. Department of Clinical Medicine, Aarhus University, Aarhus, Denmark; 3. Department of Orthopedic Surgery and Traumatology, Lillebaelt Hospital, Kolding, Denmark.

Background: The Banff Patellar Instability Instrument 2.0 (BPII 2.0) is a patient reported outcome measure designed specifically for measuring patellofemoral instability. As only few questionnaires evaluating patellar instability has been developed, the BPII 2.0 might be the best option to evaluate patients with patellar instability. The questionnaire has shown good psychometric properties in major countries. A cross-cultural translated Danish version of the BPII 2.0 was done in 2019, but the psychometric properties have not been evaluated.
Aim: This present study aimed to assess the BPII 2.0 psychometric properties in a Danish population of patients with patellar instability. Secondly to present the cross-culturally translated and adapted Danish version of the BPII 2.0.
Materials and Methods: The BPII 2.0 was cross-culturally adapted according to international guidelines. The BPII 2.0-DK was tested for concurrent validity (Spearman Rho), internal consistency (Cronbach alpha), and test-rest reliability (intraclass correlation-ICC) in a cohort of patients with patellar instability. The Tegner activity score, the Victorian Institute of Sport Assessment-Patella (VISA-P), the Anterior knee pain scale (Kujala-DK), and the International Knee Documentation Committee (IKDC) were used to assess convergent validity. The test-retest reliability of the Danish version of the BPII 2.0 was evaluated in 50 patients with patellar instability. The patients completed the score, 2 times with a 7-day interval between assessments.
Results: Very strong concurrent validity was found with a value of 0.80 for VISA-P, 0.79 for Kujala-DK and 0.87 for IKDC. Strong convergent validity was found with the Tegner activity score (0.67). A calculated Cronbach alpha sum score of 0.97 indicating excellent internal consistency among items within the BPII 2.0. Test-retest reliability shows excellent and consistent results between the 2 assessments 7 days apart with ICC sum score of 0.94 and individual sum scores from 0.36 to 0.96.
Interpretation / Conclusion: The BPII 2.0-DK is a valid and reliable tool for patients with patellar disorders, showing excellent internal consistency and excellent test-retest reliability and is comparable to other translated versions of the BPII 2.0.

164. Two-year outcome after Bereiter trochleoplasty for high grade trochlear dysplasia in a cohort of 374 consecutive cases over a ten-years period (2011-2022).

Christian Dippmann[1], Anette Kourakis[1], Simone Rechter[1], Volkert Siersma[2], Peter Lavard[1]
1 Section for Sports Traumatology M51, Department of orthopedic surgery, Copenhagen University Hospital Bispebjerg and Frederiksberg, Copenhagen, Denmark. A part of IOC Research Center Copenhagen. 2 The Research Unit for General Practice and Section of General Practice, Department of Public Health, University of Copenhagen, Denmark

Background: Recurrent patellar dislocation (chronic patellar instability) is often caused by predisposing factors, with trochlear dysplasia (TD) as the most prominent. Untreated patellar instability leads to impaired function and an increased risk of patellofemoral osteoarthritis. TD can be treated by trochleoplasty (TP) and section of sports traumatology at Bispebjerg Frederiksberg Hospital has performed 78% of the TPs in Denmark between 2011 -21, following a standardized treatment algorithm including Bereiter TP by which all predisposing factors are corrected.
Aim: To analyse a cohort of consecutive patients treated 2011-2021 with Bereiter TP for severe TD, including their concomitant predisposing factors, for two-year clinical and patient reported outcome measures.
Materials and Methods: Prospectively collected information covering 2011 to 2021 was analyzed for all patients undergoing patella stabilizing surgery with TP +/- concomitant procedures to correct predisposing pathology (MPFL reconstruction, medialization/distalization of the tibial tuberosity, de-rotating osteotomy, among others). Data preoperatively and at follow-up after one and two years included clinical examination and scores from patient reported outcome measures (Kujala, KOOS and Lysholm).
Results: From 2011 to September 2021 374 Bereiter TPs were performed on 335 patients (102 males, 233 females, 39 bilateral surgeries). There were 92 cases (25%) who had previous patella stabilising surgery. The mean age at surgery was 22 years (range 12-47). All patients had TP and MPFL-reconstruction. 94 knees (25%) also had medialization of the tibial tuberosity, while 98 (26%) had other additional procedures. 102 knees (27%) had subsequent surgery (in 49 (12.1%) arthroscopically assisted brisement force). Four knees (1.1%) experienced a re- dislocation. There were significant improvements in all PROM-scores ($p<.0001$), e.g. mean Kujala (range 0-100) had improved 18.7 points (95%CI 16.5-20.9), and mean KOOS QoL 31.0 points (95%CI 28.0-34.0) two years after surgery.
Interpretation / Conclusion: Following our algorithm there was a very low re- dislocation rate and significant improvement of the subjective condition one and two years after Bereiter trochleaplasty.

167. Evaluating knee muscle strength with the ForceFrame dynamometer in patients with anterior cruciate ligament injury - a study evaluating psychometric properties

Kamilla Arp[1,2], Thomas Frydendal[3,4], Troels Kjeldsen[3,4], Ulrik Dalgas[5], Signe Timm[1], Bjarke Viberg[6,7], Claus Ingwersen[1,8], Claus Varnum[1,2]

1. Department of Orthopedic Surgery, Lillebaelt Hospital - University Hospital of Southern Denmark, Beriderbakken 4, 7100 Vejle, Denmark 2. Department of Regional Health Research, University of Southern Denmark, Campusvej 555230 Odense M, Denmark 3. Department of Orthopedic Surgery, Aarhus University Hospital, Palle Juul- Jensens Boulevard 99, 8200 Aarhus N, Denmark 4. Department of Clinical Medicine, Aarhus University, Palle Juul-Jensens Boulevard 99, 8200 Aarhus N, Denmark 5. Exercise Biology, Department of Public Health, Aarhus University, Dalgas Avenue 4, 8000 Aarhus C, Denmark 6. Orthopaedic Surgery and Traumatology, Odense University Hospital, J. B. Winsløws Vej 4, 5000 Odense C, Denmark 7. Traumatology, Hospital Lillebaelt - University Hospital of Southern Denmark, Sygehusvej 24, 6000 Kolding, Denmark 8. Department of Physio- and Occupational therapy, Lillebaelt Hospital - University Hospital of Southern Denmark, Beriderbakken 4, 7100 Vejle, Denmark

Background: Restoring maximal muscle strength of knee extension and knee flexion following anterior cruciate ligament (ACL) injury and reconstruction is of great importance. It is therefore essential for clinicians and healthcare providers to have dynamometers that are easy-to-use, valid and reliable. The ForceFrame is a novel dynamometer that may be a reliable option in comparison to the gold-standard isokinetic dynamometer.

Aim: To assess the reproducibility of the ForceFrame dynamometer and compare to an isokinetic dynamometer in maximum voluntary isometric contraction (MVIC) during knee extension and flexion.

Materials and Methods: Twenty-seven participants with ACL injury or reconstruction participated in this reproducibility study. ForceFrame MVIC were tested on two separate days: Day one including gold-standard isokinetic dynamometer,day two assessment by a new assessors. Main outcomes were concurrent validity and agreement (ForceFrame vs. isokinetic dynamometer), day-to-day test- retest reliability and agreement and inter-tester reliability of ForceFrame.

Results: ForceFrame showed a fair concurrent validity compared to the isokinetic dynamometer for extension (r=0.56), poor concurrent validity for flexion (r=0.24), Bland-Altman plots between ForceFrame and the isokinetic dynamometer showed a mean difference of -0.51 Nm/kg for extension and -0.32Nm/kg for flexion. There was a good day-to-day test-retest reliability for MVIC of extension (ICC=0.77, CI95: 0.48-0.90) and flexion (ICC=0.83, CI95: 0.61-0.92), while there were excellent inter-tester reliability for MVIC of extension (ICC=0.97, CI95: 0.94-0.98) and flexion (ICC=0.93, 95CI: 0.85-0.97). Standard error of measurement was 8% and 9% while the smallest detectable change was 22% and 27% for extension and flexion, respectively.

Interpretation / Conclusion: ForceFrame can be used to obtain valid and reliable results to assess MVIC of knee extension and flexion but absolute results may be considered an underestimation of actual MVIC. The test position to assess knee flexion in ForceFrame does not appear to be optimal, and different test-positions may be considered.

168. Patellar Dislocation and Trochlear Dysplasia: Reference data concerning the Banff Patella Instability Instrument (BPII), the Kujala score, the Marx score and the EQ-5D in people aged 15-19 from the nationwide Faroese Knee Cohort

Niclas Højgaard Eysturoy[1,5], Hans-Christen Husum[2], Lina H. Ingelsrud[3], Lars Blønd[4], Elinborg Mortensen[1], Per Holmich[5], Kristoffer Barfod[5]

1. Department of Orthopedic Surgery, National Hospital of the Faroe Islands, Torshavn, Faroe Island 2. Interdisciplinary Orthopedics, Aalborg University Hospital, Denmark. 3. Clinical Orthopedic Research Hvidovre, Copenhagen University Hospital Amager- Hvidovre, Copenhagen, Denmark 4. Zealand University Hospital, Køge and Aleris Hospital, Copenhagen, Denmark. 5. Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Amager-Hvidovre, Copenhagen, Denmark

Background: .
Aim: To investigate patient-reported outcome measurement (PROM) reference data on a national cohort of patients between 15-19 years with prior patella dislocation and trochlear dysplasia.
Materials and Methods: All inhabitants in the Faroe Islands between 15 to 19 years were invited to answer an online survey. The survey included questions concerning prior patellar dislocation and the PROMs: Banff Patella Instability Instrument (BPII), Kujala score, Marx score and the EQ-5D- 5L. Three cohorts were established: 1) The background cohort consisting of the participants with no prior patellar dislocation, 2) The patellar dislocation cohort consisting of all participants with prior patellar dislocation, 3) The trochlear dysplasia cohort consisting of participants with prior patellar dislocation who had trochlear dysplasia.
Results: 3749 persons were contacted, and 1119 (30%) completed the demographic survey and at least one PROM. 43 persons had prior surgery to the knee and were excluded. 102 reported prior patellar dislocation, of whom 57 were found to have trochlear dysplasia. All PROMs except the Marx score reflected worse quality of life and function after patellar dislocation than the background population, most pronounced in the BPII. The percentage of people experiencing problems in the EQ-5D-5L dimensions was increased for the patellar dislocation cohort and the trochlear dysplasia cohort in all EQ-5D-5L domains, except for anxiety/depression.
Interpretation / Conclusion: Young people (age 15-19) with prior patellar dislocation report seriously affected quality of life and function measured with the BPII, the Kujala, the EQ-5D-5L index values, and all EQ-5D-5L domains except anxiety/depression.

177. Seventy-four percent of patients with Anterior Cruciate Ligament injury treated non-operatively manage without Anterior Cruciate Ligament reconstruction five years after treatment

Randi Rasmussen[1], Lone Frandsen[2], Torsten Grønbech Nielsen[2], Martin Lind [2]
1. Department of Physiotherapy and Occupational Therapy 2. Department of Orthopaedics, Aarhus University Hospital

Background: Today, both operative and non-operative treatment of Anterior Cruciate Ligament (ACL) injuries are considered viable treatment options depending on the individual patient's preference. The Danish Knee Ligament Reconstruction Registry (DKRR) monitor the outcomes of surgeries for ACL-injury. However, no registry data exist for ACL injury patients who are managed non-operatively
Aim: To investigate how many patients remained non- operatively treated five years after physiotherapy-led non-operative treatment. Furthermore, we aimed to describe and compare the demographics and epidemiology characteristics of patients who managed with non-operative treatment and patients who failed non-operative treatment and were converted to ACLR
Materials and Methods: A retrospective analysis was performed to identify patients with ACL injuries referred to non-operative treatment at The Orthopaedic Rehabilitation Center in Aarhus between 2014 and 2018. Demographic and epidemiology data were extracted from medical records. Furthermore, patients were encouraged to complete a questionnaire. Finally, data from the Danish Knee Ligament Registry was extracted to identify the patients who underwent ACLR
Results: A total of 289 patients (290 knees), with 63.5% females and a mean age of 37.4 years (range 18-64) were identified in medical records. Mean time from physiotherapy-led non-operative treatment to ACLR was nine months. Seventy-four percent (216 patients) managed with non-operative treatment five years after physiotherapy-led non-operative treatment. 76% of these were females with a mean age was 39.2 years. 161 patients had an isolated ACL injury while 52 had ACL and medial collateral ligament (MCL) injury. Of the 72 patients that converted to ACL reconstruction were 66% females with a mean age of 32.7 years. Fourty-eight patients had an isolated ACLR and three patients had ACLR and MCL reconstruction while 21 patients had ACLR and meniscal surgery
Interpretation / Conclusion: 74% of patients with ACL injury treated with physiotherapy-led non-operative treatment managed without conversation to ACLR five years after treatment. More females than males were referred to non-operative treatment. Patients converted to ACLR within the first year after treatment

193. Limited evidence on which patients need anterior cruciate ligament reconstruction after initial treatment with rehabilitation. A scoping review

Kamilla Arp[1,2], Jacob Nedermark[1], Kim Ingwersen[2,3], Eva Ageberg[4], Claus Varnum[1,2], Bjarke Viberg[5],
1.Department of Orthopedic Surgery, Lillebaelt Hospital – Vejle, University Hospital of Southern Denmark, Denmark 2. Department of Regional Health Research, University of Southern Denmark, Odense, Denmark 3. Department of Physiotherapy, Lillebaelt Hospital – Vejle, University Hospital of Southern Denmark, Vejle, Denmark 4. Department of Health Sciences, Faculty of Medicine, Lund University, Lund, Sweden 5. Orthopaedic Surgery and Traumatology, Odense University Hospital, Odense, Denmark

Background: Some patients with anterior cruciate ligament (ACL) injury initially treated with rehabilitation need ACL reconstruction (ACLR), yet it is unclear what characterizes these patients.
Aim: This review aimed to describe predictors for ACLR in patients initially treated with rehabilitation.
Materials and Methods: A systematic literature search was performed in the Cochrane, Embase, Medline, SportsDiscus and Web of Science databases from inception to 21st of February 2023. Articles describing characteristics in adult patients with ACL injury undergoing ACLR after minimum of 5 weeks rehabilitation were included. It was a priori chosen that characteristics described in at least three articles were considered more certain and could be defined as a predictor for ACLR. Characteristics described in less than three articles were considered less certain and therefore defined as possible predictors. Articles were screened by two independent reviewers. The study was originally intended as a systematic review with meta-analysis but in case of limited data we would convert to a scoping review, as was the case for this review.
Results: There were 22,836 studies identified and 181 full texts were screened of which 10 papers were finally included. Only lower age and higher preinjury activity level were identified as predictors for ACLR. Another 12 possible predictors were identified in single studies. Through an iterative process, potential predictors were categorized into 4 groups: patient demographics, knee function, patient-reported outcome measures and anatomical structures.
Interpretation / Conclusion: Lower age and higher preinjury activity level were the only predictors for ACLR after initial treatment with rehabilitation. The evidence regarding which patients need delayed ACL reconstruction is very limited. While younger and highly active patients show a higher need for ACLR more studies focusing on predictors and reasons for delayed ACLR are warranted.

201. Low complication rate for lateral patellar instability treated with a non-anatomic functional reconstruction of the medial patellofemoral ligament

Johanna Dalsgaard[1], Signe Petri[1], Henrik Sjølander[1], Jens Christian Pörneki[2], Knud Gade Freund[3], Niels Maagaard[1], Bjarke Viberg[1]

1. Department of Orthopaedic Surgery and Traumatology, Odense University Hospital; 2. Department of Orthopaedic Surgery and Traumatology, Hospital Lillebaelt – University Hospital of Southern Denmark; 3. Department of Orthopaedic Surgery and Traumatology, Hospital of South West Jutland.

Background: Most hospitals in the Region of Southern Denmark uses a lesser demanding technique for the reconstruction of the medial patellofemoral ligament (MPFL) but it has not been assessed for complications. Instead of anchoring the MPFL graft in the bone, the graft is sutured into the top of the medial collateral ligament (MCL) using it as a pulley providing a functional non-anatomical reconstruction. This procedure offers several advantages: a simpler technical procedure without the use of fluoroscopy, the fixation is dynamic and not static as with an interference screw in the femur, and the procedure can be used for children with open physis as well.

Aim: To assess the outcome of an operative method for non-anatomic medial patellofemoral ligament (MPFL) reconstruction using the medial collateral ligament (MCL) as a pulley in adults above 16 years old

Materials and Methods: Patients were retrieved using procedural codes for MPFL reconstruction at hospitals the region of Southern Denmark from 1st of January 2016 to 31st of December 2020. Health care records were reviewed for data concerning surgical information with one- and two-year follow-up. All patients with a primary MPFL reconstruction (no previous surgery) were included. Major complications were defined as re-dislocations, infections, and reoperations with intervention of the graft. Minor complications were defined as arthroscopy of the knee without graft intervention.

Results: There were 420 knees (342 patients) with non-anatomic MPFL reconstruction included in the study. The median age was 22 (16-78) years and 68.5% were female. The gracilis tendon was used as the graft in 92.4% of the cases and there were 76 (18.2%) patients who had additional minor surgery to the primary intervention such as synovectomy, lateral release, and cartilage debridements or reinsertions. There were an overall of 14 (3.3%) complications within 1 year and 26 (6.2%) within 2 years. Within the first year, 10 (2.4%) were major complications, and four (1%) were minor. Within 2 years, 18 (4.8%) were major complications and eight (1.9%) were minor.

Interpretation / Conclusion: Using the MCL as a pulley demonstrates low rates of major complications and can safely be used in the reconstruction of the MPFL.

154. The effectiveness of low-load Blood flow restriction Exercise in patients with an acute Achilles tendon rupture treated Non-surgically (BEAN): Protocol for a randomized controlled trial

Andreas Bentzen[1,2], Per Gundtoft[1], Karin Silbernagel[3], Stian Jørgensen[1,4,5], Inger Mechlenburg[1,2,6]
1. Department of Orthopaedic Surgery, Aarhus University Hospital 2. Department of Clinical Medicine, Aarhus University 3. Department of Physical Therapy, University of Delaware, USA. 4. Department of Occupational and Physical Therapy, Horsens Regional Hospital 5. H-HIP, Department of Orthopedic Surgery, Regional Horsens Regional Hospital 6. Department of Public Health, Aarhus University

Background: Blood flow restriction exercise (BFRE) has been proposed as a viable method for preserving muscle mass and function after an injury, particularly during periods of load restrictions, such as after an acute Achilles tendon rupture. However, its effectiveness and safety in patients with an Achilles tendon rupture have yet to be evaluated in a randomized trial.
Aim: The objective of this trial is twofold: firstly, to investigate the effectiveness of early initiated BFRE in patients with non-surgically treated acute Achilles tendon rupture; secondly, to evaluate whether there is a difference in outcome when applying BFRE in the beginning (1-12 weeks) versus later in the rehabilitation period (13-24 weeks).
Materials and Methods: This is an assessor-blinded, randomized, controlled multicenter trial with patients assigned in a 1:1 ratio to two parallel groups, that either receive BFRE in weeks 1-12 followed by usual care in weeks 13-24, or receive usual care in weeks 1-12 followed by BFRE in weeks 13-24. The BFRE program is performed three times weekly on the injured leg at 80% of the pressure required to restrict the arterial blood flow fully. Post-intervention tests are conducted in week 13, comparing early BFRE with usual care, and in week 25, comparing early BFRE with late BFRE. At the 13-week evaluation, the primary outcome is the Single-Leg Heel-Rise test which assesses the patient's ability to raise the heel of the injured leg a minimum of 2 cm. At the 25- week evaluation, the primary outcome is the Achilles tendon Total Rupture Score which assesses the patient's self-reported symptoms and physical ability.
Results: Results are expected in early 2027.
Interpretation / Conclusion: BFRE may enable patients with Achilles tendon rupture to return to normal function far earlier than with current rehabilitation practices. We expect that positive results regarding the effectiveness of BFRE in patients with an Achilles tendon rupture may profoundly impact the physiotherapeutic practice within this patient group, both locally at participating hospitals and possibly on a national and international scale.

Poster Walk 7:

Trauma

Chair: Bjarke Viberg & Ole Brink

149. TENSION BAND VERSUS LOCKING PLATE FIXATION FOR THE TREATMENT OF PATELLA FRACTURES - a study and an analysis plan for a multicenter, Randomized Clinical Trial

Rasmus Elsoe[1], Rikke Thorninger[2], Rasmus Severinsen[2], Jens-Christian Beuke[3], Rikke Serritslev[3], Steffen Skov Jensen[4], Morten Kjerri Rasmussen[4], Peter Szephalmi[5], Juozas Petruskevicius[6], Jeppe Barckman[6], Nils Henrik Bruun[7], Peter Larsen[1,8]

1 Department of Orthopedic Surgery, Aalborg University Hospital, Denmark 2 Department of Orthopedic Surgery, Randers, Denmark 3 Department of Orthopedic Surgery Kolding, Denmark 4 Department of Orthopedic Surgery Viborg, Denmark 5 Department of Orthopedic Surgery, Hjoerring Hospital, Denmark 6 Department of Orthopedic Surgery, Aarhus University Hospital Denmark 7 Research Data and Biostatistics, Aalborg University Hospital, Aalborg Denmark 8 Department of Occupational Therapy and Physiotherapy, Aalborg University Hospital, Aalborg, Denmark

Background: Following surgical management of patella fractures, patients commonly report pain, difficulties with weight-bearing tasks such as walking, running, and climbing stairs and restrictions in quality of life. Recently a locking plat system for surgical management of patella fractures have been introduced. To date, no studies have tested standard treatment with tension band wiring against locking plate fixation in a randomized study design.

Aim: We aim to compare the 1-year patient- reported Knee Injury and Osteoarthritis Outcome subscale Scores (KOOS5- subscales) after standard care tension band fixation with locking plate fixation for patients with patella fractures.

Materials and Methods: This study is a multicenter randomized and prospective clinical trial. A total of 122 patients will be included in the study, and the primary outcome will be the KOOS at 12 months following surgery.

Results: This is a study protocol - no results will be available

Interpretation / Conclusion: Findings from the present study is expected to advance the understanding of outcome following surgical treatment of patella fractures.

150. The knee injury and osteoarthritis outcome score (KOOS) for lateral tibial plateau fractures – validity, reliability, responsiveness, and minimal clinically important difference

Jens Trærup[1,2]

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

Background: Evidence is lacking in psychometric properties such as validity, reliability, responsiveness, and minimal clinically important difference for PROMs to patients with lateral tibial plateau fractures

Aim: This study aimed to establish validity, reliability, and responsiveness and to estimate the minimal clinically important difference (MICD) of the Knee Injury Osteoarthritis outcome score (KOOS) for patients with lateral tibial plateau fractures.

Materials and Methods: Adult patients with surgically treated lateral tibial plateau fractures (AO 41B) were included. The primary outcome measure was the KOOS subscales: Pain, Symptoms, Activity of Daily Living (ADL), Sport and Recreational Activities (Sport/rec), and Quality of Life (QOL). The KOOS was repeated at 14 and 15 days, six weeks, and 6 and 12 months. Content validity was evaluated by patients ranking the relevance of all the items in the KOOS, test-retest reliability by an interclass correlation coefficient, and responsiveness by effect size end estimation of minimal clinically important difference (MCID) by the anchor-base method.

Results: Forty-one patients with a mean age of 54.8 years (ranging from 21 to 81 years) were included. The results showed an acceptable content validity of all the KOOS subscales. The test-retest reliability was moderate to high for all five subscales, with an interclass-correlation coefficient ranging from 0.6-0.9. At the 6- and 12-month follow-ups, the responsiveness showed large effect sizes for all the KOOS subscales, ranging from 0.9 to 2.1. The MCIDs for the KOOS subscales were: Pain 5.6, Symptoms 7.9, ADL 5.3, Sport/Rec 6.1, and QOL 6.1.

Interpretation / Conclusion: The KOOS appear to be a valid and useful patient- reported outcome measure to capture patients' perceived outcomes within one year following a lateral tibial plateau fracture.

155. Accuracy and reliability of the AO/OTA classification for tibial shaft fractures

Rasmus Stokholm[1], Peter Larsen[1,2], Jan Duedal Rölfing[3], Marie Arildsen[1], Christian Rasmussen[1], Firaz Mahdi[4], Rasmus Elsoe[1]

1.Department of Orthopedic Surgery, Aalborg University Hospital, Aalborg, Denmark 2. Department of Occupational Therapy and Physiotherapy, Aalborg University Hospital, Aalborg, Denmark. 3. Department of Orthopedics, Aarhus University Hospital, Aarhus, Denmark. 4. Department of Radiology, Aalborg University Hospital, Aalborg, Denmark

Background: Available literature lacks information regarding the accuracy and reliability of the AO/OTA classification for tibial shaft fractures.

Aim: This study aimed to assess the inter- and intra-observer agreement and accuracy of the AO/OTA 42 classification (4-signs) for adult patients with tibial shaft fractures.

Materials and Methods: The study design is an accuracy, inter- and intra-observer agreement study. Anterior and posterior (AP) and side X-rays of the fracture were used in the examination. The raters comprised two junior doctors and two orthopedic trauma consultants. A committee including two consultant orthopedic trauma surgeons, one consultant orthopedic radiologist, and one associate professor was established to represent the “golden standard.” Each patient was scored twice, including a washout period between the first and second examinations of minimum 18 days.

Results: A total of 101 patients were included. X-rays were available for all 101 patients. Based on the golden standard classification, AO/OTA 42-A1 (56%) was the most common fracture type, followed by AO/OTA 42-A3 (14%). The agreement, when comparing the four raters and the golden standard classification was between 75% and 86% (Choen’s kappa 0.53 to 0.79). Choen’s kappa coefficient for intra-and inter-observer agreement was between 0.57 and 0.74 and 0.47 and 0.59, respectively.

Interpretation / Conclusion: This study showed substantial to moderate accuracy of the AO/OTA 42-classification for tibial shaft fractures. Inter- and intra- observation agreements showed substantial to moderate agreement. Results indicated that using the AO/OTA 42- classification for tibial shaft fractures may be valuable in clinical practice.

166. AI software technology for quick Hip-fracture detection

Camilla Cronstad Jørgensen[1], Kamilla Jægerum Nielsen [2], Michael Lundeman[3], Jacob Fyhring Mortensen[4]

1: Anaestisiology department, Nykøbing Falster hospital. 2: Orthopaedics, Slagelse hospital. 3: Radiobotics ApS. 4: orthopaedic department, Nykøbing Falster Hospital.

Background: Fast diagnosis and treatment are pivotal in the management of hip fractures and have been shown to reduce the 1-year mortality rate and number of complications following surgery.
Aim: The aim of this study was to investigate how the use of an artificial intelligence (AI) decision support tool may affect the diagnostic accuracy of clinicians working with the diagnostic workup of hip and pelvic fractures in an accident and emergency (A&E) department.
Materials and Methods: Radiographic exams from 214 adult patients referred with suspicion of hip fractures were consecutively collected using stratified sampling to ensure a 50% fracture prevalence. Two radiographers, two medical interns and two consultants evaluated fracture status on all exams without and with support from the AI tool. The reference standard was defined from the radiological reports, taking additional information from computed tomography into consideration when relevant. The change in sensitivity and specificity was recorded.
Results: The patient age was 78.0 (standard deviation: 11.9) and 149 were females. The sensitivity and specificity across all clinicians changed from 0.93 (CI: 0.91;0.95) and 0.87(CI: 0.85; 0.90) to 0.96 (CI: 0.95; 0.98) and 0.86 (CI: 0.83; 0.89), respectively. The change was equivalent to a 43% reduction in missed fractures and 8% increase in overcalls. The improvement in sensitivity was consistent for all six readers. The specificity, on the other hand, decreased for the radiographers and the seniors, but not for the interns. Furthermore, with the help from the AI tool, radiographers and interns found as many fractures as the senior orthopedists, but not as many as the AI.
Interpretation / Conclusion: The sensitivity for hip and pelvic fracture detection among and clinicians increased significantly when supported by the AI tool. The change in specificity was not statistically significant. The improvement in diagnostic performance may lead to improvements in patient care through better initial diagnosis and shorter time to surgery, however, this warrants further research in a prospective study.

171. RESTORE: a multi-national, Randomized Controlled Trial of a Local Osteo-Enhancement Procedure (LOEP) to Prevent Secondary Hip Fractures in Women Presenting with Index Fragility Hip Fracture

Jan Duedal Rölfing[1,2], Rikke Thorninger[1,2], Ole Brink[1,2], Rehne Lessmann Hansen[1,2], Ahmed Abood[1,2], Per Hviid Gundtoft[1,2],

1. Department of Orthopaedics, Aarhus University Hospital 2. International RESTORE collaborators

Background: Hip fractures occur predominently in as fragility fractures in postmenopausal women. The 1-year cumulative incidence of secondary hip fractures has been estimated to be 2-10%, increasing up to 20% by 5 years. Preventing a contralateral secondary hip fractures may thus be an important treatment goal after sustaining a hip fracture.

Aim: RESTORE (NCT04796350) will evaluate the safety and efficacy of AGN1 LOEP in reducing the incidence of secondary hip fractures in subjects presenting with an index hip fracture and undergoing hip fracture repair surgery.

Materials and Methods: Up to 2,400 women ≥65 years of age will be randomized (1:1) to receive AGN1 LOEP on the contralateral, non-fractured hip in a single- blinded, multi-national study. AGN1, a proprietary calcium-based implant material is delivered using a minimally invasive procedure to strengthen the proximal femur. The cumulative incidence of secondary fractures and adverse events (primary outcomes) will be compared to a non-treated, control arm over a 5-year study period. As an event driven study, efficacy and safety analysis will be performed once 56 secondary hip fractures occur across both study arms. An interim analysis at the 28- event mark may result in an “early-win” termination of recruitment, subject to a statistically significant effect. Areal bone mineral density (aBMD) will be compared at 12, 24 and 60-months using interval DXA scans, as secondary outcome measure.

Results: To date, 224 patients have been enrolled across 51 sites in Austria, Denmark, France, Germany, Italy, the Netherlands, Spain, the UK and Japan. Aiming at a total of up to 100 RESTORE sites globally, additional sites in Canada and Europe are currently in activation.

Interpretation / Conclusion: The first Danish site, Aarhus University Hospital, was activated in February 2024. Other Danish and Scandinavian sites may follow. Hopefully, minimally invasive AGN1 LOEP will prove as safe as well as effective in preventing secondary fractures in at risk treated hips.

182. Healing, infection rates and clinical scores of surgically treated tibial non-unions: a single-centre cohort of 53 consecutive patients with a mean 2.8 years follow-up

Marie Arildsen[1], Jan Duedal Rölfing[1, 2], Mats Bue[1, 2], Juozas Petruskevicius[1]
1. Department of Orthopaedics, Aarhus University Hospital, Denmark 2. Department of Clinical Medicine, Aarhus University, Denmark

Background: Tibial non-unions are notoriously difficult to treat due to the high risk of infection and the need for multiple surgical procedures. Non-union occurs after approx. 2% of all fractures and up to 17% of tibial fractures. The treatment is costly, often demanding long recovery with the risk of chronic pain, reduced functional outcomes and amputation.
Aim: To report healing, infection rates and clinically relevant non-union scores in surgically treated tibial shaft non-union patients.
Materials and Methods: A single-centre retrospective follow-up study of a consecutive cohort of 53 patients (18 F, median age 56 (IQR 24-64), and 35 M, median age 50 (IQR 34- 62)) treated at Aarhus University Hospital from Dec 2018 until Dec 2023. Pathological fractures, as well as non-union after osteotomies, were excluded. Infection status was evaluated based on the diagnostic criteria for fracture-related infections. NUSS was used as clinical non-union score and RUST to evaluate radiographic healing.
Results: During a mean follow-up of 2.8.y, 49 patients (92%) obtained healing, 2 were amputated, and 2 were lost to follow-up. 21 patients were confirmed infected: 17 monomicrobial, 3 polymicrobial and 1 with negative growth but a confirmatory clinical sign. 8 patients were identified as likely infected based on biochemical markers, presence of a persistent wound and a single bacteria identified by culture. 24 patients were ruled unlikely of infection. For data analysis infected and likely infected were pooled and tested against non-infected. The mean number of surgical revisions for the infected group was 2.5 (range 1-8) and for non- infected group, 1.8 (range 1-4). Neither the median RUST score 13.6 (IQR 13- 15) vs. 14.3 (IQR 13-15) or the median NUSS score 34 (IQR 26-38) vs. 27 (IQR (20-38) were significantly different between the infected and non-infected groups. External fixation for definitive surgical management was more often used in the infected group (p=0.01).
Interpretation / Conclusion: Results indicate that future standardized prospective data collection is needed in patients with tibial non-union to optimize the diagnostic approach and improve treatment. Treatment of these patients is complex and should be performed in a multidisciplinary team.

184. Fast track reconstructive surgery, a preliminary review of 22 cases

Ulrik Kähler Olesen[1]
Department of Orthopedics, Rigshospitalet, Copenhagen.

Background: Current focus on reducing health care cost by increasing flow in all aspects of surgical treatment, demands efficient solutions.
Aim: To evaluate the preliminary results of 22 cases of fast track surgeries in reconstructive orthopedic. Based on a new protocol aiming at discharge on the day or the day-after surgery: Avoiding epidurals and other motor blocks, minimizing blood loss (blodlessness, vasoconstrictors, compression), promoting fast mobilisation, involving all caregivers (surgeons, anesthesiologist, nurses, physiotherapists).
Materials and Methods: 20 patients booked for 22 elective procedures: Intramedullary lengthenings (6), osteotomies around the knee (7), bone transport (1) and hardware removals (8) were evaluated for LOS (length of stay), complications, and general satisfaction with the setup.
Results: 7 of 10 patients planned for same-day discharge achieved the goal. 3 patients had one extra night in hospital. 6 of 11 patients planned for discharge on the day after surgery achieved the goal. 5 patients had 2-4 additional nights in the hospital. Of these, 4 were osteotomies around the knee and one external ring fixator. Reasons for delay were pain (5), logistics (missing relative at home, late start (3), bleeding (1) and/or anticoagulant treatment issues (1).
Interpretation / Conclusion: Our protocol was relatively succesfull in achieving the time-saving goals, given the heterogenecity of the population. Reconstructive nailing seems less troublesome than osteotomies. Most patients were more than happy to recover in their home and expressed overall satisfaction with the setup. However, meticulous planning of all details in the flow, backup in case of delays, flexibility and close follow up, involvement of all allied health care givers, including relatives - is mandated to ensure compliance with the protocol.

200. High-voltage injury leading to bilateral transtibial amputation in a 17-year-old boy: A case report

Charlotte Mosbak Festersen [1], Sakshi Andersen[1], Rikke Holmgaard[1]
1. Department of Plastic Surgery and Burns Treatment, Rigshospitalet

Background: High voltage current can cause serious damage to the skin, but also to underlying tissue. Current passes through tissue with the lowest resistance (e.g. nerves, vessels, muscles) where it will generate heat, cause tissue necrosis and subsequently edema. Muscle breakdown (rhabdomyolysis) and edema in the muscle compartments may lead to compartment syndrome (CS), and if so, fasciotomy needs to be performed.
Aim: The purpose of this case report is to describe how the body is affected by high voltage current and to highlight possible complications.
Materials and Methods: Case report of a patient with severe injuries due to high voltage current.
Results: A 17-year-old male was admitted to the hospital in Greenland following a high voltage accident by a transmission tower. Examination revealed bilateral circumferential 3rd degree burns on the lower extremities and 2nd degree burns on some of the body and face. Due to the severe burns, the patient was intubated, but prior to this expressed severe pain from both feet. At initial assessment, there was no pulse or capillary refill (CR), but CS was not suspected. The patient had dark red urine - a sign of myoglobinuria. Transfer to Denmark was delayed 32 hours, and upon arrival, both feet appeared vital with bleeding from the dermis and with no obvious signs of CS. The patient underwent necrectomy of the 3rd degree burns 47 hours after the trauma, and during this, bilateral CS of the lower extremities was suspected. Bilateral fasciotomy was performed to regain sufficient blood supply distally however, the muscles were only partially vital. Bilateral transtibial amputation was performed 15 days after the trauma.
Interpretation / Conclusion: CS is a well-described complication to high voltage injuries typically characterized by pain as the predominant clinical symptom. In cases where electrical current passes through the body it is important to consider internal injuries especially in intubated patients who are unable to express pain. Key indicators such as the absence of distal pulses, delayed CR and the presence of myoglobinuria are indicators of potential internal damage. Therefore, fasciotomies must be performed with a low threshold if there is any anamnestic or clinical suspicion of CS.

173. Does single plating of complex tibial plateau fractures portend to lower infection rates?

Papa Kwadwo Morgan-Asiedu[1,2], Easton Ryan[1,3], Bram Verhofste[1,3], Devon Brameier[1], Nishant Suneja[1], Derek Stenquist[1], Michael Weaver[1], Arvind G. Von Keudell[1]

1. Harvard Medical School Orthopedic Trauma Initiative, Brigham and Women's Hospital 2. Perelman School of Medicine, University of Pennsylvania 3. Harvard Combined Orthopedics Residency Program

Background: There is scarce evidence comparing infection rates in complex bicondylar tibial plateau fractures treated with single versus dual plated Open Reduction Internal Fixation (ORIF)

Aim: To identify the rate of surgical site infection (SSI) in OTA/AO 41C tibial plateau fractures treated with single versus dual plating

Materials and Methods: Setting: Retrospective cohort study of patients presenting to two level 1 trauma centers with OTA/AO 41C tibial plateau closed fractures who received ORIF Intervention: Single vs dual plated ORIF Primary outcome: SSIs after index operation Covariates: Age, sex, BMI, tobacco use, alcohol use, compartment syndrome Chi square comparisons: Overall SSI rates, superficial SSIs, deep infections requiring reoperation stratified by AO fracture subclass to account for asymmetric distribution of higher energy fractures

Results: We included 223 patients with mean age 53.4 years, 49.3% (n=110) males, mean BMI 28.3. 148 had single plated ORIF and 75 had dual plated ORIF. Cohorts were similar in terms of age, number of males, mean BMI, tobacco use, alcohol use & compartment syndrome. The overall rate of SSIs was 24.2% (n=54); single plating had a lower infection rate (19.6%, n=29, p=0.02) than dual plating (33.3%, n=25). Single plating had lower rates of superficial SSIs (4.7%, n=7, p=0.02) than dual plating (13.3%, n=10). The rates of deep infection requiring reoperation were similar for single plating (16.9%, n=25, p=0.09) and dual plating (26.7%, n=20). Among 41C1 fractures, single plating had lower infection rates (3.0%, n=1, p<0.01) than dual plating (44.4%, n=4). Among 41C2 fractures, single plating had lower infection rates (8.6%, n=3, p<0.01) than dual plating (37.5%). However, 41C3 fracture infection rates were similar between single plating (34.3%, n=23, p=0.58) and dual plating (29.3%, n=12). Finally, among dual plated patients with infections requiring reoperation, 60% (n=12) involved the medial component, 20% (n=4) involved the lateral, and 15% (n=3) involved both components.

Interpretation / Conclusion: Per this study, single plating in fixation of OTA/AO 41C tibial plateau closed fractures is associated with a lower rate of SSIs as compared to dual plating, especially for 41C1 and 41C2 fractures.

176. Current Payment Model for Geriatric Hip Fractures Underestimates the Cost to Treat

Alec Friswold, Devon Brameier, Faith Selzer, Liqin Wang, Li Zhou, Michael Weaver, Arvind von Keudell
Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA.

Background: Geriatric hip fractures utilize substantial hospital resources. The Center for Medicare & Medicaid Services (CMS) reimburses hospitals by a fixed amount as determined by patients' Medicare Severity Diagnosis Related Group (MS-DRG), which assign payment weights based on the average resources required to manage that condition.
Aim: In this study, we evaluate whether current CMS estimates of resource utilization for the MS-DRG, "Hip and Femur Procedures Except Major Joint", the most commonly allocated MS-DRG for geriatric femur fractures, is consistent with resource utilization of these patients at a large academic medical center.
Materials and Methods: Analysis included 198 patients over 65 years old who underwent surgical repair of a hip fracture between 2018-2020 at a Level 1 Trauma Center and were reimbursed under one of three MS-DRGs: "Hip and femur procedures except major joint without complication or comorbidity (CC)", "...with CC", and "...with major CC (MCC)". Financial data was obtained for each episode. Primary outcome was a percentage difference in total cost of care compared to the "without CC" group. Secondary outcomes include difference in length of stay (LOS) between the study site and CMS, profitability, and frailty within each MS- DRG.
Results: Compared to patients without CC, treating patients with MCC on average cost 60% more ($p<0.05$). The average profit per episode was negative for all three MS- DRGs. Moreover, patients coded with MCC were 64% less profitable than patients coded without CC. The average LOS at the study site was 1.9 days longer than the LOS CMS cites for this condition. Moreover, severely frail patients made up 38% of patients with a MCC compared to 7% of patients without a CC.
Interpretation / Conclusion: Negative profits across all versions of the "Hip and Femur Procedures Except Major Joint" MS-DRG suggest current payment weights are not sufficiently meeting the cost to treat. This may be due to CMS underestimating the average LOS, and thus resource utilization, of these patients. Caring for patients with major complications was associated with more negative profit, suggesting the current payment model may disincentivize treating patients who are more likely to have complications.

Poster Walk 8:

Spine and Tumor

Chair: Dennis Hallager & Michael Bendtsen

158. Reconstruction surgery with custom-made 3D-printed pelvic implants due to bone tumors involving the acetabulum. A single-center retrospective cohort study with clinical follow-up

Müjgan Yilmaz[1], Linda Fernandes[2], Michael Mørk Petersen[3]
1. Department of Orthopaedics, North Zealand Hospital, Denmark 2. University College Copenhagen, Copenhagen, Denmark 3. Department of Orthopaedics, Rigshospitalet, Denmark

Background: In patients with malignant bone tumors, metastases, or benign tumors causing significant bone loss, limb-salvage surgery is the recommended surgical intervention.
Aim: We evaluated the effects (surgical and functional outcomes) of using pelvic reconstruction using personalized, 3D- printed pelvic implants in bone tumor surgery.
Materials and Methods: A single-center cohort study including 12 patients (M/F=8/4, mean age 51, range:15- 76 years) reconstructed with custom-made 3D-printed pelvic prosthesis. Pathology: Chondrosarcoma (n=4), Ewing sarcoma (n=1), Giant cell tumor (n=1), B- cell lymphoma (n=1), Renal cell carcinoma (n=2), Ductal carcinoma (n=1), Planocellular carcinoma (n=1) and Aneurismal bone cyst (n=1). Ten patients were available for follow-up (not alive=1, sick=1) and were assessed with active/passive ROM, isometric muscle strength, MSTS, TESS, EQ-5D-5L, EORTC QLQ-C30, 6-minute walk test, and 30- second chair-stand test on average 4 years postoperatively.
Results: The probability of avoiding revision due to implant failure calculated by Kaplan-Meier survival analysis was 85.7% (95%CI: 63.3%-100%) at 5 years. We found that active-ROM for the surgical limb was decreased compared to the healthy contralateral site in hip abduction (p=0.007), adduction (p=0.007), internal rotation (p=0.007), and external rotation (p=0.007). Hip flexion was decreased in passive ROM (p=0.007). In the surgical limbs, we found decreased hip muscle strength in flexion (p=0.008), abduction (p=0.008), knee extension (p=0.008), and flexion (p=0.008). EQ-5D-5L (preoperative: 0.9 (range:0.87- 0.97) and 0.9 (postoperative range:0.84- 0.92)), TESS (mean: 68.3, range:55-90), MSTS (mean: 66.1, range:55-85), and EORTC QLQ-C30 (mean: 63.3, range:55-80) 6-minute walk test (mean: 413.6 m, range:320-501.5) and 30-second chair- stand test (mean: 11.2, range:7-18) was assessed at follow-up.
Interpretation / Conclusion: Reconstruction with custom-made 3D- printed pelvic prosthesis has overall expected lower isometric muscle strength and ROM compared with the healthy site.

199. Soft tissue sarcomas masquerading as hematomas - three case reports

Kasper Vestergaard Rydberg[1], Flemming Secher Kromann Nielsen[2], Anna Bertoli Borgognoni[3], Michael Melchior Bendtsen[4], Thomas Baad-Hansen[5]

1. Department of Orthopaedics, Aarhus University Hospital; 2. Department of Radiology, Aarhus University Hospital; 3. Department of Orthopaedics, Aarhus University Hospital; 4. Department of Orthopaedics, Aarhus University Hospital; 5.Department of Orthopaedics, Aarhus University Hospital.

Background: Misdiagnosis of soft tissue sarcomas as hematomas can lead to treatment delays, larger tumors, metastasis, difficult surgical removal, and poor prognosis.
Aim: We present three cases where patients initially diagnosed with hematoma-like soft tissue masses were later found to have sarcomas. The aim of the study is to identify and highlight diagnostic characteristics of a suspected hematoma that should arise suspicion of a soft tissue sarcoma.
Materials and Methods: The study is a retrospect case study. In the three patients' journals we found information about patient history, clinical examinations, imaging diagnostics, and biopsies.
Results: The extended duration from the initial appearance of a thigh swelling to diagnosis delays surgical intervention, allowing tumor growth and metastasis, reducing the chance of successful treatment. Larger tumors are harder to remove surgically, increasing the risk of incomplete removal and potential cancer spillage, heightening the risk of relapse. Additionally, tumor expansion within soft tissue and muscle necessitates more extensive limb removal during surgery, leading to reduced postoperative limb function. The patients presented with a lump accompanied by swelling and pain. Intriguingly, none of the patients manifested subcutaneous ecchymosis. Consequently, the absence of ecchymosis coupled with the presence of a lump, swelling, and pain in an extremity signals potential suspicion of soft tissue sarcoma, particularly in the absence of direct trauma. The study suggests that delayed MRI extends the interval between clinical appearance of a tumor and final surgical treatment, ultimately worsening prognosis and increasing the risk of unplanned excisions. MRI should therefore be performed without further delay. Core needle biopsy or open biopsy yielded conclusive diagnoses in all three cases presented, suggesting these methods should be prioritized for obtaining correct diagnosis.
Interpretation / Conclusion: A soft tissue sarcoma should be suspected when a patient presents with a lump, swelling, and pain in the absence of a direct trauma. MRI scans and core needle biopsies are vital in soft tissue sarcoma diagnostics and should be performed without unnecessary delay.

161. Health-related quality of life is unchanged at 5 years follow-up after AIS surgery - A single-center study of 164 patients

Niklas Tøndevold[11], Lærke Ragborg [1], Martin Heegaard[1], Martin Gehrchen[1], Benny Dahl[1]
1. Ortopaedic department U, Copenhagen University Hospital Rigshospitalet

Background: Surgical treatment for adolescent idiopathic scoliosis (AIS) is typically performed before the patients embark on their work life. A few multicenter studies have shown a decline in patient-reported outcome when patients are followed beyond the traditional two years after surgery. However, most of these large studies are characterized by a low follow-up rate and the inherent heterogeneity of multi-center studies.
Aim: Determine health-related quality of life in patients surgically treated for scoliosis with a minimum of 5- year follow up.
Materials and Methods: All patients surgically treated for AIS from marts 2011 to marts 2018 were included. All patients had multi-segmental all-pedicle screw constructs. Patient-reported outcome; SRS-22, NRS 1-10 and EQ-5D-3L were collected pre-operatively and at 1- year, 2-year and final follow-up. Radiological and clinical follow included use of daily pain medication, work status including weekly work hours and physical activity level.
Results: One hundred and sixty-four of 178 (92%) patients surgically treated for AIS during the inclusion period were available for follow-up. Mean age at surgery was 15.6 years. Mean follow-up was 6.8(SD±1.4) years with a mean age of 22.3(SD±2.4). Sixteen patients (10%) had revision surgery, most commonly due to infection (26%). We found no change in main curve correction between 2 and 5 year follow-up (29° vs 30°, p=0.78) and no significant difference in SRS-22 (Table 1). At 5-year follow-up, 132 (80%) patients used over-the-counter painkillers once a week or less and only 2 patients (1.2%) used morphine daily. Thirteen patients (8%) where unemployed and the rest was in either full- time employed or studying.
Interpretation / Conclusion: In this single-center study, we found no decline in patient reported outcomes at minimum 5-year follow-up. With a 92% follow-up rate and use of all- pedicle screw constructs, it is illustrative of the advances made in surgical treatment of AIS over the last decade.

162. Is your surgical field as sterile as you think when operating patients with adolescent idiopathic scoliosis?

Niklas Tøndevold[1], Gehrchen Martin[1], Benny Dahl[1],
1. Orthopeadic department U, Copenhagen University Hospital, Rigshospitalet

Background: Late surgical site infection (>90 days) is seen in 1.7 to 6.9% of patients undergoing surgery for AIS. Cutibacterium acnes (C. acnes) is reported to be the most common finding in these patients. However, the same pattern is not seen ASD patients. C. acnes is known to act as an opportunistic pathogen through biofilm. Particularly shoulder arthroplasties but also breast implants and cardiovascular device-related infections are known to have high infection rates with that pathogen. However, whether inoculation is hematogenic or the result of bacterial contamination at the initial surgery is not known.
Aim: Exmine the presence of skin bacteria, especially Cutibacterium acnes, is more prevalent in the surgical field of patients treated for adolescent idiopathic scoliosis (AIS) than that of patients treated for adult spinal deformity (ASD).
Materials and Methods: We included patients at least two years after their last spine surgery (ASD group) or no prior spine surgery (AIS group) undergoing surgery at our institution from January 1 through December 31, 2020. The patients were surgically prepared according to the consensus guidelines. Three muscle tissue samples were obtained before wound closure, and two positive cultures were considered a positive test result. Furthermore, the unused rod tip was sent for sonication. All cultures were observed for 14 days.
Results: We included 161 AIS patients and 23 ASD patients. There were no statistically significant differences between the 2 groups regarding surgical time or blood loss. Cultures were positive in 112 AIS patients (68%) and in 2 ASD patients (8.6%). Of the 112 positive AIS cultures 100 had C. acnes as the only pathogen. The remaining were other skin bacteria. Bacteria were found on 92 of the rod tips (81%) all were C. acnes. WGS showed no sign of a single contaminate source.
Interpretation / Conclusion: C. acnes is present in the muscle tissue of most patients surgically treated for AIS. In the majority of cases the same bacteria were found on the unused sterile implant only handled by the surgeons, possibly by contamination from the surgical gloves. Surgeons treating these patients should therefore make sure of targeting this pathogen in their prophylactic strategy.

178. Does a Thoracolumbar Sacral Orthosis Affect Axial Rotation in Adolescent Idiopathic Scoliosis Patients?

Lærke Ragborg[1,2], Amy McIntosh[2], David Thornberg[2], Jamie Gross[2], Søren Ohrt-Nissen[1], Martin Gehrchen[1], Benny Dahl[1], Daniel Sucato[2], Megan Johnson[2]

1. Spine Unit, Dept. of Orthopedic Surgery, Rigshospitalet, København, Denmark 2. Scottish Rite for Children, Dallas, United States of America

Background: Modern brace design aims to correct spinal deformity in the coronal, sagittal, and axial planes through personalized brace construction. However, limited data is available confirming if axial changes actually occur when patients are treated with a thoracolumbar sacral orthosis (TLSO).
Aim: To assess if axial changes occur in-brace.
Materials and Methods: A consecutive cohort of patients diagnosed with AIS who underwent bi-planar, low-dose x-rays with subsequent 3D reconstructions at both pre- brace and inbrace was assessed retrospectively for inclusion. All patients were prescribed a full- time, 3D CAD/CAM, de-rotational TLSO. Axial rotation magnitude and direction were compared at each vertebral level between pre-brace and in- brace images to detect where changes occurred according to major curve location (Thoracic (T1- T11) and Lumbar (T12-L5)). Magnitude was calculated as the absolute value of the difference between in-brace and pre-brace. Direction of axial rotation was termed “amplification” or "de- rotation" defined as an increase in magnitude toward the initial direction or a change in the opposite direction regardless of magnitude, respectively.
Results: We included 126 consecutive patients, 91 (72%) were females and 93 (74%) had main thoracic curves. Pre-brace major Cobb angle was 32±8° and in-brace Cobb angles reduced to 23±8°. Overall and within groups, there was a greater proportion of de- rotation compared to amplification at every level. For thoracic curves, the highest frequency of de- rotation occurred at T8-T9 with the largest changes in magnitude occurring at T1-T4 (Figure 1). For lumbar curves, the highest frequency of de-rotation occurred at T7-T8, T11 and L1, with the highest magnitude of de-rotation occurring at T12 .
Interpretation / Conclusion: A TLSO does influence axial rotation in patients with adolescent idiopathic scoliosis while in-brace. Although de-rotation primarily occurs around the apical regions, changes can be observed throughout the length of the spine regardless of curve type.

187. Using Electric Stimulation of the Spinal Muscles and Electromyography during Motor Tasks for Evaluation of the Role in Development and Progression of Adolescent Idiopathic Scoliosis

Christian Wong[1,2], Benny Dahl[1,2]
Department of Orthopedic Surgery, Rigshospitalet, 2100 Osterbroo, Denmark Department of Orthopedic Surgery, Copenhagen University Hospital, Hvidovre, Denmark

Background: The role of the spinal muscles in scoliogenesis is not fully substantiated. Do they act scoliogenic (inducing scoliosis) or counteract scoliosis in adolescent idiopathic scoliosis (AIS)?
Aim: In this study, we will examine this by using selectively placed Transcutaneous Electric Stimulation (TES) combined with a cinematic radiographic technique and by performing electromyographic (EMG) evaluations during various motor tasks
Materials and Methods: This is a cross-sectional study of subjects with small-curve AIS. Using cinematic radiography, they were evaluated dynamically either under electrical stimulation or when performing motor tasks of left and right lateral bending and rotation while measuring the muscle activity by EMG.
Results: Five subjects volunteered for TES and six subjects performed the motor tasks with EMG.When analyzing the spatial positions when calibrated, we found that the spinal muscles exert a compressive 'response' with a minor change in the Cobb angle (CA) in small-curve AIS (CA = 10–20°). In larger curves (CA > 20°), TES induced a relative four-fold change in the CA compared to small-curve AIS with a ratio of 0.6. When adding the absolute EMG ratios for all four motor tasks, the subject with progression had almost 10-fold fewer summed EMG ratios, and the subject with regression had more than 3-fold higher summed EMG ratios.
Interpretation / Conclusion: Based on these findings, we suggest that the spinal muscles in small-curve AIS have a stabilizing function, maintaining a straight spine and keeping it in the midline. When deformities are larger (CA > 20°), the spine muscle curve exerts a 'scoliogenic response'. This suggests that the role of the muscles converts from counteracting AIS and stabilizing the spine to being scoliogenic for a CA of more than 20°. Moreover, we interpret higher EMG ratios as heightened asymmetric spinal muscle activity when the spinal muscles try to balance the spine to maintain or correct the deformity. When progression occurs, this is preceded or accompanied by decreased EMG ratios. These findings must be substantiated by larger studies.

189. The association between Hounsfield units and mechanical failure in ASD patients

Martin Heegaard[1], Kristín Ingadóttir[1], Lærke Ragborg[1], Benny Dahl[1], Lars V. Hansen[1], Søren Ohrt-Nissen[1], Martin Gehrchen[1]

1. Spine unit, Rigshospitalet, Copenhagen University Hospital, Denmark

Background: Low bone mineral density (BMD) is a known risk factor for revision surgery in patients with adult spinal deformity (ASD). Hounsfield units (HUs) on CT scans have been suggested as a proxy for assessing BMD.

Aim: This study aimed to assess HUs in the lumbar region, including the upper instrumented vertebra (UIV) as well as UIV+1, and the association with mechanical failure in patients undergoing ASD surgery.

Materials and Methods: We retrospectively included ASD patients undergoing surgery from 2010-2020 with a minimum of two-year follow-up. We excluded patients without a preoperative CT scan, or a CT scan made more than one year before surgery. Mechanical failure was defined as proximal junctional failure, pseudarthrosis, or implant failure requiring revision surgery. On preoperative CT scans, HUs were measured on three axial slices on each vertebra from L1 to L5 and, if available, at UIV and UIV+1. A logistic regression model was used to assess the association between HUs and mechanical failure.

Results: We included 170 patients with a mean age of 63 (±12) years, 108 (64%) were females, and the median instrumentation was 13 [IQR 10-16] levels. Mechanical failure occurred in 27% (n=46) of patients at two-year follow-up. Mean lumbar HUs were 146 ±51 in the mechanical failure group and 135 (±52) in the no-revision group (p=0.232). The area under the curve was 0.58 (95% CI 0.48-0.68) corresponding to no to low discriminatory power in predicting mechanical failure using lumbar HUs. Univariate logistic regression analysis showed no statistically significant difference between mechanical failure and HUs in the lumbar region (OR= 1.00, 95%CI 1.00-1.01, p=0.239) or at UIV/UIV+1 (OR= 1.00, 95%CI 0.99-1.01, p=0.286).

Interpretation / Conclusion: We found no association between mechanical failure and HUs on preoperative CT scans in ASD patients. Thus, we cannot recommend using HUs to predict mechanical failure in these patients.

204. Posterior migration of the mobile core in an unconstrained cervical disc replacement: A Case Report

Katerina Znacko, Anders Kruse, Dennis Winge Hallager

Background: Cervical disc replacement (CDR) offers motion preservation compared to fusion for degenerative disc disease. Potential harms should be weighed against the possible advantages when patients are counselled on the treatment choice.
Aim: To present a rare case of posterior core migration in an unconstrained CDR device, highlighting the risk of devastating complications and discus failure mechanism.
Materials and Methods: A 29-year-old woman underwent arthroplasty at C5/6 with an unconstrained device in 2016 for a disc herniation, when conservative treatment failed. In 2024, she presented with recurrent neck and right sided arm pain, and difficulty in neck flexion. Imaging revealed posterior migration of the device core, which occupied the right side of the spinal canal. Revision surgery unveiled a loose upper metal endplate with soft tissue metallosis and severe wear of the migrated core. The device was removed, and after debridement, anterior fusion surgery was performed. Soft tissue and device sonication cultures were obtained.
Results: Postoperatively, the symptoms had resolved, and cultures revealed Cutibacterium acnes infection. Antibiotic treatment was initiated, and the patient is currently planned for follow-up at three months in our outpatient clinic.
Interpretation / Conclusion: Discussion: This case underscores CDR surgery complexities, urging research into device failure mechanisms. Loosening of the upper endplate may exacerbate core wear, facilitating core migration. Conclusion: Posterior core migration in unconstrained CDR devices poses a severe risk, which surgeons and patients should consider when choosing this surgical option.

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