Effectiveness of Spraino for preventing lateral ankle sprain injuries in indoor sports

a pilot randomised controlled trial with 510 athletes with previous ankle injuries

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Abstracts

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DOS Best Papers

Effectiveness of prescribing a large additional dosage of shoulder muscle strengthening in the non-operative care for subacromial impingement (The SExSI-Trial)

1.

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Background: In 2019, the British Medical Journal issued a strong recommendation against subacromial decompression surgery, leaving non-operative care as the only treatment option. Evidence-based guidelines recommend shoulder strengthening as key in non-operative care for subacromial impingement (SIS), but recent studies suggest that the dose of strengthening exercise is not sufficient in current care.
Purpose / Aim of Study: To assess the effectiveness of adding a large additional dose of home-based shoulder-strengthening exercises to current non-operative care.
Materials and Methods: In this double-blinded randomised controlled trial, we randomly allocated 200 consecutive patients with longstanding SIS (>3 months) to intervention (IG) or control (CG). The CG received usual non-operative care according to evidence-based clinical guidelines; the IG received the same plus an add-on intervention with the aim to at least double the total dosage of shoulder strengthening. The Shoulder Pain and Disability Index (SPADI, 0-100), external-rotation and abduction strength, and patient acceptable symptom state (PASS) was evaluated at baseline, 5-weeks, 10-weeks and four-months follow-up (primary end-point).
Findings / Results: Intention-to-treat and per protocol analyses showed no significant or clinically relevant between-group difference for the primary or other outcomes. From baseline to four-month follow-up, SPADI improved in both groups (intention-to-treat: CG 22.8 points, IG 22.1 points, mean between-group difference 0.6 points (95%CI -5.5 to 6.6)). Four months after randomization, only 54% (IG) and 48% (CG) had reached patient acceptable symptom state (p=0.4127).
Conclusions: Prescribing a large additional dosage of shoulder strengthening exercise, in addition to usual non-operative care for SIS, does not result in superior outcome. As the confidence limits for between group differences in shoulder disability did not surpass the margin of clinical relevance, it is unlikely that additional studies will alter this conclusion. Importantly, half of all randomised patients had unacceptable symptoms after four months of non-operative care, leaving a large and substantially disabled group of patients with no further options in the traditional health-care system.

Press-fit fixation of a conical shaped trapezium cup is superior in cortical compared to cancellous bone: A radiostereometric analysis in a pig bone model

2.

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Background: Cup failure is a major problem in trapeziometacarpal (TMC) arthroplasties. Primary press-fit bone fixation is important for achievement of later osseointegration of cementless implants. The articulating trapezium surface is usually cut, leaving a level cancellous surface for cup insertion. The cortical bone is stronger, but cup insertion in a saddle shaped surface may be challenging.
Purpose / Aim of Study: We aimed to compare primary cancellous and cortical press-fit fixation of a new conical shaped TMC cup design, and to investigate the effect of cup diameter.
Materials and Methods: Thirty-two hydroxyapatite-coated conical cup designs of 9mm and 10mm were randomly allocated to cancellous or cortical bone fixation in a 1:1:1:1 ratio. The saddle- shaped bone from the forefeet of two-month old pigs were dissected and rigidly fixed in epoxy glue. Before press-fit fixation of the cups, six tantalum beads of 1mm were inserted in the bone. Cup migration was evaluated with static radiostereometric (RSA) radiographs, recorded at baseline and repeated after cyclic-load tests (Mark10), performed from 150N to 1050N with 100N intervals. RSA precision was evaluated by double- examinations. The total translation (TT) was calculated and an >0.5mm increase, between two pressure load tests, was defined as cup-failure.
Findings / Results: The precision of TT was 0.09 mm and the random error was 0.12 mm. From 0N to 750N load , all cups had a TT of less than 0.5mm migration between each load cycle, but the TT of cups with cancellous bone fixation was higher (up to 0.25mm (CI95 0.12-0.37)) compared to cups with cortical bone fixation ($p<0.04$). In 9mm cups, a 250N pressure load resulted in a higher TT of cancellous fixated cups compared to cups with cortical bone fixation ($p=0.001$), whereas the 10 mm cups required to 550N to detect a difference ($p=0.008$). The Kaplan-Meier cumulative survival estimate (at 1050N) was best for 10 mm cortical fixated cups (88%; CI95 39-98) and least for 9mm cancellous bone fixated cups (13%; CI95 0-42).
Conclusions: Based on this experimental study, we advise clinical use of the largest possible size conical shaped cup in addition to cortical bone fixation, when treating TMC joint osteoarthritis with total TMC joint arthroplasty.

Occlusive Wound Closure Prevents Prolonged Wound Discharge - A Randomized Controlled Trial In Patients Undergoing Tumor Resection And Endoprosthetic Reconstruction Of The Proximal Femur -

3.

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Background: This study examined the effect of an occlusive wound closure product (Dermabond Prineo-22 skin closure system (Ethicon, Somerville, NJ, USA)) in a patient population at high risk for prolonged wound discharge and found that it significantly reduced frequency, degree and duration of this complication in comparison to conventional skin staples.
Purpose / Aim of Study: Prolonged wound discharge (PWD) is a common post-operative complication of orthopaedic procedures and a risk factor for implant-related infection. Occlusive wound closure (OWC) methods have previously been suggested to reduce or even prevent this complication. However, conclusive evidence in support of this hypothesis is still lacking.
Materials and Methods: We performed a randomized controlled trial on 70 patients who underwent surgical treatment for metastatic- or malignant hematologic bone disease involving the proximal femur at our center between January 2017 and August 2018. At conclusion of the tumor resection and endo-prosthetic reconstruction procedure, patients were randomized to either OWC (n=35), using the Dermabond Prineo-22 skin closure system, or routine wound closure with conventional skin staples (n=35).
Findings / Results: Skin closure with OWC resulted in a significantly lesser degree ($p<0.0001$) and shorter duration of post-operative wound discharge (HR 2.89 [95% CI 1.6-5.05], $p<0.0018$). Compared to staples, surgical wounds were already dry after a mean of 3.5 days (vs 6.1 days, [95%CI 3.2-3.9 vs. 4.8-7.3], $p<0.0001$). PWD for 7 days or more was observed in 23% of patients (n=8) in the Staples-group, but was entirely absent in the OWC-group ($p<0.003$). For every four patients treated with OWC, one complication of PWD of 7 days or more was prevented (NNT = 4).
Conclusions: This study provides strong evidence that occlusive wound closure (OWC) significantly reduces degree and duration of wound discharge in patients undergoing tumor resection and endoprosthetic reconstruction of the proximal femur and prevents PWD of 7 days or more in comparison to conventional skin staples.

Effectiveness of Spraino for preventing lateral ankle sprain injuries in indoor sports: a pilot randomised controlled trial with 510 athletes with previous ankle injuries

4.

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Background: Lateral ankle sprains (LASs) are common in indoor sports and high shoe-surface friction is considered a risk factor for non-contact LASs. Spraino is a novel Teflon-patch that is attached to the outside of sports shoes to minimise friction at the lateral edge, which could mitigate the risk of LAS.
Purpose / Aim of Study: We aimed to determine preliminary effectiveness (incidence rate and severity) and safety (harms) of Spraino when used to prevent LAS injury among indoor sport athletes.
Materials and Methods: In this exploratory, parallel-group, two-arm pilot RCT, 510 sub-elite indoor sport athletes with a previous LAS injury were randomly allocated (1:1) to Spraino or "do-as-usual". Allocation was concealed and the trial was outcome-assessor-blinded. Match and training exposure, LASs and associated time-loss were captured weekly via text messages. Information on harms, fear-of-injury and ankle pain were also documented.
Findings / Results: 480 participants completed the trial, reporting a total of 151 LASs, of which 96 were categorised as non-contact, and 50 as severe. All outcomes favoured Spraino with incidence rate ratios of 0.87 (95% CI, 0.62-1.23) for all LASs; 0.64 (95% CI, 0.42-0.98) for non-contact LASs; and 0.47 (95% CI, 0.25-0.88) for severe LASs. Time-loss per LAS was also lower in the Spraino group (1.8 vs 2.8 weeks, p=0.014). Six participants reported minor harms because of Spraino.
Conclusions: Compared to usual care, athletes allocated to Spraino had a reduced risk of LAS injury and reduced time-loss, with only few reports of minor harms. The next step is to test these promising risk reductions in a confirmatory RCT.

RISK OF REVISION IN TOTAL HIP ARTHROPLASTY WITH CERAMIC-ON-POLYETHYLENE AND METAL-ON-POLYETHYLENE BEARINGS – RESULTS FROM THE NORDIC ARTHROPLASTY REGISTER ASSOCIATION (NARA)

5.

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Background: Ceramic heads were introduced as an alternative to metal heads in total hip arthroplasty (THA) in order to reduce wear and osteolysis which may result in aseptic loosening.
Purpose / Aim of Study: We investigated the risk of any revision of ceramic-on-polyethylene compared to metal-on-polyethylene bearings in primary THA and secondly the risk of revision due to aseptic loosening.
Materials and Methods: The study population was identified from the NARA dataset, and consisted of 310,177 patients who had undergone a primary THA with a ceramic-on- polyethylene or metal-on-polyethylene articulation because of primary osteoarthritis, femoral head osteonecrosis, arthritis, or sequelae from childhood hip disorders. The adjusted relative risk (aRR) and 95% confidence intervals for revision were assessed with regression with the pseudo-value approach and adjusted for sex, age, diagnosis, year of surgery, fixation, and femoral head size. Analyses were made separately for ceramic-on-conventional polyethylene (CoP) compared to metal- on-conventional polyethylene (MoP), and ceramic-on-crosslinked polyethylene (CoXLP) compared to metal-on- crosslinked polyethylene (MoXLP).
Findings / Results: CoP vs. MoP: 24,018 had CoP and 166,402 MoP bearings and were followed up to 20 years. At 20 years, the aRR for any revision was 1.04 (1.01-1.07) for CoP compared to MoP. There was no difference in aRR for revision due to aseptic loosening. CoXLP vs. MoXLP: 25,070 had CoXLP and 94,687 MoXLP bearings and were followed up to 12 years. At 12 years, the aRR for any revision was 0.99 (0.97-1.02) for CoXLP compared to MoXLP. There was no difference in aRR of revision due to aseptic loosening.
Conclusions: The risk of revision was increased by 4% in CoP compared to MoP THAs at 20 years but no difference was found for CoXLP compared to MoXLP at 12 years. Our study did not demonstrate any advantage of ceramic heads over metal heads in the medium- to long-term follow-up. A limitation is that the NARA database does not contain any information on type of ceramic material.

Unexpected positive cultures after revision shoulder arthroplasty -does it affect outcome?

6.

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Background: Several studies have confirmed the high rate of unexpected positive cultures (UPC) after aseptic revisions of failed shoulder replacements. Especially Cutibacterium acnes are often cultured. However, the impact of UPC on outcome is still largely unclear.
Purpose / Aim of Study: The aim of this prospective and nationwide Danish study was to examine if emergence of UPC had any impact on the patient reported outcome after revisions of failed shoulder replacements.
Materials and Methods: Consecutive patients revised with a standard component exchange without any pre- or perioperative suspicion of infection were included from 2014 to 2017. Patients were assessed at baseline and two years after revision with Oxford Shoulder Score (OSS, 0-48 points), a subscale OSS pain score (0-12 points) and range of motion. Biopsy-specimens were obtained at revision and cultured for 14-days. Emergence of UPC was defined as growth of the same bacteria in ≥3 cultures. If UPC emerged; patients were treated with oral antibiotics for 6 weeks.
Findings / Results: Of the 124 patients included, UPC emerged in 27 cases (22%) with Cutibacterium acnes accounting for 67% (18/27). At baseline the median OSS was 22 in both the culture negative and the UPC group. At follow-up the median OSS was 37 in the culture negative group and 35 in the UPC group. Similarly, at baseline forward elevation was 76 degrees in the culture negative group and 77 degrees UPC group; at follow-up elevation was 121 and 117 degrees in the two groups respectively. Both groups had a pain score of 4 at baseline and 10 at follow-up (higher score equals less pain). Consequently, no statistical differences in OSS, pain or range of motion were found at any timepoint between the two groups ($p>0.05$). Forthermore, increases in OSS and forward flexion and decrease in level of pain were statically significant and clinically relevant in both groups .
Conclusions: We could not detect any impact of UPC on the OSS score, range of motion or level of pain either before or after revision of a failed shoulder replacement. Both the culture negative and the UPC group experience similar, statically significant and clinically relevant increase in OSS, forward flexion and decrease in level of pain after revision.

Assessment of cross-cultural differential item functioning of the primary outcome measure in the Scandinavian Knee Ligament Reconstruction Registers

7.

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Background: Patient-reported outcome measures (PROMs) are important to evaluate the results of many clinical studies. Therefore, most PROMs are available in versions that have been translated and adapted to other languages. If data from different countries or cultures – for instance from the different knee ligament reconstruction registries – are compared or pooled, it is necessary to have proof that the measurement properties across the different language versions are comparable, meaning that there is no cross-cultural differential item functioning (DIF).
Purpose / Aim of Study: As the Knee injury and Osteoarthritis Outcome Score (KOOS) is commonly used to compare treatment results across Scandinavian countries, the aim was to test if there is cross-cultural DIF between the Danish, Norwegian, and Swedish versions of KOOS.
Materials and Methods: From each of the Scandinavian knee ligament reconstruction registries (in Norway, Sweden, and Denmark) 150 preoperative KOOS questionnaires from patients aged 18-37 years, completed 2016-18 were obtained and cross-cultural DIF was evaluated using confirmatory factor analysis (CFA) and Rasch analysis.
Findings / Results: Assessment of cross-cultural DIF across Denmark, Norway, and Sweden for KOOS yielded different results for the five subscales. The ADL subscale did not show construct validity in any of the three countries, making evaluation of cross-cultural validity meaningless. The Symptoms subscale was valid in each country, but all items displayed evidence of DIF. The Pain and Sport subscales were valid in all countries, but they exhibited DIF with respect to some (but not all) items, and thus conversion tables could be constructed. The Quality of Life subscale was valid in each country, and no evidence of DIF was found.
Conclusions: There was DIF between the Danish, Swedish, and Norwegian versions of KOOS. For the two sub scales with DIF for some but not all items conversion tables were constructed. These can be used if data are pooled (e.g., from the three Scandinavian ACL registries). Data from the sub scales ADL and Symptoms cannot be pooled. Data from the Quality of Life sub scale can be pooled without conversion.

DOS Best Posters

Blood Flow Restricted Training in Patients with Persistent Knee Pain

8.

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Background: Strengthening of the quadriceps musculature through high-load resistance training (HL-RT) is a cornerstone in knee rehabilitation. Despite decreasing symptoms and improving strength, HL-RT is unfeasible for some patients. Low-load blood flow restricted training (LL-BFRT) is an alternative, incorporating partial vascular occlusion. LL-BFRT has been found equal to HL-RT in terms of strength improvements, while being less stressful on the knee.
Purpose / Aim of Study: To assess the effect of an 8-week training protocol using LL-BFRT in patients with persisting knee pain.
Materials and Methods: Prospective cohort study consisting of participants with at least six months of persisting knee pain or at least three months of subjectively unsuccessful rehabilitation. The participants were instructed, by a physiotherapist in daily sessions of single-legged squats on the leg of the affected knee with blood flow restriction (BFR). Baseline and 8-week measurements for the Knee injury and Osteoarthritis Outcome Score (KOOS), isometric maximal voluntary contraction (iMVC) for quadriceps extensions, thigh girth and physical performance tests were performed. Results are given as mean with 95% confidence interval.
Findings / Results: 35 participants completed the study, two participants dropped out (one due to exercise related pain) and seven declined follow-up. The mean age was 38 years and 47% were female. The KOOS-subscale for Quality of Life. (QoL) increased by 5.6 [0.1 ; 11.2] points ($p<0.04$), iMVC strength by 14.6 [5.1 ; 24.0] Nm ($p<0.01$), one-leg jump for distance by 11.6 [0.8 ; 22.4] cm ($p<0.04$), in one-leg crossover jump by 25.9 [1.9 ; 49.9] cm ($p<0.04$), and one-leg 30 seconds side hop 7.2 [3.0 ; 11.3] ($p<0.01$). Among the participants who completed the study, the session adherence rate was 5.4 out of 7 weekly sessions, and the VAS score was 56.9 out of 100. No statistically significant im¬provements were observed in any other KOOS-subscales.
Conclusions: This is a novel study demonstrating that LL- BFRT is a feasible training form for patients otherwise unable to perform physiotherapy with improvements in the QoL subscale, iMVC and physical performance, but not in the subscale for pain.

Projection of primary knee arthroplasty in Denmark from 2020 to 2050

9.

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Background: The annual number of primary knee arthroplasties has increased in the past decades, however the future incidence and prevalence of primary knee arthroplasty in Denmark is unknown.
Purpose / Aim of Study: The aim of this study is to estimate the incidence of primary knee arthroplasty in Denmark from 2020 to 2050.
Materials and Methods: 138,298 primary knee arthroplasties conducted from 1997 to 2019 were retrieved from the Danish Knee Arthroplasty Registry. Censuses and mortality rates from 1997 to 2019 as well as population projections from 2020 through 2050 were collected from Statistics Denmark. The incidence, the absolute number and the estimated prevalence of primary knee arthroplasty – based on the cumulative sum of primary knee arthroplasties and Danish mortality rates - was calculated between 1997 and 2019. Several models (exponential, linear, logistic and Gompertz) were applied to the data and mean squared error was used as a quality estimator of the models' fit to the data points. The incidence forecasts were presented with 95% confidence interval. From the incidence forecasts, we estimated the absolute yearly number of primary knee arthroplasties.
Findings / Results: The incidence from 1997 to 2009 has increased by more than 300%, but since 2009 the increase has stalled. Logistic and Gompertz regression had the lowest mean squared error and both assume an asymptote (i.e. a maximal incidence), wherefore these models were used to forecast the future incidence. Both regressions estimated that the incidence will soon reach a plateau and thus, the maximum incidence will be reached in 2025 at 250 (237-262) per 100,000 by logistic regression or in 2035 at 260 (241-279) per 100,000 by Gompertz regression. Due to the aging population, both scenarios will result in a rise in the annual number of knee arthroplasties ranging from 10,388 (logistic) to 10,819 (Gompertz).
Conclusions: The incidence seems to have plateaued or near its plateau, however the absolute number of primary knee arthroplasty will continue to increase as the Danish population gets older. The Danish healthcare system ought to prepare for an increase in primary knee arthroplasties as well as revisions in the future.

Short knee radiographs in the evaluation of coronal alignment after total knee arthroplasty

10.

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Background: Standardized postoperative short knee radiographs radiographs serve as documentation and surgeon performance feedback following following total knee arthroplasty. Controversy Controversy regarding the relationship between between alignment measurements on postoperative and full-length radiographs radiographs are evident both scientifically scientifically and during daily conference conference with participation of non-knee knee surgeons. Measurement of mechanical mechanical coronal knee alignment from standing full-length lower-limb radiographs radiographs is gold standard, alignment alignment in the range from 177-183 is considered considered neutral.
Purpose / Aim of Study: To examine relationship between coronal coronal plane implant alignment measured measured from postoperative and follow follow-up full-length radiographs.
Materials and Methods: Retrospective study on a consecutive cohort cohort. Measurements of alignment using using TraumaCad™ guides. Examination Examination of intra- and inter-rater reliability reliability of the measurements, and agreement between short knee radiographs radiographs and full-length radiographs radiographs, with intraclass correlation coefficient coefficient. Evaluation of clinical relevance relevance from Bland Altman analysis and sensitivity analysis.
Findings / Results: 138 cases were included. Intra- and inter-rater reliability of the measurements measurements was excellent, with ICC above above .95. Agreement between the methods methods was good (ICC=.81(.74-.87)). Mean mechanical tibiofemoral alignment alignment from full-length radiographs ((mTFA) = 179 ±2.9 degrees. Mean anatomical anatomical tibiofemoral alignment from the knee radiographs (aTFA) = 185 ± ±2.6 degrees. Mean difference between between methods = 5.8 (CI 5.4-6.1) and 95% limits of agreement 1.4 to 10 degrees degrees. Censoring of suboptimal projections projections and very short short films only only improved the results slightly. 32 full-length radiographs and 35 postoperative showed malalignment. Positive predictive value of a postoperative knee radiograph with malalignment malalignment was 54% and negative predictive predictive value was 87%.
Conclusions: Good agreement between the methods might might justify the cautiously use of short film anatomical angulations as surrogate surrogate measurement of alignment. Clinicians Clinicians should be aware of the wide limits of agreement and predictive power when evaluating postoperative TKA radiographs.

Risk of reoperation when comparing locking plate with non-locking plate in ankle fractures

11.

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Background: Locking plate is designed for better stability in fractures with poor bone quality but is today widely used - also in patients with normal bone quality. The literature is sparse regarding the benefit of locking plate in ankle fractures.
Purpose / Aim of Study: The aim is to compare the risk of reoperation for locking plate with non-locking plate in patients with ankle fractures. Secondary, to investigate the distribution of locking plate use in Denmark.
Materials and Methods: The study is a population based register study. Data on patients with AO type 44A1/2 and 44B1/2 treated with either locking or non-locking plate were obtained from the Danish Fracture Database for the period March 15, 2012 to December 31, 2016. The follow-up period was 24 months. Data were linked with the Danish National Patient Registry to ensure complete information on reoperations, which were divided into major and minor complications. Major complications were defined as complications needing surgical intervention with the exception of simple hardware removal, which was defined as minor complications. Multivariate regression analysis was performed for relative risk (RR) adjusted for age, sex, American Society of Anesthesiologists Classification (ASA) and level of surgeons experience. All results are reported with 95% confidence interval.
Findings / Results: A total of 2,177 ankles fractures were included of which 718 (33%) were treated with locking plate and 1,459 (67%) with non-locking plate. The mean age was higher in the locking plate group ($p<0.001$) and locking plate was used more often in women ($p=0.018$), in patients with higher ASA-score ($p<0.001$), and in patients operated by consultants ($p=0.018$). In both groups the risk was 3% for major complications and 22% for minor. The adjusted RR of major reoperation was 1.00 (0.66;1.66) for locking plate compared to non-locking plate and 0.92 (0.76;1.11) for minor reoperation. The proportion of locking plate use varied widely between departments, ranging from 6% to 61%.
Conclusions: There is no difference in association to reoperation when comparing locking plate with non-locking plates in patients with surgical treated ankle fracture. The indication of locking plate use should be evaluated on all hospitals.

Results following prolonged recovery show satisfactory patient-reported and functional outcome after intramedullary nailing of a tibial shaft fracture – a prospective five-year follow-up cohort study

12.

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Background: Although a large number of studies aim to investigate the outcome in patients following tibial shaft fractures, the literature includes limited information on prospective reported patients with mid- to long-term follow-up.
Purpose / Aim of Study: The aim of the present study was to investigate prospectively the five-year development in patient-reported quality of life after intramedullary nailing of a tibial shaft fracture.
Materials and Methods: The design was a prospective, five-year follow-up cohort study. Quality of life (QOL) was measured with the questionnaire Eq5d- 5L and compared to one-year outcome and norm data from a Danish reference population. Secondary outcome measurements were: The Knee Injury and Osteoarthritis Outcome Score (KOOS), recordings of pain, gait and muscle strength.
Findings / Results: Twenty-nine patients were eligible for participation. The mean age at the time of the five-year follow-up was 46.3 years. The five-year postoperative mean Eq5d-5L index was 0.864 (95%CI: 0.809–0.918). The mean Eq5d-5L VAS was 88.4 (95%CI: 83.4–93.5). Compared with the same patients Eq5d-5L index scores at one-year follow-up (0.784), a significant increase was observed (P=0.014). A comparison to the Danish Eq5D reference population, showed no statistically significant difference.
Conclusions: Patient-reported quality of life among patients treated with intramedullary nailing following a tibial shaft fracture increase significantly between the one-year and five- year follow-ups. In contrast to the one-year patient-reported quality of life, results are comparable to those of a reference population at the five-year follow-up. In a clinical setting these results highlight that patients may expect a prolonged period to regain full recovery. However, patients can expect satisfactory outcome years after fracture and treatment.

Clinical and radiographic outcome of tension band suture fixation for olecranon fractures: A prospective cohort study

13.

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Background: Tension band wire (TBW) is a well-known method for treating displaced olecranon fractures. Recent studies, however, have reported high revision rates due to prominent metalwork, wound breakdown, infection and loss of reduction, when using this technique. A known method for treating displaced olecranon fractures. Recent studies, however, have reported high revision rates due to prominent metalwork, wound breakdown, infection and loss o of reduction, when using this technique. A standardised surgical method using tension band suture fixation (TBSF) h has recently been published as an alternative to TBW.
Purpose / Aim of Study: To evaluate the clinical and radiographic outcome in patients with displaced olecranon fractures treated with TBSF. Primary outcome was revision surgery at 6 month follow-up.
Materials and Methods: This was a single-center prospective cohort study. TBSF was introduced in February 2019 in our facility and p patients (>18 years) treated for displaced olecranon fractures were consecutively enrolled. Follow-up was performed at 2 weeks, 6 weeks, 3 months and 6 months postoperatively. Radiographs, range of motion (ROM), Quick-DASH and Oxford Elbow Score were used to evaluate outcome.
Findings / Results: A total of 24 patients were included. All patients completed 6 month follow-up, although, in 2 cases, only patient reported outcome measures and ROM were available due to covid-19-related delays. Median age was 64 years [IQR 39-72.5], 9 of 24 patients were males and median ASA score was 2 [IQR1-2]. 15 fractures were Mayo 2A and 9 were 2B with minor comminution. Surgical treatment was performed by 1 of 3 surgeons with a median duration of surgery of 41 min [IQR 32-55.25]. No patients were reoperated reoperated or scheduled for revision surgery at 6 month follow-up. At 6 month follow-up, the median Quick-DASH and Oxford Elbow Score were 2.3 [IQR 0 DASH and Oxford Elbow Score were 2.3 [IQR 0-4.5] and 47 [IQR 46-48], respectively. Median elbow extension and flexion deficit were 0 degrees [IQR 0-2.25] and 0 degrees [IQR 0-0], respectively. Radiographic union was achieved in all patients. 2 patients experienced loss of reduction and malunion. The malunions were asymptomatic and the patients had no functional deficits. 1 patient refractured the elbow because of a second trauma and was reoperated.
Conclusions: TBSF is a promising technique for Mayo 2A and 2B fractures with minor comminution. There were no surgical revisions within the first 6 months and we found good functional outcome and high union rate.

The association between duration of anticoagulant thromboprophylaxis in primary total hip arthroplasty and revision rate: A cohort study based on 50,482 patients with osteoarthritis from the Nordic Registries

14.

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Background: There are concerns that postoperative bleeding contribute to prolonged wound drainage and hematoma formation, may increase susceptibility to bacterial migration and revision due to prosthetic joint infection (PJI). Furthermore, it is unclear if longer duration of thromboprophylaxis plays a role in aseptic loosening of total hip arthroplasty (THA).
Purpose / Aim of Study: We examined whether short (1-5 days), medium (6- 14 days), and extended (≥ 14 days) duration of thromboprophylaxis is association with the revision rate after THA.
Materials and Methods: This cohort study was based on data from hip arthroplasty registries, prescription databases and patient registries in Denmark and Norway (2008-2013). Outcome was revision;
any, due to PJI, and due to aseptic loosening, respectively. We performed Cox regression analyses to estimate adjusted cause-specific hazard ratio (HR) of revision with 95% confidence interval for patients receiving short or extended vs medium duration of thromboprophylaxis.
Findings / Results: Among 50,482 primary THA patients with osteoarthritis, 8,333 received short, 17,009 received medium, and 25,140 received extended thromboprophylaxis. The HRs for any revision were 1.01 (0.88-1.17) for short and 0.96 (0.87-1.07) for extended vs medium thromboprophylaxis. The HRs for revision due to PJI were 0.92 (0.69-1.24) for short and 1.04 (0.85-1.27) for extended thromboprophylaxis vs. medium thromboprophylaxis. However, HRs for revision due to PJI were pointing in opposite direction in the two countries. The HRs for revision due to aseptic loosening were 1.07 (0.75-1.52) for short and 1.27 (1.00-1.61) for extended thromboprophylaxis vs. medium thromboprophylaxis, being consistent on country level. In all cases, the absolute differences in cumulative incidences were less than 1% after 5 years.
Conclusions: Our data suggest no association between duration of anticoagulant thromboprophylaxis and revision rate within 5 years of THA. However, there is an indication that the extended thromboprophylaxis might be associated with increased revision rate due to aseptic loosening, and that country-specific factors plays role in the revision rate due to PJI.

Risk factors for dislocation and re-revision after first-time revision total hip arthroplasty due to recurrent dislocation – a study from the Danish Hip Arthroplasty Register

15.

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Background: Persistent instability after hip revision due to dislocation is a serious problem. In order to lower the risk of this complication, it is essential to identify risk factors.
Purpose / Aim of Study: Our aim was to analyze surgery- (liner type, extent of revision, head size) and patient- (age, sex, Charlson comorbidity index (CCI)) related risk factors for both new dislocation and re-revision any cause following a first-time revised hip due to dislocation.
Materials and Methods: We included patients with a primary THA due to osteoarthritis and a first-time revision due to dislocation registered in the Danish Hip Arthroplasty Register (DHR) from 1996-2016. Patients were followed from the day of the first revision to either Dec. 2018, re-revision, or death. We identified dislocations in the Danish National Patient Register based on a validated method and re-revisions in the DHR. Risk factors were analyzed by a Fine-Gray multiple regression analysis adjusting for the competing risk of death. Results are presented as subdistribution hazard ratios (sHR) with 95% confidence intervals.
Findings / Results: We identified 1,678 first-time revisions due to dislocation and 22.4% of these had a new dislocation. 19.8% were re- revised for any reason. Median follow-up was 5.3 years. For new dislocations, the sHR was 0,36 (0.27-0.48) for those who had a constrained liner (CL) during revision and 0.21 (0.08-0.58) for dual mobility cups (DMC) meaning a lower risk of dislocations compared to regular liners. Changing only the head/liner increased the risk of dislocation (sHR=2.65 (2.05- 3.42)) compared to full cup revisions. Age, sex, CCI, and head size was not significant risk factors for new dislocations. Regarding risk of new re-revision, changing only head/liner resulted in an increased risk of re-revision (sHR=1.73 (1.34-2.23)). Patients <65 years had increased risk of re-revision compared to 65-75 years (sHR=1.36 (1.05-1.77)). Sex, CCI, head size and liner type were not significantly associated with re- revisions.
Conclusions: Patients revised with a DMC and CL were associated with a lower risk of dislocation after a first-time revision but not re-revision whereas only changing the head/liner was associated with higher risk of dislocation and re-revision.

Length of Stay, Risk of Readmission and Mortality after Primary Surgery for Pediatric Spinal Deformities: A 10-year Nationwide Cohort Study

16.

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Background: Extended length of stay (extLOS) and unplanned readmissions after pediatric deformity surgery pose a considerable challenge to both the patient and the healthcare system. In some cases, it may be preventable, and it would be helpful to identify potential risk factors.
Purpose / Aim of Study: To describe reasons for extLOS, 90-day readmission and mortality after primary pediatric deformity surgery.
Materials and Methods: Patients were identified by procedure and diagnosis code in the Danish National Patient Registry (DNPR). From DNPR, data on LOS, readmissions and mortality within 90 days were retrieved. Patients were categorized in six groups according to etiology. Medical records were reviewed for reason for extLOS (LOS >75th percentile according to etiology) and discharge summaries were reviewed for primary diagnosis upon readmission.
Findings / Results: For the 1310 patients, the median LOS was 8 days (IQR: 7–9). A total of 274 (21%) patients had extLOS. Overall, the most common reason was pain/mobilization issues but with considerable variation between etiologies; idiopathic (59%), congenital (30%), syndromic (44%), spondylolisthesis (38%) and Scheuermann kyphosis (91%). Pulmonary complications were the primary reason for extLOS in the neuromuscular group (22%). The 90-day readmission rate was 6%; 67% of readmissions were medical, mainly infections unrelated to the surgical site (23%); 33% of readmissions were surgical related and 14% of patients required revision surgery. Neuromuscular scoliosis, spondylolisthesis, Scheuermann kyphosis and extLOS>9 days were independent risk factors for readmission; OR 5.5(95% CI: 2.8–10.6, p<0.01), OR 3.0 (1.1- 8.5, p=0.03), OR 4.7 (1.7–13.3, p<0.01) and OR 1.8(1.1-3.1, p=0.04), respectively. The 90-day revision rate and mortality rate were 3% and 0.4%, respectively.
Conclusions: In this nationwide cohort, pain and mobilization issues were overall the most common reason for extLOS. The 90-day readmission rate was 6% and the most common reason was infection unrelated to the surgical site. Readmission after pediatric spine surgery is related to the etiology and increased focus should be directed towards patients operated for neuromuscular scoliosis, spondylolisthesis and Scheuermann kyphosis.

A review of outcomes associated with femoral neck lengthening osteotomy of Morscher in patients with coxa brevis

17.

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Background: Avascular necrosis in the skeletally immature hip may result in a short femoral neck (coxa brevis). A triple femoral neck lengthening osteotomy has been described by Morscher to correct the deformity. The outcome has only been reported in small case series and no overview exists.
Purpose / Aim of Study: Provide an overview of the clinical and radiological outcomes of Morscher femoral neck lengthening osteotomy in patients with coxa brevis.
Materials and Methods: An extensive search of PubMed, CINAHL and Embase libraries for relevant terms of "proximal femoral deformity", "hip dysplasia", "coxa brevis", "femoral neck lengthening osteotomy" and "Morscher osteotomy" performed, while no restrictions regarding date, design and language of the studies had been applied. Subsequently the detected articles were screened for eligibility by two authors. Studies reporting the outcomes of Morscher femoral neck osteotomy in patients with coxa brevis included. Clinical and radiological outcomes were extracted.
Findings / Results: After screening 456 initial articles were found, 77 were selected for full-text evaluation. 11 articles, reporting 149 operated hips in 143 patients (31% male, 64% female, 5% unspecified), were included. Average age of the patients was 20.1 years (7 years– 52 years). Indications were DDH (51%), LCPD (27%), infection (6%), post-traumatic (4%), congenital (2%), SCFE (1%), idiopathic (3%) and unspecified (6%). Follow up was 74 months (6 – 192 months). The average LLD reduced 12 mm (0 – 40 mm). 65% of 101 hips with pre-op positive Trendelenburg test experienced improvement of hip abductor strength. Satisfactory improvements could be found in functional hip scores, especially in 'pain relief' and 'ability to walk'. ATD increased in average 24.3 mm. The results in incongruent hips were unsatisfying. Total twelve complications occurred (75% Category-I, 17% Category-II, 8% Category-IIIA, no Category-IIIB).
Conclusions: Femoral neck lengthening osteotomy of Morscher for coxa brevis shows good results with few complications in the literature. However, all studies are retrospective, and further prospective studies are needed.

A Web-program and an Action Guide for patients with anterior cruciate ligament injuries

18.

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Background: Comprehensive preoperative information is important to ensure that ACL patients are able to observe and respond to symptoms after discharge. Based on interviews, many patients express that these information meetings can be problematic due to difficulty of absence from school and that it is too much information during the meeting. Further, many patients were concerned after surgery and felt they were left alone with the problems.
Purpose / Aim of Study: The aim of this study was to investigate if it was possible to replace a personal pre-operative information meeting with a Web-program preparing for ACL reconstruction and to develop and implement an Action Guide to help patients to assess and address their post-operative concerns and problems.
Materials and Methods: A Web-program with all the pre- operative information was designed. To investigate how patients would like to be informed pre-operatively, 93 patients were allowed to choose between participating in the pre- operative information meeting or only to be informed by the Web-program. To address the patients` concerns after ACL surgery, we created an "Action Guide" based on the patients´ experienced problems, The purpose of the Action Guide was to help the patients to decide what to do in the post-operative period according to different problems. To evaluate the Action Guide, 76 patients participated in a survey before and after implementation of the Action Guide. As an estimate of their concerns patients were asked about their telephone call to the clinic two weeks after surgery.
Findings / Results: After implementation of the Web- program patients participating in the information meeting were reduced by 89%. Patients have expressed satisfaction with the Web-program and it does not appear to have impaired the quality of the treatment. A survey showed that the number of telephone calls from post-operative patients decreased by 34% after implementation of the Action Guide.
Conclusions: Most patients with anterior cruciate ligament injuries prefer information from a Web-program instead of a pre- operative information meeting. An Action Guide can help the patients to assess and address their post- operative concerns and problems, which again can reduce telephone calls to the clinic.

YODA Best Papers

Less Polyethylene Wear in Monobloc compared to Modular Ultra-High-Molecular-Weight-Polyethylene Inlays in Hybrid Total Knee Arthroplasty: A 5-year Randomized Radiostereometry Study

19.

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Background: A modular polyethylene (PE) inlay in total knee arthroplasty (TKA) may wear on both sides. PE particles may induce osteolysis, which can lead to implant loosening. We hypothesized higher PE wear of a modular PE inlay compared to a monobloc PE inlay in TKA at 60-month follow-up.
Purpose / Aim of Study: The aim of this study was to examine how tibial component design, modularity and materials affect polyethylene wear and tibial component migration in cementless TKA.
Materials and Methods: In a prospective, patient-blinded trial, 50 patients were randomized to hybrid TKA surgery with either a cementless, high- porosity, trabecular-metal tibial component with a monobloc UHMWPE inlay (MONO- TM) or a cementless, low-porosity, screw- augmented, titanium fiber-mesh tibial component with a modular UHMWPE inlay (MODULAR-FM). Radiostereometry was used to measure PE wear and tibial component migration.
Findings / Results: At 60 months follow-up, the mean PE wear of the medial compartment was 0.24 mm and 0.61 mm and the mean PE wear of the lateral compartment was 0.31 mm and 0.82 mm for the MONO-TM and the MODULAR- FM groups, respectively ($p<0.01$). The PE wear rate was 0.05 mm (95% CI 0.03 – 0.08) in the MONO-TM group and 0.14 mm (95% CI 0.12 – 0.17) in the MODULAR-FM group ($p<0.01$). Total translation at 60 months was mean 0.30 mm (95% CI 0.10 – 0.51) less ($p<0.01$) for MONO-TM compared with MODULAR-FM tibial components. In both groups, the majority of tibial components migrated continuously (>0.2 mm MTPM) between 24-to-60-month follow-up (phase 3).
Conclusions: At mid-term follow-up, monobloc PE inlays had approximately 60% less PE wear compared to modular PE inlays, which suggest back-side wear of modular PE inlays is a significant contributor of PE wear in hybrid TKA.

What happens 20 years after surgical and non-surgical treatment of an ACL-rupture? A population-based cohort study. 20.

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Background: Rupture of the anterior cruciate ligament (ACL) can be treated non-surgically which yields good short-term results in comparison to surgery. However, there are very few studies investigating the long-term effect and there are no large studies with long- term follow-up.
Purpose / Aim of Study: To compare the risk of long-term secondary surgical procedures after primary surgical and non-surgical treated ACL rupture in adult patients.
Materials and Methods: This is a population-based register study on patients aged 18-35 registered in the Danish National Patient Registry (DNPR) with an ACL-rupture (DS835, DS835B+E) between January 1, 1996 and December 31, 2000 with 20 years follow-up. The surgical treatment group was defined as receiving an ACL reconstruction (KNGE41, KNGE41B-E, KNGE45, KNGE45B-E) within 1 year after diagnosis. Major secondary surgical procedures were defined as subsequent ACL surgery (reconstruction/revision), arthroplasty, deep infection, arthrodesis and amputation. Minor procedures were defined as meniscal surgery, synovectomy and brisement. Multivariate regression analysis was performed for relative risk (RR) adjusted for age and sex. Results are reported with 95% confidence interval.
Findings / Results: In total, 7,539 patients had an ACL rupture and 1,970 patients were surgically treated. 4,773 (63%) were males and the mean age was 25.5 years (25.4; 25.6). There were 5.9% major secondary surgical procedures in the surgical group compared to 6.2% in the non-surgical group yielding an adjusted RR of 1.06 (0.86;1.31). The majority (86.5%) had only 1 major secondary surgery with no difference between the groups (p=0.171). There were 43.9% minor complications in the surgical treated group and 49.1% in the non-surgical group yielding an adjusted RR of 1.29 (1.20;1.39). A total of 37.3% had more than 1 minor secondary procedure with no difference between the groups (p=0.381).
Conclusions: We found no significant differences in major complications between surgically and non- surgically treated ACL patients with 20 years follow-up but the non-surgical group were associated with higher risk of minor secondary surgeries.

Differences in length of stay, readmission and complication rates within 90 days between unicompartmental and total knee arthroplasty in a fast-track setup: a propensity score matched study of 12,492 procedures.

21.

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Background: It is still debated whether unicompartmental (UKA) or total knee arthroplasty (TKA) is the best treatment for unicompartmental osteoarthritis. UKA potentially offers superior patient reported outcomes, faster recovery and fewer complications, however differences in preoperative comorbidity between TKA and UKA patients potentially affecting these outcomes are reported in multiple studies.
Purpose / Aim of Study: The aim of this study was to investigate differences in length of postoperative stay (LOS), readmissions and complications within 90 days of surgery between matched UKA and TKA patients.
Materials and Methods: UKA and TKA patients, operated in well-defined fast-track setup, from nine orthopaedic centers were included in this study. Propensity score matching (ratio = 1:3) was used to address differences in demographics and comorbidity between UKA and TKA patients resulting in a matched cohort of 3123 UKA patients and 9369 TKA patients. Univariable and multivariable linear or logistic regression models, and Chi-Squared test were used to investigate differences in LOS, readmission and complications between UKA and TKA patients.
Findings / Results: All significant differences in comorbidity between the groups were no longer present following propensity score matching. The UKA-group had a lower LOS compared to the TKA-group (median LOS 1 vs. 2 days, p<0.001). UKA patients were more likely to be discharged on DOS (OR = 64.06 [95% CI 44.76-84.64]) and less likely to have a LOS > 2 days (OR = 0.19 [95% CI 0.16-0.22]) compared to the TKA patients. There were no significant differences in the number of overall readmissions within 90 days. UKA patients were less likely to get a prosthetic joint infection (OR = 0.51 [95% CI 0.28-0.91]) or a reoperation (OR = 0.44 [0.23- 0.83]) compared to TKA patients. However, UKA patients were more likely to get a non-septic revision (OR = 4.52 [95% CI 1.85-11.07]) compared to TKA patients.
Conclusions: UKA patients had shorter hospital stays, a higher rate of discharge on the day of surgery, fewer prosthetic joint infections and reoperations compared to TKA patients. However, TKA patients had fewer non-septic revisions. Our findings support increasing utilization of UKA in a fast-track setup whenever indicated.

Quadriceps tendon and hamstring tendon grafts for anterior cruciate ligament reconstruction yield equal rates of graft failure and revision surgery at two years follow up

22.

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Background: It has been indicated that anterior cruciate ligament reconstruction (ACLR) with quadriceps tendon (QT) graft has a higher risk of revision.
Purpose / Aim of Study: To investigate if in a high-volume center ACLR with QT graft had higher risk of graft failure and revision surgery compared to hamstring tendon (HS) graft. The hypothesis was no between group difference.
Materials and Methods: This was a registry study with review of medical records. Our study cohort consist of patients with primary ACLR using either QT or HS performed at Hvidovre Hospital from January 2015 to December 2018 and were retrieved from the Danish Knee Ligament Reconstruction Registry. This cohort was linked to the Danish National Patient Registry to identify all hospital contacts post-ACLR and review of medical records was performed. The outcome variables were graft failure (re-rupture or >3mm side difference in A-P laxity), revision ACLR, revision due to cy-clops, revision due to meniscal injury and revision due to any reason. Also, A-P laxity and pivot shift were assessed at 1 year. Using Kaplan-Meier estimates, the categorical events were eval- uated at 2 years and comparison performed with Cox regression analysis.
Findings / Results: 475 subjects (nHS =252, nQT =223) were identified and included. The risk of graft failure at 2 years was 9.4% for QT and 11.1% for HS (p=0.46). Respectively, the risk of revision ACLR was 2.3% and 1.6% (p=0.66), the risk of revision due to cyclops was 5.0% and 2.4% (p=0.13), and the risk of revision due to meniscal injury was 4.3% and 7.1% (p=0.16). The risk of revision due to any reason was 20.5% and 23.6% (p=0.37). A-P laxity was 1.3 mm for QT and 1.4 mm for HS (p=0.35). The proportion with a positive pivot shift was 29% for both groups.
Conclusions: Quadriceps tendon and hamstring tendon grafts yield equal rates of graft failure and revision surgery at two years follow up after ACLR. Graft failure was found in 9-11%. QT was associated with higher risk of revision due to cyclops, and HS with higher risk of revision due to meniscal injury.

Introduction of a new treatment algorithm reduces the number of periprosthetic femoral fractures (PFF) following primary THA in elderly females

23.

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Background: Increasing global usage of cementless prostheses in total hip arthroplasty (THA) surgery presents a challenge, especially for elderly patients with increased revision rates, re-revision rates, and decrease in prosthetic survivorship when compared to cemented THAs. To reduce the risk of early periprosthetic femoral fractures (PFF), a new treatment algorithm for females >60 years undergoing primary THA was introduced.
Purpose / Aim of Study: The aim of this study was to determine the impact of the new treatment algorithm on the early risk of peri- and post-operative PFFs and guideline compliance.
Materials and Methods: A total of 2,405 consecutive THAs that underwent primary unilateral THA at out institution were retrospectively identified in the period January 1st 2013 to December 31st 2018. A new treatment algorithm was introduced on April 1st 2017 with female patients aged >60 years intended to receive cemented femoral components. Prior to this, all patients were scheduled to receiving cementless femoral components. Demographic data, number of peri- and post-operative PFFs and surgical compliance were recorded, analyzed and intergroup differences compared.
Findings / Results: The utilization of cemented components in female patients >60 years increased from 12.3% (n=102) to 82.5% (n=264). In females >60 years a significant reduction in the risk in early post-operative and peri- operative PFF following introduction of the new treatment algorithm was seen; (4.57% vs 1.25%, p=0.007) and (2.29% vs. 0.31%, p=0.02), respectively. Overall risk for post-operative and peri- operative fractures combined was also reduced in the entire cohort (4.1% vs 2.0%, p=0.01).
Conclusions: Use of cemented fixation of the femoral component in female patients >60 years significantly reduces the number of PFF. Our findings support use of cemented femoral fixation in elderly female patients.

KKR – Korte Kliniske Retningslinjer

Systematic clinical examination of perfusion with use of Ankle-Brachial-Index is a safe method in the initial evaluation of vascular injury after traumatic knee dislocation.

24.

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Background: Traumatic dislocation of the knee is a rare orthopaedic injury with often severe concomitant damage. In addition to the ligamentous injuries there is a significant risk of vascular injury (18% of total number) which can be potentially limb threatening if undiagnosed or late recognised. It is therefore crucial with a correct and safe diagnostic method in the acute phase.
Purpose / Aim of study: To establish an evidence based and standardised guideline for diagnosing vascular injuries in the acute phase after dislocation of the knee (with or without associated fractures).
Materials and Methods: The investigated diagnostic methods were clinical examination by means of Ankle-Brachial-Index (ABI) compared to a defined golden standard, i.e., CT- or MR-angiography.
A systematic Pubmed search for relevant literature published during the last 10 years was made (April 2020). Languages were English and German. In total 1383 articles were found, by title 1245 were excluded.
The latest systematic review found was from 2014. Including this all articles published hereafter (99) were evaluated by abstract and/or full text and 98 excluded. The remaining systematic review was included.
Additional search was made in Scopus (database of citations) using the identified seminal paper as object.
The quality of the included studies was evaluated by using AMSTAR and QUADAS.
Findings / Results: Two relevant studies of sufficient quality were identified: 1 systematic review and 1 diagnostic study. No studies directly comparing the diagnostic modalities were identified. Yet the available data did not show any difference in sensitivity between the methods.
Conclusions: Based on existing evidence clinical examination combined with systematic observation and use of ABI is a safe alternative to CT- or MR-angiography in the acute phase after dislocation of the knee.
There is however a need of more studies to sufficiently enlighten the field.

Efficacy of Intra-articular Local Anesthetics after arthroscopic knee surgery

25.

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Fagområde: Idrætskirurgi

Background: There is concern about chondrotoxicity of intraarticular local anesthetics. Some surgeons have lowered the dose or discontinued the use but there is no national consensus.
Purpose / Aim of Study: The aim of this short clinical guideline is to report the effect of postoperative intraarticular injection of local anesthetics after arthroscopic knee surgery reported with a relevant pain score.
Materials and Methods: We conducted a search on PubMed database for systematic reviews. Then made another search for any clinical trials published after the latest systematic review. We included 3 systematic reviews (1 study on Morphine, 1 study on Bupivacaine and 1 study on Ropivacaine) and 1 clinical trial published later (Ketamine). The methodological quality of systematic reviews was assed using AMSTAR and the clinical trial was assessed using Cochrane risk of bias tool.
Findings / Results: Studies report small differences in VAS. Bupivacaine had the best effect 2 hours postoperatively, reducing VAS by 10,7mm. Ropivacaine showed similar effect and reduced VAS by 11,9mm 2-8 hours postoperatively. The study testing ketamine did not report a specific VAS reduction and was of low methodical quality. Morphine had no significant effect. When analyzing the reduction in VAS, it should be noticed that the Minimal Clinical Important Difference (MCID) for patients postoperatively is reported to **Conclusion:** This short clinical guideline found a slight reduction in VAS when using Bupivacaine and Ropivacaine postoperative. This reduction might not be of clinical relevance. It is recommended to consider the adverse effects before administration of Ropivacain or Bupivacain.

Short Clinical Guideline for the conservative treatment of Adolescent Idiopathic Scoliosis with Night-time bracing or Full-time bracing.

26

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Background: In 2016 a short clinical guideline (KKR) was presented, regarding the choice off conservative treatment off Adolescent Idiopathic Scoliosis Patients. Night-time bracing was introduced as a treatment in 2007 in Denmark.
Purpose / Aim of Study: The purpose of this study was to revise the short clinical guideline (KKR) from 2016, and include research performed since 2016.
Materials and Methods: A systematic review off the literature was conducted with the original pubmed search string, but due to technical problems the search string was updated, and a new search was performed 3.3.2020. The answer to the PICO question, is the rate off curve progression in Patients with Adolescent Idiopathic Scoliosis similar, between patients treated with Night-time brace and Full-time brace was based on the findings.
Findings / Results: 195 abstracts were identified, and 44 papers was evaluated by the authors. 23 papers were found eligible to include. We were not able to find any systematic reviews or randomised controlled trials (RCT) comparing full time bracing and night-time bracing of AIS patients. 2 controlled trials and 21 retrospective studies were identified and included.
Conclusions: It is still our recommended to use night-time braces in the conservative treatment off AIS, but the recommendation is based on a weak scientific basic, since no systematic reviews or RCT was included.
CONTRAIS a RCT comparing fulltime bracing with Boston Braces and Night-time bracing with Providence Night time braces is currently performed, at Karolinska Hospital, Sweden. The findings from this study will influence the recommendation for conservative treatment off AIS patients and a further revision is recommended when the results from this study is performed.

Revision of existing short clinical guideline for treatment of complete acute AC joint dislocations.

27

A. H. Qvist & T. Falstie-Jensen

Background: Dislocation of the acromioclavicular (AC) joint is a common injury in the active population. Traditionally, management of complete dislocations has been nonoperative with satisfactory outcome. However, some patients experience unacceptable functional limitations and require secondary surgery. Currently, the role of primary surgical treatment in complete acute dislocations remains controversial.

Purpose / Aim of study: The aim of this study was to revise the Danish short clinical guideline (KKR) for the treatment of acute complete AC joint dislocations.

Materials and Methods: The existing short clinical guideline was used as a framework for this study. A systematic search in PubMed was conducted to identify meta-analyses comparing nonoperative treatment with operative treatment for AC joint dislocations. The methodological quality of all meta-analyses was evaluated with AMSTAR. Only meta-analyses of high methodological quality were included in the revised guideline. Outcomes of interest extracted from the meta-analyses were: functional outcome, complications, pain and radiological outcome. Furthermore, a systematic search in PubMed was conducted to identify relevant randomized controlled trials published after the included meta-analyses.

Findings / Results: We found 5 relevant meta-analyses. One new meta-analysis was identified compared to studies evaluated in the existing KKR. This meta-analysis was the only of the five meta-analyses of high methodological quality and was the only included in this study. It is based on 5 randomized studies and one quasi randomized with a total of 357 patients. Overall, the meta-analysis found the evidence-level of all included randomized studies low.

We identified no new randomized controlled trials not represented in the included meta-analysis.

Operative treatment of AC joint dislocations improves radiological outcomes, but offers no long-term improvements in functional outcome and pain. Furthermore, operative treatment is associated with complications not seen after nonoperative treatment.

Conclusions: Currently, there is no evidence to support routine operative treatment for complete acute AC joint dislocations.

KKR vedr. initial kirurgisk behandling af septisk artrit i knæleddet

28

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Dansk Selskab for Ortopædisk Infektionskirurgi (DSOI)

Background: Septic arthritis (SA) is a disease with significant joint destruction and mortality if not treated in time. The initial treatment of SA in the knee joint opens up several dilemmas regarding the level of surgical experience and timing.
Purpose / Aim of study: 1. Can rinsing the joint via the aspiration cannula ensure sufficient treatment effect in the initial phase? 2. Is early treatment more important than a high level of experience in the initial surgical treatment?
Materials and Methods: The following two PICO questions were investigated: PICO1: Acute surgical treatment for septic knee arthritis - lavage or synovectomy? PICO 2: Timing of surgical intervention for septic knee arthritis - acute (<12 hours) or subacute (12-48 hours)?
Findings / Results: There are no controlled or randomized studies that shed light on the two PICO questions and the defined outcomes. And the literature quality is generally too low compared to making evidence-based recommendations regarding initial treatment of septic arthritis.
Conclusions: The working group suggests initial treatment by joint lavage through the puncture needle until clear water returns in cases where bacterial knee arthritis is suspected without septicemia.

Kort Klinisk Retningslinje vedrørende osteosyntese af ustabile pertrochantære frakturer med marvsøm

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Background: The algorithm from Hvidovre concluded that all stabile intertrochanteric fractures (AO 31 A1.1, A1.2, A 1.3 and A 2.1) benefit from osteosynthesis with a dynamic hip screw, while all unstable intertrochanteric fractures (AO 31 A2.2, A 2.3, A 3.1, A 3.2 and A 3.3) should be treated with an intramedullary nail. However, it has never been determined whether a long or short nail was the ideal method of osteosynthesis.
Purpose / Aim of study: The aim of this short clinical guideline (KKR) was to answer the following research question: "Should unstable intertrochanteric fractures (AO 31 A 2.2, A 2.3, A 3.1, A 3.2 and A 3.3) be fixed with a long intramedullary nail (reaching the top of patella) or a short intramedullary nail."
Materials and Methods: A search through literature according to a standardized search-protocol admitted by the Danish Orthopedic Society (DOS) was conducted via Pubmed on the 2. Of March 2020. We focused on clinical guidelines, systematic reviews and randomized control-studies (RCT), supported by the directives from DOS. The included studies were rated by GRADE.
Findings / Results: Three systematic reviews were found and included after evaluation by AMSTAR. The three systematic reviews had a large overlay of included primary studies. They all showed a longer duration of surgery and increased peroperative bleeding. There were no statistically significant differences regarding reoperations, refracture rates or infections leading to further surgery. These data support the treatment of AO 31 A2-subtypes, but the studies only included few A3-fractures. Further studies on AO 31 A3-fractures are needed for a conclusion on this subtype.
Conclusions: Long intramedullary nails should only be used after thorough considerations regarding intertrochanteric fractures of the AO 31 A2-subtypes, since there is no evidence supporting a better outcome for the patients compared to a short intramedullary nail.

Hemiarthroplasty – to cement or not

30.

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Background: Displaced femoral neck fractures are typically treated with a hemiarthroplasty. The fixation of the femoral stem can be cemented or uncemented. Cemented fixation might be associated with increased risk for pulmonary embolism while uncemented fixation might be associated with increased risk for intra- and postoperative fracture. It is unclear whether stem fixation effects mortality, reoperation rate and patient reported outcome.
Purpose / Aim of Study: The aim of the short clinical guideline was to answer the question: "Does patients aged 65 years or above with a femoral neck fracture, and indication for surgery a with hemiarthroplasty, achieve better results with uncemented stem fixation compared to cemented fixation with respect to mortality, reoperation and patient reported outcome?"
Materials and Methods: A systematic literature search was conducted in Pubmed and Embase. Ten RCT and 16 register studies were included. Quality assessment of included articles was conducted using Cochrane Risk of Bias tool for RCT and ROBINS-I for register studies. Final assessment was performed using GRADE.
Findings / Results: The main finding was a reduced risk of reoperation within one and five years when using cemented fixation compared to uncemented fixation. No significant difference was found in mortality. Only few studies presented patient reported outcomes with no clinical relevant differences.
Conclusion: Use a cemented stem fixation for hemiarthroplasty surgery in patients above 65 years with a displaced femoral neck fracture in order to reduce the risk for reoperation.

Experimental

Double-dose cefuroxime concentrations in bone, knee joint, and subcutaneous adipose tissue – A randomized porcine microdialysis study

31.

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Background: Surgical site infection is a severe complication to orthopaedic surgery, which can prolong admission and increase cost. Optimal perioperative antimicrobial prophylactic treatment is a key factor in preventing surgically related infections.
Purpose / Aim of Study: To evaluate the time with concentrations above relevant minimal inhibitory concentrations (fT>MIC) of 4 µg/mL in bone, knee joint, and subcutaneous adipose tissue after double dose of cefuroxime given as either one bolus administration (1x3,000 mg) or two single doses with a four-hour interval (2x1,500 mg)
Materials and Methods: Sixteen female pigs (Danish Landrace breed, weight 73-77 kg) were randomized into two groups of eight: Group 1 received a bolus administration of 3,000 mg cefuroxime. Group 2 received two single doses of 1,500 mg administered with a four- hour interval. Microdialysis was applied for sampling in cortical and cancellous bone, knee joint, and subcutaneous adipose tissue. Plasma samples were collected as reference. Sampling was performed for eight hours.
Findings / Results: During an 8 h sampling interval, the mean percentage fT>MIC (4 µg/mL) across compartments was longer for Group 2 (298 – 422 min) compared to Group 1 (221 – 269 min) ($p<0.01$). In cortical bone, there was a tendency towards longer fT>MIC (4 µg/mL) in Group 2 (298 min) compared to Group 1 (221 min) ($p=0.053$). Within 50 min after administration, the mean concentration of 4 µg/mL was reached for both groups in all compartments. In tissues the mean concentrations decreased below 4 µg/mL after approximately 4 h (Group 1) and 3 h (Group 2) from initiation of administration (time zero).
Conclusions: A delayed tissue penetration was found in all tissues, where a mean concentration of 4 µg/mL was reached within 50 min for both groups in all compartments. During an 8 h interval, double dose cefuroxime administered as bolus 2x1,500 mg with a 4 h interval provides longer time above MIC breakpoint for S. aureus (4 µg/mL) than a single bolus of 3,000 mg cefuroxim. However, to maintain sufficient tissue concentrations during longer surgeries, re- administration of cefuroxime (1,500 mg) should be considered already 3 h after the first administration.

What is so special about the myotendinous junction ?– a RNA-sequencing study

32.

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Background: The connection between the muscle fibers and the tendon, name the myotendinous junction (MTJ), is architecturally constructed to transmit force between muscle and tendon, but at the same time it is vulnerable to strain injury. In order to explain why these injuries occur and suggest how they can be prevented, a better understanding of the composition and cellular components of the MTJ is needed. Previous studies have shown the presence of an unique collagen type at the MTJ, Collagen XXII, which is not demonstrated elsewhere in the skeletal muscle system.
Purpose / Aim of Study: The purpose was to evaluate the gene expression of the MTJ and compare it to the adjacent muscle and tendon. We aimed to find new targets that are unique to the MTJ and of importance for the strength or recovery of the tissue. In addition, we wanted to identify targets that are higher expressed at the MTJ compared to the neighboring muscle and tendon.
Materials and Methods: Samples were collected from the superficial digitorum flexor muscle from 20 horses, frozen and sliced into sections containing muscle, MTJ and tendon tissue before preparation for RT- PCR. Based on the mRNA results a t-stochastic neighboring embedded plot (t-SNE) was made and sets of samples from 5 horses with the clearest separation between tissues were chosen for RNA sequencing. An expected contribution of muscle and tendon was calculated for all targets based on the known expression of 2-300 of the most selective muscle and tendon genes. Any variation between the expected and measured gene expression was regarded as expressed by the MTJ.
Findings / Results: No targets were found to be uniquely expressed at the MTJ. Collagen XXIIÐ1 was expressed 17-fold higher compared to the expected value. Generally, genes involved in remodeling and reformation of skeletal muscle fibers and extracellular matrix were expressed to a larger extent at the MTJ.
Conclusions: Despite the MTJ being a region specialized in force transmission with a highly specialized morphology no genes could be demonstrated as being unique to this region. The genes expressed higher in the MTJ compared to muscle and tendon were related to remodeling activities, and this confirms the previous finding of high rates of remodeling at the MTJ.

ELECTRICAL IMPEDANCE CHARACTERIZATION OF BONE FRACTURE

33.

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Background: Differences in electrical characteristics of different tissues can provide information of the tissue composition at the fracture region. Real-time monitoring of bone healing with electrical impedance spectroscopy might provide information for an individualized treatment of fracture patients. However, electrodes must be placed at a distance to the fracture site in order not to interfere with bone healing.
Purpose / Aim of Study: We investigated whether electrical impedance measurements from electrodes placed at a distance to a bone defect can detect differences between intact bone and bone defects in vivo.
Materials and Methods: Approval was granted from the Inspectorate of the Animal Experimentation of Danish Ministry of Justice. 6 rabbits were anaesthetized, and a fracture protocol was subjected to both tibias. Electrical impedance was measured in frequencies from 10 Hz to 1 MHz at each step: 1) intact bone, 2) medial defect, 3) medial and lateral defect, 4) complete 2 mm bone defect. One electrode was placed in the medullary canal and two electrodes extracortical (lateral and posterior) 2 mm from the defect. For each rabbit, one tibia had measurements with a free inner electrode and the other tibia had measurements both with a nail and an isolated nail.
Findings / Results: For all tibias, the intact bone resulted in higher impedance compared with the complete defect, and this difference was most pronounced in the frequency range of 1kHz to 100 kHz. This applied for all types of electrodes including electrode, nail, isolated nail. The isolated nail showed the biggest impedance difference between the intact bone and the complete defect. Incomplete bone defects had lower impedance compared with intact bone, but no consistent pattern for differences in impedance was observed between the different applied defects.
Conclusions: Consistent impedance differences between intact bone and complete defects were detected in-vivo in rabbits. Further research is needed to explore whether the presented method can be used to characterize bone healing over time.

The ability of comorbidity indices to predict mortality in an orthopedic setting: A systematic review and meta-analysis

34.

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Background: Several comorbidity indices have been created to measure and adjust for the estimated burden of comorbidity.
Purpose / Aim of Study: The objective of this systematic review was to evaluate and compare the ability of different comorbidity indices to predict mortality in an orthopedic setting.
Materials and Methods: A search string was developed in collaboration with a scientific librarian. The search string was used to extract possible studies from Embase, Medline, and the Cochrane Library. Two reviewers independently screened the studies using Covidence. This study was registered in Prospero and ROBINS-I assessment tool was used to assess the risk of bias. The area under the curve (AUC) was chosen as the primary effect estimate. An exploratory meta-analysis was made comparing the ability of the Elixhauser Comorbidity Index (ECI) and the Charlson Comorbidity Index (CCI) to predict in-hospital and 1-year mortality.
Findings / Results: Of the 5338 studies identified, 16 met the eligibility criteria. Most studies included patients with either hip fractures (7 studies) or arthroplasties (5 studies). The risk of bias was serious for 2 studies and moderate for the remaining. Overall the predictive ability of the different comorbidity indices ranged from poor (i.e. AUC <0.70) to excellent (AUC >0.89). The majority of the included studies only compared the ECI and CCI. In-hospital mortality for ECI and CCI was reported in 8 studies yielding an overall effect size of 0.84 (CI 0.81- 0.88) for ECI and 0.83 (CI 0.79-0.86) for CCI. The AUC values were generally lower for all other time points ranging from 0.67 to 0.78. For 1-year mortality the overall effect size was 0.69 (CI 0.66-0.72) for ECI and 0.70 (CI 0.67-0.74) for CCI.
Conclusions: ECI and CCI can equally be used to adjust for comorbidities when analyzing in-hospital mortality in an orthopedic setting. However, in general, both indices have poor to fair AUC values for 30-day and 1-year mortality, where other indices might perform better.

Sampling of the myotendinous junction – how can we do it? 35.

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Background: The myotendinous junction (MTJ) is the region where strain injuries most often occur. Clinically, the risk for these injuries can be reduced through specific resistance training. This positive effect may be caused by changes in the concentration of structural proteins, leading to a strengthening of the MTJ. However, specific knowledge about the effect on the structure and tissue composition of the MTJ of resistance exercise is sparse. In order to study changes in protein content or gene expression at the MTJ it is necessary to isolate MTJ from the skeletal muscle and tendon to avoid that results from different tissues are mixed.
Purpose / Aim of Study: We aimed to develop a method to divide a sample taken from the MTJ into its three components: muscle, tendon and MTJ.
Materials and Methods: Samples were collected from the superficial digitorum flexor muscle from 20 horses and frozen routinely for immunohistochemistry. In frozen form each specimen was manually sliced parallel to MTJ into 10 µm thick sections and sampled for further processing. By controlling every 20th section visually it was noted whether the section contained muscle, MTJ or tendon. RT-PCR was performed on the collected sections identifying mRNA targets regularly used in the study of skeletal muscle and tendon. A Principle Component Analysis (PCA) and a t- distributed stochastic neighboring plot (t-SNE) were made on all the results to evaluate how well the different tissue regions had been isolated.
Findings / Results: It was possible visually to group the samples according to the three tissues. The t-SNE plot confirmed that the MTJ samples grouped specifically and were very similar in relation to their expression of the mRNA targets.
Conclusions: It was possible by this method to divide a specimen from the MTJ into muscle-, tendon- and MTJ-tissue. It is a cheap and specific method which is useful in studies looking into changes introduced at the MTJ following resistance exercise and experimental set- ups.

Manipulating the journal impact factor? The use of Journal-Self-Citations among orthopedic journals to boost journal rankings

36.

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Background: The Journal Impact Factor (JIF) is often used as an indicator of research quality by tenure, promotion, and funding assessment committees. Thus, a higher JIF could lead to increased visibility for journals and more publication submissions. This provides incentives for journal editors to optimize in accordance with the JIF formula; the number of citations received in a given year to a journal's publications from previous two years divided by the number of only articles and reviews from previous two years. However, the use of JIF to assess research quality is highly problematic, since it can easily be manipulated. A strategy to boost the JIF-score is by increasing the rate of Journal-Self-Citations (JSC) to the two previous years (JIF-years), which increases the number of citations (size of the numerator).
Purpose / Aim of Study: The aim is to investigate to what extent Orthopedic journals might use different strategies to influence and increase their JIF- scores.
Materials and Methods: All journals indexed in the subject category Orthopedics by the Journal Citation Report between 1997 and 2018 were analyzed. The data source was the in-house database version of Web of Science owned by the Royal Institute of Technology (KTH). The study covers 95 journals, 210,528 publications, and 3,990,809 citations. We analyze the publishing and citation patterns of these journals and apply different measures to identify which strategies might be the most frequent in the field to optimize the impact factors and which journals might take most advantage of these strategies to boost their JIF and ranking.
Findings / Results: Our first results show that the rate of JSC to JIF- years tend to be as almost double as high than usual. Still, there are large variance in the JSC intensity among journals. If the JSC to the JIF- years are excluded, the impact factor on average decreases 15%. For the 2018 JIF ranking, four journals in the top10 changes position when JCS are excluded.
Conclusions: The study finds a strong tendency for JSC in the JIF-years. It suggests that the inclusion of JSC in the calculation influences the JIF-scores and ranking of journals.

Bacteriophage treatment against Staphyloccus aureus periprosthetic osteomyelitis in rats

37.

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Background: Bacteriophages (phages) are virus-like entities that only target bacteria and are composed of protein-encapsulated phage chromosomes. Using recognition proteins attached to the protein capsule, phages bind to the surface of specific bacteria and inject their chromosome into the cytoplasm. Inside the cell the bacterial gene expression machinery is hijacked by the phage chromosome, to produce a large litter of phage progeny, eventually killing the bacterium and releasing the phages into the environment.
Purpose / Aim of Study: To investigate the ability of Bacteriophages to eradicate S. aureus, in a knee prosthesis model of osteomyelitis in rats.
Materials and Methods: Ten Sprague-Dawley rats had prosthesis inserted in their left knee, and were divided into three groups. 103 S. aureus MN8, ica+ was inserted into the femoral and tibial bone marrow of the knee, before insertion of the prosthesis. The study included two bacteriophage groups with 4 rats in each group and one control group with two rats: One Bacteriophage group was given high dose (106), and one low dose (103) of bacteriophages, before insertion of the prosthesis. Control rats were given sterile saline (0.1 ml) and S. aureus bacteria. After two weeks the rats were sacrificed, and all specimens were analyzed clinically, radiographically, microbiologically and histologically.
Findings / Results: In the group with high dose of bacteriophage, two rats died of allergic reaction or cytokine storm. The remaining two rats showed no reaction to treatment. In the group with low dose of bacteriophage, one rat died. One rat had a nearly total clearing of infection. The other two rats, showed a significate reduction of infection in nearly all parameters. One rat in the control group died of unknown causes.
Conclusions: Bacteriophage treatment against S. aureus osteomyelitis, reduced the infection in the low dose group, but no effect was seen in the group given high dose of bacteriophage in any parameters. Two rats died in the group given high dose of bacteriophages because of cytokine storm. Lower dose than 103 bacteriophages might reduce the infection around the prosthesis, as judged by all parameters.

Foot and Ankle

Acute Achilles tendon rupture – Investigation of a genetic contribution to the etiology. A registry study from the Danish Twin Registry.

38.

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Background: The etiology and pathogenesis of acute Achilles tendon rupture (ATR) are complex and not fully understood. Some studies have shown possible associations between specific genes and ATR. No twin studies have yet investigated the genetic component of ATR.
Purpose / Aim of Study: To identify a possible genetic component in the risk of ATR.
Materials and Methods: The study was performed as a registry study using the Danish Twin Registry and the Danish National Patient Registry. Twins registered with the diagnosis codes DS86.0 and DS86.0A were retrieved and the probandwise concordance for monozygotic (MZ, ~100% identical genetics) and same-sex dizygotic (ssDZ, ~50% identical genetics) were calculated. If the probandwise concordance rate in the MZ twins was larger compared to the ssDZ twins, the results suggest a genetic component of the etiology.
Findings / Results: From 1994 to 2014, 577 twin pairs were registered in the Danish Twin Registry with at least one of the twins having had an ATR. Of those, 122 were MZ (5 concordant pairs, 117 discordant pairs) with a probandwise concordance rate of 0.079 (CI 95% 0.027;0.170) and 230 were ssMZ (5 concordant pairs and 225 discordant pairs) with a probandwise concordance rate of 0.043 (CI 95% 0.014;0.095). No statistically significant difference between the groups was found (p-value 0.31).
Conclusions: If one twin of a pair have had an ATR, this study found a risk of ATR for the second twin of 8% for a MZ twin and 4% for a ssDZ. The larger probandwise concordance rate for MZ twins compared to ssDZ speaks for a genetic component in the etiology, however the finding was not statistically significant and no definite conclusions can be made.

Operative versus non-operative treatment of acute Achilles tendon rupture. A register study from the Danish Achilles tendon Database.

39.

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Background: For decades, the choice of operative or non- operative treatment of acute Achilles tendon rupture has been debated. Few studies present data on the difference in functional outcomes.
Purpose / Aim of Study: To compare functional outcomes in operative and non-operative treatment of acute Achilles tendon rupture.
Materials and Methods: The study was performed as a register study from the Danish Achilles tendon Database. The primary outcome was the Achilles Tendon Resting Angle (ATRA) 12 months post-injury. The secondary outcomes, assessed 12 months post-injury, were heel-rise height, Achilles tendon Total Rupture Score (ATRS), return to pre-injury work and sport, as well as satisfaction with the treatment and the result. Comparison between operative and non-operative treatment was performed using multiple linear and logistic regression analysis, controlling for sex, age, diabetes, rheumatism, hypertension, treatment with corticosteroids, hospital of treatment and age of the rupture.
Findings / Results: 364 patients were included in the study population from August 2016 to January 2019. ATRA showed a statistically significant difference of 1.67 degrees (CI: -2.83; -0.52; P = 0.0047) in favor of operative treatment. Also, operatively treated patients had statistically significantly better odds (odds ratio 2.2 (CI: 1.07; 4.72; P = 0.038)) of returning to the same type of sports. There was no statistically significant difference in heel-rise height, ATRS, return to pre-injury work or satisfaction with the result and treatment.
Conclusions: This study found a statistically significant difference in the primary outcome (ATRA) in favor of operative treatment compared to the non-operative. This difference is not considered clinically relevant.

Tourniquet Induced Ischemia and Reperfusion in Subcutaneous Tissue and Calcaneal Cancellous Bone

40.

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Background: Tourniquet is widely used in orthopedic surgery in order to improve visualization and reduce perioperative bleeding. However, tourniquet has been associated with multiple adverse effects which may be related to the tourniquet induced ischemia.
Purpose / Aim of Study: We aimed to evaluate the ischemic metabolites in subcutaneous tissue and calcaneal cancellous bone before, during, and after tourniquet application.
Materials and Methods: Eight female pigs were included. Microdialysis catheters were placed for sampling of the ischemic markers glucose, lactate, pyruvate, and glycerol bilaterally in subcutaneous tissue and calcaneal cancellous bone. A tourniquet was applied on a randomly picked leg of each pig. Tourniquet inflation time was 15 min and the tourniquet duration was 90 min. Dialysates were collected for 8 hours.
Findings / Results: Shortly after tq inflation, a three-fold increase in the lactate/pyruvate ratio was found in both subcutaneous tissue and calcaneal cancellous bone. While the lactate/pyruvate ratio for subcutaneous tissue decreased to baseline immediately after tq release, the lactate/pyruvate ratio was normalized in calcaneal cancellous bone after 2.5 hours. Furthermore, calcaneal cancellous bone was exposed to a decreased glucose ratio and an increased glycerol ratio during tq application.
Conclusions: This study demonstrates that microdialysis can be used to monitor ischemic markers in the interstitial space of subcutaneous tissue and calcaneal cancellous bone. We found that tourniquet application induced ischemia and cell damage in subcutaneous tissue and calcaneal cancellous bone, which were fully recovered within 2.5 hours from tourniquet release.

Tourniquet use and complications in a national cohort - data from the Danish Fracture Database

41.

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Background: Tourniquet (TQ) is widely used in orthopaedic trauma surgery for better fracture visualization but there are complications directly related to its use. The evidence concerning the benefit or frequency of complications when using TQ is sparse.
Purpose / Aim of Study: The aim is to compare the risk of complications in TQ use or not in patients with surgical treated ankle fractures. Secondary to investigate whether surgical experience is associated with TQ use and the distribution of TQ use in Denmark.
Materials and Methods: The study is a population based register study from the Danish Fracture Database (DFDB). Data was extracted on patients with AO type 44 and primary internal fixation in the period March 15, 2012 to December 31, 2016. Primary outcome was major complications defined as re- osteosynthesis, amputation, deep infection, arthroplasty, and arthrodesis. Minor complications was defined as removal of osteosynthesis after more than 12 weeks. DFDB data was linked update with data from the Danish National Patient Registry for complete complication information. Multivariate regression analysis was performed for relative risk (RR) adjusted for age, sex, American Society of Anesthesiologists Classification (ASA) and level of surgeons experience. All results are reported with 95% confidence interval.
Findings / Results: There were 3,389 (83%) without TQ (non-TQ) and 669 (17%) with TQ. The average age was 53.5 years (52.9; 54.1), 61% were female and 89% had an ASA score of 2 or less with no statistical difference between the 2 groups. In the non-TQ group, 148 (4%) had major complications compared to 21 (3%) in the TQ group yielding an adjusted RR of 1.45 (0.91; 2.32). There were 791 (24%) minor complications in the non-TQ group compared to 165 (25%) in the TQ group yielding an adjusted RR of 0.99 (0.84; 1.17). Consultants predominantly used TQ during fracture surgery ($p< 0.0001$) and there was significant variance in inter-hospital use of TQ ($p<0.0001$) ranging from 0% to 43%.
Conclusions: There was no association between the use of TQ and minor or major complications. However, the use of TQ varied considerable between hospitals and with surgical experience. The potential benefit of TQ use should be considered in all hospitals.

The Effect of a Single Hyaluronic Acid Injection in Ankle Arthritis - a Prospective Cohort Study. 42.

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Background: Non-operative measures are often used as first line treatment in ankle osteoarthritis (OA). One of these measures consists of hyaluronic acid (HA) injections in the affected ankle joint but the efficiency of this treatment is uncertain with lacking evidence regarding both the effect and number of injections needed.
Purpose / Aim of Study: To evaluate the effect on Self-reported Foot and Ankle Score (SEFAS) score, visual analogue scale (VAS) score at rest and VAS score at activity prior to and 6 months after a single dose of HA in patients with grade I - IV OA of the ankle.
Materials and Methods: Patients above 18 years were included during the period December 2017 to Marts 2019. All patients were not interested in surgery and had tried other conservative measures without effect. Included patients received a single intra-articular injection of either Cingal (4 mL, 88 mg HA plus 18 mg triamcinolone hexacetonide) or MonoVisc (4 mL, 88 mg HA) in the affected ankle joint, with the latter being used in case of diabetes or surgeon preference. Age, gender, OA-grade, SEFAS-score, VAS at activity and at rest prior to injection and after 6 months was registered. Statistical analysis was conducted in SAS 9.4.
Findings / Results: A total of 33 patients were included in the study with 14 being lost to follow-up. As such, 19 patients (31.5 % men and 68.5 % women) with a median age of 55 (range 30-81) were included for analysis. Fifteen (79 %) were injected with Cingal and 4 (21%) with Monovisc. Median SEFAS-score remained unchanged at 21 (p=0.13) while VAS at activity went from 7 to 6 (0.003) and VAS at rest was reduced from 4 to 3 (0.03).
Conclusions: The unchanged SEFAS-score together with the minor changes in VAS at activity and at rest indicates that a single injection of HA might be insufficient to produce at clinical response after 6 months and further studies on the subject should focus on treatment protocols with multiple injections.

The heel-rise work test overestimates the performed work with 22-24 % after an Achilles tendon rupture. A validity study using a motion caption system as gold standard.

43.

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Background: The heel-rise work test is the most common outcome measure used for quantifying functional deficits after acute Achilles tendon rupture. The test is usually performed with use of a linear encoder, as introduced by Silbernagel et al. in 2010, but its validity is unknown.
Purpose / Aim of Study: The purpose of this study was to evaluate the concurrent validity of the heel-rise work test performed with use of a linear encoder.
Materials and Methods: The study was designed as a validity study performed on a prospective cohort of consecutive patients. Data was collected as part of an ongoing randomized controlled trial. A motion capture system was used as gold standard. The test was carried out with the participant standing on a wooden box with af 10-degree incline. The string of the linear encoder was attached to the participants heel. Reflective markers were attached to the heel and anatomical landmarks on the pelvis from which the pelvic center was calculated. The heel-rise work tests ability to detect total work is based on the assumption, that the heel is lifted as high as the center of body mass during a heel rise. The pelvic center was used to estimate the center of body mass, from which the true total work can be detected. The heel marker was used to quantify the measurement error, when the motion capture system was given the same prerequisites as the linear encoder. The heel-rise work test was carried out using the two measurement systems simultaneously.
Findings / Results: The linear encoder overestimated the total work with 22 % on the injured limb and 24 % on the non-injured limb, when compared to the pelvic centre ($p < 0.0001$). When compared to the heel markers, the measurement error was 1.5 % on the injured limb ($p = 0.043$) and 2.4 % on the non-injured limb ($p < 0.0001$). When comparing the limb symmetry index assessed by the linear encoder to the limb symmetry index assessed by the motion capture system, no differences was found.
Conclusions: The linear encoder was able to detect the relative differences between the injured and uninjured limb in an accurate manner but overestimated the absolute work with 22 %to 24 %.

Should recreational badminton players land like a pro? – a possible strategy to protect the Achilles tendon from rupture

44.

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Background: Achilles tendon (AT) rupture is common among recreational male badminton players. Observations indicate that AT ruptures often occur in the transition from landing to forward acceleration following a forehand stroke on the rear court. It is an observation that many recreational players use a different landing technique from elite players, and the hypothesis is that this result in higher AT forces and increased risk of sustaining an AT rupture.
Purpose / Aim of Study: The aim of this study was to explore the relationship between landing technique and AT forces in recreational badminton players during simulated rear court forehand strokes.
Materials and Methods: Ten recreational male badminton players (age: 28.1 ± 6.3 yr., height: 182.7 ± 5.9 cm, mass: 79.7 ± 10.5 kg) attended a single test session, where they performed 5 forehand rear court strokes with their usual technique jumping straight backwards, and 5 forehand strokes adopting the technique of elite players landing with the rear foot perpendicular to the direction of movement. AT force, of the leg opposite to the players' racket arm, was calculated from 3D motion analysis. A multiple stepwise linear regression was performed to explore the relationship between peak AT force and four independent variables: peak dorsiflexion (DF), outwards foot position (Fpos), vertical ground reaction force (vGRF) and average forward velocity (Fvel).
Findings / Results: The stepwise regression analysis generated three models. DF had the largest Pearson correlation ($r = 0.39$) and was therefore included in Model A ($R2 = 0.15$). The combination of DF, Fvel and Fpos could account for 39% of the variance in AT force. Similar standardized beta-weights (0.32-0.36) were observed for DF, Fvel and Fpos, and all three were significant ($p<0.05$) predictors of the peak AT force.
Conclusions: Landing from a rear court forehand stroke with large dorsiflexion or with a neutral foot position, or with increased forward acceleration upon landing, are all equally associated with increased AT forces. These findings indicate that recreational players may reduce the high loads on their AT by adopting the landing technique of elite players, and potentially reduce the risk of sustaining an AT rupture.

Mid-term results after treatment of complex talus osteochondral defects with HemiCAP implantation

45.

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Background: Osteochondral defects (OCDs) of the talus represents a surgical challenge. Primary OCDs with a size less than 150 mm2 /15 mm in diameter, without large cyst formation or other complicating factors can be treated with simple arthroscopic bone marrow stimulation techniques. When confronted with more complex OCDs a HemiCAP metal resurfacing implant of talus might be an option but few follow-up studies exist.
Purpose / Aim of Study: To evaluate the mid-term results after HemiCAP implantation in patients with complex OCDs during the period 2008-2016.
Materials and Methods: Patients were included during the period 2008-2016. Inclusion criteria's were: OCD of the medial or lateral talar dome, symptoms for >1 year since last surgery, OCD treated at least 1 year conservatively without effect. Exclusion criteria's were: defects larger than 20 mm, ankle osteoarthritis Grade >II or other ankle pathology, known allergy to implant material or diabetes. Outcome measures were the American Orthopaedic Foot and Ankle Society Score, the Numerical Rating Scale, Foot and Ankle Outcome Score, sports participation, work level and radiographic evaluation. Implant survival, defined as the implant remaining in situ without revision to total ankle arthroplasty, ankle fusion or removal of the implant was evaluated as well.
Findings / Results: 31 patients were included during the period with a mean follow-up of 50 months (11.5 – 81.4). All outcome measures improved significantly. Only one patient had an complication registered which were an infection treated with antibiotics. 13 patients (41,9 %) had an additional procedure performed (eg. arthroscopic debridement, hardware removal, cheilectomy) with none of the patients being revised.
Conclusions: The primary aim of OCD treatment is to reduce pain, and this is achieved with the HemiCAP implant in patients with complex OCDs even tough patient information and selection is mandatory due to the relative high numbers of additional surgery following the HemiCap implantation.

Benefits and harms of exercise therapy for patients with diabetic foot ulcers: A systematic review

46.

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Background: One of the most feared complications of diabetes mellitus is diabetic foot ulcers (DFU), as it can cause severe adverse consequences such as amputation or death. Patients are often required to refrain from bearing weight on their affected limb, leaving some patients immobile for weeks, months or even years. This is in direct contrast to guidelines for diabetes where exercise therapy and physical activity are core elements in the treatment. This leaves patients and caretakers with a paradox. If a DFU evolves, should patients continue following the guidelines for diabetes? Even if these guidelines include recommendations of brisk walking and exercising at high intensity.
Purpose / Aim of Study: Exercise therapy is a core element in the treatment of diabetes, but the benefits and harms for patients with a diabetic foot ulcer are unknown. We aimed to systematically review the benefits and harms of exercise therapy for patients with DFU.
Materials and Methods: We searched six major databases. We performed citation and reference searches of included studies and contacted authors of ongoing trials. We included randomized controlled trials to assess potential benefits on health-related quality of life (HRQoL) and harms of exercise therapy. Observational studies were included to identify potential harms of exercise therapy.
Findings / Results: We included 10 published publications of 9 trials and results from two unpublished trials including a total of 281 individuals with DFUs receiving various forms of exercise therapy. Due to lack of HRQoL measurements and high heterogeneity, it was not possible to perform meta-analyses. Results on HRQoL was present in one unpublished study. Harms reported ranged from musculoskeletal problems, increased wound size, to amputation; however, no safe conclusions could be drawn from the available data due to high heterogeneity and risk of bias in the trials.
Conclusions: Protective strategies are often preferred over therapeutic exercise which might have unforeseen consequences for patients over time. Based on the current literature, no evidence-based recommendations can be provided on the benefits and harms of exercise therapy for patients with DFUs. Well-conducted RCTs are needed to guide rehabilitation.

Reliability of a new measure of landing stability

47.

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Background: Standing postural control has often been used as a measure of stability and a potential indicator of lower limb injury risk. Yet, acute injuries like ankle sprains happen within the first few milliseconds after contact, and dynamic landing tests might have a better potential for injury risk after rehabilitation.
Purpose / Aim of Study: To examine the reliability of a new parameter of landing stability in a group of young recreational athletes.
Materials and Methods: 11 subjects (3 female) volunteered to participate and were tested twice, one week apart. The subjects were instructed to jump a distance equal to 100% of leg length and land on a force plate as stable as possible and remain still for 5 seconds. The resultant centre of pressure (CoP) was measured at 200 Hz, and the distance of CoP translation was calculated in epochs of 200 ms during the first second. The average of 3 landings on the preferred jump leg was calculated. The Student t-test for paired samples was used to identify systematic error in the test- retest measurements ($p < 0.05$). Intraclass Correlation Coefficient (ICC3,k) was determined for relative reliability, while Coefficients of Variance (CV) were determined for absolute reliability.
Findings / Results: The distance of the CoP was highest during the initial 200 ms and rapidly declined and levelled during the last 400 ms. No differences from test to retest was found in any time epoch. The reliability was good in the first 200 ms (ICC200: 0.843 (0.42- 0.96) 95% CI), p=0.004, CV= 10.4% (7.4-16.4)), but was poor and non-significant from 200-600 ms. In the last two time-epochs reliability was fair and good, respectively (ICC800: 0.70 (-0.14-0.92), p=0.037, CV=27.9% (20.6-44.1);
ICC1000: 0.80, (0.24-0.95), p=0.01, CV=18.4% (14.4-29.5)).
Conclusions: This new approach to quantifying landing stability showed good perspectives as an evaluation tool, both the initial landing stability measure, as well as for the stability epochs 600-1000 ms after landing. The early stability may be most useful to evaluate risk of lower limb injury, since injuries occur in this early time period after landing. However, the relatively large CV indicates that it may be most useful for group interventions and less useful for individual feedback.

Hand and Wrist

1 & 2 Column Fusion - solution for the SLAC or SNAC Wrist; case series of 42 consecutive patients

48.

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Background: Limited intercarpal bone fusion (1CF, 2CF) has been introduced as an alternative to classic Four Corner Fusion (4CF) for the treatment of scapholunate advanced collapse (SLAC) arthritis and scaphoid non- union advanced collapse (SNAC) as 4CF is found related to high non-union- and complication rates. The rationale behind the simplified method with a less invasive approach, needing less bone grafting was to improve the union and consequently the results of surgery

Purpose / Aim of Study: The goal of this study was to present the results of lunocapitate/hamatotrapezoid (two column) or lunocapitate fusion only (one column), using the bone graft from the removed scaphoid bone and the Acutrak headless compression screw system

Materials and Methods: From August 2014 to January 2020, 42 consecutive patients,13 women, with a 58,5 year of age (mean) (range 35-76,) have been treated for SLAC/SNAC wrist. In 33 cases the surgery was performed as 2CF, in 9 as 1CF, triquetrum has been removed in 5 cases. In 26 cases surgery was done on the right wrist, 16 on left. The union was determined by CT- or X-ray follow-up studies and clinically. The assessment of pain (VAS score 0-100), range of motion (ROM), grip strength and Disabilities of the Arm, Shoulder and Hand (quick-DASH) Score were included

Findings / Results: 35 patients were available for the minimum 6 months follow-up, mean 12 (range 6- 48). All patients but two achieved union at mean of 10,8 weeks (range 5 –25). Pain diminished from 62 (mean), preoperatively to 10 (mean), postoperatively ($p<0,05$). Grip strength decreased, expectedly, from 31 KgF (mean) to 26 KgF (mean), pre- and postoperatively, respectively. qDASH improved from 45 (mean) to 10 (mean), before and after the surgery ($p<0,05$), while ROM of 69/31 (degrees, mean) were recorded for dorsovolar/radioulnar flexions, respectively. One pt. united after re- operation, eventually, two developed radiocarpal arthritis with time and were converted to TWF. Tree patients experienced complications needing surgery

Conclusions: 1 & 2CF showed significant improvement in pain and the function with minimal impairment of the grip strength on the short-term follow-up. A High union rate and an acceptable complication rate were achieved without fusing all carpals

Two-year results of trapeziometacarpal joint arthroplasty with the cementless hemispherical T type cup

49.

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Background: In 2015 our department introduced a new cementless TMC total joint arthroplasty (Type T) consisting of a hydroxyapatite coated hemispherical cup with 3 rim-fins, a hydroxyapatite coated anatomical stem, a fixed-bearing UHMWPE polyethylene liner, and an 5mm diameter cobalt- chrome head/neck segment.
Purpose / Aim of Study: To evaluate the two-year clinical and radiological results.
Materials and Methods: From December 2015 to April 2017 five hand surgeons operated 106 joints (49 right side) with TMC osteoarthritis using the cementless Type T cup/stem (Beznoska). Mean patient age was 59 years (range 43-76). 75% were women. 18 patients (17%) received bilateral Type T implants. Clinical outcome was assessed by Quick DASH (QDASH), grip strength, pain, satisfaction, and complications. Implant fixation was evaluated with radiostereometry.
Findings / Results: There were two intraoperative trapezium fractures treated with screw fixation, and two intraoperative metacarpal fractures treated with cerclage wire. Nine cups (8%) were revised to trapeziectomy (eight due to aseptic loosening, 1 due to dislocation) and further ten cups (9%) had radiological signs of cup loosening at two years. No stems were revised or radiologically loose. QDASH improved mean 18 points (sd 24) from preoperative to three months (p=0.00), and was mean 13 (sd 18) at two years. Grip strength improved mean 3.8kg (sd 8.7) at two years (p=0.002). Pain at rest improved from mean 4.1 (sd 2.5) to 1.4 (sd 2.1) at three months (p=0.00). Pain in activity improved mean 4.2 (sd 2.8) at three months. 93% of patients without cup revision were very satisfied (NRS 8-10) with the result at two years, and 92% of patients without cup revision were willing to repeat surgery (NRS 8-10). The cup total translation was 0.34mm (sd 0.35) at three months, 0.37mm (sd 0.40) at one year, and 0.39mm (sd 0.40) at two years. The stem total translation was 0.52mm (sd 0.91) at three months, 0.59mm (sd 0.63) at one year, and 0.72mm (sd 0.99) at two years. Cup subsidence was higher in revised cups and cups with radiological loosening (p<0.02).
Conclusions: The Type T total TMC joint arthroplasty had a high rate of cup failure with revision and radiological loosening at 2 years follow-up. Failed cups migrated more.

Fixation of combined TFCC foveal and capsular injury by modified ulnar tunnel technique – a feasible solution?

50.

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Background: Methods for fixation of TFCC injuries vary depending on the type of injury. Different suturing techniques (outside-in, inside in, inside-out, all-inside) have been introduced for the capsular injuries (Atzei Class 1). Similarly, different techniques (anchors, trans-osseous sutures, ulnar tunnel) are used for the foveal injuries (Atzei class 3). Solutions for fixation of the combined lesions (Atzei Class 2) have been sparsely investigated.
Purpose / Aim of Study: The aim of the study was to evaluate the feasibility of the modified ulnar tunnel technique in treating combined TFCC lesions through same 3,2 mm bony canal in ulna, usually used for foveal injuries. Second purpose was the evaluation of the MRI without contrast as a diagnostic tool for the combined TFCC injury.
Materials and Methods: Between June 2018 and February 2020, 18 patients, underwent surgery in which both components of the injury were sutured, using the all-inside technique for the capsular injury and usual technique for the foveal fixation, through the same ulnar tunnel. All patients had ulnar-sided wrist pain and mild to moderate instability of the distal radioulnar joint (DRUJ). Diagnosis was finally established intraoperatively by the positive hook- and trampoline tests and by visualization of the capsular tear. Prospective tear. Prospective evaluation included assessment of pain (VAS score), grip strength, range of motion and q-DASH score. score.
Findings / Results: No complications related to surgery occurred. 8 out of 18 patients were eligible for the minimum 6 months follow-up, mean follow-up 5 months [3-14]. All patients achieved stability of the DRUJ. Mean preoperative VAS score (rest/activity) decreased from 32 and 67 to 6 and 32 postoperatively ($p<0.05$). Grip strength and range of motion did not change, while qDASH score improved from 52 preoperatively to 25 postoperatively ($p<0.05$). One patient sustained new wrist trauma and is planned for re-operation. MRI without contrast was only positive in half of the cases.
Conclusions: Arthroscopic TFCC fixation of combined, capsular and foveal tear by modified ulnar tunnel technique is feasible, showing promising results on the short follow-up. MRI without contrast is questionable in diagnosing the TFCC injury. Longer follow-up study is needed.

Ulnar Head- or total DRUJ replacement, isolated and combined with total wrist arthroplasty: mid-term results

51.

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Background: Various implants have been described for ulnar head replacement (UHR) or for total replacement of the distal radioulnar joint (DRUJ). Few reports on mid- or long-term results.
Purpose / Aim of Study: This study aimed to report on the midterm results after ulnar head- only and total DRUJ replacement using the uHead in the treatment of painful disorders of the DRUJ. The secondary aim was eventually, to assess the combination of UHR and total wrist arthroplasty (TWA).
Materials and Methods: uHead was performed in 20 consecutive patients (14 women) between 2005 and 2017. Mean age was 59 years (range 36 - 80 y). The mean follow-up time was 5 years (range 2 – 15 y). Data were recorded prospectively and at follow-up examinations. The patients were followed- up at 3 weeks, 6 w, 3, 6 and 12 months postoperatively, thereafter annually. In 5 cases the uHead was implanted simultaneously with a Remotion TWA. In 4 cases, a Remotion TWA had been implanted previously. Kaplan-Meier survival analysis was used to estimate the cumulative probability of remaining free of revision. A nonparametric Wilcoxon signed- rank test was used for comparing data not normally distributed (QDASH scores), and the paired parametric Student's t-test was used for normally distributed data (pain and VAS scores, range of motion, grip strength).
Findings / Results: Pain, grip strength and the function improved significantly. Pain after surgery decreased with 50 points on the VAS score scale of 100, from 66 (mean), preoperatively (range 16 - 97) to 16 (mean) (range 0 - 51), postoperatively, while grip strength nearly doubled - from 12 KgF (mean) (range 4 - 22), before to 21 KgF (mean) (range 6 - 36), after the surgery. qDASH scores improved from 56 (mean) (range 36 - 75), preop to 19 (mean) (range 4 - 47), postop. While 3 UHRs were revised early, 17 had an uncomplicated postoperative course. Due to limited number, comparing combined cases with UHR-only cases was abandoned.
Conclusions: Ulnar Head Replacement (uHead) showed significant improvement in pain, grip strength and the function of the patients with a painful disability of the DRUJ, without impairment on mobility on the mid-term followup. The overall implant survival over the time and the complication rate was acceptable.

Osteosynthesis with volar locking plates in distal radius fractures: evaluation of radiological perfection

52.

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Background: Open reduction and internal fixation with volar locking plates (VLP) of distal radius fractures in adults is one of the most frequent surgeries in fracture management. The argument for surgery is improved functional outcome by achieving anatomical reduction of the fracture. However, the rate of postoperative complications is not negligible and some of these can be related to implant position and imperfection of the osteosynthesis.
Purpose / Aim of Study: To evaluate the radiological quality of open reduction and fixation of distal radius fractures with VLP.
Materials and Methods: Retrospectively we identified 354 adults treated with VLP for distal radius fracture at our facility in 2015 and 2016. Postoperative radiographs were reviewed for twelve predefined operative imperfections, chosen based on the literature and clinical experience: Incorrect screw length, intraarticular screws, missing screws in the distal row, <6 corticis proximal to the fracture, floating plate, incorrect plate size or position, ad latus displacement, dorsal angulation, insufficient radial inclination, positive ulnar variance and incongruent joint surface.
Findings / Results: Radiological imperfection was found in 332 cases (93,8%) with an average of 2,63 imperfections per osteosynthesis (IQR 2-4). The highest number of imperfections in a single case was eight out of twelve possible. More imperfections were identified in intraarticular fractures compared to extraarticular fractures (mean 2.87 vs 2.40, p-value=0,004). Suboptimal placement of the implants was most common (n=320 / 90,4% of all cases) with incorrect screw length (n=249 / 70.3%) and incorrect position of the plate (n=186 / 52.54%) as the main imperfections. Anatomical reduction was not achieved in 184 cases (52,0%), most commonly due to residual ulnar variance (n=64 / 18.1%) and dorsal angulation (n=61 / 17.2%).
Conclusions: Based on the finding of imperfections in almost all cases we conclude that osteosynthesis with VLP is not a simple procedure. Knowledge of proper implant positioning and normal anatomy is mandatory to achieve surgical perfection. However, it is uncertain whether perfecting the osteosynthesis will improve functional outcome.

Arthroscopic bone grafting of the scaphoid nonunion - high union rate despite the high proximal pole incidence and the humpback deformity

53.

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Background: Arthroscopic treatment of the scaphoid nonunion is a minimally invasive technique, not interruptive to the patient´s blood supply and proprioception. Few studies enlightened the union rate and the exact heeling progress of the arthroscopic procedures in the scaphoid nonunion treatment, nor the feasibility of the method has been investigated in technically demanding cases.
Purpose / Aim of Study: The aim of our study is to present the results of the arthroscopically assisted, scaphoid nonunion treatment, using a local bone grafting from the distal radius and Mini Acutrak headless compression screw system, regardless the location of the nonunion, presence of cystic formations or humpback deformity.
Materials and Methods: From December 2015 to November 2019, 18 consecutive patients have been treated for the scaphoid nonunion, arthroscopically. All the patients but one was men, with the mean age of 24,2 years (range 14 –51). Ten patients injured their left hand, nine their dominant. Mean time from the injury to surgery has been 16 months (range 3 months – 15 years). 6 patients had nonunion of the proximal pole, 7 had humpback deformity of the scaphoid waist, thus having the risk of poorer outcome. 14 patients presented cystic formations. The union was determined by the CT- or X-ray follow-up studies and clinically. The assessment of pain (VAS score), range of motion (ROM), grip strength and Disabilities of the Arm, Shoulder and Hand (quick-DASH) Score were included. Surgery duration was recorded.
Findings / Results: 16 out of 18 patients were eligible for the minimum of 6 months follow-up, mean 8 months (range 6-12 m). No complication during the surgery or postoperative treatment were discovered. All patients but one heavy smoker achieved bony healing at the mean of 7,8 weeks (range 5 –18). All patients who united showed statistically significant, ($p<0,05$) improvement in pain, grip strength and the functional outcome as well as full satisfaction. ROM improved, not significantly. Duration of surgery diminished by time.
Conclusions: Arthroscopically assisted bone-grafting and compression screw fixation of established scaphoid nonunion yielded fast and high union rate, thus allowing fast functional recovery.

Volar locking plate fixation of distal radius fractures and associated complications: A retrospective study of 599 patients with a mean of 2 years follow-up

54.

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Background: In displaced and non-reducible distal radius fractures (DRF), open reduction and internal fixation with volar locking plates (VLP) has become the gold standard. Despite good outcome, surgery is not without complications.
Purpose / Aim of Study: To evaluate the incidence of postoperative complications after surgical treatment of DRFs with the use of VLPs.
Materials and Methods: We retrospectively reviewed the medical records of all patients treated with VLP (2.4- mm LCP, Synthes) for a DRF between January 2016 and December 2018 at Hvidovre Hospital. All postoperative complications (defined as minor or major) were extracted and radiographically evaluated in regard to fracture type (AO/OTA classification), volar plate positioning (Soong grade) and dorsal screw prominence. Days from injury to surgery and surgeon's experience were reviewed as well. Patients were followed for a mean of 2 (range 1 to 3) years after primary surgery.
Findings / Results: A total of 605 DRFs treated with VLP fixation in 599 patients (127 males, 472 females) were included and reviewed. The mean age was 61 years (range 19-93). Fractures were classified as AO 23-A (29.3%), 23-B (19.0%) and 23-C (51.7%). The overall complication rate was 12.6% (76 cases), with 8.8% major (n=53) and 3.8% minor (n=23) complications. The most common complications were those attributable to metal hardware leading to removal (3.6%), mainly due to intraarticular screw (1.5%) and pain/reduced ROM (1.5%). Carpal tunnel syndrome (1.8%), transient neurapraxia (1.7%), loss of reduction (1.7%) and tendon complications, i.e. tenosynovitis (0.5%)/ruptures (0.5%) were frequent complications as well. Secondary revision surgery was performed in 9.3% (56 procedures). An overall majority of complications were found in patients with Soong grade 1, but no association was found in regard to the surgeon's experience or the fracture according to AO type.
Conclusions: The incidence of postoperative complications in DRFs is low after VLP fixation, suggesting surgical treatment is an efficient technique. However, secondary surgery does occur due to complications; some of them could have been avoided. Consequently, it is imperative that the surgeon is aware of the risks and difficulties related to the procedure.

Hip

Evaluation of a Novel Porous Titanium Coating and the Impact of Large Heads on Cup Fixation in Metal on Vitamin E doped Total Hip Arthroplasty. A 2-year Report from a Randomized Control Trial.

55.

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Background: In the quest for hip arthroplasty implants that last the lifespan of patients improvements are still needed. Improved fixation and stability of the acetabular cup f could potentially be achieved with higher porous structures facilitating bony ingrowth.
Purpose / Aim of Study: We aimed to investigate if a novel porous titanium (OsseoTi) surface provides a superior early cup fixation compared with the well-established porous plasma spray (PPS) surface in total hip arthroplasty (THA) and if the use of larger metal heads could affect the early cup fixation in uncemented THA.
Materials and Methods: 96 patients were randomized to receive either an OsseoTi or a PPS cup, as well as, either the largest possible (36-44 mm) or a standard 32- mm metal head in vitamin E cross-linked polyethylene (VEPE) liner. Patients were followed at 2 years with RSA, plain x-rays and patient reported outcome measures. The primary outcome was proximal cup migration and cup rotation comparing the OsseoTi with the PPS cups as well as large head THA with 32-mm THA. The secondary outcome was the presence of radiolucencies and patient reported outcome between patients with OsseoTi and PPS cups.
Findings / Results: The mean proximal cup migration (95% confidence interval) was 0.18 (CI=0.09 to 0.26) mm for the OsseoTi and 0.24 (0.16 to 0.32) mm for the PPS. Large head THA had a mean proximal cup migration of 0.20 (0.13 to 0.26) mm and 32-mm THA had 0.21 (CI=0.11 to 0.31). No significant cup rotation around the X-axis was observed in any group. The presence of radiolucencies and patient reported outcome did not differ between OsseoTi and PPS cups.
Conclusions: The use of the OsseoTi surface provides a stable cup fixation equal to the use of the PPS surface. Larger metal heads were not inferior to 32-mm heads regarding early cup fixation. Longer-term studies on the safety profile of the novel OsseoTi cup and larger heads are required before they can be routinely used in THA.

Patient-reported outcome after dislocation of primary total hip arthroplasties – a cross-sectional matched case-control study derived from the Danish Hip Arthroplasty Register

56.

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Background: It is well-known that there is a substantial risk of re-dislocation and eventually revision after the first dislocation following primary THA, but knowledge about patient-reported outcomes (PRO) after dislocation and closed reduction is lacking.
Purpose / Aim of Study: Our aim was to report on health- and hip- related quality of life (QoL) in patients with dislocation following primary THA due to osteoarthritis.
Materials and Methods: We conducted a cross-sectional, matched case-control study involving patients registered in the Danish Hip Arthroplasty Register between 2010 and 2014. Dislocations were captured in the Danish National Patient Register using a validated algorithm. We matched patients with dislocation 1:2 upon age, sex, date and hospital of primary surgery to patients without dislocation. They received two PRO questionnaires (EQ- 5D, HOOS) and three patient satisfaction items. Results are descriptively compared using mean with 95% confidence intervals.
Findings / Results: We identified 1,010 living patients with dislocation. The response rate was 70.1%. Mean follow-up was 7.2 years from index surgery and 4.9 years from the latest dislocation. Patients without dislocation reported a higher EQ-5D VAS score of 75.6 (74.5-76.7) compared to 67.8 (65.9-69.7) in the dislocation group. Regarding hip-related QoL, patients with dislocation reported a lower HOOS-QoL domain score of 62.8 (60.2-65.4) compared to 82.9 (81.7-84.1) in the control group (100=no problems, 0=extreme problems). Even after five years from the latest dislocation, the HOOS-QoL score was still low, demonstrated by 65.6 (62.0-69.2) points. The other HOOS domains were consistently 8-10 points worse after dislocation. Regarding satisfaction, only 59% reported either an "excellent" or a "very good" overall result after experiencing dislocations, as opposed to 85% for the controls.
Conclusions: This is the first national case-control study on PRO after hip dislocation. The study showed that both health- and hip-related QoL is markedly and persistently reduced compared to a control group even 2-5 years after the latest dislocation. The most important aspect must be to avoid the first episode of dislocation, since the full relieving potential for this THA is never achieved.

No difference in whole blood metal ions for 32 mm versus 36-44 mm femoral heads in metal-on-polyethylene Total Hip Arthroplasty: A 2-year report from a randomized control trial.

57.

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Background: Corrosion at the head-neck junction in total hip arthroplasty (THA) is considered a potential concern as it might result in material loss and adverse local tissue reaction (ALTR). Elevated blood metal ions could be used as an indicator of corrosion. Lager femoral heads may contribute to increased taper corrosion by creating greater friction torques at the head-neck junction. However, it is controversial whether large heads are the predisposing factor for corrosion.
Purpose / Aim of Study: To investigate the effect of femoral head size on blood metal ion levels on vitamin E cross-linked polyethylene (MoVEPE) THA, comparing 36-44 mm heads with 32 mm heads.
Materials and Methods: As part of a randomized controlled single blinded trial, 96 patients were randomized to receive either the largest possible metal head (36mm-44 mm) that could be accommodated in the thinnest available VEPE insert or a 32 mm femoral head. Participants blood levels of titanium, chrome and cobalt ions were collected at 1 and 2- years follow-up.
Findings / Results: At 1-year follow-up, median (interquartile range) cobalt, chrome and titanium blood level did not differ between the groups: 0.119 µg/L (0.083-0.158) for 32 mm versus 0.122 µg/L (0.075-0.224) for 36-44 mm, (p=0.663), 0.500 µg/L (0.500-0.585) for 32 mm versus 0.500 µg/L (0.500-1.163) for 36- 44 mm, (p=0.050), 1.575 µg/L (1.343-2.033) for 32 mm versus 1.500 µg/L (1.220-1.870) for 36-44 mm, (p=0.456). At 2-years follow-up, median cobalt, chrome and titanium blood levels did not differ between groups: 0.146 µg/L (0.124-0.242) for 32 mm versus 0.161 µg/L (0.116-0.259) for 36-44 mm, (p=0.9113), 0.500 µg/L (0.500-0.500) for 32 mm versus 0.500 µg/L (0.500-0.511) for 36-44 mm, (p=0.5426), 1.540 µg/L (1.148-1.895) for 32 mm versus 1.350 µg/L (1.018-1.708) for 36-44 mm, groups (p=0.1631).
Conclusions: No difference in blood metal ions was found between the groups. Choosing the largest possible head size (36-44 mm) over a 32 mm head in MoVEPE does not seem to elevate blood metal ion levels up to 2 years postoperatively. As taper corrosion is probably time-dependent, longer-term reports are needed to evaluate the association between large metal heads and blood metal ion levels.

No difference in migration pattern of the uncemented Echo® Bi-Metric® and Bi-Metric® THA stem: a prospective randomized controlled RSA-study involving 62 patients and 24-months follow-up

58.

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Background: Despite the good results with modern total hip arthroplasty (THA) new implants are continuously being developed to meet the demand for even longer durability. The Echo Bi-Metric (EBM) THA stem is the successor to the Bi Metric (EBM) THA stem is the successor to the Bi-Metric (BM) THA stem. The EBM uses many of the features of the BM while incorporating new design attributes to augment the clinical performance.
Purpose / Aim of Study: The purpose of this study was to compare the migration behavior with radiostereometric radiostereometric analysis (RSA) of the EBM stem in comparison to the BM stem during the first 24 months and to evaluate the clinical outcome.
Materials and Methods: We randomized 62 patients with o osteoarthritis (mean age=64 years, F Female/Male=28/34) scheduled for an u uncemented THA to receive either an E EBM or a BM THA stem. We performed RSA within a week after surgery and at 3, 6, 12 and 24 months. The clinical outcome was evaluated using Harris Hip Score (HHS) and Oxford Hip Score (OHS).
Findings / Results: During the first 3 months both the EBM and the BM stems showed obvious subsidence (-2.53 mm and -2.22 mm respectively), and retroversion (2.51° and 2.24° respectively). From 3 to 24 months, however, there is only slight and statistically insignificant migration without any difference between the groups. The expected increase in HHS and OHS is observed without statistical difference between groups.
Conclusions: The EBM stem shows similar migration patterns as the precursor, the BM stem, and both seem to stabilize and osseointegrate osseointegrate after 3 months with satisfying clinical results measured up to 24 months.

The impact of socioeconomic status on utilization of total hip arthroplasty during 1995-2017 - Data from nationwide databases in Denmark

59.

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Background: In Denmark, all citizens are guaranteed free access to medical care, which should minimize the influence of socioeconomic status (SES). However, knowledge concerning the impact of SES on utilization of total hip arthroplasty (THA) is relatively sparse.
Purpose / Aim of Study: To examine the association between SES and the utilization of THA across different age groups and over time.
Materials and Methods: We conducted a population-based case-control study. From the Danish Hip Arthroplasty Register we included all patients undergoing primary THA due to osteoarthritis (cases) in Denmark from 1995 to 2017. The Danish Civil Registration System was used to select 5 population controls for each THA case, matched on sex, region of residence and surgery date/index date. We retrieved individual-level data on SES markers (education, income, and liquid assets) from Statistics Denmark. We used logistic regression to estimate adjusted odds ratios (aOR) with 95% confidence intervals for THA, adjusting for SES markers and comorbidity.
Findings / Results: A total of 108,946 THA cases and 544,730 population controls were identified. Among persons aged 45-55 years (youngest), we found a higher risk of THA (aOR 1.42 (1.32-1.53)) for those with the lowest education vs. highest education, as well as for those with the lowest vs. highest income (aOR 1.12 (1.02-1.23)). The association between education and income and higher risk of THA decreased with increasing age. On the contrary, the risk of a THA was lower for the youngest age group with the lowest vs. highest liquid assets (aOR 0.75 (0.70-0.80)). The risk of a THA was higher for persons with the lowest education vs. highest in the years 1995-2000 (aOR 1.23 (1.15-1.31)), which decreased in 2013-2017 (aOR 1.01 (0.97-1.05)). For the lowest income vs. the highest there was a higher risk of THA in 1995-2000 (aOR 1.22 (1.12-1.32)), decreasing to a lower risk in 2013-2017 (aOR 0.84 (0.80-0.89)).
Conclusions: The association between low level of education, low level of income, and higher risk of THA was observed among the youngest age group, but decreased with increasing age. The inequality in the risk of THA by education decreased over calendar time, whereas the inequality by income was persistent.

Association of Perioperative Thromboprophylaxis on Revision Rate due to Periprosthetic Joint Infection in Primary Total Hip Arthroplasty - New Evidence from the NARA group

60.

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Background: Thromboprophylactic agents are routinely administered in patients undergoing total hip arthroplasty (THA). Concerns have been raised if post-operative surgical site bleeding following the use of low molecular weight heparin (LMWH) or Non-Vitamin K antagonist oral anticoagulants (NOAC) leads to periprosthetic joint infection (PJI) that may require revision surgery. It is further unclear if bleeding can interfere with the initial implant fixation leading to increased revision rate due to aseptic loosening of the hip implant.

Purpose / Aim of Study: We examined the revision rate due to PJI, aseptic loosening and all-causes after primary THA in patients treated with LMWH versus non-vitamin K antagonist oral anticoagulant (NOAC) as thromboprophylaxis.

Materials and Methods: We conducted a prospective cohort study (n=53,605) based on data from the national hip arthroplasty registries in Denmark and Norway. The exposure was thromboprophylaxis (LMWH vs. NOAC) and the primary outcome was PJI at 1-year follow up. Secondary outcomes were aseptic loosening and all-cause revision at 5-year follow-up. Cumulative incidences were estimated including death as a competing risk. Cox proportional hazard model was applied to estimate crude and adjusted cause-specific hazard ratios (HRs). We adjusted for sex, age, Charlson Comorbidity Index, fixation type, start and duration of thromboprophylaxis, and preoperative use of Vitamin K antagonists, NOAC, aspirin, and platelet inhibitors.

Findings / Results: We included 40,451 patients in the LMWH group and 13,154 patients in the NOAC group. The 1-year cumulative incidence of revision due to PJI was 0.9% (0.8-1.0) in the LMWH group and 0.7% (0.6-0.8) in the NOAC group. During the entire follow-up period, the adjusted HR for revision due to PJI was 0.87 (0.68-1.12), 1.62 (1.25-2.11) for aseptic loosening, and 1.36 (1.16-1.59) for all-cause revision for NOAC versus LMWH.

Conclusions: No clinically important difference in revision rate due to PJI when comparing NOAC with LMWH was observed. However, a higher revision rate due to aseptic loosening and all-cause revision was observed in patients treated with NOAC compared to patients treated with LMWH.

Adaptive bone remodeling in the proximal femur in two uncemented total hip arthroplasty stems: a prospective randomized controlled DEXA-trial involving 62 patients and 24-months follow-up

61.

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Background: Total hip arthroplasty (THA) has proven to be a successful procedure. But people are living longer and there is an increasing demand for an active retirement. Thus, attempts to increase the longevity of the implants by developing new ones seem necessary. developing new ones seem necessary.
Purpose / Aim of Study: The aim of this study was to evaluate how two different uncemented THA stems - the Echo Bi-Metric (EBM) and the Bi-Metric (BM) - compares regarding adaptive bone remodeling.
Materials and Methods: From February 2016 to September 2 2017 we randomized 62 patients, 1:1 ((mean age=64 years, F Female/Male=28/34), scheduled for an u uncemented THA to receive either an E EBM or a BM THA stem. We performed dual-energy x-ray absorptiometry (DEXA) scans within a week after surgery and at 3, 6, 12 and 24 months with measurements of bone mineral density (BMD) in the 7 Gruen zones (region of interest (ROI) 1-7). The clinical outcome was evaluated using Harris Hip Score (HHS) and Oxford Hip Score (OHS).
Findings / Results: We found a decrease in BMD between the postoperative and the 24-months values in all ROIs for both stems. The greatest decrease over time was seen for both groups in the ROI1 (BM =-8.4%, p=0.044, and EBM=-6.5%, p=0.001) and ROI7 (BM =-7%, p=0.005, and EBM=-8.6%, p<0.0005). We found a tendency in ROI2-4 towards different early bone remodeling pattern between the groups with a higher degree of bone loss in the EBM group. However, this difference only continued beyond 6 months in ROI4 (24 months: BM=-1.2% and EBM =-2.8%, p=0.001). The HHS score increased from 61 to 99 points in the BM and from 67 to 98 points the EBM group. The OHS score increased by 23 points in both groups. The final scores were close to the maximum for both measurements in both groups and we found no statistically significant differences between the groups.
Conclusions: Both stems show similar adaptive bone remodeling as well as satisfying clinical results.

No difference in the risk of early mortality after cemented compared with cementless total hip arthroplasty for primary osteoarthritis: A cohort study based on 188,606 procedures registered by the Nordic Arthroplasty Register Association

62.

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Background: Current literature indicates no difference in 90-day mortality after cemented compared with cementless THA. Although the individual burden of comorbidities is a very important confounder, very few studies were designed to address this issue.
Purpose / Aim of Study: We examined the comorbidity-adjusted mortality up to 90 days after cemented compared with cementless total hip arthroplasty (THA) performed due to osteoarthritis.
Materials and Methods: Population-based, prospective cohort study based on The Nordic Arthroplasty Register Association database 2005-2013. We calculated the Charlson comorbidity index of each patient based on data from national patient registers. We included 108,572 patients with cemented and 80,034 with cementless THA. Outcome: 90-day mortality. We used Cox regression to estimate hazard ratios (HR) with 95% confidence intervals comparing cemented with cementless THA, adjusting for age, gender, comorbidity, nation, and year of surgery.
Findings / Results: All-cause mortality within 90 days was 0.41% after cemented and 0.26% after cementless THA. The adjusted HR for cemented vs. cementless fixation was 0.97 (0.79 to 1.20), and a similar risk estimate was obtained for mortality within 14 days. We found no differences in mortality between cemented and cementless THA after stratification by age, gender, Charlson comorbidity index, or year of surgery. However, among patients younger than 60 years, cemented THA was associated with a minimally increased adjusted mortality risk compared with cementless, with an absolute risk difference of 0.09%.
Conclusions: After adjustment for comorbidity as an important confounder, we observed no clinically relevant overall differences between the two fixation techniques in terms of early mortality. A small risk increase associated with cemented fixation in younger patients may be due to residual confounding and selection bias.

A home-based exercise and activity modification program in patients with acetabular retroversion and excessive anterior pelvic tilt - a feasibility and intervention study

63.

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Background: Patients with symptomatic acetabular retroversion is reported having reduced functional ability and quality of life but little is known about the effect of non-surgical interventions.
Purpose / Aim of Study: To investigate feasibility and change in patient-reported symptoms of a home-based exercise intervention in patients with acetabular retroversion and excessive anterior pelvic tilt, in comparison with a prior control period.
Materials and Methods: Patients with symptomatic acetabular retroversion and excessive anterior pelvic tilt were included. Following an 8-week control period, patients were instructed to follow an 8-week targeted (3 times/week) progressive home-based exercise intervention. Feasibility assessment included; dropout, acceptable adherence (≥75% of sessions), exercise-related pain, and adverse events. Primary outcome was change in the Copenhagen Hip and Groin Outcome Score (HAGOS) pain subscale. Secondary outcomes included change in the remaining HAGOS subscales, EQ-5D- 3L questionnaire, and pelvic tilt measured by EOS® scanning.
Findings / Results: Forty-two patients (39 women) (median [interquartile range (IQR)], 20.5 [19 - 25 years]) were included. Three patients were lost to follow-up (one regretting participating during the control period, one during the intervention period and one patient was lost at follow-up). Adherence to exercise sessions was 85%. Exercise-related pain and adverse events were acceptable. Between-period mean change score for the HAGOS-PAIN subscale was 5.2 points (95% confidence interval [CI]: [-0.3 – 10.6] and -1.6 degree [-3.9 – 0.7]) of anterior pelvic tilt. Additionally, patients who responded positively (≥ minimal clinically important difference) to the exercise intervention (n = 10, 26%), all had a pre-exercise HAGOS-PAIN score between 47.5 to 70 points.
Conclusions: Current exercise intervention was feasible. However, no clinical relevant changes in self- reported hip-related pain, function, quality of life, nor anterior pelvic tilt were found. Post- hoc responder analysis revealed that patients with moderate pain at baseline might benefit from current exercise.

Migration pattern of cemented Exeter Short Stem in Dorr Type A femurs - A prospective radiostereometry study with 2-year follow-up

64.

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Background: The Exeter short stem(ESS) is a 25 mm shorter stem compared to the classic v40 Exeter stem (Stryker) and is intended for use in a narrow femoral diaphysis.
Purpose / Aim of Study: To evaluate the migration pattern of the cemented Exeter short stem.
Materials and Methods: In a prospective single center cohort study, 23 patients (21 female) mean age 77.7 (range 70-89) with symptomatic hip osteoarthritis and Dorr Type A femurs were included. All were DXA scanned preoperatively (T-score/Bone Mineral Density (BMD)) and operated with a collarless polished double-tapered Exeter short stem type N°1 L125. Follow-up was performed at 6 weeks, 3, 6, 12 and 24 months with model- based RSA (stem migration), regular hip radiographs (stem position and cementation quality by Barrack's system), Oxford Hip Score (OHS) and VAS pain. Mean (CI95%) are reported.
Findings / Results: The T-score was -1.4 (-1.8; -0.97). 7 patients had normal (> -1) and 15 low (<-1) T-score. At 2 years follow-up, the stems subsided 1.46 mm (1.67; 1.25) and retroverted 0.48 deg (-0.01; 0.97). From 12 to 24 months, stem subsidence was 0.18 mm (0.1; 0.25) (p=0.001) and retroversion -0.04 deg (-0.27; 0.18)(p=0.70). T-score and subsidence correlated moderately (Rho=0.48; p=0.025) and patients with normal T-score had 0.45 mm (0.05; 0.86) less subsidence as compared to patients with low T-score (p= 0.03). 13 stems were in neutral positions and 10 stems in varus (mean 4 deg, range 3.4; 5.8). Femoral component cementation quality was grade A in 15 patients, grade B in 7 patients, and grade C in 1 patient. Subsidence where similar in stems in neutral and varus position (p=0.069). Subsidence where similar between cementation quality groups (p=0.44) At 2-year follow-up, mean OHS improved (p<0.001) 18.5 points (13.5; 23.6) to 40.7 (36.8; 44.7), VAS pain at rest decreased (p<0.001) 22 mm (CI95 14; 32) to 5 mm (-1; 11), and VAS pain in activity decreased (p<0.001) 41 mm (27; 56) to 10 mm (2; 19).
Conclusions: The ESS migrated more in patients with low- as compared with normal T-score. The migration pattern of the cemented ESS is similar to reports for the cemented standard Exeter stem.

Dislocation rate of dual mobility cup in total hip arthroplasty

65.

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Background: Dislocation is a well-known complication to total hip arthroplasty (THA) and constitutes a frequent cause of hospital contacts and revisions. The dual mobility cup (DMC) design has shown promising results in lowering the dislocation rate after primary THA compared to conventional cups. However, not many studies on long term dislocation rate of DMC in a large cohort are available. Viborg Regional Hospital introduced the DMC in 2001 (Saturne®, later Avantage™) and has since used it as primary acetabular component in THA's in a variety of patients. Thus, a large cohort with the possibility of long-term follow-up is available.
Purpose / Aim of Study: To determine the dislocation rate of DMC (Saturne® and Avantage™) in primary THA's with up to 10 years' follow-up. Further, to elucidate factors that might effect the dislocation rate by subpopulation analysis.
Materials and Methods: The Danish Hip Arthroplasty Register (DHR) was used to identify THA's with DMC inserted in Viborg since January 2001. 2721 cups in 2414 patients were identified for this study. Patients treated for dislocation of the DMC were retrospectively identified by review of medical files using several diagnosis-codes for identification. Information on each patient regarding indication of operation, means of fixation of the femoral stem and stem type was collected from DHR.
Findings / Results: We found a 2-year dislocation rate for DMC on 2,08% (95% CI 1,61-2,71%). The 10-year dislocation rate was 2,5% (95% CI 1,96-3,25%). The dislocation rate was lowest in patients who had a primary THA with DMC due to primary arthrosis and highest in patients treated for a displaced collum femoris fracture. Cemented stems (Exeter) had a lower dislocation rate compared to uncemented stems (Ancafit, Bicontact, Corail).
Conclusions: Our findings indicate a lower dislocation rate of DMC compared to conventional cups, especially in regards to long-term risk. The use of DMC seems particularly effective in lowering the dislocation rate in patients with collum femoris fractures. Means of fixation could affect the dislocation rate. However, further studies in regards to prosthesis survival of DMC are needed.

Revision risk of total hip arthroplasty with vitamin E doped liners: Results from The Danish Hip Arthroplasty Register

66.

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Background: The main long-term revision cause of total hip arthroplasty (THA) is aseptic loosening which may be associated with polyethylene wear. Vitamin E doped polyethylene (VEPE) liners were designed to reduce wear and risk of aseptic loosening.
Purpose / Aim of Study: To investigate risk of revision of THA with VEPE liners compared to THA with cross-linked polyethylene (XLPE) liners in a nation-wide cohort.
Materials and Methods: We included uncemented THAs from The Danish Hip Arthroplasty Register performed between Jan 1, 2008 and Dec 31, 2017 with metal-on-polyethylene articulation and a VEPE or XLPE liner. Each THA was followed for at least one year. The primary outcome was revision for any cause, and secondarily revision for specific causes. Risk of revision with 95% confidence intervals was estimated using Cox regression adjusted for sex, age, comorbidity, duration of surgery (for infection) and head size (for dislocation).
Findings / Results: 3,472 (9%) THAs with a VEPE liner and 36,738 (91%) THAs with an XLPE liner were included. Median follow-up was 3.85 [interquartile range (IQR) 2.59, 5.04] years for VEPE liners and 4.34 [IQR 2.36, 6.78] years for XLPE liners ($p<0.001$). For early (≤ 90 days) revision, THA with VEPE had an increased risk of revision over XLPE (HR 1.77 [1.44, 2.16]), primarily due to increased risk of aseptic loosening of the stem (HR 10.67 [3.75, 30.37]) and femoral fracture (HR 2.34 [1.71, 3.19]). For risk of revision after 90 days, no difference was found in overall risk (HR 0.88 [0.69, 1.13]), but a lower risk of aseptic loosening for cup or stem was found for THA with VEPE liners (HR 0.50 [0.25, 0.96]). Early revision due to aseptic loosening or femoral fracture was associated with one particular stem (Bimetric collarless TI, odds-ratio 1.94 [1.36, 2.78]). No differences were found for risk of revision due to infection, dislocation, or other causes.
Conclusions: This is a nation-wide population-based study with complete follow-up of all THAs. THAs with a VEPE liner had an increased risk of early (≤ 90 days) revision compared with XLPE. Beyond 90 days, the risk of any revision was similar for THA with VEPE and XLPE liners, and interestingly, we found a lower risk of aseptic loosening for THA with VEPE liners.

What improvement in Oxford Hip Score represents a meaningful change after undergoing a total hip replacement? Estimating the Minimal Important Change (MIC) value in a single unit.

67.

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Background: Meaningful interpretation of improvements in Oxford Hip Score (OHS) is challenged by the lack of knowledge about the patients' perspectives on which degree of improvement that reflects important change.
Purpose / Aim of Study: To determine Minimal Important Change (MIC) values for the OHS in patients undergoing primary total hip replacement (THR).
Materials and Methods: Data from patients undergoing primary THR due to primary hip osteoarthritis between January 2015 and March 2019 were extracted from one hospital's arthroplasty database. Patients completed the OHS preoperatively and at 12 months postoperatively, accompanied by an MIC anchor question. Response options were 1) better, an important improvement, 2) somewhat better, but enough to be an important improvement, 3) very small change, not enough to be an important improvement, 4) about the same, 5) very small change, not enough to be an important deterioration, 6) somewhat worse, but enough to be an important deterioration, and 7) worse, an important deterioration. MIC values were defined with the predictive modeling approach based on logistic regression, with important improvement (responses 1 or 2) as dependent variable and change in OHS as independent variable. The MIC was adjusted for the high proportion of improved patients. Confidence Intervals (CI) were derived with bootstrapping.
Findings / Results: Complete data were obtained for 393 out of 627 (63%) patients with available data undergoing primary THR due to hip OA (median age 70 years, 57% female). The proportion of patients reporting having improved importantly after 12 months was 96% (n=377), while 4% (n=13) reported being unchanged or worse. Spearman's correlation between the anchor and the OHS change score was 0.38. The OHS MIC value (95% CI) was 7.4 (4.8; 9.6).
Conclusions: We established an improvement at 1-year follow-up of 8 OHS points to represent the MIC value after THR. The estimate serves as a good starting point for interpretation of PROM outcomes collected in national quality databases. A large number of patients are needed to calculate robust MIC values. Considering the low number of not importantly improved patients, the MIC value should be confirmed in larger and national cohorts.

Revision risk of cemented versus hybrid total hip arthroplasty in patients 70 years and older - A study from the Danish Hip Arthroplasty Register.

68.

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Background: In elderly patients, there is good evidence that cemented femoral components have a good long- term track record, whereas there is a higher degree of uncertainty for cemented acetabular components. During recent years there has been a trend towards a decreased use of cemented cups.
Purpose / Aim of Study: We aimed to evaluate the risk of revision due to any cause after insertion of cemented or cementless cups and a cemented stem in patients aged 70 years or older diagnosed with osteoarthritis, and secondly to estimate the risk of acetabular revision (cup, liner and/or head) due to any cause in the two groups.
Materials and Methods: In the Danish Hip Arthroplasty Register, we identified all primary total hip arthroplasties (THAs) with a cemented stem operated from January 1, 2002 to December 31, 2018 in patients aged 70 years or older with a cemented (N=16,255) or cementless (N=13,227) cup. The Kaplan-Meier estimator was used to assess the component survival, and Cox regression was used to estimate the adjusted relative risk (aRR) of revision both assessed with 95% confidence intervals. Adjustments were made for age, sex, bearing surface (metal-on-polyethylene, ceramic- on-polyethylene) and comorbidity.
Findings / Results: All revisions: The 15-year survivorship was 93 % (92.2 - 93.6) for revision of cemented THAs and 91 % (89.7 – 91.9) for revision of hybrid THA. After 15 years 717 and 583 revisions were performed for cemented THA and hybrid THA, respectively. The aRR for any revision showed a decreased risk for cemented (0.85 (0.75-0.95)) compared to hybrid THA. Acetabular revisions: The 15-year survivorship was 96 % (95.7 - 96.7) for cemented and 96 % (95.4 – 97.0) for cementless cups. After 15 years, 408 cemented and 292 cementless acetabular revisions were performed for any reason. THAs with a cemented cup had similar aRR of acetabular revision (1.03 (0.88-1.22)) compared to those with cementless.
Conclusions: In patients having THAs, we found a decreased risk of revision of cemented compared with hybrid THA due to any cause. When restricting the analysis to revisions with cup replacement, we found no difference between cemented and cementless cups.

Tumors

Physical function is reduced and correlated to quality of life after limb-sparing surgery due to bone sarcoma 69.

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Background: Patients with bone sarcoma report that quality of life (QoL) is affected years after treatment. In rehabilitation, both QoL and different measures of physical function are assessed and targeted. However, few studies have investigated physical function and its relationship to QoL in this patient group.
Purpose / Aim of Study: The purpose was to investigate if physical function in patients with bone sarcoma receiving limb-sparing surgery (LSS) and reconstruction with a tumour- prosthesis was affected and associated with QoL.
Materials and Methods: Thirty patients operated (proximal femur (n=12), distal femur (n=14), proximal tibia (n=4)) between 2006 and 2016 were compared to 30 healthy controls in a cross-sectional design. Differences between groups were tested for objectively measured physical function: isometric muscle strength in gluteus medius and quadriceps, six-minute walk test (6MWT) and 30s sit-to-stand test (STS). In the patient group, measures of physical function were correlated with EORTC QLQ-C30 Global Health (GH), Physical functioning (PF) and Role functioning (RF) subscales. Paired samples t-test was used for analyses of between group differences and Spearman's rank correlation for associations within the patient group.
Findings / Results: Mean age of participants was 51 years and mean BMI 26. Significant (statistical and clinical) differences were found for all muscle strength tests between the two groups, both for comparisons of the leg that underwent surgery and the contralateral leg. Significant differences were also seen for the 6MWT (499 vs. 607 m, $p<0.001$) and the STS (12 vs. 18, $p<0.001$). Physical function was correlated to QoL when comparing muscle strength of gluteus medius with GH (rho 0.43, $p=0.019$) and with PF (rho 0.51, $p=0.006$), and quadriceps strength with PF (rho 0.40, $p=0.034$) and with RF (rho 0.40, $p=0.038$).
Conclusions: Patients with bone sarcoma receiving LSS and reconstruction with a tumour-prosthesis showed deficits in muscle strength, 6MWT and STS when compared to controls. Decreased strength of gluteus medius and quadriceps muscles correlated to QoL subscales, indicating that strength training could be a potential factor for improving physical components of QoL.

Surgical Treatment of Proximal Femoral Metastases: A Systematic Review and Meta-Analysis of Reoperations and Implant Failures

70.

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Background: The continuous improvements in survival of cancer patients increases the prevalence of metastatic bone disease, while also altering the demands for the durability of the surgical implants used. In the appendicular skeleton the metastatic lesions requiring surgery are most often located in the proximal femur, and are currently treated with either open reduction and internal fixation (ORIF), intramedullary nailing (IMN) or endoprosthetic reconstruction (EPR).

Purpose / Aim of Study: To investigate whether there is a difference in reoperation or implant failure rates between the currently used methods of surgical treatment of metastatic bone disease of the proximal femur.

Materials and Methods: The literature was systematically reviewed through a PubMed search in order to identify studies concerning surgical treatment of proximal femur metastases in the period 01.01.2009-04.01.2020. The primary outcome measure was reoperation rate, while implant failure rate was registered as the secondary outcome measure. Eighteen studies, with a total of 2489 patients, were included for analysis, all retrospective and non-randomized. In a meta-analysis pooled estimates for the odds-ratios (OR) between treatments regarding both reoperation and implant failure were calculated with 95 % confidence intervals (CI).

Findings / Results: Meta-analysis showed more patients treated with ORIF needed further surgery, with the pooled OR estimate being 3.07 (95% CI: 1.98-4.76, $p<0.001$) for reoperation and 8.47 (95% CI: 5.05-14.21, $p<0.001$) for implant failure compared to EPR. No difference was found when comparing reoperation after IMN to EPR (OR = 1.04 (95% CI: 0.77-1.42, $p=0.79$)), but the analysis showed a higher risk of implant failure after IMN with an OR of 2.65 (95% CI: 1.74-4.02, $p<0.001$).

Conclusions: The higher reoperation rate found in patients treated with ORIF, suggests that this method of treating proximal femur metastases should be considered obsolete. Analysis of implant failure further indicates, that EPR provides a more mechanically stable solution compared to IMN. The mediocre evidence that the included studies provide calls for further research reporting time-adjusted reoperation rates, allowing for more optimal comparison of methods between studies.

Development and comparison of one-year survival models in patients with primary bone sarcomas - External validation of a Bayesian belief network model and creation and external validation of a new Gradient Boosting Machine model.

71.

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Background: Bone sarcomas often presents late with advanced stage at diagnosis, resulting in varying short-term survival. In 2016 Nandra et al., generated a Bayesian belief network model (BBN) for 1-year survival of patients with bone sarcomas.
Purpose / Aim of Study: The purpose of present study is to: 1) External validate the prior 1-year BBN prediction model for survival of patients with bone sarcomas, 2) To develop a Gradient Boosting machine (GBM) model using Nandra et al.'s cohort and evaluate if the GBM model outperform the BBN model suggested by Nandra et al. when externally validated on an independent Danish population cohort.
Materials and Methods: The training cohort comprised 3493 patients newly diagnosed with bone sarcoma from the institutional prospectively maintained database at The Royal Orthopaedic Hospital, Birmingham UK. The validation cohort comprised 771 patients with newly diagnosed bone sarcoma included from The Danish Sarcoma Registry between January 1st, 2000 and June 22sd, 2016. Predictive performance of models was evaluated by area under receiver operator characteristic curve (AUC ROC) analysis, Brier score and decision curve analysis (DCA).
Findings / Results: External validation of the BBN 1-year prediction model demonstrated AUC ROC of 68% (95%CI, 62%-73%). AUC ROC of the GBM model demonstrated 75% (95%CI: 70%-80%), overall model performance by Brier score was 0.09 (95%CI: 0.077-0.11) and DCA demonstrated a positive net- benefit for threshold probabilities above 0.5. External validation of the developed GBM model demonstrated AUC ROC of 63% (95%CI: 57%-68%) and the Brier score was 0.14 (95%CI: 0.12-0.16).
Conclusions: External validation of the 1-year Bayesian belief network survival model yielded poor outcome and is hence not recommendable for clinical usage. The developed Gradient Boosting Machine 1-year survival model did not outperform the prior Bayesian belief network model, and modernization is pending.

Work ability and physical activities in patients with tumour prosthesis in hip or knee following bone sarcoma. A cross-sectional study comparing patients with healthy controls.

72.

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Background: While most patients going through limb-sparing surgery (LSS) due to bone sarcoma are of the working-age population, limited knowledge exist about their work ability.
Purpose / Aim of Study: The study aim was to assess work ability and physical activity (PA) in these patients.
Materials and Methods: This cross-sectional study compared employed patients, receiving LSS and reconstruction in proximal (n=9) or distal femur (n=7) or proximal tibia (n=4) between 2006 and 2016, with employed healthy controls (n=20). The Musculoskeletal Tumour Society Score (MSTS) was used as descriptive information. The Work Ability Index (WAI), financial difficulties, the Patient Specific Functional Scale (PSFS), activity monitor and the International Physical Activity Questionnaire (IPAQ) were used to evaluate work ability and physical activities. Between group differences were assessed using unadjusted and adjusted (sex, age, BMI, educational level, type of work) general linear models.
Findings / Results: The patients were seen on average 7 (±2.9) years post-surgery, had a mean age of 43 (±13.6) years, BMI 27 (±3.7) and MSTS of 69 (±14.6)%. Six patients (30%) experienced that their physical condition had caused financial difficulties. The adjusted analyses showed differences in general work ability (7.8 vs. 9.1 points, p=0.002) and work ability due to physical demands (3.2 vs. 4.6 points, p<0.001) between patients and controls. There were between group differences in PSFS mean score (2.8 vs. 9.5 points, p<0.001). No differences were seen in step counts/day (10588 vs. 12239 steps, p=0.144) or the IPAQ (4107 vs. 4035 METs/week, p=0.942).
Conclusions: Most patients experienced difficulties in performing tasks requiring physical demands at work. Furthermore, 1/3 reported financial difficulties caused by their condition. Although we found no differences in PA, patients reported great difficulties in performing activities that they scored as important. Assessments of work demands and collaboration with workplaces should be considered in rehabilitation following LSS and reconstruction with tumour prosthesis.

Quantitative measurements of adaptive bone remodeling around the Cemented Zimmer® Segmental stem after tumor resection arthroplasty using dual-energy X-ray absorptiometry

73.

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Background: Limb salvage surgery is currently offered to more than 90% of patients with bone or soft tissue sarcomas and to a greater extent also to patients with metastatic bone disease.
Purpose / Aim of Study: The aim of the present study was to evaluate the adaptive remodeling of the periprosthetic cortical bone after insertion of a tumor prosthesis with a cemented stem.
Materials and Methods: A prospective study of 21 patients (F/M=12/9), mean age 55 years (range 15-81) with metastatic bone disease (n=9), sarcomas (n=8) or aggressive benign tumors (n=4) who underwent bone tumor resection and reconstruction with a tumor prosthesis (Zimmer® Segmental 130 mm straight fluted cemented stem with trabecular metal (TM) collars) in the proximal femur (n=10), distal femur (n=9) or proximal tibia (n=2) . Measurements of bone mineral density (BMD) were done postoperatively and after 3, 6, and 12 months of the periprosthetic bone and in both ankles by using dual-energy X-ray absorptiometry. BMD (/g/cm2) was measured in 4 regions of interest around the cemented stem and in one region of interest 1 cm proximal from the ankle joint. Repeated measures ANOVA and students paired t-test was used to evaluate BMD changes over time
Findings / Results: At 1-year follow-up, BMD compared to the postoperative value was seen in all 4 regions of interest with a statistically significant bone loss of 8- 15%. The bone loss was most pronounced (14-15%) in the 2 regions of interest closest to the TM collar and lowest (8%) adjacent to the tip of the stem. After 1 year the decrease in BMD of the ankle on the affected extremity was 9% and the ankle on the contralateral extremity was close to baseline.
Conclusions: The periprosthetic BMD around the cemented 130 mm Segmental stem decreased significantly during the first postoperative year and is considered caused by a combination of stress shielding and immobilization.

Reconstruction of the humerus using the Comprehensive Segmental Revision System in patients suffering from metastatic bone disease.

74.

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Background: Surgical treatment of malignant bone tumors of the humerus is often followed by reconstruction with a tumor prosthesis. The Comprehensive Segmental Revision System® (Zimmer-Biomet, Warsaw, IN, USA) (SRS) offers a new option for such reconstructions. Biomet, Warsaw, IN, USA) (SRS) offers a new option for such reconstructions.
Purpose / Aim of Study: The aim og this study was to evaluate implant failure incidence, surgical complications, and clinical results.
Materials and Methods: A study of 22 consecutive patients (F/M= 9/13, mean age = 67 (51-83) years) suffering from metastatic bone disease having surgery with bone resection of the humerus (18 proximal humerus replacements (hemiarthroplasty/total-reverse joint = 4 4/14) and 4 distal humerus r replacements) and reconstruction u using the SRS prosthesis from May 2 2014 to January 2017. Statistics: Kaplan-Meier survival analysis (patient survival) and Aalen-Johansson estimate (incidence of implant failure) presented with 95% Johansson estimate (incidence of implant failure) presented with 95%--confidence intervals (CI). Results are g given as mean (range).
Findings / Results: Two-year overall patient survival was 41% (CI: 20-62%). Five patients suffered from surgical complications: radial nerve palsy (n=2) and superficial postoperative infection (n=3). Two patients experienced revision surgery: soft tissue revision (n=1) and a hemiarthroplasty revised to a reverse total shoulder replacement (n=1). Two-year implant failure incidence was 5% (CI:0 year implant failure incidence was 5% (CI:0-13%). The mean MSTS score (n=6) was 16 (11-25), 221 (95-360) days postoperatively.
Conclusions: The use of the SRS prosthesis in orthopedic oncology patients resulted in low incidence of implant failure. Since the introduction of the SRS prosthesis in our department represented at shift from using hemiarthroplasty to prefer total-reverse joint implants, the fact that we observed no shoulder dislocations was a positive short-term result.

Ewing´s sarcoma of the calcaneus treated by limb sparing surgery with calcanectomy and reconstruction with a composite of an allograft and a vascularized osteocutaneous fibula graft.

75.

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Background: Primary malignant bone tumors of the calcaneus are very seldom, and due to poor possibilities to do surgery with wide margins in this region and limited options for reconstruction after calcanectomy many orthopedic oncologists use amputation as the preferred surgical treatment in such cases.
Purpose / Aim of Study: We present two cases of Ewing´s sarcoma of the calcaneus treated with calcanectomy and reconstruction with a composite of an allograft and a vascularized osteocutaneous fibula graft.
Materials and Methods: The medial cases of 2 girls suffering from Ewing´s sarcoma of the calcaneus that were almost 6 years old (case 1) and 16 years old (case 2) at the time of surgical treatment with calcanectomy in respectively August 2012 and October 2013 are presented. Both patients were without metastatic disease and received pre- and post-operative chemotherapy.
Findings / Results: In both cases removal of the calcaneus was performed using a combined medial and lateral incision. In case 1 a femoral head allograft was fitted to replace the removed calcaneus, and in case 2 a calcaneus allograft was used. In both cases, with the aim of obtaining arthrodesis, the allograft was fixed to the talus and cuboid bone with screws. A distally pedicled osteocutaneous flap was use for reconstruction of soft tissue, and a 5-6 cm piece of vascularized fibula bone was fitted into the allograft and fixed using staples. Arthrodesis between talus and the graft healed and full weight- bearing was allowed in both cases 8-9 months postoperatively. At follow-up 6½ and 4½ years after surgery both patients were without local recurrence or metastases, and they were both pain-free and able to walk using normal footwear without any walking-aids.
Conclusions: Biological reconstruction is possible after removal of the calcaneus because of primary malignant bone tumors and long-term good functional results can be achieved.

Knee

Dose-response efficacy and "need for surgery?" after pre-operative home-based knee-extensor exercise in patients eligible for knee replacement: A randomized trial (The QUADX-1 trial)

76.

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Background: Guidelines recommend that exercise has been tried before surgery is considered in patients with severe knee osteoarthritis (OA). Low knee-extensor strength is associated with worse symptoms in patients with knee OA. Exercise may play a role improving knee-extensor strength and physical function before surgery, but the optimal dosage is unclear.
Purpose / Aim of Study: To compare the efficacy of three knee-extensor strength exercise dosages on knee-extensor strength and patient-reported outcomes before surgery in patients eligible for knee replacement.
Materials and Methods: One-hundred and forty patients eligible for knee replacement were randomized to 2, 4 or 6 home- based knee-extensor exercise-sessions per week for 12 weeks. Eligibility for surgery was assessed by an orthopedic surgeon. Exercise instruction was done by a physiotherapist. The primary outcome was change in knee-extensor strength after 12 weeks. Secondary outcomes were: "need for surgery?" – re-evaluation of treatment, change in Oxford Knee Score, Knee Osteoarthritis Outcome Score, average knee pain last week (0-10 numeric rating scale), 6- minute walk test and stair climbing test. Intention-to-treat, One-way ANOVA statistics were used to analyze between-group differences. ClinicalTrials.gov ID: NCT02931058.
Findings / Results: After 12 weeks of exercise, data were available for 117 patients (39/group). Primary outcome: no difference between the three groups on knee- extensor strength at 12 weeks. Secondary outcomes: "need for surgery?" (all groups): 38 (32.5%) patients wanted surgery, 79 (67.5%) postponed surgery, and there was significant difference between group "2 sessions/week" and "6 sessions/week" for Oxford Knee Score (4.2 [95% CI 0.6 to 7.8], P=0.02) and average knee pain last week (NRS 0-10) (-1.1 [95% -2.2 to -0.1], P=0.03) in favour of two sessions per week. No other differences were observed.
Conclusions: Prescribing knee-extensor exercise for 2, 4 or 6 times per week result in the same levels of knee- extensor strength after 12 weeks. However, two home-based exercise sessions a week seems superior in relation to patient-reported outcomes – and importantly – only one of three patients wanted surgery after home-based knee-extensor exercise.

Effect of supervised neuromuscular exercise and education to participants with severe knee osteoarthritis – a single blinded randomized controlled trial

77.

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Background: The effect of first-line treatment for knee osteoarthritis (KOA) including exercise and education is well established in mild to moderate KOA, but less in participants with severe KOA

Purpose / Aim of Study: To estimate the effect of supervised neuromuscular exercise and patient education to participants with severe knee osteoarthritis (KOA) on their wish for knee replacement, satisfaction, physical activity, physical performance and patient reported outcomes.

Materials and Methods: Participants with moderate to severe KOA (Ahlbäck>=1) and pain on activity (VAS>=5) were included from the orthopedic out-patients clinic at Herlev and Gentofte Hospital. Participants were allocated to exercise therapy and patient education vs. patient education using a stratified block randomization. Supervised neuromuscular exercise were performed twice a week in 6 weeks and two sessions of patient education were offered (duration 1 hour each). Outcomes at 7 weeks were patients wish for knee replacement, satisfaction, physical activity, physical performance (30 sec. sit-to-stand, 40 m. walk test and 2 minutes stair climb) and patient-reported outcomes (KOOS and OKS).

Findings / Results: One hundred and eighty-nine patients were included with 94 allocated to exercise and education and 95 to education. Mean age was 66 years, 106 was women and BMI 28.7. Forty- nine participants out of 70 (70%) in the exercise group vs. 42 out of 67 (63%) did not wish for surgery, based on their current level of function. The corresponding numbers on satisfaction with the intervention was 70 out of 71 (99%) vs. 52 out of 68 (76%), respectively. More participants in the exercise group with 51 out of 71 (72%) increased their physical activity with 2 hours compared to 42 out of 68 (62%) in the education group. No significant effect was found on objective measured and patient reported function.

Conclusions: At post-intervention more participants in the exercise group did not wish for surgery (especially among participants with severe KOA with bone attrition (Ahlbäck score 3- 5)). Larger satisfaction and increase in physical activity in the exercise group, however this was not reflected in the physical performance tests and only to a smaller extend in the patient-reported outcome.

Two-year migration using RSA of both tibial and femoral components after primary total knee arthroplasty with the hybrid Persona® prosthesis

78.

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Background: Persona (ZimmerBiomet) total knee arthroplasty (TKA) is designed to minimize persistent postoperative pain, using an asymmetrical tibial component. This allows coverage of the entire tibial plateau, without overhang, reducing the risk of placing the component in in-ward rotation.
Purpose / Aim of Study: Aim: measuring two-year migration of both tibial and femoral components using Model- based Radiostereometric Analysis (Mb-RSA).
Materials and Methods: Prospective cohort of 31 patients (F/M= 18/13, mean age 65 (52-70) years) scheduled for primary TKA due to osteoarthritis (OA). Two patients were excluded. Patients received a hybrid Persona TKA with cemented tibia and all-poly patella, and uncemented Trabecular Metal (TM) femur components. RSA-examinations were performed at 1 week (baseline) and 3, 6, 12 and 24 months. Functional outcomes were evaluated with Knee Society Score (KSS) and Oxford Knee Score (OKS).
Findings / Results: Mean Maximal Total Point Motion for uncemented femur TM Persona (n=24) was at 3-months 0.65 mm (range: 0.15-2.6), 6- months 0.72 mm (range: 0.24-1.44), 1-year 0.77 mm (range: 0.22-1.8) and 2-year 0.77 mm (range: 0.20-2.24). Corresponding results for cemented tibia Persona (n=27) was at 3-months 0.54 mm (range: 0.22-1.29), 6-months 0.61 mm (range: 0.17-1.99), 1-year 0.65 mm (range: 0.13-2.8) and 2-year 0.69 mm (range: 0.12- 3.2). KSS-clinical/KSS-function was increased from 38 (range:10-79)/54 (range:10-60) pre- operatively to 84 (range:57-93)/92 (range:60-100) after 1-year and 87 (range:60-90)/94 (range:50-100) after 2 years. OKS was increased from 25 (range:13-38) to 43 (range:32-48) and 44 (range:35-48) after 2 years.
Conclusions: Mb-RSA results for cemented tibia and uncemented femur Persona components are comparable to other well-performing implants. The TKAs in the study had a good functional outcome after 2 years.

The relationship between pre-operative knee-extensor exercise dosage and effect on knee-extensor strength prior to and following total knee arthroplasty: A systematic review and meta-regression analysis of randomized controlled trials

79.

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Background: Patients with knee osteoarthritis have decreased knee-extensor muscle strength and may ultimately receive total knee arthroplasty (TKA). Recent trials with large pre-operative knee-extensor exercise dosages report positive effects on clinical outcomes before and after TKA – indicating a dose-response relationship.
Purpose / Aim of Study: The aim of this systematic review was therefore to evaluate the relationship between knee-extensor strength exercise dosage in pre-operative exercise intervention and the effect on knee-extensor muscle strength before and after TKA.
Materials and Methods: A systematic literature search was performed including RCT´s evaluating the effect of pre- operative exercise before and after TKA. Meta- regression analysis was performed to evaluate the dose-response relationship between exercise dose and the pooled effect, measured as standardized mean difference (SMD). PROSPERO-ID: CRD42018076308.
Findings / Results: Twelve trials with 616 patients were included. Meta- regression analyses showed no relationship between pre-operative knee-extensor exercise dosage and change in knee-extensor strength neither before (slope 0.0005 [95%CI -0.007 to 0.008]) or three months after TKA (slope 0.0014 [95%CI -0.006 to 0.009]). Before TKA, a moderate effect favoring pre-operative exercise for increase in knee-extensor strength was found (SMD 0.50 [95%CI 0.12 to 0.88]), but not three months after TKA (SMD -0.01 [95%CI -0.45 to 0.43]).
Conclusions: We found no relationship between pre-operative knee-extensor exercise dosage and change in knee-extensor strength. Pre-operative exercise including knee-extensor muscle strength exercise increased knee-extensor strength moderately before but not three months after TKA. The results suggest changing focus from pre-operative exercise to enhance post-operative recovery – to "pre-evaluation" – including pre- operative exercise to enhance shared surgical decision-making – as part of an enhanced recovery program after TKA.

Postoperative morbidity and mortality in diabetic patients after fast-track hip and knee arthroplasty – a prospective follow-up cohort of 36,762 procedures

80.

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Background: Diabetes mellitus (DM) increases risk of adverse outcome in surgical procedures including total hip and knee arthroplasty (THA/TKA) with prevalence ranging from approximately 8-20%. However, there is still a need to clarify the role of diabetes and antihyperglycemic treatment in a fast-track THA/TKA setting which otherwise may decrease morbidity.
Purpose / Aim of Study: Consequently, we investigated the effect of diabetes and antihyperglycemic treatment on length of stay (LOS) and complications following fast-track THA/TKA within a multicenter fast-track collaboration.
Materials and Methods: Observational study design on data from a prospective multicenter fast-track collaboration on unselected elective primary THA/TKA from 2010 to 2017. Complete follow-up (>99 %) was achieved through The Danish National Patient Registry and types of complications leading to LOS > 4 days, 90- day readmission or mortality obtained by scrutinizing health records and discharge summaries.
Findings / Results: 36,762 procedures were included of which 837 (2.3%) had insulin-treated DM, 2615 (7.1%) orally treated DM, and 566 (1.5%) dietary treated DM. Median LOS was 2 (IQR: 1-3) days. More diabetic (14.7% for insulin treated and 9.4% for orally treated DM, p <0.001) than non-diabetic patients (6.0%), had LOS > 4 days. This association remained significant after adjustment for comorbidities insulin-treated (OR 2.2; 99.6% CI[1.3-3.7]; p <0.001) and orally-treated (1.5 [1.0–2.1]; p =0.002). Insulin-treated was independently associated with increased odds of "diabetes related" morbidity (OR 2.3[1.2–4.2]; p <0.001). DM had increased renal complications regardless of antihyperglycemic treatment, but only insulin-treated patients suffered significantly more cardiac complications. There was no increase in periprosthetic joint infections or mortality associated with DM.
Conclusions: Patients with pharmacologically treated DM undergoing fast-track THA/TKA were at increased risk of LOS > 4 days. Although complication rates were low, patients with insulin-treated DM where at increased risk of postoperative complications. Further investigation into the pathogenesis of postoperative complications differentiated by antihyperglycemic treatment is needed.

The Rosenberg view can replace standardized coronal plane stress radiography in the diagnostic process for Uni-compartmental and Total knee replacements. 81.

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Background: Choosing the optimal radiographic methods to diagnose knee osteoarthritis could save both the radiation and cost in the diagnostic process, when considering either a unicompartmental or total knee replacement.
Purpose / Aim of Study: To evaluate and compare the Rosenberg view and standardized varus/valgus stress radiography, this study measured joint space width by determining intra- and interrater agreement and test-retest reliability of radiographs in patients with knee osteoarthritis.
Materials and Methods: A prospective study, including 73 patients. Radiographs were taken with the Rosenberg view and coronal stress radiography with the Telos stress device. Repeated measurements were performed. Experienced knee surgeons performed measurements of joint space width (JSW) and minimal joint space width (mJSW). Three measurement rounds allowed for test-retest reliability and Intra- and Interrater agreement. Coronal stress measurements were compared to the Rosenberg view in the relevant corresponding compartment of the knee.
Findings / Results: A total of 12,264 measurements were performed. The radiographic methods proved substantial reliability. Among raters, Intra- and interrater agreement showed substantial to almost perfect agreement. A very strong correlation was observed in the medial knee compartment (Đ= 0.91; CI = 0.84- 0.95 ; p< 0.001) when comparing JSW between the Rosenberg view and Varus stress. A Strong correlation was observed in the lateral knee compartment (Đ = 0.83 ; CI = 0.71-0.89 ; p < 0.001) when comparing mJSW between the Rosenberg view and Valgus stress.
Conclusions: The Rosenberg view can replace 20° coronal valgus-varus stress radiography, saving the cost of equipment, additional radiographs, specialized staff, and time to set up the device, and potentially increasing hospital cost-effectiveness.

Body mass index, hypertension and patient-reported outcomes in obese patients who underwent total knee arthroplasty. 6-8 years follow-up data from a randomized controlled trial

82.

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Background: Obesity is an increasing problem in patients in need of total knee arthroplasty (TKA). We have previously shown that it is feasible and safe to implement an intensive weight loss program shortly before TKA. The program resulted in a 10% body weight loss, lower cardiovascular risk factors but did not improve patient-reported outcomes (PRO).
Purpose / Aim of Study: To evaluate body mass index (BMI), hypertension and PRO 6-8 years after TKA in obese patients of whom half participated in a weight loss intervention before TKA.
Materials and Methods: This study is a 6-8 years follow-up from a previously published randomized controlled trial. Obese patients (BMI>30) scheduled for TKA were recruited from Hospital of Southern Jutland, between 2011 and 2013. Prior to TKA, the patients were randomized to a control group, who had standard care due to TKA and the intervention group who underwent an 8-week weight loss intervention program before surgery.
Findings / Results: The number of patients lost to follow-up from baseline to 6-8 years was 27 of 76 included patients (35%). Among the patients lost to follow-up there were more females, they had a higher mean BMI, more were unskilled workers and more lived alone. 6-8 years after TKA, there were no differences between the intervention and the control group on BMI, hypertension and PRO. The intervention group had increased their mean BMI significantly more than the control group 3.1 (95% CI 1.3;4.8). 31 of 47 (66%) had hypertension and 10 (83%) had Type II diabetes. PRO for pain, function and quality of life was considerably improved for both groups, with no differences between the groups.
Conclusions: The weight loss intervention program ended 1 year after TKA and the patients maintained their pre- operative weight loss of 10%. At the end of the intervention program, the dietician group sessions ended, and the patients were left to themselves. The results at 6-8-year follow-up after TKA showed that the patients were unable to maintain their weight loss without support. The patients in the intervention group gained the lost weight and more so (BMI increased from 33.6 to 37.3). The majority of the patients had hypertension.

No-fault compensation after primary total knee replacement in Danish hospitals 2005-2017 - A retrospective cohort study

83.

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Background: In Denmark, 99,507 primary total knee arthroplasties (TKA) were performed between 2005- 2017. Although TKA surgeries have a high success rate, complications, failed surgeries, and patient dissatisfaction are unavoidable. This works follows a previous study, which showed that 2.6% of all primary total hip arthroplasties in Denmark reported to the Danish Patient Compensation Association (DPCA), resulted in compensation; and half of these were approved.
Purpose / Aim of Study: We examined the DPCA database to outline the frequency and financial burden of compensation claims after primary TKA in Denmark.
Materials and Methods: This was a retrospective study of closed compensation claims following TKA reported to DPCA between 1st of January 2005 and 31st of December 2017. The primary cause for claim was included.
Findings / Results: There were 1,611 primary TKA claims out of 29,370 orthopaedic cases reported (5.5%). This accounts for 2% of all TKAs performed in this period. The approval rate was 42%. The number of claims filed had increased with a peak in 2012, followed by a decrease. The total payout was DKK 145,269,621. The highest payouts were for infection (DKK 59,011,085), insufficient or incorrect treatment (DKK 32,371,468), nerve damage (DKK 19,831,988), and incorrect indication (DKK 9,069,492). Collectively, these four complications accounted for 83% of the total amount of payouts. Claims most likely to be filed were due to insufficient or incorrect treatment (29%), infection (23%), dissatisfaction with correct treatment (17%), and nerve damage (7%). However, those likely to result in payout were pressure ulcer with a payout success rate of 86%, followed by incorrect indication (82%), missed diagnosis (82%), and incorrect prosthesis or equipment (76%).
Conclusions: 2% of all primary TKAs resulted in a compensation claim reported to DPCA with a 42% approval-rate. The majority of payouts were due to infection, insufficient or incorrect treatment, nerve damage, and incorrect indication. Although DPCA manages claims for patients, the data can also provide beneficial feedback to arthroplasty surgeons with the aim of improving patient care.

MRI cannot replace specialized radiographs prior to unicompatmental knee arthroplasty.

84.

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Background: Choosing the optimal diagnostic approach to knee osteoarthritis could save both the radiation of extra radiographs and costly examinations in the diagnostic process.
Purpose / Aim of Study: The purpose of this study was to compare the joint space width of specialized radiography to the cartilage thickness on MRi scans in patients undergoing Unicompartmental and Total Knee Replacements.
Materials and Methods: A prospective study, including 60 patients. Specialized radiographs were taken with the Skyline view, the Rosenberg view, and coronal stress radiography. Experienced knee surgeons performed measurements of joint space width (JSW) and minimal joint space width (mJSW) on all radiographs. One experienced radiologist performed measurements of cartilage height on MRi scans. Radiographic measurements of each radiographic technique were used to compare with cartilage height measurements in MRi scans, in each respective knee compartment.
Findings / Results: When comparing specialized radiography with MRi, a weak correlation was found in the patellofemoral compartment (Medial facet: JSW/mJSW; Đ= 0.39/0,35 ; CI = 0.07-0.58/0.09-.058 ; p< 0.005) (Lateral facet: JSW/mJSW; Đ= 0.28/0,32 ; CI = 0.03- 0.5/0.06-.05 ; p< 0.016), a negligible and non- significant correlation was found in the medial compartment, and a moderate to strong correlation in the lateral compartment(Rosenberg view: JSW/mJSW; Đ= 0.56/0,62 ; CI = 0.3-0.8/0.4-.8 ; p <0.000) (Valgus stress: JSW/mJSW; Đ= 0.7/0,61 ; CI = 0.5-0.84/0.4-.77 ; p <0.000).
Conclusions: MRi by itself cannot and should not replace these specialized radiographic methods when choosing implant type. MRi should be reserved for more special cases where abnormal radiography or suspicion of atypical clinical findings present themselves. We recommend that a work-up of patients for mUKA include a skyline view with a Rosenberg view projection as a standard, and avoid the extra costs of MRi scan and/or extra radiation of additional special radiographs.

Does preoperative pain catastrophizing influence objectively measured physical activity before and after total knee arthroplasty: a prospective cohort study

85.

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Background: Pain catastrophizing is associated with pain both before and after a total knee arthroplasty (TKA). However, it remains uncertain whether pain catastrophizing affects physical activity (PA).
Purpose / Aim of Study: The aim was to examine the influence of pain catastrophizing on the objectively measured PA profile, knee function and muscle mass before and after a TKA.
Materials and Methods: We included 58 patients with knee osteoarthritis scheduled for TKA. 29 patients had a score >22 on the pain catastrophizing scale (PCS) and 29 patients had a score <11. PA was measured with a tri-axial accelerometer preoperative, 3 and 12 months after TKA. Other outcome measures consisted of the Knee Osteoarthritis outcome Score (KOOS) and Dual-energy X-ray absorptiometry (DXA) scans.
Findings / Results: We found no difference in PA between patients with a high or a low score on the PCS and none of the groups increased their mean number of steps/day from preoperative to 12 months postoperative. Patients with low PCS scores had higher preoperative scores on the KOOS subscales: symptoms, pain and ADL and they walked longer in the 6MWT. Furthermore, they had lower BMI, lower percent fat mass, and higher percent muscle mass than patients in the high PCS group both before and after a TKA.
Conclusions: Preoperative pain catastrophizing did not influence PA before or after a TKA. Although the patients improved substantially in self- reported knee function after TKA, their PA did not increase. A TKA alone is not enough to improve PA and this may be important to consider when the clinicians are informing the patients about the expected benefits from the operation.

Paediatrics

Complications of Fitbone and Precice intramedullary bone lengthening nails: a systematic review with 782 patients

86.

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Background: More than 16000 intramedullary Precice and Fitbone lengthening nails have been implanted worldwide. Complications are so far only heterogeneously reported in small case series, and no systematic overview of complications exists.
Purpose / Aim of Study: To perform a systematic literature review of complications with Fitbone and Precice bone lengthening nails in lower extremity bone lengthening.
Materials and Methods: In PubMed, EMBASE, Cochrane Library a systematic search, with no limits concerning study design, date or language, was performed with search string of medical subject headings: Bone Nails, Bone Lengthening and "Word" Fitbone and Precice nail. One author selected the articles. The first and last author assessed complications. Complications were severity graded (Black et al. 2015) and categorized into subgroups based on origin.
Findings / Results: The search found 952 articles, 116 were full text screened and 41 included. 983 segments were lengthened in 782 patients (age: 8-74 years). Number of patients: 208 congenital, 305 acquired limb shortening, 111 short status, 158 unidentified etiology. We identified 332 complications (34% of segments). Type I (minimal intervention): 11% of segments; Type II (substantial change in treatment plan): 15% of segments; Type IIIA (failure to achieve goal): 5% of segments; Type IIIB (new pathology or permanent sequelae): 3% of segments. Joint contracture/subluxation/luxation was the most frequent type IIIB complication. The two most frequent origins of complications were related to device (13% of segments) and bone (9% of segments).
Conclusions: The risks of complications represent average risks as data did not allow stratification of risks based on etiology of lengthening. Intramedullary lengthening nails were introduced to reduce complications in limb lengthening. The overall risk of complication is still high with one complication for every three segments lengthened. In one of every four segments, the complication has a major impact on treatment: substantial change in treatment, such as unplanned surgery (15%), failure of achieving lengthening goal (5%) or introduction of a new pathology or permanent sequelae (3%).

One-year results after anterior cruciate ligament reconstruction in 113 children

87.

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Background: The treatment of anterior cruciate ligament (ACL) rupture in the pediatric population (children < 16 years) is debated, primarily because of a high risk of re-rupture after ACL- reconstruction (ACLR). In Denmark the treatment of pediatric ACL rupture is centralized in two centers.
Purpose / Aim of Study: To present the 1-year follow-up results in a consecutive cohort from one center in Denmark after pediatric ACLR using hamstring autografts and epiphysis sparing techniques.
Materials and Methods: Between 2012 and 2018 all children < 16 years operated with an ACLR were evaluated preoperatively and at 1-year follow-up. Evaluation included pediatric patient related outcome scores (PROMs): Pedi-IKDC and KOOS-child, in addition to laxity measurements with a rolimeter. Laxity measurements at one-year follow-up were made by an experienced physiotherapist, independent of the surgeon.
Findings / Results: During the 6-year period 113 patients < 16 years had an ACL reconstruction. 82 patients (73 %) had completed the one-year follow-up program. Three patients (2 girls and 1 boy) had been reoperated because of graft rupture. The mean age at follow up was 14.5 years (SD 1.5) (Đ‰48 %; ĐŠ 52%). The most common reasons for injury among both genders was soccer (41.5%) and handball (22,3%). Side to side laxity difference at follow- up was 1.00 mm (SD 1.48) for boys and 1.00 mm (SD 1,13) for girls. Mean Pedi-IKDC score: 86.3 (SD 13.0). Mean KOOS-Child subscales: Pain 88.7 (SD 11.4), Symptoms 87.7 (SD 11.4), ADL 97.6 (SD 4.6), Sport/Rec. 81.1 (SD 17.1), QOL 68.4 (SD 17.1).
Conclusions: The re-rupture rate, the stability and the subjective scores at one-year follow-up were satisfactory, except for the KOOS-Child subscale Quality of Life. However, the scores from this subscale were influenced by the restrictions in the program related to return to sport.

The performance of single leg hop tests in ACL-reconstructed children one-year after surgery compared to matched controls

88.

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Background: Functional performance are commonly recommended prior to the decision of return to sport (RTS) after ACL reconstruction (ACL-re) with a criteria of leg symmetry index (LSI) above 90 % of the contralateral uninjured limb
Purpose / Aim of Study: The purpose is to describe the leg symmetry index (LSI) of single leg hop test among children with an ACL-r and compare with healthy controls
Materials and Methods: ACL-re children and age-matched healthy controls recruited schools participated. They performed: Single leg hop tests (SLH, 6M-timed, TLH og COH). The highest result out of three trials on each leg were noted. The LSI were calculated as the injured or weak limb/uninjured or best limb*100 for the ACL-group and healthy group respectively except for the 6M-timed where it is opposite. All results are presented as mean±SD
Findings / Results: 376 healthy children and 88 children at 1-year follow up after ACL-re participated. Age-group 11-12 years consisted of 210 school children and 10 ACL-re, age-group 13-14 years of 125 school children and 36 ACL-re and age-group 15-16 years of 41 and 42 children respectively. The absolute values between the best/uninjured side of the healthy controls and the ACL-re at one year follow up respectively were: SLH healthy group 113.5 ± 28.3 and ACL-group 119.1 ± 24.2. 6M-timed healthy group 2.4 ± 0.5 and ACL-group 2.3 ± 0.4. TLH healthy group 370.9 ± 82.2 and ACL 82.2 and ACL-group 374.4 ± 100.5. COH healthy group 308.9 ± 84.5 and ACL-group 319.6 ± 94.1. The percentage side to side differences (LSI) between weak/best limb for the controls and injured/uninjured limb for the ACL-re at one-year follow-up were for the controls 10 % (SLH 89.3 ± 8.6, 6M-timed 110.1 ± 9.4; TLH 91.6 ± 8.1 and COH 91.6 ± 8.1) whereas it for the ACL-re were 3 % (SLH 96.6 ± 12.5; 6M-timed 96.7 ± 10.8; TLH 97.5 ± 9.4 and COH 97.9 ± 13.0)
Conclusions: No differences were seen between the best limb of the healthy controls and the uninjured limb for the ACL-re at one-year follow-up. However, the ages-matched controls showed a 10% side to side difference in performing the four SLH which were only 3 % for the ACL matched controls showed a 10% side to side difference in performing the four SLH which were only 3 % for the ACL-re children at a one-year follow-up. Based on these results the LSI criteria of > 90 % before RTS seems to be a reasonable parameter for ACL up. Based on these results the LSI criteria of > 90 % before RTS seems to be a reasonable parameter for ACL-re children

Effects of treatment with reciprocal inhibition on gait function in children with cerebral palsy

89.

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Background: Mollii (Inerventions, Danderyd) is a full-body garment with 58 integrated electrodes with capability of stimulating 40 muscles in the body. The body garment with 58 integrated electrodes with capability of stimulating 40 muscles in the body. The Mollii suit facilitates reciprocal inhibition of a spastic muscle by stimulation of the antagonist muscle.
Purpose / Aim of Study: The aim of this preliminary study was to investigate the effect of the Mollii suit on gait function in children with cerebral palsy as a part of a larger study of whole-body function.
Materials and Methods: 29 children with spastic cerebral palsy GMFCS 1-2 (15 boys; 13 girls; 11.3±3.2 years; 1.41 ± 0.29 m, 37.9 ± 12.7 kg) were included in this six 12.7 kg) were included in this six-month prospective study. The month prospective study. The Mollii suit was individually adapted to stimulate the antagonists of their affected muscles in both upper- and lower extremities. The children wore the suit one hour daily during activities of daily living for six months. Gait function was evaluated with a 3-D gait analysis before and after the intervention with kinematic, kinetic and temporospatial temporospatial outcome parameters related to the ankle joint. Paired samples statistics were used for every parameter obtained from the gait analysis. Effect sizes (Cohen's d or Wilcoxon effect size r) were calculated.
Findings / Results: 17 children (10 boys; 7 girls; 10.9±3.2 years, 1.37±0.34 m, 36.5±12.1 kg) completed the intervention. Temporospatial Temporospatial parameters including cadence, stride length, gait velocity and limp index were unchanged after six months of treatment with the Mollii suit. Dorsiflexion in stance phase improved significantly from 11.4±6.5° to 15.7±4.5° (p=0.001, r=0.49). Dorsiflexion in swing phase was significantly improved from -8±10.2° to - -4.6±9.5° (p=0.012, r= 0.36).
Conclusions: Improved dorsiflexion in swing phase is a positive change which might improve gait function by decreasing the risk of stumbling. Improved dorsiflexion in stance phase could be a measure of less spasticity in the plantar flexor muscles and hence better shock absorption. This preliminary study shows moderate effect on biomechanical gait parameters, as an effect of this intervention, but further evaluation of the full data set and the reasons for the large drop out should be considered before a concluding assessment of this new intervention method may be obtained.

Evaluation of somatosensory profiles in children and adolescents with cerebral palsy and chronic pain by quantitative sensory testing

90.

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Background: Chronic pain in children and adolescents with cerebral palsy (CP) is a partly overlooked and undertreated clinical problem, while being a major determinant for quality of life.
Purpose / Aim of Study: To better understand the underlying pain mechanisms, we investigated the somatosensory profiles of children and adolescents with and without CP, and chronic pain with quantitative sensory testing (QST).
Materials and Methods: This prospective cross-sectional, explorative study investigated 51 subjects; 25 with CP (9 with chronic pain [CP-P], 16 without [CP-NP]), and 26 without CP (14 with chronic pain [non-CP-P], 12 without [controls]). All subjects were recruited from the outpatient orthopedic clinic. The subjects had their reaction time tested prior to the QST. The QST included assessments of warmth (WDT), cool (CDT), mechanical (MDT) and vibration (VDT) detection thresholds; heat (HPT), pressure (PPT), and mechanical (MPT) pain thresholds; and tests of wind-up (WUR), dynamic mechanical allodynia (DMA) and conditioned pain modulation (CPM).
Findings / Results: There were no statistical differences in QST results between subjects with CP-P and CP-NP. Reaction times were longer in subjects with CP compared to subjects without CP (P=0.010). Subjects with CP demonstrated hypoesthesia in WDT (P=0.031) and CDT (P=0.029), with a trend for mechanical hypoesthesia in MDT (P=0.052), and no difference in HPT compared to controls. When rating pain during HPT-assessment, more subjects with CP rated the pain intensity as high (13/25 vs. 2/12, P=0.008), and in WUR, fewer subjects with CP registered increasing pain over time (6/25 vs. 7/12, P=0.041), compared to controls. Subjects in the non-CP-P group demonstrated hypoesthesia in WDT (P=0.008) and HPT (P=0.021), and more subjects rated the pain intensity as high (9/14 vs. 2/12, P=0.014), compared to controls. Regarding the rest of the QST variables, no significant differences were shown.
Conclusions: The somatosensory profiles of subjects with CP demonstrated similarities regardless of the pain phenotype; thermal and mechanical hypoesthesia and decreasing pain in responses to WUR. Further sensory studies are warranted examining the pathophysiological mechanism of pain in children and adolescents with CP.

Complex regional pain syndrome (CRPS) in children – treatment with peripheral nerve catheter

91.

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Background: Complex regional pain syndrome (CRPS) is a neuropathic condition characterized by circular allodynia and functional loss of an extremity. Treatment with continuous peripheral nerve blockade in children has so far only been reported in case studies.
Purpose / Aim of Study: This study reports our results and complications combining continuous peripheral nerve blockade for pain relieve and physio-occupational therapy in children with CRPS.
Materials and Methods: Inclusion criteria were children meeting Budapest criteria for CRPS, having sensory disturbances and allodynia, thereby losing the ability to self-support on their limb. Under general anesthesia and with ultrasound and electric stimulation guidance, a catheter was placed close to either the sciatic nerve, the saphenous nerve or the Brachial plexus. All children received continuous infusion of ropivacaine 0.2%, 5-7 mL/h combined with immediate physiotherapy and/or occupational therapy with a supplement of self-training every two hours throughout the day. The therapy focused on improving coordination, strength and sensory motor skills.
Findings / Results: 28 children were consecutively included (25 girls and 3 boys). 23 children had foot pain, 4 had pain in the hand and 1 had combined foot and hand pain. On admission the average age was 12 years (8-16); the average duration of pain was 12 months (2-64) with a median VAS score of 9 (7-10). Initiation of pain was either no trauma (9), minor trauma/distortions (17) or fracture (2). After an average observation period of 68 months (5.6 year) the median VAS score was 0 (0-7). In 2 children the treatment plan had no effect. In one child a relapse occurred 3 weeks after removal of the catheter, but renewed nerve catheter treatment was successful. One catheter had to be replaced due to accidental discontinuation. Finally, one child had a superficial infection. No neurological complications were observed during the period.
Conclusions: Treatment with continuous peripheral nerve block and training seems safe, effective and feasible for children with CRPS, resulting in pain-free or almost pain-free patients.

The prevalence of hip contracture in children with cerebral palsy and the association between hip contracture and gross motor function and the experience of pain in the lower extremities

92.

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Background: The prevalence of hip contractures in children with Cerebral Palsy (CP) in Denmark is unknown. Moreover, it is unclear if hip contracture leads to pain in the lower extremities.
Purpose / Aim of Study: To identify the prevalence of hip contractures and their association with gross motor function among Danish children with CP. In addition to investigate the association between hip contracture and pain in the lower extremities.
Materials and Methods: This cross-sectional study included 688 children with a pediatrician-verified diagnosis of CP in Denmark born in 2001- 2019 and registered in the National Danish Clinical Quality Database for Cerebral Palsy (CPOP). The dataset included children aged 5 to 12 years across all Gross Motor Function Classification System (GMFCS) levels. GMFCS level was and range of motion reported by physiotherapists, and by using goniometer, contractures were defined according to the "traffic-light algoritm" used in CPOP in the nordic countries. Data was collected in the period 2018-2019. The associations were estimated as odds ratios (OR) with 95% confidence intervals by logistic regressions, adjusted for age, GMFCS and the experience of pain in the lower extremities.
Findings / Results: The population included 59% boys and 41% girls with a mean age of 8 years. The prevalence of hip contracture was 22%, across all five GMFCS levels. There was a significant inverse association at GMFCS level IV (OR=1.99, 95% CI: 1.10;3.62) and V (OR=5.49, 95% CI: 3.33;9.07) and the odds for hip contracture. Furthermore, the presence of hip contracture increased the experience of pain in the lower extremities (OR=1.43, 95% CI: 0.95;2.15).
Conclusions: The present study indicates that, a higher GMFCS-level increases the prevalence of hip contracture and that the occurrence of hip contractures is associated with the experience of pain in the lower extremities of children with CP.

Reliability of MRI in pediatric acetabular dysplasia

93.

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Background: MRI is increasingly used in the assessment of residual acetabular dysplasia (RAD) as cartilaginous structures are investigated for their role in hip stability. Osseous migration index (OMI) is a commonly used parameter in the assessment of RAD in conventional radiology. We propose the cartilaginous migration index (CMI) as a new and improved measurement for hip stability.
Purpose / Aim of Study: Primary aim was to establish the reliability of OMI and CMI in a retrospective cohort of patients examined for RAD. Secondary aim was to compare findings of OMI and CMI and agreement of MRI with XR.
Materials and Methods: We retrospectively identified sixteen patients (2 male, mean age 5 years(±1.57)), examined for RAD during a period of 2½ years, at the Department of orthopedics, Aarhus University Hospital, Aarhus, Denmark. MRI scans were all performed without sedation. Four raters performed blinded repeated measurements of OMI, CMI, pelvic rotation index and pelvic tilt index in MRI and XR. Bland Altman plots and intraclass correlation coefficients (ICC) were calculated for agreement and reliability.
Findings / Results: Intrarater reliability for OMI(XR), OMI(MRI) and CMI all had ICC values above 0.97 with 95% CI in the range of 0.91-0.99. Mean differences and ranges were: OMI(MRI)-OMI(XR) 0.083 (0,0.38), OMI(MRI)-CMI 0.08 (0-0.23), OMI(XR)-CMI 0.062 (0, 0.27). Bland Altman plots for OMI(XR) and OMI(MR) produced a mean difference of 0.07 LOA (-0.12-0.25) with higher disagreements at low average MI values. Mean OMI(XR) was lower than mean OMI(MRI) 0.17 versus 0.24 (P<0.001)
Differences in OMI(MR) and OMI(XR) showed no correlation to pelvic rotation index or pelvic tilt index but a positive correlation to the interval between XR and MRI exams.
Conclusions: We propose CMI as a new radiographic measurement, and conclude that it has good reliability and correlates positively to OMI(XR) and OMI(MRI). Measurement of MI in XR and MRI had good to excellent reliability. Our results show that pelvic radiographs underestimated OMI when compared to pelvic MRI.

The effects of a systematic non-invasive, electrical low frequency and low intensity stimulation with multiple electrodes incorporated in a whole-body suit on children with cerebral palsy, GFMCS III-V; A 6 month clinical prospective study

94.

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Background: The Mollii suit is a low intensity and low frequency electric stimulation treatment of spasticity. Spasticity is a common characteristic in children with cerebral palsy (CP). This treatment has the advantage to be used by even immobile handicapped children, since patient participation in principle would only require donning of the suit, which would be performed by a parent or therapist.
Purpose / Aim of Study: The objective of this clinical study was to examine the effect on spasticity and function of multifocal transcutaneous electrical stimulation (TENS) incorporated in a 2-piece suit, the Mollii suit on children with CP, GFMCS 3-5.
Materials and Methods: This study was a prospective cohort study. Participants were recruited from three schools for disabled children in our region. Thirty-one participants with predominantly spastic disease, GFMCS 3-5 were included; 17 completed the study. Participants wore the suit for 1 hour every second day in a trial period of 24 weeks. We measured spasticity using the modified Ashworth (MAS) and Tardieu scales (MTS) before initiation and after 4, 12, and 24 weeks, and passive range of motion (pROM) using a goniometer. The participant's personal therapists defined and evaluated two motor related SMART goals by the goal attainment scale (GAS). GMFM-66 and posture and postural ability scale (PPAS) evaluation were performed for overall function and stability.
Findings / Results: The overall spasticity level and from the proximal arm and leg were significant reduced according to MAS. There was an additive effect on spasticity reduction over time and related to specific stimulated muscles. No clinically meaningful reduction was seen in pROM and MTS as well as in overall and dimensions of GMFM-66. SMART goals improved significantly and clinical meaningful for motor function as standing/walking and hand and arm use. We saw non-significant improvements in the sitting and prone position according to the PPAS.
Conclusions: In conclusion, this clinical study demonstrated that the use of Mollii suit in a 24-week intervention in children with CP, GFMCS 3-5 has significant reduction in spasticity and significant improvements in motor functions as mobility of walking and standing and motor skills of hand and arm.

High prevalence of knee contractures in children with cerebral palsy in Denmark

95.

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Background: Cerebral palsy (CP) is a neurological disease occurring in children at early gestation to the age of 2 years. In Denmark, children with CP are registered in the Danish National Cerebral Palsy Database (CPOP) and offered a program that includes treatment and follow-up. To our knowledge, only one study has investigated the prevalence of knee contracture and its association with gross motor function, age and spasticity, yet it remains to be investigated in a Danish population.
Purpose / Aim of Study: To examine the prevalence of knee contracture in children with CP, and secondly to examine the association with gross motor function, age and spasticity.
Materials and Methods: The study is a cross-sectional study, including 1163 children with CP (679 boys and 479 girls) aged 1-15 years, registered in the CPOP database, with measurements performed between 2017-2019. Knee contracture was defined as a deficit greater than or equal to 5 degrees knee extension, measured with a goniometer at passive range of motion test by physiotherapists. To examine the association between knee contracture and gross motor function, age and spasticity, logistic regression analysis were performed and odds ratios (OR) with 95% confidence intervals (95% CI) were calculated. Gross motor function was assessed with Gross Motor Function Classification System Expanded and Revised (GMFCS E&R) and spasticity was measured with Modified Ashworth Scale.
Findings / Results: 509 out of 1163 children with CP had knee contracture resulting in a prevalence of 44%. In the adjusted analysis, knee contractures were significantly more frequent in GMFCS E&R level IV (OR: 1.9, 95% CI: 1.21; 2.97) and V (OR: 3.62, 95% CI: 2.36; 5.55) compared to level I. Age groups 4-6 years (OR: 1.73, 95% CI: 1.19; 2.52), 7-9 years (OR: 1.85, 95% CI: 1.29; 2.66) and 10-12 years (OR: 2.12, 95% CI: 1.39; 3.24) years were associated with a higher prevalence of knee contractures compared to age group 1-3 years.
Conclusions: There is a high prevalence of knee contractures in children with CP in Denmark and knee contractures are significantly associated with low levels of gross motor function and with older age. The study did not find knee contractures to be associated with spasticity.

Shoulder and Elbow

10-year follow-up of 1,371 acute proximal humeral fractures treated with stemmed hemiarthroplasty

96.

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Background: There is no consensus on the treatment of proximal humeral fractures. Hemiarthroplasty has been widely used in patients when non-surgical treatment is not possible. The short-term outcome is varying and there is, despite extensive use for many decades, limited information about the long-term outcomes.
Purpose / Aim of Study: To report the 10-year patient reported outcome and implant survival after acute proximal humeral fractures treated with hemiarthroplasty.
Materials and Methods: Data was obtained from the Danish Shoulder Arthroplasty Registry. The Western Ontario Osteoarthritis of the Shoulder (WOOS) index form was send to all patients 8 to 14 years after primary surgery. 1,371 patients with an acute proximal humeral fracture were treated with hemiarthroplasty between 2006-2010. 822 (60.0%) patients had died and 6 (0.4%) had emigrated. 549 patients were alive of which 38 (2.8%) were revised. Thus, 511 (37.3%) patients with a mean follow- up time of 10.7 (SD 1) years were available for analysis. 378 (74.0%) patients answered the 10- year follow-up with 339 (66.3%) having a complete questionnaire. The implant survival was calculated using the Kaplan-Meier method.
Findings / Results: Mean age at surgery was 67 years (SD 10) and 81 % (n=412) were women. Mean WOOS score was 65 (SD 26). Linear regression models found no statistically significant relationship between WOOS score and age, sex, prosthesis brand or year of surgery. The revision rate of the total study population was 4.5 % (n=62) and the cumulative implant survival rate was 94 % (95 % CI 93-96).
Conclusions: This is the largest long-term follow-up study of acute proximal humeral fractures treated with hemiarthroplasty. We found a low revision rate and a reasonable 10-year patient-reported outcome. The patient-reported outcome should be interpreted with caution as the patients are a selected population without any information about the large number of patients who died or did not return a complete WOOS score. However, the long-term outcome and revision rate suggest that hemiarthroplasty offers a valid alternative, when non-surgical treatment is not possible, in fracture patients with long life expectancy.

Implant migration, clinical outcome and revision rates following humeral head resurfacing: 9-13 years results from a randomized controlled clinical trial comparing two different implants

97.

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Background: Humeral head resurfacing implants (HHRI) have been widely used due to theoretical advantages including restoration of anatomy, preservation of bone stock and a shorter operating time. Several studies have shown unacceptable revision rates of HHRI, but no previous studies have evaluated implant migration at mid-term follow-up and related migration patterns to revision at longer-term.
Purpose / Aim of Study: To compare implant migration, clinical outcome and revision rates of the Copeland and the Global C.A.P. HHRIs.
Materials and Methods: Thirty-one patients (13 women), mean age 63 years (range 39-82), with shoulder osteoarthritis were randomly allocated to a Copeland (Biomet) (n=13) or Global C.A.P. (DePuy) (n=18) HHRI. Patients were followed for 5 years with radiostereometry, Constant Shoulder Score (CSS), and the Western Ontario Osteoarthritis of the Shoulder Index (WOOS). Additionally, WOOS scores and revision status were obtained at 9-13 years follow-up.
Findings / Results: At the 5-year follow-up, total translation (TT) was 0.75 mm (95% CI: 0.53-0.97) for the Copeland HHRI and 1.15 mm (95% CI: 0.85-1.46) for the Global C.A.P. HHRI (p=0.04). The overall cumulative risk of revision at 5 years and at the latest available follow-up was 30% (95% CI: 17-49) and 47% (95% CI: 31-66), respectively, but there was no difference in risk of revision between the two implants at these timepoints (p>0.44). At the 1-year follow-up, HHRIs which were later revised, had a mean 0.53mm (95% CI: 0.18-0.88) higher TT compared to non-revised HHRIs. The migration pattern in revised HHRIs was medial translation and lift-off. Clinical scores and reasons for revision will be presented at DOS.
Conclusions: At 5-year follow-up, the Global C.A.P. HHRI displayed higher total translation than the Copeland HHRI but revision rates in this small cohort were similar. HHRIs, that were later revised, migrated more during the first postoperative year compared to non-revised implants. A cumulative revision risk of nearly 50% at the latest follow-up is higher than reported in the Danish Shoulder Arthroplasty Registry.

The incidence and epidemiology of acute acromioclavicular dislocations in the capitol region of Copenhagen

98.

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Background: Acromioclavicular joint (AC) dislocations are common injuries accounting for 9-12% of all injuries to the shoulder girdle. The frequency is widely reported in the literature; however only limited research is available that describes the incidence and basic epidemiological features of the injury in a general urban population.
Purpose / Aim of Study: To investigate and describe the incidence and epidemiology of acute acromioclavicular dislocations in the capitol region of Denmark
Materials and Methods: The study was designed as a prospective cohort study. All patients with an acute (<2 weeks) injury to the AC joint admitted to Copenhagen University Hospital Amager, Hvidovre and Glostrup from January 1st to December 31st 2019 were prospectively registered. The hospitals serve a population of 532.000 citizens. The patients were identified by evaluation of all x-rays of the AC-joint and clavicle obtained in the three Emergency Departments. Patients with trauma to the shoulder, pain from the AC-joint and increased coracoclavicular distance were included and classified according to Rockwood's classification (type II-VI) by two independent raters. Rockwood type I was considered a sprain with no AC joint displacement and therefore not included. Data on age, gender, time of injury, affected side and mechanism of injury were registered.
Findings / Results: A total of 106 patients with mean age 40.2 years (range 19-77, SD 14.1) were included in the study. The incidence was 20 per 10^5 inhabitants per year. 95 patients were male and 11 were female giving a male-female ratio of 8.6:1. Rockwood type III was the most common type of AC joint dislocation accounting for 59/106 (55.7%) of the injuries. Type II and V accounted for 43 (40.6%) and 4 (3.8%). Type I was not included in the study and there was no type IV or VI dislocations. The most common mechanism of injury was sport 80/106 (75.5%). Cycling accounted for half of all injuries 51/106 (48%). The age distribution was bimodal with 31% of injuries occurring in age 18-29 years and 26% occurring in age 50-59.
Conclusions: Rockwood type III was the most common type of AC joint dislocation. Young and middle-aged men were at highest risk. 75% of the injuries occurred during sports most frequently within cycling.

Less than half of patients in secondary care adheres to clinical guidelines for subacromial impingement and have acceptable symptoms after treatment: A nationwide cohort study of 3306 patients

99.

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Background: According to evidence-based guidelines for treatment of subacromial impingement (SIS), non-operative care with three months of exercise therapy is first line of treatment, but guideline adherence is unknown.
Purpose / Aim of Study: We investigated to what degree current care complies with clinical guidelines and to what extent successful outcomes are achieved.
Materials and Methods: We invited all 4521 patients diagnosed with SIS at any Danish hospital during a 3-months period to participate in this Nation-wide retrospective population-based cohort study. The questionnaire used to obtain patient-reported information on content of care was based on the Danish National Clinical Guidelines for treatment of SIS and referral guidelines. Nine members of the working group responsible for the National Clinical Guidelines, including three orthopedic surgeons, commented on the questionnaire. We developed a revised version based on systematic condensation of all comments. Participants also reported patient acceptable symptom-state. Invitations were sent to eligible patients 3.5 months after diagnosis at the hospital.
Findings / Results: In total, 3306 eligible patients completed the questionnaire at median 16.7 weeks after diagnosis at a hospital. In total, 44% had completed 12 weeks of exercise therapy, while 13% had not engaged with exercise therapy at all. The remaining patients had completed less than 12 weeks and were either still engaged with exercise therapy (13%) or had stopped (30%). From the full cohort, 21 % had underwent surgery for their shoulder condition at four months follow-up, with 40% of these reporting to have engaged with exercise therapy for 12 or more weeks before surgery. Exercise therapy most commonly included mobility (81%), strengthening (75%), stretching (67%), and posture correction/scapula setting (49%). Only 43% of patients undergoing non-operative care had reached acceptable symptom-state.
Conclusions: Less than half of patients diagnosed with subacromial impingement follow the clinical guidelines recommending three months of exercise therapy. Furthermore, less than half of the patients reaches an acceptable symptom-state. Future investigations should focus on the link between guideline adherence and treatment results.

The precontoured clavicle plate: clinical and radiological evaluation of two different generations of plates for 290 acute midshaft clavicle fractures

100.

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Background: Primary surgical fixation of displaced midshaft clavicle fractures has significantly increased over the last decades. Precontoured locking plates has been used for many years and the plates have evolved over time with potential improvements to increase unions and lower complications.
Purpose / Aim of Study: Purpose of this study was primarily to compare two generations of precontoured clavicle plates
Materials and Methods: Retrospective chart and radiological review of 290 patients with acute displaced midtshaft clavicle fractures treated with an Acumed Clavicle plate (N=194 of previous generation plates and N=96 of current plates). The overall cohort had a mean age of 42.9 years (SD 14.6), the male:female ratio was 4:1 and 64% of the fractures was displaced in combination with a segmental fragment. 64% had DASH completed with an overall follow-up of 6.8 years (range 4.0-9.4)
Findings / Results: In general, no significant differences were found between the two plate generations in relation to all investigated outcomes. Implants were removed in 23.7% of all cases with the previous plate compared to 13.5% with the current lower profile plate (p=0.06). The overall union rate was 98.3%. A secondary surgical procedure was done in 24.8% of all cases with most due to implant related irritation resulting in implant removal (20.3%). Functionality measured by DASH was excellent at follow-up (median DASH 2 (range 0-63))
Conclusions: Using a precontoured clavicle plates to treat patienta with displaced clavicle fractures with precontoured clavicle plates seems to result in excellent union and function with few complications. Current generation of lower profile plates does not seem to improve clinical outcome compared to older plates but is seems that the percentwise risk of implant related discomfort is lower though the difference is not statistically significant

Is the quality of tension band wiring for olecranon fractures related to complications?

101.

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Background: Tension band wiring (TBW) is the most frequently used fixation for displaced olecranon fractures. TBW is in general terms known as a simple method that can be performed by most orthopaedic surgeons and has satisfying results.
Purpose / Aim of Study: The aim of this study was to determine if the quality of TBW for displaced olecranon fractures in adult patients were associated with an increase in complications.
Materials and Methods: From 2013 to 2018, eligible patients were retrieved using elbow and olecranon fracture diagnosis codes from the hospitals administration databases in the Region of Southern Denmark. Patients' health care files were reviewed for demographics and complications. Major complication was defined as any reoperation within 8 weeks or deep infection. Any loss of fixation was added to define surgical complications. Pre- operative x-rays were reviewed for classification and postoperative x-rays were evaluated quality of TBW based on 10 imperfections and yielding 10 points if no imperfections were present. STATA was used for descriptive statistics with median and inter quartile range. Chi square test was used for group comparison.
Findings / Results: 305 patients were included, 208 (68%) females, median age was 64 (IQR=24), and 20% were ASA≥3. There were 76% Mayo type 2A and 20% type 2B. A postoperative cast applied for 96% of the patients for 2 (IQR=1) weeks. The TBW's were rated with a median score of 8 points (IQR=2). There were 11.8% with major complications. No complications were seen if given 10 points and 15,4% if given 5 points thereby resulting in a clear relation between a higher score and less complications ($p<0.0000$). 105 patients (34.4%) had surgical complications overall which gave a similar relation between higher points and less complications ($p<0.000$).
Conclusions: In total 34.4% of the patients had complications and there was a clear relation between the quality of osteosynthesis and complications. The outcome of traditional TBW is therefore depending on the quality of the osteosynthesis.

Superior capsular reconstruction (SCR) – results after reconstruction with a porcine extracellular matrix graft.

102.

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Background: A prerequisite for a satisfying functional result in the treatment of an irreparable rotator cuff rupture is a significant reduction of shoulder pain and better range of motion with an increase in anatomical glenohumeral joint stability.
Purpose / Aim of Study: Prospective study to examine the outcome after superior capsular reconstruction using a porcine extracellular matrix dermal graft.
Materials and Methods: Clinical results were evaluated using the Constant score and WORC index over a 2- year period. All patients had magnetic resonance imaging of the injured shoulder after one year.
Findings / Results: 13 patients with 13 superior capsular reconstructions were included over a 3-year period. Mean age was 61 years (range 50 to 70) at the time of surgery. At final follow-up (mean 24 months, range 23 to 26) the mean Constant score had improved by a percentage average of 127 % (0-268, % increase). The mean WORC index had increased by a percentage average of 130 % (0-484, % increase). 11 out of 13 grafts were intact on follow-up magnetic resonance imaging.
Conclusions: Our hypothesis was that successful implantation of a dermal xenograft would correlate with both better functional outcome and stabilized glenohumeral radiographical features. We saw a group of patients with variable but significant increases in functional results and in general with limited pain and satisfaction and intact xenografts on an MRI scan. We did not find a positive correlation between functional outcome scores and graft durability and with single cuff defects versus larger rotator cuff defects. The group of patients were generally qualitatively and measurably satisfied with their result. This study suggests that a superior capsular reconstruction can yield results that are comparable or superior to other known salvage treatment options in patients with large to massive rotator cuff defects without significant cuff tear arthropathy. The hypothesis that superior capsular reconstruction can be a relevant treatment method for irreparable rotator cuff tears could not be refuted despite a fairly low patient inclusion number. With these results, selected patients can be considered for a different treatment than reverse shoulder arthroplasty, debridement or tendon transfer.

Ultrasonographic measurements of subacromial structures in patients with subacromial pain show moderate to excellent interrater reliability when performed by novice sonographers

103.

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Background: Ultrasonography is becoming increasingly available for health professionals with limited sonographic experience. In the diagnosis of shoulder problems ultrasonography is commonly used and has been described as a helpful and reliable tool, when performed by experienced sonographers. The reliability of subacromial measurements performed by novices is thus relevant.
Purpose / Aim of Study: To investigate if standardized ultrasonographic subacromial measurements are reliable in the hands of novice sonographers.
Materials and Methods: After an open training- and supervision phase, two novice sonographers, a medical student and an orthopedic resident, performed a standardized ultrasonographic protocol on patients diagnosed with subacromial pain by orthopedic specialists. The protocol consisted of two measures of supraspinatus tendon thickness and subacromial bursa thickness, one measure of acromio-humeral distance and an assessment of dynamic impingement. Intraclass correlation coefficients (ICC 2,2), linear weighted Ð, standard error of the measurement (SEM), minimal detectable change (MDC) and linear weighted Ð were used to evaluate reliability.
Findings / Results: Measurements were obtained from 28 symptomatic shoulders and 20 contralateral asymptomatic shoulders. ICC-values for supraspinatus tendon thickness ranged from 0.84 to 0.87 (SEM 0.43–0.50 mm, MDC 1.19–1.38 mm, mean (SD): 5.72 (0.9) mm). Subacromial bursa thickness had ICC ranging from 0.58 to 0.93 (SEM 0.15–0.35 mm, MDC 0.41- 0.97 mm, mean (SD): 1.70 (0.43) mm). For acromio- humeral distance ICC ranged from 0.81 to 0.84 (SEM 0.90-0.93 mm, MDC 2.50-2.57 mm, mean (SD): 11.59 (1.70) mm). Reliability of dynamic impingement was fair in symptomatic shoulders (Ð: 0.29, agreement: 68 %) and moderate in asymptomatic shoulders (Ð: 0.46, agreement: 90 %).
Conclusions: Although the results are inferior to results obtained by experienced sonographers, ultrasonographic assessment by novice sonographers showed acceptable reliability, with supraspinatus tendon thickness and acromio-humeral distance measures resulting in good reliability. Reliability of the bursa measurements ranging from moderate to excellent and the assessment of dynamic impingement resulting in fair to moderate reliability.

Rotator Cuff Tear; A diagnose often missed at initial contact. A prospective study

104.

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Background: Rotator cuff tears are common injuries. They are often missed upon the initial examination at the emergency room.
Purpose / Aim of Study: In this study, the incidence rate of rotator cuff tears in patients seen in the emergency room with relevant shoulder trauma is evaluated. Furthermore, it is investigated, whether a limited clinical examination is correlated to an ultrasonography confirmed rotator cuff tear.
Materials and Methods: Patients referred to the emergency room with isolated shoulder trauma and no x-ray verified fracture, were referred to a follow-up examination with a shoulder surgeon within 14 days after trauma. At follow-up a limited clinical examination with three diagnostic tests was performed. The patients were tested for: abduction, external rotation and impingement. The clinical examination was immediately followed by an ultrasonography examination to determine the status of the rotator cuff.
Findings / Results: We included 59 patients in the study with a median age of 47 years. 7 (12%) patients had a rotator cuff tear (RC tear) upon evaluation. If the patient was a candidate for surgery, the cuff tears would be verified by MRI or arthroscopy. 17 patients had all three tests positive at the follow- up examination. Of these, 7 (24%) patients, had a RC tear. All patients with a RC tear had a positive test for external rotation, and all three diagnostic tests had negative predictive values above 92%.
Conclusions: 12% of the patients seen in the emergency room after isolated shoulder trauma had a RC tear. This study shows that a limited clinical examination can assist the surgeon in determining which patients are likely to have a RC tear and for whom, a referral for a concluding ultrasonography examination is likely recommendable.

Spine

Interbody fusion does not influence development of lumbar compensatory mechanisms 10 year after lumbar fusion

105.

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Background: Restoration of lumbar lordosis in lumbar spine surgery is thought to be associated with better postoperative outcomes. Various inter-body fusion techniques can theoretical help to change and correct sagittal balance. Pelvic plays a central role in sagittal balance. The Three key pelvic parameters are pelvic incidence (PI), pelvic tilt (PT), and sacral slope (SS). The last 2 can change due to compensatory mechanism. Decrease in SS is posed to increase risk of adjacent segment degeneration (ASD)

Purpose / Aim of Study: To assess radiographic signs of degenerative changes and compensatory mechanisms after lumbar fusion at 10 year follow-up and their relation to outcome comparing posterolateral instrumented fusion (PLF) to Transforaminal interbody lumbar fusion (TLIF) in a RCT

Materials and Methods: 100 pat. enrolled in a RCT between TLIF and PLF had standing lumbar radiographs analyzed with respect to olisthesis, lordotic angle at adjacent level (AL) and differences in SS. SS was determined by PI = PT + SS. Clinical outcome was measured by Owestry disability index (ODI) and SF-36 Physical Function (PF), Bodily pain (BP) and Physical Component Summary(PCS). Data was analyzed using STATA

Findings / Results: There was no difference in development of olisthesis at the (AL) between the two groups at 10 year follow-up (p=0.43). Lordotic angle of the adjacent disc decreased with 5 or more degrees in 6 patients in the TLIF group and 3 in the PLF group. Three pats in the TLIF group and 4 in the PLF group had an increase in lordotic angle at the adjacent disc, the remainders were unchanged (p=0.58). Five pat. in the TLIF group and 7 in the PLF groups had a decrease in SS of 5 degrees or more (p=0.51).There was no difference in ODI score nor PF, BS & PCS at 10 year follow-up between those who developed changes in adjacent disc angle and those who remained unchanged (p=0.49, p=0.20, p=0.94 p=0.65). The same held true for changes in SS (p=0.46, p=0.49, p=0.39, p= 0.58)

Conclusions: No difference between the two fusion methods with respect to degenerative changes visible on radiographs at 10 years follow-up. Signs suggesting development in compensatory mechanisms (SS) was not associated with poorer clinical outcome

Are Modic changes associated with health-related quality of life after discectomy - a registry-based cohort study on 620 patients

106.

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Background: Previous studies have failed to show a clinically significant association between Modic changes (MCs) and patient-reported outcomes (PRO's) after discectomy.
Purpose / Aim of Study: To assess whether Modic Changes (MCs) are associated with health-related quality of life, long- term physical disability, back- or leg pain after discectomy.
Materials and Methods: Data from the Danish National Spine Registry on patients undergoing first-time lumbar discectomy at a single institution from 2014-17 with an accessible preoperative lumbar MRI, complete pre-operative and two-year follow-up questionnaires were obtained, n=620. Patients were stratified based on the presence (+MC) or absence (-MC) of MCs on the pre-operative MRI.
Findings / Results: Of 620 patients included, MCs were present in 270 patients (47%). Of these, MC type 1 (MC-1) was present in 70 (25%) and MC type 2 (MC-2) in 210 (75%) patients. Preoperative data for ODI, EQ-5D, VAS-BP, and VAS-LP were comparable for the +MC and -MC groups. Both groups had a statistically significant improvement in PRO's from baseline compared to two-year follow-up ($p<0.001$). At two-year follow-up, both groups had improved with no significant difference between them in regards to ODI (15.5 vs. 17.2, $p=0.208$); EQ-5D (0.75 vs. 0.72, $p=0.167$); VAS-BP (27.1 vs. 28.3, $p=0.617$); VAS-LP (26.8 vs. 25.0, $p=0.446$) and patient satisfaction (74% vs. 76%, $p=0.878$).
Conclusions: MCs were not found to be associated with health- related quality of life, disability, back- or leg pain or patient satisfaction two years after discectomy.

Change in Sagittal Alignment after Decompression alone in patients with Lumbar Spinal Stenosis: A prospective cohort study

107.

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Background: Patients with lumbar spinal stenosis present with low back pain, numbness and pain in the legs and gait difficulties due to neurogenic claudication. Patients often walk in a stooped posture to increase the spinal canal diameter by stretching out the ligamentum flavum. This stooped posture leads to a positive sagittal balance. After decompressive surgery, patients may walk in a less stooped manner, improving their sagittal balance, which may lead to less back pain and improved patient reported outcomes.
Purpose / Aim of Study: To determine if sagittal balance will improve in patients with spinal stenosis after decompression alone
Materials and Methods: This study compares pre-operative and 6-month post-operative full-length 36" standing lateral and posterior-anterior x-rays and one year Oswestry Disability Index (ODI), Visual analogue scale (VAS)- leg and back pain, in patients undergoing decompression alone without fusion for central or combined central and lateral stenosis, in patients 60 years and older from March 2016 until September 2017. The following radiographic parameters were measured Coronal Cobb Angle (COBB), Pelvic Incidence (PI), Sagittal Vertical Axis (SVA), Lumbar Lordosis (LL), Pelvic Tilt (PT), Pelvic Incidence-Lumbar Lordosis ratio (PI-LL) and Sacral Slope (SS).
Findings / Results: Forty-five patients (24 males and 21 females) were included. Patients had symptoms for more than 3 months at the time of surgery. Most patients were operated with a bilateral laminectomy over two levels. Sagittal balance showed a statistical significant change in SVA from 65.0mm to 48.6mm (p=0.009) and PI-LL mismatch 7.80 to 4.24 (p= 0.005). A small to moderate association was found between SVA and ODI both preoperatively (r=0.54, p= 0.001) and postoperatively (r=0.51, p= 0.001) and preoperative VAS-leg/back pain (r=0.60, p=0.001)/(r=0.42,p=0.009).
Conclusions: There is a statistically significant improvement in sagittal balance in patients undergoing decompression alone for lumbar spinal stenosis. Associations between the SVA and ODI and VAS- leg/back pain indicate that improvements in sagittal balance contribute to improvements in patient reported outcomes.

Serum Metal Ion Levels in Adolescent Idiopathic Scoliosis (AIS) Patients 25 years after treated with Harrington Rod Instrumentation or Bracing

108.

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Background: Concerns have been raised regarding persistent levels of serum metal ions in patients with spinal instrumentation, there are only a few studies published on the topic
Purpose / Aim of Study: Do patients with Adolescent Idiopathic Scoliosis (AIS) treated with Harrington Rod Instrumentation have higher levels of serum metal ions compared to patients treated with Bracing?
Materials and Methods: AIS patients treated with Boston brace (BB) or posterior spinal fusion with Harrington rod instrumentation (HR) from 1983 to 1990 were requested to return to clinic. One hundred fifty-nine (73%) of 219 patients were available for follow-up of whom 115 agreed to have a blood draw.
Findings / Results: The proportion of patients who agreed to have a blood draw were similar in the BB (48 of 100, 48%) and HR (67 of 112, 60%, p=0.085) groups. None of the surgical patients had their implants removed. Mean age at follow-up (BB: 43.2yrs vs HR: 43.5yrs, p=0.566) and mean length of follow up (BB: 26.5yrs vs HR: 24.5yrs). Mean Chromium serum levels were similar between the BB (2.71nmol/L) and the HR (2.94nmol/L, p=0.827). Mean Cobalt serum levels were also similar between the BB (2.62nmol/L) and the HR (2.75nmol/L, p=0.200).
Conclusions: Serum metal ions were similar in AIS patients treated with bracing or Harrington Rod instrumentation 25 years after initiation of treatment.

Translation and Validation of the Danish Version of the Zurich Claudication Questionnaire

109.

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Background: The Zurich Claudication Questionnaire (ZCQ), also known as the Swiss Spinal Stenosis Measure or the Brigham spinal stenosis questionnaire was developed in 1996 by Gerald Stucki et al. The ZCQ was designed specifically to evaluate physical function and to assess quality of life in patients with LSS. Since its introduction, the ZCQ has become one of the primary outcome measures when reporting on treatment results in patients with spinal stenosis. The ZCQ is a self-administered Patient Reported Outcome Measure (PROM) measuring symptom severity, physical function and patient satisfaction in patients with LSS. The questionnaire has not yet been culturally adapted and translated into Danish.

Purpose / Aim of Study: was to translate and validate the Zurich Claudication Questionnaire ZCQ into a Danish version of the disease specific patient reported outcome measure PROM for patients with Lumbar spinal stenosis LSS, which assesses Symptom severity, Physical function and satisfaction after surgery.

Materials and Methods: Translation into a Danish version of the original questionnaire by back and forward translating the questionnaire and finally transforming a prefinal test version into a final and cross cultural adapted version. Validation was performed as a cohort study assessing floor-ceiling effects, Internal consistency, test-retest reliability, criterion validity, discriminant validity and responsiveness to change.

Findings / Results: Seventy-five patients were consecutively included in the study, fifty-three healthy controls were matched. Floor effect was seen in the postoperative data. Internal consistency, Cronbach alpha was good to excellent. Substantial test-retest reliability was found using Cohen's weighted kappa. The Danish ZCQ showed moderate to strong association with similar domains of ODI, SF-36, EQ-5D, VAS-leg and VAS- back. The questionnaire showed significant responsiveness to change and a significant discriminant validity between LSS patients and healthy controls.

Conclusions: This study shows the Danish translation of the original Zurich claudication questionnaire to be well understood by Danish patients. The Danish version is furthermore a reliable and valid questionnaire, which is responsive to change.

Risk factors and reasons for revision following primary surgery for pediatric spine deformities: A nationwide study with 2-year follow-up

110.

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Background: Revision risk after pediatric spine surgery is not well established but varies among patients with different deformity etiologies.
Purpose / Aim of Study: To report on the two-year revision risk following surgery for primary pediatric spine deformity in a nationwide cohort. Secondarily, to evaluate potential risk factors for revision surgery and describe reasons for revision.
Materials and Methods: All patients ≤ 21 years of age undergoing spine deformity surgery in Denmark in 2006–2015 were identified by procedure and diagnosis code in the Danish National Patient Registry (DNPR). From DNPR, data on revision within two years were retrieved. Patients were categorized in six groups according to etiology. Medical records were reviewed for reason for revision. Identification of risk factors for revision was assessed with multiple logistic regression analyses and included the variables; age, etiology, sex and growing-rod treatment.
Findings / Results: Of 1310 surgically treated pediatric patients, 9 % were revised within 2 years and 1.5 % were revised more than once. Median time to revision was 203 (IQR 35-485) days. Patients were categorized according to etiology; idiopathic scoliosis (53%), congenital/structural scoliosis (9%), neuromuscular scoliosis (23%), syndromic scoliosis (3%), spondylolisthesis (7%) and Scheuermann kyphosis (5%). Independent, significant risk factors for revision were growing rods (OR = 4.4, 95% CI 2.2–8.8) and etiologies of (with idiopathic scoliosis as reference) congenital (OR=2.7, 95% CI 1.3-5.4), neuromuscular (OR = 1.9, 95% CI 1.1–3.2), spondylolisthesis (OR = 3.6, 95% CI 1.9–7.0) and Scheuermann kyphosis (OR = 3.8, 95% CI 1.8–8.2). The most common reason for revision was implant failure (33%) followed by residual deformity and/or curve progression (16%).
Conclusions: In this nationwide study, the two-year revision risk after pediatric spine deformity surgery was 9%. Risk factors for revision were etiology of congenital deformity, neuromuscular deformity, spondylolisthesis, Scheuermann kyphosis and patients with growing rods. The most common reason for revision was implant failure.

Sports Orthopaedics

CARGEL Bioscaffold Improves Cartilage Repair Tissue after Bone Marrow Stimulation in a Minipig Model

111.

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Background: Recently several microfracture enhancement treatments have been developed to improve the cartilage repair after microfracture treatment. One such already clinically used enhancer is the Cargel Bioscaffold (CB) which is based on chitosan.
Purpose / Aim of Study: To gain knowledge of the repair tissue of cartilage repair using bone marrow stimulation combined with CARGEL Bioscaffold compared with bone marrow stimulation (BMS) alone in chondral defects in a validated animal model.
Materials and Methods: Six adult Göttingen minipigs received two chondral defects in each knee. The knees were randomized to BMS combined with CB or BMS alone. The animals were euthanized after 6 months. Follow-up consisted of histomorphometry, immunohistochemistry, semiquantitative scoring of the repair tissue (ICRS II), and µCT of the trabecular bone beneath the defect.
Findings / Results: There was significantly more fibrocartilage (80% vs 64%, $p = 0.04$) and a trend towards less fibrous tissue (15% vs 30%, $p = 0.05$) in the defects treated with CB. Hyaline tissue was only seen in one defect treated with CB and none treated with BMS alone. For histological semiquantitative score (ICRS II), defects treated with CB scored lower on subchondral bone (69 vs. 44, $p = 0.04$). No significant differences were seen on the other parameters of the ICRS II. Collagen type II staining revealed a trend towards more positive staining in the CB group ($p = 0.08$). µCT revealed thicker trabeculae ($p = 0.029$) and a higher bone material density ($p = 0.028$) in defects treated with CB.
Conclusions: Treatment of cartilage injuries with CARGEL Bioscaffold seems to lead to an improved repair tissue and a more pronounced subchondral bone response compared with bone marrow stimulation alone, however the treatment did not lead to formation of hyaline cartilage.

Knee muscle strength in patients undergoing ACL reconstruction using either knee extensor or flexor graft: a systematic review of randomized controlled trials.

112.

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Background: Anterior cruciate ligament reconstruction (ACLR) may lead to persistent muscle strength deficiency for more than one year after ACLR, increasing the risk of developing knee osteoarthritis. Common harvest techniques include the Quadriceps tendon (QT), bone-patellar tendon-bone (BPTP) or Hamstring (HS) tendon. Previous systematic reviews have reported reduced knee extensor and knee flexor strength in the ACLR limb compared to the non-operated limb, depending on graft type. However, several randomized controlled trials (RCT) on the subject have since been published.

Purpose / Aim of Study: The aim was to determine short- and long-term deficits in knee flexor and extensor strength following ACLR using either QT/BPTB or HS graft, at 6, 12, 24 and +48 months, post-surgery.

Materials and Methods: A comprehensive literature search for RCTs comparing muscle strength deficits after QT/BPTP and HS graft after ACLR was performed in MEDLINE, EMBASE and CENTRAL. Risk of bias was assessed using the Cochrane risk-of-bias tool (RoB.2). GRADE guidelines for measuring the overall study quality were applied. Results were pooled using a random effect meta-analysis. PROSPERO Reg. nr: CRD42018068351

Findings / Results: Twenty-six studies, evaluating 1017 and 1050 ACLR patients with the PT/BPTB or HS graft, respectively were included. Studies revealed significant limb-to-limb strength deficits of both the knee flexors and extensors after ACLR. QT/BPTP showed extension deficits of 24% (SE: 5.1) at 6 months post-surgery, resolving over time to 16% (6.7), 9% (5.8) and 9% (5.8) at 12, 24 and +48 months. The corresponding values for flexion deficit were 8% (5.2), 5% (5.3), 5% (5.3) and 5% (5.3). HS showed extension deficits of 15% (5.4) at 6 months post-surgery, resolving to 10% (6.1), 8% (4.4) at 12, 24 and +48 months. The corresponding values for flexion deficits were 16% (5.6), 10% (5.3) and 6% (5.3) at 12, 24 and +48-months, respectively.

Conclusions: The available evidence suggest that lower limb muscular strength deficits persist one year or longer after ACLR. Use of QT/BPTB grafts showed substantially higher knee extensor strength deficits compared to HS grafts in the early post-surgical phase which resolved over time. Thus, the graft types were deemed comparable.

Danish version of the Western Ontario Meniscal Evaluation Tool (WOMET): a cross-cultural adaptation, test-retest reliability and responsiveness study

113.

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Background: The Western Ontario Meniscal Evaluation Tool (WOMET) is a widely used Patient Reported Outcome Measure (PROM) designed to evaluate Health Related Quality of Life (HRQOL) in patients with meniscal injuries.
Purpose / Aim of Study: The purpose of this study was to translate and cross-culturally adapt the WOMET for use in the Danish speaking population and evaluate its test- retest reliability and comparative responsiveness.
Materials and Methods: The WOMET consists of 3 subscales (physical symptoms, sports/recreation/work/lifestyle and emotions) and the total score range from 0-1600 (0=best and 1600=worst). It was forward and backward translated into Danish according to international guidelines. 60 patients (mean age 49 years (range 19-71 years), 57% females) with meniscal injury scheduled for arthroscopy meniscal surgery at Silkeborg Regional Hospital, in the period from September 2017 to February 2018, were included in this study. The WOMET was completed at 3 time points, at baseline, at 3- and 6-months postoperatively. Additionally, test- retest reliability was assessed at 3-months and at 3-months plus one week, in 55 patients with stable symptom state from test to retest assessed with a Global Response Question. Comparative responsiveness was assessed between the WOMET and The Knee injury and Osteoarthritis Outcome Score (KOOS4 – an aggregate score of 4 of the 5 KOOS subscales, excluding the activities of daily living subscale).
Findings / Results: The Danish version of the WOMET was successfully translated and showed good face validity. Test-retest reliability was excellent, with Intra Class Correlation (ICC) of 0.88 (95%CI 0.84- 0.92) for the total score. The Standard Error of Measurement (SEM) was 125 points and the Minimal Detectable Change (MDC) was 347 points (i.e., 7.8% and 21.7% of the total score, respectively. No floor or ceiling effects was observed. The WOMET had good responsiveness with an effect size (ES) of 1.12 at 6 months after surgery, which was comparable to the KOOS4 (ES 1.10).
Conclusions: The Danish version of the WOMET is reliable and responsive for assessing health-related quality of life in patients with meniscal pathology.

Hip kinematics and kinetics in patients with femoroacetabular impingement syndrome before and one year after hip arthroscopic surgery

114.

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Background: Patients with femoroacetabular impingement syndrome (FAIS) experience decreased function. Consequently, earlier studies have evaluated gait biomechanics in these patients, but a larger study evaluating gait biomechanics before and after an intervention standardizing gait speed is lacking.
Purpose / Aim of Study: To investigate gait kinematics and kinetics in patients with FAIS compared with pain-free controls before and one year after surgery. Secondary, we aimed at analyzing gait pattern separately for sex and to investigate associations between peak kinematics and kinetics and the Copenhagen Hip and Groin Outcome Score (HAGOS).
Materials and Methods: Sixty patients with FAIS and 30 pain-free controls were tested at a standardized gait speed (1.40 m/s ±10%). Patients were tested twice: before and one year after surgery. Kinematics and kinetics were recorded using infrared high-speed cameras and a force plate. Participants answered HAGOS.
Findings / Results: The largest difference among groups was that gait differed between males and females. Neither before nor after surgery could we demonstrate large alterations in gait pattern between patients and pain-free controls. Male patients demonstrated associations between peak kinematics and kinetics and HAGOS Sports function.
Conclusions: Gait pattern was only vaguely altered in patients with FAIS compared with pain-free controls before and after surgery when using at standardized gait speed. Hence, analyzing gait in patients with FAIS does not seem of major importance. Nevertheless, there was an association between HAGOS Sports function and peak kinematics and kinetics in male patients implying that there could be a clinical importance.

Intra-day and Inter-day reliability and validity of the Reactive Strength Index derived from unilateral drop jumps measured on the My Jump 2 app and a force platform

115.

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Background: The unilateral drop jump has been proposed as a test for measuring single-limb reactive strength index (RSI), a metric for the ability to rapidly absorb and produce force. RSI is considered important for performance and for guiding rehabilitation in athletes and physically active patients. RSI can be obtained clinically using a simple smartphone app based in video analysis. However, no data exists on the reliability or validity of deriving single- limb RSI from the MyJump2 application.
Purpose / Aim of Study: This study aims to investigate the reliability and validity of MyJump2 compared to a force platform, when measuring
Materials and Methods: Thirty-seven participants (Tegner >5) aged 18-35 years attended two sessions and performed UDJs from three different box heights (15, 20, 25 cm) down onto a force plate in a random order whilst being recorded on a smartphone camera. Minimal detectable change (MDC) was established, and Bland-Alman plots and ICC (intraclass correlation coefficient) scores between instruments were examined for systematic bias.
Findings / Results: Excellent validity was found across all three heights; 15, 20 and 25 cm, respectively (ICC = 0.986, 95%CI:0.976-0.989, p<0.001). However, MyJump2 underestimated the RSI by approximately 0.05 RSI. Inter-rater reliability within MyJump2 showed excellen to near to perfect correlation (ICC = 0.989, 95%CI:0.952- 0.996, p<0.001). Intra-day reliability showed moderate-excellent correlation across all three heights (ICC = 0.810-0.887, p<0.001). Inter-day reliability showed moderate-excellent correlation across all three heights (ICC = 0.805-0.865, p<0.001). Low SB was found between the two instruments. The MDC of the RSI extracted from MyJump2 ranged 0.08-0.18 (10.4-24.25%), with the 25 cm box height having the lowest MDC.
Conclusions: MyJump2 app is valid and reliable compared to a force platform when measuring the RSI of UDJs from different jump heights. The 25 cm box height had the best results indicating that this height would be the best option when testing UDJs. Systematic bias is present between the app and force platform; therefore, practitioners should not compare results across these two instruments.

Adaptation and validation of FASH (Functional Assessment Scale for Acute Hamstring injuries) questionnaire for Danish-speaking football players

116.

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Background: The FASH questionnaire is a valid and reliable patient reported outcome measure (PROM) for evaluating pain and functional status of athletes suffering from an acute hamstring muscle injury (AHI).
Purpose / Aim of Study: The aim was to translate and adapt FASH cross- culturally with validity and reliability testing for Danish-speaking footballers suffering from AHI.
Materials and Methods: Translation and following cross-cultural adaptation was done according to guidelines by Beaton et al. The final Danish version (FASH-DK) accepted by the original authors was tested for reliability and validity on 11 footballers with hamstring injuries and 70 asymptomatic controls.
Findings / Results: Healthy controls and AHI patients had mean FASH- DK scores of 95 (SD 6.1) and 40.5 (SD 17.3) respectively. Validity was demonstrated by a significant difference between AHI patients and healthy controls ($p < 0.001$). Concurrent validity displayed no statistical difference between the original ($p = 0.14$ AHI; $p = 0.88$ healthy) or the German questionnaire ($p = 0.35$ AHI; $p = 0.94$ healthy) and that of the Danish FASH. FASH-DK demonstrated good to excellent test-retest reliability (ICC = 0.93 with a 95% confidence interval 0.84 - 0.97 and a Spearman's rho r = 0.91. Internal consistency was excellent (Ð = 0.97).
Conclusions: FASH-DK is a valid and reliable instrument shown compatible to the original version. It is useful to assess and determine the severity of AHI in Danish footballers, both for researchers and clinicians.

Assessment of maximal and explosive muscle strength during hip adduction squeeze and hip abduction press test: An intra- and inter-tester reliability study using a hand-held dynamometer

117.

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Background: Assessment of hip adduction and abduction isometric peak torque and rate of torque development are important when assessing and monitoring athletes with groin pain. Such measures can be easily obtained using the long- lever hip adduction squeeze test and the bilateral hip abduction press test, both with a handheld dynamometer. However, data is lacking on the intra- and inter-tester reliability.
Purpose / Aim of Study: The purpose was to investigate the intra- and inter-tester reliability of maximal torque exertion and the ability to exert torque rapidly obtained during the hip adduction long lever squeeze test and a bilateral hip abduction press test using a hand-held dynamometer.
Materials and Methods: Forty-nine healthy subjects (39 males, 24 years (SD 4) were included for intra- (n=20) and inter- tester reliability (n=29). Subjects performed the hip adduction long lever squeeze test and the bilateral hip abduction press test in a randomized order. Isometric peak torque and early (0-100 ms) and late (0-200 ms) phase rate of torque development were obtained using a hand-held dynamometer. Relative reliability was assessed for all tests using ICC2,1 two-way mixed model - absolute agreement, thereby taking any bias between testers into account.
Findings / Results: Assessment of peak torque showed good intra- and inter-tester reliability for adduction (ICC: 0.93-0.97) and abduction (ICC: 0.88-0.92). For 0-200 ms rate of torque development, both tests showed good intra-tester reliability (ICC: 0.85- 0.87), whereas intertester reliability was good for hip adduction squeeze (ICC: 0.75) and moderate for hip abduction press (ICC: 0.71). For 0-100 ms rate of torque development, the hip abduction press test showed good intra- tester reliability (ICC: 0.78). Remaining tests for intra- and inter-tester reliability showed moderate reliability (ICC: 0.50-0.71).
Conclusions: Assessment of isometric peak torque in hip adduction squeeze and abduction press test showed good intra- and inter-tester reliability, whereas 0-200 ms rate of torque development demonstrated good intra-tester reliability. Therefore, measures of hip torque development should preferably be conducted by the same tester, while this is less important for measures of isometric peak torque.

Long term outcome of combined bone and cartilage chips transplantation for osteochondral lesions

118.

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Background: Osteochondral injuries have proved difficult to treat. There are several treatments available, but no gold standard treatment exists.
Purpose / Aim of Study: We present long term data on a one-step, combined autologous bone and articular cartilage chips transplantation, Autologous Dual-Tissue Transplantation (ADTT). The aim of this study was to investigate the long- term results using MRI, CT and patient reported outcome of ADTT.
Materials and Methods: Eight patients (age 32 ± 7.5 years) suffering from osteochondritis dissecans in the knee were included. There were no control group. The lesion was debrided and the osteochondral defect was filled with autologous bone, to a level at the base of the adjacent cartilage. Cartilage from the intercondylar notch was chipped using a scalpel and embedded in fibrin glue in the defect. Radiologic evaluation was performed using MRI and CT preoperatively, at 1 and at 6 years, and patient reported outcome scores were used to assess subjective and functional clinical outcome preoperatively and at 1, 2 and 5 years (IKDC, KOOS and Tegner activity score).
Findings / Results: The preoperative IKDC score increased from 35.9 to 68.1, 75.4 and 78.2 after 1, 2 and 5 years ($p<0.01$). The Tegner score improved from 2.5 to 4.7, 5.1 and 5.1 at 1, 2 and 5 years ($p<0.05$). KOOS subscores Sport/rec, and quality of life improved at 1 year and the improvements persisted at 2 and 5 years ($p<0.05$). KOOS pain improved after 5 years ($p<0.01$). Cartilage tissue repair evaluated using MOCART score improved from 22.5 to 52.5 at 1 year ($p<0.01$). There was a slight deterioration at 6 years (not statistically significant). CT imaging demonstrated good subchondral bone healing at 1 year, with an avg defect bone filling of 75%. At 6 years CT showed an improvement in all patients with an average bone filling of 90% and a more even surface than at 1 year.
Conclusions: Treatment of osteochondral defects with ADTT resulted in very good subchondral bone restoration and good cartilage repair. Significant improvements in patient reported outcome was found at 1 year postoperative and the improvements persisted at 2 and 5 years. This study suggests ADTT as a promising, low-cost, treatment for osteochondral injuries.

High revision rate after quadriceps tendon graft use for anterior cruciate ligament reconstruction is associated with surgical activity of clinics. Results from the Danish Knee Ligament Reconstruction Registry

119.

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Background: Quadriceps tendon (QT) has recently gained increase interest as ACL reconstruction (ACLR) graft due to introduction of minimal invasive harvesting techniques and low donor site morbidity. Recent Danish registry data have demonstrated surprizing higher revision rate of 4.7 % for QT graft compared to hamstring (HT) and patella tendon (PT) graft. The influence of individual department/clinic routine for the procedure could be an important factor for revision outcome.
Purpose / Aim of Study: The purpose of the present study is to use the Danish Knee Ligament Reconstruction Registry (DKRR) to compare revision rates in patients who have undergone ACLR with QT, HT, and PT as graft for ACLR related to individual clinic surgical activity. It was hypothesized that low clinic volume of the new QT grafts would result in higher revision rates compared to high volume clinics.
Materials and Methods: Data on primary ACLRs in the DKRR from 2012 through 2019 were analyzed since QT graft usage started in 2012. Revision rates for QT, HT, and PT grafts were compared according to clinic activity (0-100 procedures) and (> 100 procedures). Revisions rates for the three autograft cohorts are presented as well as adjusted revision hazard rates.
Findings / Results: QT revision rate for low activity clinics (0- 100 procedures) was 5.1 % which was significantly higher than a rate of 2.0 % for high activity clinics. (p = 0.003) Adjusted revision hazard rate for low 0-100 group was 2.0 (P=0.01). HT revision rate for clinics (0-100 procedures) was 1.9 % and 2.3 % for > 100 procedure clinics. (ns). PT revision rate for low activity clinics (0-100 procedures) was 3.2 % and 2.2 % for high activity clinics. (ns).
Conclusions: Quadriceps tendon autografts for ACLR was associated with higher revision rates in clinics with lower than 100 procedures performed from 2012-2019. Learning curve and surgical routine appears to account for the previously demonstrated high revision rate for QT graft ACLR in Denmark compared to HT and PT grafts.

Translated and locally adapted versions of PROMs are often of questionable quality and there are many undocumented versions

120.

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Background: If a good PROM exists in one language, it is convenient to translate this PROM instead of developing a new one in another language. However, translation may alter the meaning of items and thereby the psychometric properties of the PROM. Hence, translation has to be structured in order to achieve proper adaptation to a new culture.
Purpose / Aim of Study: The aims were to assess how the most commonly used PROMs in sports research had been translated, culturally adapted and validated, including assessment of differential item functioning (DIF) locally and between versions.
Materials and Methods: For 392 translated versions of 61 different PROMs identified by search in PubMed and SCOPUS, the methods for translation, cultural adaption and construct validation were assessed. Information about translated versions were obtained from the homepages of commonly used PROMs and compared to the translations that could be identified in literature.
Findings / Results: 94% of all translations had been performed with forward-backwards technique, but only 49% used cognitive interviews to ensure appropriate wording, understandability, and adaption to the local culture with patients and laypersons. Only 2% of the translated versions were validated according to modern test theory models, and no study assessed differential item functioning (DIF) for the local PROM or cross-cultural DIF. For PROMs that were not developed in English language, it was common that translations to other languages were based on undocumented English versions. Many translated versions of commonly used PROMs were undocumented.
Conclusions: A majority of translated PROMs are of questionable quality, despite the common conclusion that the actual PROM is a valid and reliable measurement tool.

Sterno-clavicular arthroscopy is a safe and effective procedure – experience with 67 cases

121.

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Background: Advantages of arthroscopy of the sternoclavicular joint (SCJ) is a better visualization and lower surgical morbidity. However, there are only few, small treatment series reported in literature.
Purpose / Aim of Study: To report a prospective, consecutive series of SCJ-arthroscopies.
Materials and Methods: In 67 patients with pain from the SCJ we found indication for the procedure. All cases were unilateral, and we used the same arthroscopic technique in all (published earlier). Patients completed DASH and Oxford Shoulder Score (OSS) before the operation and at 1, 2 and 5 years. Complications and reoperations were recorded.
Findings / Results: In twelve of the 67 cases it was not possible to insert the scope to the joint: two joints turned out to be anchylotic, in one case the subcutaneous fat was extensive making portal positioning unsafe, and in nine osteophytes blocked for the scope. These cases were converted to open surgery. In two cases open resection of osteophytes at the costoclavicular ligament was added to arthroscopy of the joint. In the majority the degenerated or torn disc was resected, and cartilage was debrieded/medial clavicle end resected. In two cases the disc was sutured and in three loose bodies were removed. There were no infections, no per- or post-operative bleedings and no case of penetration of the posterior capsule. Two cases needed re-arthroscopy with further resection of the clavicle. In one case instability occurred after resection of osteophytes and was treated with a stabilizing procedure. In one case an interposition plasty with a gracilis tendon was performed for persisting pain despite resection of the medial clavicle end. DASH score decreased from median 54 (range 30-94) preoperatively, to 37.5 (24-108)($p<0.05$) at 1 year and 36 (24-102) at 2 years follow-up. Worst pain item from OSS decreased from mean 2,6 preoperatively to 1,9 at 1 year ($p<0.05$) and 1,7 at 2 years. Usual pain-item decreased from 2,2 preoperatively to 1,4 at 1 year ($p < 0.05$) and 1,1 at 2 years. Pain at night decreased from 2,4 preoperatively to 1,3 at 1 year ($p<0,05$) and 1,4 at 2 years.
Conclusions: SCJ arthroscopy was safe and the clinical results were comparable to or better than reported results of similar open procedures.

Satisfying validity of four out of six diagnosis codes for sports related injuries concerning the Achilles tendon and the knee. A validation study from the Danish National Patient Register.

122.

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Background: The diagnosis codes for sports injuries in the Danish National Patient Register (DNPR) are frequently used for research, however the validity is unknown.
Purpose / Aim of Study: The aim was to investigate the validity of diagnosis codes for some of the most common sports related injuries: acute Achilles tendon rupture (DS86.0A), Achilles tendinitis (DM76.6), rupture of anterior cruciate ligament of the knee (ACL) (DS83.5E), dislocation of the patella (DS83.0), traumatic tear of the meniscus (DS83.2) and degenerative meniscal lesion (DM23.2).
Materials and Methods: The study was performed as a registry study in the DNPR. For each diagnosis code, patient records from Copenhagen University Hospital Hvidovre were retrieved from January 1st to December 31st 2017. We considered a positive predictive value (PPV) of 80% or higher to be satisfying.
Findings / Results: The population consisted of 85 patients registered with the diagnosis code for acute Achilles tendon rupture, 65 patients with Achilles tendinitis, 73 patients with ACL rupture , 100 patients with dislocation of the patella , 100 patients with traumatic tear of the meniscus, and 100 patients with degenerative meniscal lesion. For acute Achilles tendon rupture the PPV was 98% (95% CI: 92%-100%), for Achilles tendinitis 85% (95% CI: 74%-92%), for ACL rupture 96% (95% CI: 88%-99%) and for dislocation of the patella 96% (95% CI: 90%-99%). Depending on the definition of the diagnoses, the PPVs were 56%-72% for traumatic tear of the meniscus and 53%-77% for degenerative meniscal lesion.
Conclusions: This study documented a satisfying validity allowing for epidemiological research concerning the diagnosis codes for acute Achilles tendon rupture, Achilles tendinitis, ACL rupture and dislocation of the patella. The diagnosis codes for traumatic tear of the meniscus and degenerative meniscal lesion showed a lower validity and should therefore be used with caution.

Rehabilitation with blood flow restriction resistance exercise in patients with early weight bearing restrictions after knee surgery: A feasibility study

123.

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Background: In musculoskeletal rehabilitation, blood flow restriction (BFR) resistance exercise is potentially indicated in patients who may not load tissues as required for "classic" heavy resistance exercise.
Purpose / Aim of Study: The purpose of this study was to explore the feasibility of rehabilitation with BFR resistance exercise in patients with early weight bearing restrictions after knee meniscus or cartilage repair.
Materials and Methods: In total, 42 patients with meniscus (n=21) or cartilage repair (n=21) attended 9 weeks of supervised rehabilitation with BFR resistance exercise at an outpatient rehabilitation center (5 sessions/week). Clinical outcomes were assessed at different time points from 2 to 26 weeks postoperatively and included: Thigh circumference (muscle size proxy), isometric knee-extension strength, knee joint and thigh pain, knee joint range of motion and effusion, perceived exertion, self- reported disability and quality of life, and adverse events.
Findings / Results: On average, patients performed 48 BFR sessions (35 home, 13 supervised). 38 patients reported 64 harms (dizziness, n=52) - none considered serious. Thigh circumference increased 0.6 cm (SD=1.5) from baseline to end of the rehabilitation program for the operated leg from 52.8 to 53.3 cm (p=0.01), and 0.1 cm (SD=1.1) for the healthy leg from 54.9 to 55.0 cm (p=0.41). At 26 weeks postoperatively, isometric knee-extension strength (limb symmetry index) was 83% (SD=25).
Conclusions: Rehabilitation with BFR resistance exercise initiated early after meniscus or cartilage repair seems feasible and may increase thigh muscle mass during a period of weight bearing restrictions. Harms were reported, but no serious adverse events were found. Trial registration: NCT03371901

Infection

The effect of sole gentamicin loaded bio-composite treatment following limited or extensive debridement of osteomyelitis lesions in a porcine model

124.

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Background: CERAMENTTM|G is an absorbable gentamicin loaded bio-composite, trusted by several clinical studies as an on-site vehicle of antibiotics for the treatment of chronic osteomyelitis.
Purpose / Aim of Study: We aimed to assess the sole effect of CERAMENTTM|G, i.e. without additional systemic antibiotic therapy, in relation to a limited or extensive debridement of osteomyelitis lesions in a porcine model.
Materials and Methods: Osteomyelitis was induced in nine pigs by inoculation of 104 CFU of Staphylococcus aureus into a drill hole in the left tibia. After one week, the pigs were allocated into three groups. Group A (n=3) received no treatment during the study period (19 days). Group B (n=3) and C (n=3) received limited or extensive debridement 7 days post inoculation, respectively, followed by injection of CERAMENTTM|G into the bone voids. The pigs were euthanized 10 (Group C) and 12 (Group B) days after the intervention.
Findings / Results: All animals demonstrated confirmatory signs of bone infection post-mortem. The estimated amount of inflammation was substantially greater in Groups A and B compared to Group C. In both Groups B and C, peptide nucleic acid fluorescence in situ hybridization (PNA FISH) of CERAMENTTM|G and surrounding bone tissue revealed bacteria embedded in an opaque matrix, i.e. within biofilm. In addition, in Group C, the peak post-mortem gentamicin concentrations in CERAMENTTM|G and surrounding bone tissue samples were 16.6 µg/mL and 6.2 µg/mL, respectively.
Conclusions: CERAMENTTM|G may not be used as a standalone alternative to extensive debridement or be used without the addition of systemic antibiotics.

Timing of Antimicrobial Prophylaxis and Tourniquet inflation - A Randomized Controlled Microdialysis Study

125.

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Background: Tourniquet is widely used in extremity surgery. In order to prevent surgical site infection, correct timing of antimicrobial prophylaxis and tourniquet inflation is important.
Purpose / Aim of Study: We aimed to evaluate the time for which the free drug concentration of cefuroxime is maintained above the minimal inhibitory concentration (T>MIC) in subcutaneous tissue and calcaneal cancellous bone during three clinically relevant tourniquet application scenarios.
Materials and Methods: Twenty-four female pigs were included. Microdialysis catheters were placed for sampling of cefuroxime concentrations bilaterally in calcaneal cancellous bone and subcutaneous tissue, and a tourniquet cuff was applied on a randomly picked leg of each pig. Subsequently, the pigs were randomized into three groups to receive 1.5 g of cefuroxime by intravenous injection 15 min prior to tourniquet inflation (Group A), 45 min prior to tourniquet inflation (Group B), and at the tourniquet release (Group C). The tourniquet duration was 90 min in all groups. Dialysates and venous blood samples were collected eight-hours postcefuroxime administration.
Findings / Results: Cefuroxime concentrations were maintained above the clinical breakpoint MIC for Staphylococcus aureus (4 µg/mL) in calcaneal cancellous bone and subcutaneous tissue throughout the 90 min tourniquet duration in Group A and B. Cefuroxime administration at tourniquet release (Group C) resulted in concentrations above 4 µg/mL for a minimum of 3.5 hours in the tissues on the tourniquet side. There were no significant differences in the T>MIC (4 µg/mL) in subcutaneous tissue or calcaneal cancellous bone between the three groups. However, Group A tended toward shorter T>MIC in tourniquet calcaneal cancellous bone compared with Group C (p=0.08).
Conclusions: Administration of cefuroxime (1.5 g) in the 15-45 min window prior to tourniquet inflation resulted in sufficient calcaneal cancellous bone and subcutaneous tissue concentrations throughout the 90 min tourniquet application. If the target is to maintain postoperative cefuroxime concentrations above relevant MIC values, our results suggest that a second dose of cefuroxime should be administered at tourniquet release.

Vancomycin bone and tissue concentrations following tibial intraosseous administration – evaluated in a porcine model

126.

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Background: Systemically administered vancomycin may provide insufficient target-site concentrations. Intraosseous vancomycin administration has the potential to overcome this concern by providing high target-site concentrations.
Purpose / Aim of Study: To evaluate the local bone and tissue concentrations following tibial intraosseous vancomycin administration in a porcine model.
Materials and Methods: Eight female pigs were assigned to receive 500 mg diluted vancomycin (50 mg/mL) through an intraosseous cannula into the proximal tibial cancellous bone. Microdialysis was applied for sampling of vancomycin concentrations in tibial cancellous bone adjacent to the intraosseous cannula, in cortical bone, in the intramedullary canal of the diaphysis, in the synovial fluid of the knee joint, and in the subcutaneous tissue. Plasma samples were obtained. Samples were collected for 12 hours.
Findings / Results: High vancomycin concentrations were found in the tibial cancellous bone with a mean peak drug concentration of 1,236 (range 28-5,295) µg/mL, which remained high throughout the sampling period with a mean end concentration of 278 (range 2.7- 1,362.7) µg/mL after 690 min. The mean (standard derivation (SD)) peak drug concentration in plasma was 19 (2) µg/mL, which was obtained immediately after administration. For the intramedullary canal, in the synovial fluid of the knee joint, and subcutaneous tissue, comparable mean peak drug concentration and mean time to peak drug concentration were found in the range of 7.5-8.2 µg/mL and 45-70 min, respectively.
Conclusions: Tibial intraosseous administration of vancomycin provided high mean concentrations in tibial cancellous bone throughout a 12-hour period, but with an immediate and high systemic absorption. The concentrations in cancellous bone had an unpredictable and wide range of peak concentration. Low mean concentrations were found in all the remaining compartments. Our findings suggest that intraosseous vancomycin administration in proximal tibial cancellous bone only is relevant as treatment in cases requiring high local concentrations nearby the intraosseous cannula.

Treatment of diabetic foot ulcers with inforatio technique to promote wound healing: a feasibility trial.

127.

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Background: Chronic foot ulcers have extensive consequences for diabetic patients' quality of life and increases risks of amputation and death.
Purpose / Aim of Study: The aim of this trial was to assess the feasibility of conducting a larger clinical trial to evaluate the clinical effect of inforatio technique on healing of diabetic foot ulcers.
Materials and Methods: Inforatio technique is a newly developed procedure where small punch biopsies are taken from the wound bed to promote healing. This study was a feasibility trial conducted at an outpatient wound care clinic at Zealand University Hospital. 12 diabetic patients with foot ulcers were included. During a 90-day follow-up, participants visited the clinic five times and received inforatio technique once to twice. Photographs of the ulcers were taken at each trial visit and wound area was measured by digital wound planimetry. If participants attended the outpatient clinic after follow-up, ulcers were observed for complete healing until 140 days from baseline. Feasibility was assessed with regard to recruitment; acceptability; burden; benefits; protocol adherence; and harmful effects.
Findings / Results: During follow-up; four ulcers had complete healing (33%, 95%CI: [10-65]); five ulcers had a reduction in wound area; and three ulcers had an increase in area. Ten of the participants attended the outpatient clinic after follow-up and six of them had complete healing of their ulcer within 140 days from baseline. The recruitment rate was one patient per 8th day, and the retention rate was 100%. All participants reported a positive experience of participation. There were no patient-reported or observed harmful effects.
Conclusions: No harmful effects were reported, and patient acceptability and participant adherence was promising. Thus, a larger clinical trial for evaluating the clinical effect of inforatio technique is considered feasible to conduct. Results for complete healing witnin 140 days was promising compared to proportions of healing reported in the literature for diabetic foot ulcers treated with standard wound care. If inforatio technique has the expected prositive effect on healing of diabetic foot ulcers, it may benefit patients worldwide.

Trauma

Hospital and municipality related variation in one-year mortality after hip-fracture: a cross-classified multilevel analysis in Sweden

128.

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Background: Mortality is a widely used outcome measure when comparing hospital care performance. However, the traditional approach does not explicitly consider scenarios like in hip fracture care, where patients are referred to further care in the municipality after just a few days of hospitalization.
Purpose / Aim of Study: We aimed to estimate both case-mix adjusted hospital and municipality comparisons in order to disentangle the amount of the total patient variation in 1-year mortality that was attributable to the hospital and municipality level, respectively.
Materials and Methods: We determined 1-year mortality risk in patients aged 65 or above with hip fractures registered in Sweden between 2011 and 2014. We performed cross-classified multilevel analysis with 54,999 patients nested within 54 hospitals and 290 municipalities. We adjusted for individual demographic, socioeconomic and clinical characteristics. To quantify the size of the hospital and municipality variation we calculated the variance partition coefficient (VPC) and the area under the receiver operator characteristic curve (AUC).
Findings / Results: The overall 1-year mortality rate was 25.1%. The case-mix adjusted rates varied from 21.7 % to 26.5 % for the 54 hospitals, and from 18.9 % to 29.5 % for the 290 municipalities. The VPC was just 0.2% for the hospital and just 0.1 % for the municipality level. Patient sociodemographic and clinical characteristics were strong predictors of 1-year mortality (AUC = 0.716), but adding the hospital and municipality levels in the cross-classified model only had a minor influence (AUC= 0.718).
Conclusions: Overall in Sweden, one-year mortality after hip-fracture is rather high. However, only a minor part of the patient variation is explained by the hospital and municipality levels. Therefore, special efforts to reduce mortality after hip fracture should be focused on vulnerable patient groups of hip fracture patients wherever they are rather than directed to specific hospitals or municipalities.

The incidence of hip fractures, amongst elderly aged 70+, continues to decrease.

129.

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Background: Hip fracture patients constitutes one of the largest groups of patients in most of the orthopedic departments, and represents a substantial burden to the health system. It is therefore of interest to study the development of the number of fractures, and the incidence rates. From studies conducted in our department we know, that the annual number of fractures on Funen in the 70'ties was approximately 500 a year and the incidence rates were increasing. Around the millennium, the number was approximately 800 a year and the rates were decreasing. We have found it of interest to follow up on the above mentioned studies.
Purpose / Aim of Study: To compare the incidence rates of hip fractures on Funen from the periods 2000-2003 and 2017-2019 for patients aged 70+, and see if there has been a significant change.
Materials and Methods: Data from the first period are from a study conducted in our department by Nymark et al. Data from the second period are calculated from our local Register, where all patients from Funen (except from the municipalities of Ærø and Middelfart fractures) are included.
Findings / Results: For men aged 70+ the incidence rates for the two periods were 0,83 (C.I. 0,72-0,95) and 0,56 (C.I. 0,48-0,65) and for women aged 70+ 1,86 (C.I. 1,72- 2,01) and 1,01 (C.I. 0,91-1,11) in both cases a significant reduction of 32% and 46%. If the data are split into four age groups 70-79 80-84 85-90 and 90+the same tendency is seen. The age- and sex specific rates have decreased between 18,6 and 54,9% in the 8 groups. The number of patients in the period 2017-19 was 519, 568 and 515 and corrected for inhabitants in the two excluded municipalities: 570, 631 and 572.
Conclusions: The age- and sex specifik incidence rates for hip fractures have fallen significantly from the period 2000-2003 to 2017-2019 in all age groups older than 70. The patient group is still a large group, but the absolute number of fractures has decreased as well, which means that the expected rise, due to an increasing elderly population, has not been seen. It seems as if the general health among the elderly population has improved, and therefore compensated for the forecasted rise in the number of hip fractures.

Positive local effects of a national and local interdisciplinary, team-based quality improvement process (LKT), regarding patients with Hip Fractures aged 65+, treated surgically.

130.

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Background: Since 2018 a local interdisciplinary learning and quality team has been working with quality improvements for this patient group. The aim was to comply with the national objectives to reduce the average 30-day and 1 year mortality rate from 10% to 8% and from 28% to 25%, and no department should exceed 9% and 28% respectively. Improvement has focused on rapid preoperative optimization (<4h), early surgery (<24h) and rapid mobilization (<24h after surgery). The LKT tasks were: to review and revise our structured clinical pathway program, to recommend and implement relevant changes into daily practice and to apply data driven quality improvement principles, based on process- and result indicators.
Purpose / Aim of Study: To evaluate the changes in the quality of treatment in the period with a LKT.
Materials and Methods: Data related to patients treated in the dept. in 2017-2020 (until march 22. 2020)(n=1.657 (590, 636, 580, 151 in the 4 years)). We saw no changes in median age or sex and fracture type distribution in the period. We collected data as required to the national hip fracture register, with local supplements. Mantel- Haenzel Chi2 test for linear trends was applied to examine periodical trends.
Findings / Results: Over the years we saw a decline in both the 30 day- and the 1 year mortality rate (%): 30 days: 9.3 8.3 7.9 and 7.9 (Chi2 = 2.74, p<0.098 n.s.) and 1 year: 26.8 24.2 and 24.8 (Chi2 = 0.82, p<0.365 n.s.). The orthopedic specialist approved surgical indication within 4 hours after admission for 61.5 65.3 72.2 and 75.5 % - an increased non significant trend (Chi2 = 4.69, p<0.030 n.s.) (median: 2.2 1.9 2.1 1.9 h.). 61.5 65.3 72.2 and 87.4 % were operated within 24 hours, an increased significant trend (Chi2 = 4.69, p<10-6)(median: 22.0 21.8 20.0 16.8 h). Mobilization was attained for 78.9 71.7 71.0 and 71.2 % within 24 hours after the operation, a significant negative trend (Chi2 = 8.2, p=0.004) (median: 20.9 21.2 20.9 and 20.2 h).
Conclusions: Most of the process indicators moved in the desired direction and the goals related to mortality was reached. We conclude that the effort of the LKT has had a positive effect, and we will continue the process, to further improve the treatment based on daily data driven management.

Surgical delay in NOAC treated hip fracture patients

131.

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Background: Surgery for hip fracture in patients treated with new oral anticoagulant (NOAC) is often delayed due to the presumed increased risk of bleeding and mortality. In contrast, surgical delay is associated with an increased mortality in non-NOAC patients.
Purpose / Aim of Study: To assess the association of surgical delay with readmission and mortality in hip fracture patients above 65 years with NOAC treatment.
Materials and Methods: This is a register study from 3 regions during 01.01.2011-31.12.2017. All hip fracture patients with a dispensing for NOAC within 230 days before surgery were included. Primary exposure was surgical delay +/- 36 hours, secondary exposures were delays of <12 hours, 12 to <24 hours, 24 to <36 hours, 36 to <48, and 48 to <72 hours. Transfusion was defined as red blood cell transfusion within 7 days of surgery and readmission as any within 30 days of discharge. We performed Cox regression to estimate adjusted Hazard Ratios (aHR) with 95% confidence intervals adjusting for age, sex, BMI, comorbidity, marital status, type of fracture, type of surgery, year of surgery, region of residence, cohabiting status, and prior medication.
Findings / Results: A total of 911 hip fracture patients in NOAC treatment were identified. There were 63% females and 71% were older than 80 years old. There were 61% patients with a surgical delay less than 36 hours yielding an aHR for transfusion of 0.98 (0.79-1.22), for 30-day mortality 1.39 (0.88-2.17), for 1-year mortality of 1.06 (0.78-1.43), and for any readmission of 1.35 (0.99-1.83) compared to patients operated later than 36 hours. We observed no difference concerning transfusion, 30-day mortality, and 1-year mortality when comparing patients operated with delay of <12 hours, 12 to <24 hours, 24 to <36 hours, and 36 to <48 hours to patients operated between 48 to <72 hours. There is some indication that early surgery <24 hours is associated with increased risk of any readmission.
Conclusions: Surgical delay in NOAC treated patients was not associated with transfusion, 30-day or 1-year mortality. There was an indication of an associated higher risk of readmission with early surgery which could be due a proportion of +90 years patients.

Introducing the "hip call" to facilitate early surgical treatment of patients with hip fractures: A feasibility study

132.

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Background: Surgical treatment of hip fractures within 24-48 hours decreases morbidity and mortality, but goals for early surgery have not been widely achieved so far.
Purpose / Aim of Study: The primary aim of this study was to investigate the feasibility of implementation of a hip call, and the secondary aim was to investigate the effect of the hip call on time for preoperative preparation and surgery compared to a historical control cohort.
Materials and Methods: From March 4, 2019 until June 30, 2019, admission of patients at Copenhagen University Hospital, Bispebjerg, Denmark with a suspected hip fracture triggered an acute hip call. Key personnel are summoned to secure rapid preoperative preparation and surgery. The implementation was defined feasible, if ≥75% of the patients were ready for surgery within four hours and had surgery initiated within 24 hours of hospital arrival. The historical control cohort was patients with hip fractures in the same period in 2018.
Findings / Results: 128 patients were included in 2019, and 99 in 2018. After vs. before hip call, 88% vs. 51% were operated within 24 hours and 96% vs. 79% within 36 hours. Time from admission to surgery (hh:mm) was reduced: Mean difference 10:33 (CI 07:46 – 13:20), $p<0.001$.
Conclusions: The implementation of a hip call was feasible with 88% of patients with hip fracture being operated within 24 hours, and time for preoperative preparation and surgery was reduced compared with a historical control cohort. Future large-scale studies should clarify potential benefits on clinical outcome.

Association of CHA2DS2-VASc Score with Stroke, Thromboembolism and Death in Hip Fracture Patients: A Nationwide Cohort Study.

133.

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Background: Patients undergoing hip fracture surgery have an increased risk of stroke, compared to the general population. The CHA2DS2-VASc score has been widely used to assess stroke risk in patients with atrial fibrillation (AF) and could also be used to assess risk of cardiovascular events in hip fracture patients without AF.
Purpose / Aim of Study: Evaluate the association of CHA2DS2-VASc score and stroke, thromboembolism and all-cause mortality in hip fracture patients with or without AF.
Materials and Methods: All incident hip fracture patients in Denmark age 65 years and older with surgical repair procedures between 2004 and 2016 were identified using the Danish Multidisciplinary Hip Fracture Registry. Outcomes were ischemic stroke, all thromboembolisms (stroke, myocardial infarction, peripheral arterial embolism or pulmonary embolism), or death. We calculated cumulative incidences and hazard ratios (HR) with 95% confidence intervals, by CHA2DS2-VASc score, stratified on previous history of AF.
Findings / Results: Among 78,096 hip fracture patients, 12,319 (15.8%) had a diagnosis of AF. Only 31 % of patients in the AF- group were treated with anticoagulants at the time of admission. The cumulative incidence of ischemic stroke 1 year after hip fracture increased with ascending CHA2DS2-VASc score, being 1.9% for patients with a score of 1 and 8.6% for patients with a score of >5 in the AF group. Corresponding incidences in the non-AF group were 1.6% and 7.6%. Compared with a CHA2DS2-VASc score of 1, adjusted HRs were 5.53 (95% CI: 1.37- 22.24) among AF patients and 4.91 (95% CI: 3.40-7.10) among non-AF patients with a score of >5. All-cause mortality risks and HRs were substantially higher for all CHA2DS2-VASc scores above 1 in both the AF and non-AF groups.
Conclusions: Among hip fracture patients, CHA2DS2-VASc score was associated with risk of stroke, thromboembolism and death in patients with and without AF. Patients with high CHA2DS2-VASc scores had almost similar absolute risks for cardiovascular outcomes, irrespective of AF. Less than one third of the patients diagnosed with AF were treated with anticoagulants, indicating a very conservative treatment approach in these high-risk patients.

Patient-reported outcome 12 months following lateral tibial plateau fractures are not associated to MRI verified soft tissue injuries - a 12 months prospective cohort study of 56 patients

134.

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Background: Soft tissue injuries following lateral tibial plateau fracture affect more than half of patients. Regardless of the type of soft tissue injured, it is still unclear how different treatment strategies influence postoperative outcome.
Purpose / Aim of Study: The aim of this study was to report the 12 months Knee Injury and Osteoarthritis Outcome Score (KOOS5) of patient with surgical managed lateral tibial plateau fractures divided into groups with and without conservatively managed MRI verified soft tissue injuries.
Materials and Methods: Prospective cohort study. Patients treated surgically following a lateral tibial plateau fracture, (AO-41B) between December 2013 and November 2016 were included. Soft tissue injuries were evaluated with preoperative MRI scans. The primary outcome score was the 12 months KOOS5 score divided into groups with and without soft tissue injuries.
Findings / Results: A total of 56 patients were included. Average patient age was 56 years (range 22-86). Thirty-three patients (59%) were female. 50% of patients presented with MRI verified soft tissue injuries. At 12 months postoperatively the mean KOOS5 score for patients with soft tissue injuries was 53.5 (95%CI: 44.8-62.1) and the KOOS5 score for patients without soft tissue injuries was 59.6 (95%CI: 50.7-68.6). No significant difference in the KOOS5 score between patients with and without soft tissue injuries was observed (P=0.31)
Conclusions: Patient-reported outcome 12 months following lateral tibial plateau fractures is not associated to MRI verified soft tissue injuries. More research is needed to investigate the effects of surgical vs. non- surgical treatment strategies of associated soft tissue injuries following lateral tibial plateau fractures.

Effects of lockdown during Covid-19 on the number of Emergency Room visits in Odense University Hospital

135.

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Background: Due to the Covid-19 situation in early 2020 several governmental restrictions were imposed on population contacts, transportation, leisure, cultural events etc. Since it is well known that injuries vary with activity, behaviour and circumstances, the restrictions constituted a "natural experiment" which could affect injury occurrence.
Purpose / Aim of Study: To describe the effect of the Covid-19 lockdown on volume, composition, causal pattern and severity of acute injuries treated at an Emergency Department.
Materials and Methods: All first time injury contacts to the emergency department at OUH during two identical 56 day periods (same number of week- and weekend days) in 2019 (Febr. 14th to April 10th) and 2020 (February 13th to April 8th) were included. Two 28 day periods (Split pre/post: 12th of March 2019, 13th of March 2020) gave four periods (2019:p1+p2, 2020: p3+p4), where p4 is after the lockdown. Binary indicators included were: sex, child (age < 15), elderly (age>74), severity (Any "fracture – excl. nose+finger+toe/amputation/nerve lesion"), type: traffic, work, home-work (=private repair and garden work) and area: garden, schools+sports, bar (bars+restaurant+disco). To verify similarity of the before periods, P1 and p3 were compared , and the lockdown effect was analyzed as (p2 vs p4) and (p3 vs p4) by counts, Chi2 tests and Odds Ratios (OR,[95% CI]).
Findings / Results: A slightly larger percentage of traffic injuries (11 vs 8%) was seen in p1 vs p3 (all other indicators: p>0.10). Total number of visits in the four periods (n,avg/day): (2194,78.4), (2442,87.2), (2333,83.3) and (1357,48.5). Highly significant lower n in p4 (p<10-5). Comparison of p3/p4: No difference in sex, child, severity or work. Significant (p<10-3): higher proportion of elderly (OR=1.42,[1.16-1.74]), home-work (OR=2.6,[1.97-3.44]), garden (OR=3.9,(3.1-4.9). Less traffic injuries (OR=0.60,[0.47-0-77]), schools+sports area (OR=0.10,[0.07-0.13]), bars+restaurants (p3:n=60, p4:n=2) (OR=0.06,[0.01-0.23]). The same results were seen for comparison of p2/p4.
Conclusions: The number of injuries treated was about half during the Covid-19 lockdown period. Major changes in the injury composition was observed compared to the same period in 2019 as earlier in 2020.

136.

Clinical and radiological results treating patients with patella fractures using a novel non-metallic fixation method, the "KnotMe" technique: a prospective case series of 24 patients

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Background: Patella fractures requiring surgery are traditionally treated using metallic implants which are associated with high re-operations rates mainly due to implant prominence. Non- metallic fixation methods could be a solution to this problem.
Purpose / Aim of Study: To report results on adults with a patella fracture treated with a new non-metallic fixation method, the "KnotMe" technique.
Materials and Methods: From 1st of November 2018 all adult patients with a patella fracture requiring surgery was treated with the novel "KnotMe" technique. Prior to surgery all were informed of this experimental technique and the possibility to be treated with the standard metallic tension band technique. 24 patients were enrolled consecutively by the end of august 2019 with no patients declining the "KnotMe" treatment. We had no exclusion criteria regarding high age, fracture type, or functional level. 2 surgeons performed the surgery. The standardized postoperative regimen comprised partial knee immobilization for 4 weeks. Follow-up was done at 2 and 4 weeks and 3 and 6 months post-surgery.
Findings / Results: No patients were lost to follow-up. 15 of 24 were females, median age of 59 years (19-81 years), and 8 open fractures. Fractures were simple 2-part in 5 cases and comminuted in 19 cases. In one case additional k-wires were needed for stability due to severe comminution. At 6 months the median knee ROM was 125 degrees (90-150), median pain VAS at rest was 0,3 (0-2), median pain VAS at activity was 1,2 (0-5). Data on VAS were missing on two patients. All but 1 united radiologically. 7 patients had unexpected events (1 with asymptomatic non-union needing no further intervention, 2 with superficial wound infections treated successfully with oral antibiotics, 1 with prominent knots requiring implant removal, 2 with inflammation of the quadriceps tendon requiring corticoid injections and prolonged rehabilitation, 1 with deep venous thrombosis requiring oral antithrombotic medication).
Conclusions: The "KnotMe" technique seems to be a safe alternative fixation method for all types of patella fractures with a potential to significantly reduce the problem of prominent implants.

Validity of the Danish Fracture Database: Preliminary results from the Region of Southern Denmark

137.

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Background: The Danish Fracture Database (DFDB) has delivered data for numerous studies and currently there are more than 75,000 fracture- related surgical procedures registered. However, the validity of the data is only known for two hospitals.
Purpose / Aim of Study: To determine validity of the Danish Fracture Database.
Materials and Methods: All patients in the Region of Southern Denmark registered with a primary or planned secondary procedure in the DFDB in 2016 were included. For validity, patient medical records were assessed using a sample of 10% of the study population. The sample was randomly selected and stratified according to anatomical region and treating hospital. Validity was calculated as positive predictive value (PPV) and negative predictive value (NPV) for dichotomous variables. For non-dichotomous variables validity was calculated as the percentage of conformity between the DFDB and patient medical records. Key variables were identified as date of surgery, operated side, and type of surgery. For type of surgery, validity was defined as the presence of the correct type of surgery in DFDB, regardless of other types of surgery registered. Observations that were unavailable in patient medical records or containing missing values were excluded.
Findings / Results: The sample population consisted of 429 patients. The mean age was 55 years (3-98 years) and 43.1% were male. Conformity for key variables was 96% for date of surgery, 97% for operated side of the patient, and 98% for type of surgery. Dichotomous variables had a PPV ranging from 81% to 100% with trauma status at 81% and pathological fracture at 100% (n=1). NPV ranged from 89.5% to 100% with antibiotic prophylaxis at 89.5% and pathological fracture at 100%. For variables other than trauma status, PPV was more than 95% and for variables other than antibiotic prophylaxis, NPV was more than 99%. Validity in percentage of conformity ranged from 84% for ASA score to 100% for location of periprosthetic fracture (n=2). For variables other than ASA score, conformity was more than 93%.
Conclusions: This indicates that the DFDB in general has high validity and we expect the nationwide results to be comparable (will be presented at the congress).

Posterior tilt in nondisplaced femoral neck fractures increases the risk of reoperations after osteosynthesis. A systematic review and meta-analysis

138.

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Background: Undisplaced femoral neck fractures (uFNFs) are traditionally classified using the Garden classification. However, in 2009 Palm et al. suggested a new measurement of posterior tilt of the femoral head on a lateral radiograph and using this as a predictor of the outcome following osteosynthesis of uFNFs. Several studies have since been perfomed but there has yet to be conducted a pooled analysis.
Purpose / Aim of Study: To conduct a systematic review on the effect of posterior tilt on reoperations, patient related outcome measures (PROM) and functional outcome following osteosynthesis of uFNFs.
Materials and Methods: A search string was developed in collaboration with a scientific librarian and studies were extracted from the PubMed, CINAHL and Embase databases. Supplementary search was performed in Google Scholar. Studies were screened by two independent readers using Covidence. References of included studies were screened as well as studies citing the included studies using Web of Science. The present study was registered in Prospero. Data were extracted for the final analysis and a quality assessment was performed using Robins-I tool. Pooled data was assessed for heterogeneity using Chi2 and I2 tests. A Random-effects model was used to estimate risk ratio.
Findings / Results: 10 cohort studies with 3699 patients were included. The mean age was 76 years and 72% were female. In general, the studies were assessed to be of poor quality mainly due possible bias and confounding. 10.9% reoperations were identified, but there were 10.3% reoperations in the group with posterior tilt <20 degrees whereas there were 24.5% in the group with posterior tilt >20 degrees. The meta- analysis revealed an overall risk ratio of 0.11 (95% confidence interval; 0.04-0.18) for failure with a posterior tilt >20 degrees. Only one study investigated functional outcome using ADL as measurement but found no significant difference. No studies investigated PROM.
Conclusions: A posterior tilt >20 degrees leads to a higher risk of reoperations in uFNF. Even though the studies were of poor quality, the results suggest that we should include measuring posterior tilt in uFNF.

Hip fracture surgery simulation and career choice

139.

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Background: Virtual reality simulation of hip fracture surgery is available for orthopaedic residents in Denmark. Summative assessment of learning applying the learning curve cumulative summation test (LC- CUSUM) has not been utilized in orthopaedic simulation training. The strength of the LC-CUSUM is that it assumes incompetency and signals competency based on solid statistics. The present study HipSim investigates the LC-CUSUM characteristics of novices stepwise mastering the simulated dynamic hip screw (DHS) procedure.
Purpose / Aim of Study: The aim of this study was to describe the LC- CUSUM characteristics of DHS simulation training (HipSim) of 1st-year-orthopaedic residents and associate the results with the participants' career status after ≥2 years follow-up.
Materials and Methods: Thirty-two 1st-year-orthopaedic residents participated in HipSim and its three subsequent LC- CUSUM evaluations: placing a Kirschner wire, placing a Kirschner wire in different patients, and performing the entire DHS procedure in different patients. The career status of the participants, i.e. still working in orthopaedics or another specialty was recorded ≥2 years after participation and associated with the simulation performance (passed/failed).
Findings / Results: 13/14 participants passing HipSim according to LC-CUSUM were still working in orthopaedics, while 9/18 participants failing HipSim had quit orthopaedics at ≥2 years follow-up. None of the simulator-generated feedback differed statistical significantly between the groups and all participants achieved a tip apex distance ≤ 20 mm.
Conclusions: LC-CUSUM and its summative pass/fail assessment of each simulation was feasible in this formative simulation program. Clinical educators can be reassured that participants passing HipSim are likely to continue to 2nd-5th-year of residency, while failing HipSim should raise concerns and career counseling and close clinical supervision seem to be appropriate measures. The motivational aspect of LC-CUSUM pass/fail assessment when designing formative simulation training warrants further research.

Loss of pre-fracture basic mobility status at hospital discharge for hip fracture is associated with 30-day infection - A one-year nationwide cohort study of 5,330 Danish patients

140.

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Background: The loss of pre-fracture basic mobility status is associated with increased mortality and any readmission after hip fracture (HF). However, it is less known if the loss of pre-fracture mobility has impact on acquiring a post-discharge infection.
Purpose / Aim of Study: To examine if the loss of pre-fracture basic mobility status at hospital discharge was associated with hospital-treated or community-acquired infections within 30-days of hospital discharge after a first time HF.
Materials and Methods: Using the nationwide Danish Multidisciplinary Hip Fracture Registry from Jan. 2016 through Dec. 2016, we included 5,330 patients. The Cumulated Ambulation Score (CAS, 0-6 points) was recorded using questionnaire at admission (pre-fracture CAS) and objectively at discharge. The loss of any CAS-points at discharge compared with pre-fracture CAS was calculated and dichotomized (yes/no). Using Cox regression analyses, we estimated the hazard ratio (HR) with 95% confidence interval (CI) of any hospital-treated (based on ICD-codes) or community-acquired infection (based on antibiotic dispensing's). HRs were adjusted for sex, age, body mass index, Charlson Comorbidity Index, type of fracture, and length of hospital stay.
Findings / Results: Total of 3,261 (61%) patients lost their pre-fracture CAS status at discharge. Among patients who had lost their pre-fracture CAS, 7.3% sustained a hospital-treated infection compared to 5% of those who did not. Correspondingly, 11.4% versus 7.8% sustained a community-acquired infection. The risk of 30-day post-discharge infection increased with loss of pre-fracture CAS status. The adjusted HRs for hospital-treated and community-acquired infection were 1.35 (CI: 1.04-1.76) and 1.55 (CI: 1.24-1.92), respectively, for patients who had lost their pre-fracture CAS status, compared to patients who did not.
Conclusions: In this large national HF registry study, we found that any loss of pre-fracture basic mobility status upon hospital discharge was strongly associated with 30-day post-discharge risk of developing infection. These findings underscore the clinical importance of carefully focusing on regaining the pre-fracture basic mobility status before discharging the patient.

Hospital variation in red blood cell transfusion after hip fracture surgery

141.

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Background: Surgery for hip fractures frequently requires red blood cell (RBC) transfusion in order to treat pre- existing and acute acquired anemia and operative bleeding. Postoperative anemia in hip fracture patients is associated with reduced rehabilitation and functional independence, as well as increased mortality. However, the indications for RBC transfusion in elderly with hip fractures had not been standardized.

Purpose / Aim of Study: We examined the variation in use of RBC transfusion within seven days after hip fracture surgery across orthopaedic departments in Denmark.

Materials and Methods: In this nationwide population-based cohort study, patients who underwent surgery for an incident hip fracture in 2016 and 2017 (n=11,372) were identified in the Danish Multidisciplinary Hip Fracture Registry. Data on RBC transfusion were obtained from the Danish Transfusion Database. The outcome was defined as RBC transfusion within 7 days after hip fracture surgery (yes/no), and the prevalence of RBC transfusion was estimated overall and among 21 orthopaedic departments in Denmark. In addition, prevalence of RBC transfusion was estimated in patients treated at departments with 30-day morality <8% and >10% in 2016-2017.

Findings / Results: The overall prevalence of RBC transfusion was 32.9 %. However, the unadjusted prevalence of RBC transfusion varied from 19.7% to 72.8% across 21 departments. At Hvidovre orthropaedic department, almost three quarters of hip fracture patients received RBC transfusion, whereas only ever fifth hip fracture patient at Esbjerg orthropaedic department received RBC transfusion. At Aarhus orthropaedic department every second hip fracture patient received transfusion. Among patients treated at departments with 30-day mortality <8%, the prevalence of RBC transfusion was 38.8%, compared with 28.4% among patients treated at departments with 30-day mortality >10%.

Conclusions: We observed a substantial variation in use of RBC transfusion within 7 days after hip fracture surgery among Danish orthopaedic departments. Further analyses to examine characteristics associated with blood transfusion, and the impact of transfusion on prognosis of elderly hip fracture patients is needed.

Posters

Preoperative Oxford Knee Score predicts long term results in Total Knee Replacements

142.

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Background: Up to 20 % of all patients having a TKR are less satisfied. Predicting long term outcome would be of key importance in meeting patients' expectations. expectations.
Purpose / Aim of Study: The aim is to investigate whether preop preop Oxford Knee Score (OKS), can predict long term results for TKR patients.
Materials and Methods: OKS was collected in a prospective cohort study (preop, 1-5 and 10 years) in 200 consecutive patients with primary osteoarthritis, operated during 2006-9 with the Vanguard TKR. The change in OKS was determined for each patient. The patients were divided in thirds depending on their preop preop OKS: Lower (OKS < 21, Middle (22 < OKS < 27), High (OKS > 27). Differences between groups were measured by Anova, followed by Tukeys Tukeys Multiple Comparison post hoc a analysis. Similarly, 1 year results were divided in 3 groups, Lower (patients with OKS < 40), Middle (41 < OKS < 44), high (OKS > 45), to determine if 1 year results predicts long term results. Odds-ratio was measured using Babtista Babtista Pike and Chi-square test.
Findings / Results: 91 females (average age 64.68, range 36-82, BMI = 29.88, range 21-47) and 109 males (average age 66.58, range 46-85, BMI = 29.18 range 19-43 were i included. At 10 years, 46/200 (23%) was lost to follow-up (38 dead, 8 for other re reasons), 12 were revised. Mean OKS increased from 23.15 p points to a maximum of 44.84 points at 5 5 years with a small decline to 43.58 p points at 10 years. Median change over 10 years was dependent of preop OKS, since preop OKS < 21 changed 25.92 points; 22 < preop preop OKS < 27 changed 19.94 points, and preop OKS > 27 changed 14.78 p points (p< 0.001 between the 3 g groups). At 10 years, comparing patients with high and low preop OKS showed an odds ratio = 3.054 (p=0.009) for an OKS above 45 for patients with a high preop preop OKS. Patients with an OKS > 45 at 1 year had significantly higher OKS at 10 year than the patients with an OKS < 45 at 1 year (p=0.0036)
Conclusions: The increase in OKS depends on the preop preop score, with the highest gain for patients with the lowest preop score. Patients with a low preop OKS have s significantly lower chance of getting an e excellent long term result. Overall, preop OKS somehow predicts long term results and if known, may aid in bridging patient expectations with outcome.

Can Machine-learning Algorithms Predict Early Revision TKA in the Danish Knee Arthroplasty Registry?

143.

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Background: TKA revision is a serious adverse event and as the demand for TKA rises, reducing the risk of revision TKA is increasingly important. Predictive tools based on machine-learning algorithms could reform clinical practice. Few attempts have been made to combine machine- learning algorithms with nationwide arthroplasty registries and, to the authors' knowledge, none have tried to predict early TKA revision.
Purpose / Aim of Study: Can we build a preoperative clinical tool capable of predicting early TKA revision?
Materials and Methods: From the Danish Knee Arthroplasty Registry (DKR), we retrieved all available preoperative variables of 25,104 TKAs conducted from 2012 to 2015 and 6,170 TKAs conducted in 2016. All TKAs were followed for 2 years with revision for any indication as outcome. The models were trained on data from 2012-2015 and temporal validated on data from 2016. We created four different predictive models; a logistic regression-based model (LASSO), two classification tree models (Random Forest and Gradient Boosting Model) and a supervised neural network. The models were compared with each other and with a non- informative model estimating no revisions for all observations. The models' performance was evaluated by calibration plot, accuracy, Brier's score, ROC-curve and area under the curve (AUC). The AUC depicts the models' discriminative capacity and, a priori, an AUC of 0.7 was chosen as threshold for a clinical meaningful model.
Findings / Results: The models' calibration plot, accuracy and Brier's score was not significantly better than the non-informative model and with AUCs ranging from 0.55-0.60, none of the models reached the predefined threshold for a successful model.
Conclusions: The inability to predict early TKA revision from pre-operative information in the DKR highlighted that (1) the rarity of revision makes it difficult to predict and (2) the preoperative variables collected in the DKR are not strongly associated with early revision. Future models might benefit from including other pre- and intraoperative information, while the arthroplasty registries might aid future models by providing an anonymous surgeon identification variable.

Thermography as pin-site surveillance? A pilot study.

144.

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Background: Medical thermography is an emerging technology that uses an infrared camera to register skin temperature. A recent study found that infrared quantitative skin temperature measurement in routine wound assessment provides a reliable method to monitor wound infection status.
Purpose / Aim of Study: To investigate the positive predictive value and reliability for infrared thermography for pin-site infection.
Materials and Methods: Prospective study. Pin-sites were graded with Modified Gordon Pin Infection Classification from 0-6 by the treating surgeon. Thermography of each pin-site was performed under standardized conditions after removal dressings with a handheld FLIR C3 camera. The maximum skin temperature around the pin-site was assessed by an independent reviewer blinded to the infection-grade. Double- measurements was performed for 53 pin-sites. Clinical important infection (defined as Gordon grade 3 or above) was the gold standard thermography was tested against in a contingency table. Intra Class Correlation with 95% CI was calculated in Stata.
Findings / Results: 13 (4 females, 9 males) consecutive patients (age 9-72 years) were included. Indications for frames: 4 fracture, 2 deformity correction, 1 lengthening, 6 bone transport. Days from surgery to thermography ranged from 27-385 days. Two patients had two measurements on different days. In total 231 pin-sites were included. 11 pin-sites were clinical abnormal: 5 sites grade 1 (serous drainage), 5 sites grade 2 (erythema), 1 site grade 3 (erythema and drainage). Mean pin- site temperature varied between patients from 29,0 to 35,4 C (mean 33,9). Mean temperature and range were 32,8 (26,3-37,3); 34,3 (33,2-35,4); 34,8 (33,0-35,9); and 36,1 for grade 0, 1, 2 and 3 respectively. If 36,1 C was selected as cut-off value for infection sensitivity was 100%, specificity 98%, positive predictive value 17% and negative predictive value 100%. Intra-rater agreement for thermography was ICC 0.85 (0.77-0.92).
Conclusions: Thermography was reliable. Only one clinical important pin-site infection was present in 231 pin-sites. Further studies will show if thermography can serve as an adjunct tool in homebased pin-site infection surveillance.

Tibia component under-sizing is related to high degrees of continuous subsidence and posterior rotation in cementless TKA.

145.

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Background: Radiostereometric analysis (RSA) studies have shown that continuous migration of tibia components can predict aseptic loosening after total knee replacement (TKA).
Purpose / Aim of Study: In this study we investigated if accurate size and placement of the tibia components, could be related to the degree of migration evaluated objectively using RSA measurements.
Materials and Methods: We performed 2 year follow up of 116 patients who underwent TKA surgery with cementless tibia components, Nexgen® (N=55, Pegged design) and Vanguard® (N=61, Keeled design). Radiostereometric analysis (marker- based) was performed postoperatively and after 3, 6, 12 and 24 months. Postoperative X-rays were evaluated with respect to component sizing and placement in the tibia, by experienced knee surgeons blinded to migration data and clinical outcome. Statistics: Multivariate linear regression.
Findings / Results: We found that continuous migration (12-24 months MTPM) was related to tibia component under-sizing (p=0.001), and that subsidence was related to absence of posterior cortical support (p=0.000), postoperative varus malalignment (p=0.001) and under-sizing (p=0.002). Posterior tilt was related to under-sizing (p=0.002) and absence of posterior cortical support (p=0.014).
Conclusions: The findings of this study indicate that undersized, varus aligned and anteriorly placed cementless tibia components in TKA are in risk of poor fixation with continuous migration and therefore at higher risk of aseptic loosening should be expected.

Short and long-term mortality in patients with trochanteric hip fractures (AO/OTA 31-A) treated with sliding hip screw versus intramedullary nail: A nationwide registry study from the Danish Fracture Database (DFDB)

146.

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Background: Should trochanteric hip fractures (AO/OTA 31-A) be treated with a sliding hip screw (SHS) or an intramedullary nail (IMN)? This debate is still ongoing and while most studies find no differences in post-operative complication rates, recent studies suggest an association between IMN and excess mortality rates compared with SHS.
Purpose / Aim of Study: To compare mortality rates for IMN and SHS in elderly patients with trochanteric hip fractures (AO type 31-A).
Materials and Methods: This is a national registry study based on data from DFDB. Data on patients aged 65 years and above treated for a non- pathological AO-type 31-A trochanteric hip fracture with either IMN or SHS from January 2012 - December 2018 were retrieved. Data from DFDB was merged with data from the Danish Civil Registration registry for time of death. Outcome measures were mortality presented as 30- day, 90-day, and 1-year mortality and the relative mortality risk in crude numbers and adjusted for age, sex, ASA-class, AO-type, and department.
Findings / Results: A total of 9,547 patients were included. The mean age was 83 years, 69.2% were female, and 55.1% were ASA-class 3-5. Most patients suffered a 31-A2 fracture (56.1%), followed by 31-A1 fractures (32.3%), and 31-A3 fractures (11.6%). Stable 31-A1 fracture subtypes were primarily treated with SHS (60.9%). Fracture subtypes 31-A2 and 31-A3 were treated with IMN in 90.2% and 96.6% of cases. Implant of choice was IMN in 74.4% of cases. The 30-day mortality for IMN- patients was 12.2% (867/7105) and 10.2% (248/2442) for SHS-patients. This trend persists at 90 days (19.7% vs 17.4%) and 1 year (31.0% vs 29.3%). Relative mortality risk for IMN compared with SHS was 1.20 [95% CI 1.06; 1.35] at 30 days, 1.11 [1.01; 1.22] at 90 days, and 1.05 [0.98; 1.13] at 1 year. Adjusted relative mortality risk for IMN compared with SHS was 1.12 [0.96; 1.31] at 30 days, 1.03 [0.91; 1.17] at 90 days, and 1.01 [0.92; 1.11] at 1 year.
Conclusions: We found an association between excess mortality and the use of IMN versus SHS in elderly patients with AO-type 31A fractures at 30 days, 90 days and 1 year post- operatively consistent with recent studies. However, this association diminishes when adjusting for sex, age, ASA-class, AO-type, and department.

Elevation of pro-inflammatory cytokine levels following intra-articular fractures—A systematic review

147.

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Background: Intra-articular fractures are a major cause of post-traumatic osteoarthritis (PTOA). Despite adequate surgical treatment, the long-term risk for PTOA is high. Previous studies reported that joint injuries initiate an inflammatory cascade characterized by elevation of synovial pro-inflammatory cytokines, which can lead to cartilage degradation and PTOA development.
Purpose / Aim of Study: This review will summarize the literature on the post-injury regulation of pro-inflammatory cytokines and the markers of cartilage destruction in patients suffering from intra-articular fractures.
Materials and Methods: We searched Medline, Embase, and Cochrane databases (1960–February 2020) and included studies written in English, German or Scandinavian that were performed on human participants and included control groups. Two investigators assessed the quality of the included studies using Covidence and the Newcastle-Ottawa Scale. Six cross-sectional studies were included in the final qualitative synthesis.
Findings / Results: We found a significant elevation of several synovial pro-inflammatory cytokines including IL-1â, IL-6, IL-8, IL-12p70, IFN 12p70, IFN-y, and TNF-á in patients suffering from intra-articular fractures compared to control groups. We also found a simultaneous elevation of anti-inflammatory cytokines such as IL inflammatory cytokines such as IL-10 and IL-1RA. Most studies also reported increased IL-2 concentrations while IL-13, CTXII, 13, CTXII, sGAG, and aggrecan concentrations were not significantly different in the compared cohorts.
Conclusions: We found that intra-articular fractures are associated with an increase of inflammation-related synovial cytokines. However, more standardized studies which focus on the ratio of pro- and anti-inflammatory cytokines at different time points are needed.

Combined bone transport and limb lengthening with FITBONE® nail for segmental femoral and tibial defects

148.

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Background: Intramedullary bone transport nails have been introduced to treat segmental bone defects. Only 5 cases have been reported in the literature, and no studies have reported outcomes after nail removal.
Purpose / Aim of Study: We investigated the healing and the complication rates in patients treated for segmental bone defects with a combined bone transport and lengthening FITBONE® nail.
Materials and Methods: A retrospective case series with fifteen patients (ten males, five females) treated between 2012 and 2016. Informed consent from patients and approval by institutional board. The segmental bone loss was due to resection of non-union site in eight femurs and four tibias, or traumatic bone loss in two femurs and one tibia. The bone gap was a mean of 4 (2-10) cm. The total nail distraction (transport and lengthening) was a mean of 5 (2-8) cm. Preoperative limb length discrepancy was mean of 2 (0-6) cm. Preoperative mechanical axis deviation was from 88 mm varus to 7 mm valgus. Mean follow-up after nail removal was 45 (6-89) months. Complications were severity graded (Black et al). and rated as device or non-device related (Song et al.)
Findings / Results: 9 of 10 femoral cases, and 4 of 5 tibial cases healed with the bone transport nail. The unhealed femoral case was treated with shortening, bone graft and trauma nail. The unhealed tibial case was treated with external fixator and bone graft. At latest follow-up all fifteen patients have healed docking site and regenerate. 23 complications (14 device-related and 9 non-device) occurred in 15 patients. The number of complications was: 0 in 4 patients, 1 in 4 patients, 2 in 4 patients, 3 in 1 patient, 4 in 2 patients. The average number of complications per patient was: type 1 (minimal intervention): 0.1 (0-2); type II (substantial change in plan): 0.9 (0-3); type IIIA (failure to achieve goal): 0.3 (0-1); type IIIB (new pathology or permanent sequelae): 0.2 (0-1).
Conclusions: In selective cases, segmental bone defects might heal with bone transport nail. Future research should focus on reducing device and non-device related complications by optimized nail design, patient selection and patient treatment.

Development of a new diagnostic algorithm identifying all cases of dislocation after primary THA – Based on 31,762 THAs from the Danish Hip Arthroplasty Register

149.

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Background: Dislocation of total hip arthroplasties (THA) leads to poorer quality of life for the patients, but since dislocations are often treated with closed reduction, they are traditionally not registered in orthopedic arthroplasty registers worldwide.
Purpose / Aim of Study: This study aimed to create an algorithm designed to identify cases of dislocations of THAs with high sensitivity (SN), specificity (SP), and positive predictive value (PPV) based on codes from the Danish National Patient Register (DNPR).
Materials and Methods: All patients (n=31,762) with primary osteoarthritis undergoing THA from 01.01.2010 to 31.12.2014 were included from the Danish Hip Arthroplasty Register (DHR). We extracted available data for every hospital contact in the DNPR during a two-year follow-up period, both admissions to orthopaedic and non-orthopaedic departments and outpatient emergency room contacts. We conducted a nationwide review of 5,096 patient files to register all dislocations and applied codes. We designed the algorithm using a stepwise approach by adding codes in each step to continuously increase SN, while at the same time keeping the SP and PPV high.
Findings / Results: We identified 1,890 hip dislocations among 1,094 of the included 31,762 THAs. More than 70 different diagnoses and 55 procedural codes were coupled to the hospital contacts with dislocation. A combination of the correct codes (DT840+KNFH20) yielded a SN of 62.7% and a PPV of 97.9%. Adding alternative and often applied codes in three steps (DS730, KNFH(20;21;22;00;02)) increased the SN to 91.3%, while the PPV was kept at 93.3%. An additional step (DT840 alone, acute admissions) increased SN to 95.4% but at the expense of an unacceptable decrease in the PPV to 81.8%. A minor effort in reviewing 0.3- 1% of patient files could raise the PPV to 96.6% in the last two steps. SP was, in all steps, greater than 99%.
Conclusions: The developed algorithm demonstrated a SN of 91.3% and a PPV at 93.3% for identifying dislocations, which we consider acceptable. Higher SN is possible but at the expense of drastically lowering the PPV and are not feasible for register studies. In perspective, this kind of algorithm may be used in Danish quality registers.

Tibiofemoral joint kinematics during level and downhill gait in patients with knee osteoarthritis - A dynamic radiostereometry study.

150.

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Background: Patients with knee osteoarthritis (OA) often complain of pain and giving-way symptoms during downhill gait. The kinematic differences between level and downhill gait in healthy and OA knees are not well described but may be related to the symptoms.
Purpose / Aim of Study: To investigate the tibiofemoral joint (TFJ) kinematics of level and downhill gait in patients with knee OA and healthy volunteers.
Materials and Methods: Sixty-six patients with symptomatic knee OA scheduled for TKA and twelve age-matched healthy volunteers with asymptomatic knees were included in this study. Dynamic RSA was used to assess the TFJ kinematics during treadmill level and downhill gait. ACL lesions were graded by MRI in the OA group. Clinical outcomes were assessed with OKS. Statistical parametric mapping and linear regression was used.
Findings / Results: Comparing level and downhill gait, both groups revealed up to 25° ($p<0.01$) higher knee flexion from midstance to mid-swing phase. During most of the stance and initial swing phase, both groups displaced similar changes ($p<0.01$), with approx. 1.5mm tibial medial shift, tibial anterior draw, and joint distraction. In addition, the OA group showed 3° of tibial internal rotation ($p<0.01$). The OA group had kinematic differences ($p<0.02$) during level and downhill gait compared to healthy. The peak mean differences were 4mm tibial lateral shift, 2.5mm tibial anterior draw, 4mm joint narrowing, and 5° tibial external rotation. Additionally, the OA group had 3° ($p<0.02$) higher varus angles with intact ACL (N=20) at mid-swing phase and with partiel ACL lesion (N=25) at stance-phase. Also, ACL lesions increased tibial internal rotation and anterior draw. Clinical outcome for all subjects revealed that varus angular excursion during a gait cycle increased with giving-way symptoms (slope=0.57, $p<0.01$).
Conclusions: Knee kinematics during level and downhill gait differed in patients with OA compared to healthy. ACL lesions concealed a varus malalignment in OA patients compared to health, and giving-way symptoms is associated with increased varus instability. The findings aid to our understanding of associations between knee symptoms and kinematics in knee OA.

External hip joint peak moments in walking, jogging, and sprint acceleration: An explorative cross-sectional study of healthy adults

151.

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Background: Athletes with femoroacetabular impingement syndrome often report problems in sprinting compared to walking and jogging. This discrepancy may be related to the difference in peak moments distributed across the hip joint.
Purpose / Aim of Study: In this cross-sectional study, we examined external hip joint moments during walking, jogging, and sprint acceleration.
Materials and Methods: We included 20 healthy sports active adults (mean age 24.7 years). The primary outcome was external hip joint peak moments for adduction, abduction, flexion, and extension during: walking with a self- paced speed; jogging with 8-11 km/h; and maximal sprint acceleration. Data was collected in a 3D Motion Analysis Laboratory with two floor-embedded AMTI force platforms. The mean of three trials for each activity was captured on the dominant leg for analyses.
Findings / Results: Maximal sprint acceleration resulted in higher external peak moments than jogging and walking for all external moments ($p \leq 0.006$). The increase from walking and jogging to sprinting was 16-128 % for adduction, 168-195 % for abduction, 105-148 % for flexion, and 61-121 % for extension. Furthermore, a 36 % higher extension moment was observed for walking compared to jogging ($p<0.001$), whereas a 96 % higher adduction moment was observed for jogging compared to walking ($p>0.001$).
Conclusions: Substantially higher hip joint moments were observed in sprint acceleration compared to walking and jogging, whereas jogging only showed a higher adduction moment compared to walking. This information may explain why patients with femoroacetabular impingement syndrome often tolerate walking and jogging activities and to a lesser extent sprinting.

Can good outcomes be achieved with fixed bearing lateral UKA when using a strict strategy for usage? 152.

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Background: There is solid evidence that medial unikompartmental knee arthroplasty (UKA) offers benefits over total knee replacement in eligible patients without compromising revision rates when using contemporary indications and techniques. While there has been an increasing adoption of UKA in Denmark with a usage rate of almost 20 %, lateral UKA is used in <1% of knee replacements, despite isolated lateral compartment OA accounting for app. 10 % of OA cases. It can be speculated that such low utilization is due to sparse literature regarding its potentially good outcome, inferior survival reported in registries, and the lack of a strict strategy for adoption.

Purpose / Aim of Study: To show the feasibility of adopting fixed bearing lateral UKA as part of an overall surgical knee arthroplasty strategy with optimized UKA utilization we report the outcome of the first 41 cases.

Materials and Methods: We included all consecutive patients operated with fixed bearing lateral UKA at one department since the start of introduction in October 2016. It was an overall strategy to offer UKA whenever possible. All patients were operated in a well described fast-track setup. Data was collected prospectively in the departments arthroplasty database and included demographic, patient reported outcomes measured as Oxford Knee Score (OKS) and Forgotten Joint Score (FJS) and reoperation data. Follow-up data at 3 months and 1 year are presented.

Findings / Results: 41 cases were included. Mean age was 67 years and 75% were female. Median length of stay was 1 day. Mean (SD) preoperative OKS was 24 (7) and increased to mean 35 (6) and 42 (5) at 3- and 12- months follow-up respectively. Mean (SD) FJS was 48 (22) and 72 (19) at 3- and 12-months follow-up respectively. One knee was reoperated with repeated DAIR and was infection free at last follow- up.

Conclusions: The adoption of fixed bearing lateral UKA can be successful with good clinical outcomes similar to that reported for medial UKA. Maintaining a strict strategy for adoption in an environment with optimized UKA utilization is probably fundamental to the results.

Prognostic factors predictive of poor outcome following coccygectomy for patients with persistent coccydynia

153.

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Background: Coccydynia is pain originating in the coccyx and surrounding tissue. Coccygectomy, which is surgical amputation of the coccyx, is a way to relieve patients from their debilitating symptoms if nonoperative therapy fails to do so. The authors investigate prognostication in a prospective cohort of 134 coccygectomized patients who all suffered from persistent coccydynia and were diagnosed with instability of the coccyx. At present, no tool to improve patient selection is available.
Purpose / Aim of Study: The purpose of this study is to identify prognostic factors predictive of poor outcome following coccygectomy on patients with persistent coccydynia due to instability of the coccyx.
Materials and Methods: Through DaneSpine, the Danish National Spine Registry, 134 consecutive patients were identified from a single center experience on coccygectomy performed from 2011 to 2019. Patient demographics, including age, gender, body-mass- index (BMI), smoking status, work status, welfare payments as well as patient-reported outcomes (PROs), including pain VAS-score (0-100), Oswestry Disability Index (ODI), Euro-QoL-5D (EQ-5D), Short Form-36 (SF-36) Physical Component Score (PCS) and Mental Component Score (MCS) were obtained at baseline and at 1-year follow-up. In addition, patient satisfaction with the procedure was obtained at follow-up.
Findings / Results: A minimum of 1-year follow-up was available in 112 patients (84%). Mean age was 41.9 years (range 15-78) and 97 of the patients were female (87%). Patients were divided into three groups based on satisfaction. Regression showed no statistically significant association between the investigated prognostic factors and a poor outcome following coccygectomy. The satisfied group showed a statistically significant improvement in PROs at 1- year follow-up from baseline, whereas the not satisfied group did not show a significant improvement.
Conclusions: We did not identify factors prognostic for a poor outcome following coccygectomy. This suggests that neither of the included parameters should contradict treatment with coccygectomy for patients who suffer from persistent coccydynia with instability of the coccyx.

The effect of Direct Oral Anticoagulants on time to surgery, post-operative complications and mortality in hip fracture patients - a retrospective study

154.

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Background: With aging populations, both hip fractures and patients in Direct Oral Anticoagulants (DOAC) are expected to increase. This constitutes a surgical challenge as DOAC might increase the risk of intraoperative blood loss and postpone hip fracture surgery beyond the nationally recommended 24 hours. Few studies examine Hip fracture patients receiving DOAC and there is no common guideline on how to treat this group when it comes to emergency surgery, which renders optimizing fast track regimes challenging.
Purpose / Aim of Study: To examine time to surgery, postoperative complications, intraoperative blood loss and mortality in hip fracture patients receiving DOAC.
Materials and Methods: All hip fracture patients from 2017 and partially 2018 at Bispebjerg Hospital were included. We retrospectively collected data from patient records.
Findings / Results: 420 patients were included. The median age was 81,9 and 72,4% were female. Median time to surgery was 23 hours with a mean of 26,2 and 11,2% received DOAC. Excluding clopidogrel and VKA's showed that the DOAC group had significantly longer time to surgery >24 hours, compared with the non-DOAC group ($P \leq .05$) There was no statistically significant difference in post-operative complications between the DOAC and non-DOAC group, considering non-surgical infections, 30-day reoperation rate, 30-day readmission and acute kidney failure. 30,2% patients in the non-DOAC group received blood transfusion during admission, compared with 33,3% in the DOAC group and was non-significant (P=0,8). When categorising intraoperative blood loss in 300 mL there was no significant difference in the DOAC and non-DOAC group. 30-day mortality was 6,7 % in the DOAC group compared with 6,4% in the non- DOAC grp and was non-significant (P=1). Neither was the 90-day mortality significantly different.
Conclusions: Our study found that DOAC treatment delays time to surgery but patients receiving DOAC do not suffer higher mortality or complication rates. It may be safe to perform surgery within 24 hours in patients receiving DOAC. We propose to formulate a protocol for hip fracture patients in DOAC to enable fast track regimes and reduce time to surgery. The study is ongoing and further data will be presented at DOS.

The prevalence of ankle contractures and the association with age, gross motor function and spasticity among children and adolescents in Denmark

155.

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Background: Despite preventive treatment, children with Cerebral Palsy (CP) often develop muscle contractures, which limits their joint motion. This is problematic since reduced joint motion composes a limiting factor for the child's functional capacity and motor skills, which may result in limitations at activity and participation. Furthermore, there is a strong association between gross motor function and quality of life. A greater understanding of factors which contributes to the development of ankle contractures may be useful in the development of future treatment strategies for children with CP.
Purpose / Aim of Study: The aim of this study was to investigate the prevalence of ankle contractures among children and adolescents with CP in Denmark. Furthermore, to investigate how the prevalence varied in accordance with age, gross motor function, and spasticity.
Materials and Methods: The study is a cross sectional study based on extracted data from the nationwide clinical quality database (CPOP). The study population was children aged 6- 14 years, who in the period from 2018-2019 had been systematically examined by a physiotherapist and registered in the CPOP database. Information on Gross Motor Function Classification System Expanded and Revised level (GMFCS-E&R) and passive range of motion in the ankle joint with an extended knee was measured for 663 children. For 598 children information on Modified Ashworth Scale score (MAS) was registered. The associations between the prevalence of ankle contractures and age, GMFCS-E&R level and MAS-score were estimated as odds ratio (OR) and 95% confidence intervals (95% CI) with the use of logistic regression.
Findings / Results: 31% of the study population had an ankle contracture. ORs for ankle contracture were significant higher for children with GMFCS- E&R level IV-V (OR: 1.82, 95% CI: 1.26; 2.62) relative to level I-III and MAS-score 2- 4 (OR: 2.37, 95% CI: 1.47; 3.82) relative to MAS-score 0. There was no association with the degree of spasticity. Ankle contracture was not significantly associated with age.
Conclusions: Ankle contractures are frequent in children with CP. The study indicated that ankle contracture was associated with level of gross motor function.

Venous thromboembolism after fast-track unicompartmental knee arthroplasty – a prospective multicentre cohort study of 3,927 procedures.

156.

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Background: Unicompartmental knee arthroplasty (UKA) has increased due to potential favourable complication rates when compared to total knee arthroplasty (TKA). Although venous thromboembolism (VTE) is a well-documented complication after TKA limited data is available after UKA and mostly presented as secondary findings in observational comparisons to TKA. There is a lack of fast-track UKA VTE studies and no guidelines on thromboprophylaxis.
Purpose / Aim of Study: We aimed at describing in details the 90-day incidence and time course of VTE after UKA within a multicentre fast-track collaboration.
Materials and Methods: We used an observational cohort study design from 8 dedicated fast-track centres with prospective collection of preoperative risk-factors, complete follow-up on length of stay (LOS), 90-day readmissions and mortality from the Danish National Patient Registry and analysis of health records if LOS > 2 days or an ICD-10 code of VTE. Due to limited events we refrained from analysis of independent risk-factors.
Findings / Results: In 3,927 procedures (46.1% males, mean age 66.2 (SD 9.4) years) median LOS was 1 [IQR 0-1] day and 7.5% had LOS > 2 days. The 90-day incidence of VTE was 16 (0.41%) and 14 (0.37%) when excluding preoperatively anticoagulated patients. There were 5 (0.13%) pulmonary embolisms and 11 (0.28%) deep-vein thrombosis after median 18 [11.75-35.25] days. 90-day mortality was 3 (0.08%) with no fatal PE or initial postoperative VTE.
Conclusions: The 90-day incidence of VTE after fast-track UKA was 0.41% (0.37% when excluding preoperatively anticoagulated patients), which is comparable to reports of 0.39% VTEs after fast-track TKA in the same departments. Investigations on risk-factors are needed for optimizing thromboprophylaxis.

Effects of blood flow restricted walking exercise on functional capacity and self-reported knee function in elderly individuals with knee osteoarthritis

157.

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Background: Knee osteoarthritis (OA) negatively affects skeletal muscle size and strength, which impairs the capacity to perform activities of daily living and results in a reduced quality of life. Walking exercise with concurrent lower limb blood flow restriction (BFR- walking) has previously been shown to increase muscle strength and improve function in elderly Japanese individuals.
Purpose / Aim of Study: To evaluate changes in performance-based functional capacity and self-reported knee function after 8 weeks of BFR-walking in elderly individuals with knee OA.
Materials and Methods: Fifteen elderly individuals (>60 years of age) diagnosed with knee OA participated in 8 weeks of outdoor walking with partial blood flow restriction of the leg suffering from knee OA. Participants performed 20- min horizontal walking (4km/h) for 4 times/week with one supervised session per week. A pneumatic cuff system was applied to the proximal part of the thigh of the affected leg. The restrictive pressure applied during walking was set to 60% of the total arterial occlusion pressure for each individual participant. 30-s sit-to-stand test (30STS), Timed-Up & Go (TUG), 40-m fast- paced walk test (40MWT), 11-step stair- climb test, and Knee Osteoarthritis Outcome Score (KOOS) were assessed pre and post training.
Findings / Results: Ten participants completed the BFR-walking exercise (range 6-10 wk). Self-reported knee function (KOOS) remained unchanged following the intervention period. In contrast, a strong tendency for positive change (-4%) in 40-m fast-paced walk capacity was observed ($p = 0.06$). Subsequently post hoc analysis revealed improved ($p < 0.05$) 40MWT (-5%), 30STS (+16%) and TUG (-8%) performance in participants completing a minimum of 8 weeks of BFR- walking ($n = 9$).
Conclusions: BFR-walking exercise of moderate duration (6-10 wk) led to improved 40-m fast-paced walking capacity in the present group of elderly individuals with knee OA. Further, participants with high training compliance (≥ 8 wk BFR-walking) demonstrated significant improvements in sit-to-stand mobility (30STS, TUG) and horizontal walking ability (40MWT), which is suggested to represent an important functional adaptation in elderly with knee OA.

Coccydynia – the efficacy of available treatment options: a systematic review

158.

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Background: Coccydynia is pain originating from the os coccygis, a condition for which several treatments, of a more or less invasive character, are being practised today.
Purpose / Aim of Study: Through a systematic review and meta-analysis this study aims to evaluate the efficacy of available treatment options for patients with persistent coccydynia.
Materials and Methods: Methods: Original peer-reviewed publications on coccydynia and its treatment were identified according to PRISMA guidelines by performing a wide literature search of relevant bibliographic databases, from their inception to January 17th, 2020, combined with other sources. Data on extracted treatment outcome was pooled in suitable categories to allow for meta-analysis of efficacy. Outcome measures: All outcomes relevant to the treatment efficacy of coccydynia were extracted. No single measure of outcome was consistently present among the included studies. For the main analysis Visual Analogue Scale (VAS) of pain was evaluated. Eligible studies: Studies with treatment outcome on adult patients with persistent, primary coccydynia.
Findings / Results: In this review a total of 1980 patients across 64 studies were identified: 5 RCTs, 1 experimental study, 1 quasi-experimental study, 11 prospective studies, 45 retrospective studies and a pool of unpublished data from the DaneSpine registry. The greatest improvement in pain was achieved by those patients who underwent RFT (VAS decreased by 5.11 cm on average). A similar mean improvement was achieved from ESWT (5.06), Ganglion Block (4.92), Coccygectomy (4.86) and Injection (4.22). Although improved, the mean change was less for those who received Stretching/Manipulation (2.19) and Conservative/Usual Care (1.69).
Conclusions: Conservative therapy and stretching/manipulation showed limited improvement. Interventional treatments (ganglion impar block, injections, RFT and ESWT) showed promising results and should be considered before coccygectomy, which however remains the most investigated treatment, and despite varying complication rates consistently demonstrates high efficacy when treating otherwise refractory patients.

Patient reported outcome measures in musculoskeletal research: Less than 14 % are valid instruments.

159.

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Background: PROM-data are the most important outcomes in musculoskeletal research. Most PROMs are described as valid and reliable. However, many have not been developed with help from relevant patients and very few have been validated for construct validity with proper statistical methods.
Purpose / Aim of Study: To assess the content and construct validity of the most commonly used PROMs in sports research, and to produce a catalogue of these PROMs.
Materials and Methods: A PubMed search "patient reported outcome measures sports" resulted in 915 articles published between July 29, 2011 and November 24, 2019. Articles relevant to sports and with at least one named PROM as outcome were included, 439 articles. A total of 194 different PROMs had been used. Condition specific PROMs that had been used at least three times (42) and PROMs that had been used once or twice but were the only PROMs for a specific condition (13) plus six PROMs that were identified in a search regarding RCTs in sports science, were selected for analyses. Articles describing development of these 61 PROMs were assessed for content validity. All articles regarding construct validity for each PROM (including all published translations) (in total 622 articles) were analyzed.
Findings / Results: A catalogue with assessment of 61 PROMs and translated versions was produced. The majority of these were of inferior validity. Most commonly (in 53 of 61 PROMs (87%)) there was no security of high content validity in development. Another major reason for inferior validity was that construct validity had not been secured by adequate statistical methods.
Conclusions: A majority of the assessed PROMs have no proven validity as measurement tools. Scientific results obtained by use of these PROMs are questionable. From this catalogue it is possible to identify the most valid PROMs as outcome measures for specific studies in sports medicine and sports traumatology. It is important that a targeted effort is made to develop valid PROMs for major musculoskeletal conditions. In all articles containing results obtained by PROMs without proven content- and construct validity, it should be thoroughly discussed how this may affect the results.

Living settings and cognitive impairment are stronger predictors of nursing home admission after hip fracture surgery than physical comorbidities

160.

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Background: Sustaining a hip fracture is a life changing event for many elderlies. While doctors and researchers tend to be preoccupied with mortality and complication rates, patients are more concerned by other aspects e.g. loss of independence and ability to remain in their own home.
Purpose / Aim of Study: This study aimed to i) determine age-stratified one stratified one-year event rates of admission to nursing home after discharge, and ii) identify risk factors associated with nursing home admission.
Materials and Methods: Community dwelling patients aged 60-100 years undergoing their first hip fracture surgery in 2005 100 years undergoing their first hip fracture surgery in 2005 - 2015 were identified in nationwide administrative registries. Outcome was admission to nursing home within one year of discharge. To assess risk factors, we performed age-stratified cumulative incidence curves and multivariate cause specific cox regression models adjusted for age, sex, social factors, and comorbidities.
Findings / Results: A total of 53,157 patients were included. One-year risk increased with advancing age from 3.2% of patients aged 60 to 69, up to 22.4% in the eldest group aged 90-100 years. Living alone and dementia were strong risk factors HR 9.22 [95% CI 5.60-15.18, p = <0.0001] and HR 6.73 [95% CI 4.80 15.18, p = <0.0001] and HR 6.73 [95% CI 4.80- 9.44, p = 0.0001] respectively for patients aged 60 to 69 years, the effect decreased with higher age down to HR 2.75 [95% CI 2.12- 3.57, p = <0.0001] and HR 2.15 [95% CI 1.88- 2.46, p = <0.0001] for patients ≥ 90 years. Other important risk factors were pre 2.46, p = <0.0001] for patients ≥ 90 years. Other important risk factors were pre-injury home care, Parkinson's disease and depression. Surprisingly, physical comorbidities i.e. kidney disease, chronic obstructive pulmonary disease, diabetes and cancer did not increase the risk of nursing home admission.
Conclusions: Future initiatives aimed to reduce loss of independence and nursing home admission, among patients with first time hip fracture, should devote attention to living settings and cognitive impairment rather than physical comorbidity.

Revision Arthroplasty with use of a Total Femur Replacement

161.

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Background: Increasing numbers of THA and TKA are performed with expanding applications in a younger and elderly population. Recurrent complicated aseptic and septic revisions and periprosthetic femoral fractures are growing in numbers resulting in extensive loss of femoral bone stock making it unable to support revision implants. For these complicated cases Total Femur Replacement (TFR) is an alternative to amputation.
Purpose / Aim of Study: To assess the functional outcomes and the complication associated with TFR used in revision arthroplasty.
Materials and Methods: We retrospectively reviewed 21 non-tumour cases that received a TFR for revision surgery: mean age 71 (40-85) years, F/M=12/10, mean follow-up 51 (12-180 months), mean number of previous revisions 3.8 (1-12), history of periprosthetic infection (n=11). The indications for TFR were severe femoral bone loss because of aseptic loosening (n=8), septic loosening (n=6), periprosthetic fracture (n=6) and osteomyelitis (n=1).
Findings / Results: Mean operating time was 271 minutes (133- 600). Mean blood loss was 3417ml (560- 7300). 7 patients had a well-fixed acetabulum component and 14 cases had acetabular cup revision. 8 hips received a constrained liner, 4 patients a dual mobility cup and 9 cases had non-constraint liners. None of the 8 cases with a constrained liner dislocated, 8 of 13 patients (62%%) without constraint liners dislocated. 11 patients had no additional procedures and 10 patients had additional surgical procedures with 6 patients revised for infection: 1 total exchange of the TFR and 5 treated with DAIR. No amputations were performed. 14 patients were on lifelong antibiotics, and at end of follow-up 4 patients had died of causes unrelated to surgery. We found good patient satisfaction and low pain scores with low activity level.
Conclusions: TFR for revision surgery in non-tumour cases resulted in limb salvage in all patients and with only 1 patient having total exchange of the TFR implant. However, minor revision for infection and hip dislocation was common occurrences.

Exercise booster sessions as a mean to maintain the effect of an exercise-intervention - A Systematic Review

162.

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Background: Despite evidence supporting prescription of exercise as medicine in several chronic diseases, long-term adherence to exercise is a persistent challenge. One concept, that has been suggested and currently used clinically to preserve exercise-induced effects, is exercise booster sessions (EBS). Nonetheless, the components and effects of these EBS still remain to be reviewed.
Purpose / Aim of Study: The purpose of this systematic review was therefore to summarize and synthesize 1) the reported effects of EBS on physical function, pain, quality of life, and societal costs and 2) delineate the basic components of EBS (frequency, intensity, type and time), in healthy and clinical populations following an exercise intervention.
Materials and Methods: Seven databases were electronically searched in December 2019. Included studies were randomized controlled trials (RCTs) of exercise interventions followed by a period of EBS or a control group not receiving EBS. Abstracts and full texts were independently screened and selected for inclusion by two reviewers. Methodological quality of the included studies was assessed using the Cochrane risk of bias tool version 2.0.
Findings / Results: Five studies on respectively knee osteoarthritis (n=4) and lower back pain (n=1), reporting four RCTs were included. One study found a positive effect of EBS on the WOMAC score, -46.0 (-80.0, -12.0), whereas the others did not find any differences. The frequency of EBS ranged from 0.09-1 session/week, while no studies reported exercise intensity. One study found EBS to be cost-effective. All studies were considered to have a high overall risk of bias.
Conclusions: Only sparse literature exist on EBS, generally showing no exercise-induced effects on physical function or pain. However, the low number of trials, the potential risk of bias, plus the diversity in trial interventions prevent a firm conclusion. Further high-quality RCTs investigating the effect of EBS on physical function, pain, quality of life and societal costs are needed.

Has the Use of Fixation Techniques in THA Changed in This Decade? The Uncemented Paradox Revisited

163.

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Background: Despite studies favoring cemented fixation for patients > 75 years, a trend toward increased use of uncemented fixation has been described using arthroplasty registry data from 2006 to 2010. Updated data are needed to investigate contemporary trends in the usage of uncemented fixation, especially in patients > 75 years.
Purpose / Aim of Study: 1:Has percentage of primary THAs performed with uncemented fixation changed since 2010? 2:Has percentage of primary THAs performed in patients > 75 years performed with uncemented fixation changed since 2010? 3:After stratifying by age, which fixation strategy (cemented vs uncemented, hybrid vs uncemented) is associated with lowest risk of revision?
Materials and Methods: National reports from hip arthroplasty registers were identified, and data were extracted if published in English/Scandinavian language, with at least 3 years of reported data from 2010- 2017. All cause rates of revisions related to fixation and secondary to age groups, were taken directly from the registers and no re- analysis was done. Risk estimates were presented as HR, rate per 100 component years or K-M estimates of revision.
Findings / Results: Current use of uncemented fixation in primary THAs varies between 24% and 71%. Increasing use is reported in Norway, Denmark, and Sweden, whereas decreasing use is reported in England- Wales, Australia, New Zealand, and Finland. In patients > 75 years, numbers are stable in Netherlands, Sweden, New Zealand, and England-Wales, whereas an increasing trend is seen in Denmark and Australia. In Finland, the use of uncemented fixation has decreased (from 43 % to 24 %) from 2010 to 2017. Compared with uncemented fixation, risk of revision using cemented fixation was lower in patients > 75 years for all registers surveyed, except for the oldest males in the Finnish register, where no difference was found.
Conclusions: Our findings should be used as feedback on current THAs performed, to direct surgeons to choose the right implant fixation, especially in patients > 75 years, thereby reducing revision risk and increasing the long-term survival of primary THAs. Femoral stem fixation may be the most important revision risk factor in older patients, and future studies should examine this perspective.

Categorization of changes in the Oxford Knee Score after Total Knee Replacement: An interpretive tool developed from a data set of 46,094 replacements.

164.

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Background: With the increase in use of Patient Reported Outcome Measurements in orthopedics, including the introduction into registries, there is a need for interpretative tools to contextualize our outcome.
Purpose / Aim of Study: The aim of this study was to create an interpretive classification for the transition in the Oxford Knee Score (OKS) from pre-operative to 6-months follow- up (the change score) using the anchor-based method.
Materials and Methods: Registry data from 46094 total knee replacements from the year 2014/15, accessed via the Health and Social Care Information Centre (HSCIC) official website. Data included pre-operative and 6-month follow-up OKS and response to the transition anchor question: "How are the problems now in the operated knee compared to pre-operation?" Please select one of the following: "much better", "a little better", "about the same", "a little worse" and "much worse". Categories were determined using Gaussian approximation probability and k-fold cross-validation.
Findings / Results: 4 categories were identified with the corresponding change score intervals; "1. Much Better" (≥ 16), "2. A Little Better" (7-15), "3. About the Same" (1-6) and "4. Much Worse" (≤ 0) based on the anchor questions' original 5 categories. The mean 10-fold cross-validation error was 0.349 OKS points (95 % confidence interval 0.511 to 0.632). Sensitivity ranged from 0.34 to 0.68, specificity raged from 0.74 to 0.95.
Conclusions: We have categorized the change score into a clinically meaningful classification. We argue it should be an addition to the continuous OKS outcome to contextualize the outcomes and aid in interpretation of research results.

Measuring effects on pain and quality of life after Dysport® injection in children with cerebral palsy

165.

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Background: Studies have shown that 30 – 70 % of children with cerebral palsy (CP) experience chronic pain, which increases with age and is closely interrelated to poor quality of life. Despite this, pain is an overlooked and undertreated clinical problem. Botulinum toxin injections have for more than 20 years been used to diminish spasticity in children with CP but the effect on pain has only sparsely been investigated.

Purpose / Aim of Study: The aim of this study was to examine the analgesic effect of a single intramuscular injection of DYSPORT in the most painful muscles of the lower extremities.

Materials and Methods: Our interim analysis is based on 14 children with spastic CP, age 5-17, GMFCS I-V. Participants were recruited from outpatient clinics of two regional hospitals. The most painful muscles during a clinical examination were the targets for treatment. The children had to have at least moderate muscle pain (r-FLACC≥4) at inclusion to be enrolled in the study. Pain levels were measured before and 4 weeks after a single injection of botulinum toxin (Dysport). All measurements were performed by a single specially trained rater. The localized pain of the treated muscles was evaluated by r-FLACC. The effect on daily pain was evaluated by the Pediatric Pain Profile (PPP). The effect on clinically relevant problems was evaluated by individual SMART goals using the goal attainment scale.

Funding for this research was provided by Ipsen.

Findings / Results: A significant pain reduction was observed 4 weeks post-treatment for localized muscle pain (6.71±1.77 vs 3.86±2.63, p:0.001) and the impact on daily activities (Z= -2.496, p:0.013). For PPP, an analgesic but non-significant trend was indicated for pain intensity (z=-1.811, p:0.07) and for pain-related behaviors (27.79±12.82 vs 21.23±14.39, p:0.075). Moreover, a clinically meaningful effect was seen since almost all participants achieved their therapeutic SMART goals (Z= -2.937, p:0.003).

Conclusions: Even though Dysport has been utilized for spasticity modulation in children with CP, it also appears to have a significant analgesic effect, when muscle pain is targeted. Moreover, the localized pain reduction seems to have a positive effect on activities of daily living.

Hamstring and quadriceps muscle strength in youth to senior elite footballers: a cross-sectional study including 125 players

166.

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Background: Increasing age, high quadriceps strength, and low hamstring strength are associated with hamstring strain injury in football.
Purpose / Aim of Study: We aimed to assess the age-related variation in maximal hamstring and quadriceps strength in male elite football players from U-13 to the Senior level.
Materials and Methods: We included 125 Elite football players from a Danish professional football club and associated youth academy (1st tier) (U-13, n=19; U-14, n=16; U-15, n=19; U-17, n=24; u-19, n=17; Senior, n=30). Maximal isometric force (MVC) was assessed for the hamstrings at 15o knee joint angle and for the quadriceps at 60o knee joint angle (0o = full extension) using an external-fixated handheld dynamometer. Hamstring:Quadriceps (H:Q) strength ratio as well as hamstring and quadriceps MVC levels were compared across age groups (U-13 to Senior).
Findings / Results: Senior players showed 18-26% lower H:Q ratio compared to all younger age groups ($p \leq 0.026$). Specific H:Q ratios (mean [95% CI]) were: Senior, 0.45 [0.42;0.48]; U-19, 0.61 [0.55;0.66]; U-17, 0.56 [0.51;0.60]; U-15, 0.59 [0.54;0.64]; U-14, 0.54 [0.50;0.59]; U-13, 0.57 [0.51;0.62]. Hamstring strength increased from U-13 to U-19 with a significant drop from U-19 to the Senior level ($p=0.036$), whereas quadriceps strength increased linearly from U-13 to Senior level.
Conclusions: Elite senior football players demonstrates lower Hamstring:Quadriceps strength ratio compared to youth players, which is driven by lower hamstring strength at the senior level compared to the U-19 level combined with a higher quadriceps strength. This discrepancy in hamstring and quadriceps strength capacity may place senior level players at increased risk of hamstring strain injuries.

Manipulation under anesthesia after TKA – gain in range of motion – A cohorte study

167.

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Background: Reduced Range of Motion (ROM) in the knee due to stiffness (arthrofibrosis) after TKA is often treated with manipulation under anaesthesia anaesthesia (MUA).
Purpose / Aim of Study: To determine the effect of MUA after TKA on ROM and to identify factors affecting the final ROM after MUA
Materials and Methods: Patients receiving MUA at Gentofte Hospital after TKA performed from 2011 to 2015 were included. Age, gender, BMI, smoking, comorbidity, type of operation (primary or re-TKA) flexion and extension were extracted from electronic patient records. Assuming missing data is at random multiple imputations were performed, based on age, sex and post-operative range of motion.
Findings / Results: In total 104 participants (57 women) with at mean age of 60.7 years and BMI at 27.8 were included. A mean increase from before MUA to follow-up at 3 months of 21.3 degrees (95% CI 16.6 to 25.9) in flexion to 102.3 degrees (95% CI 98.8 to 105.9) and a mean decrease of 4.8 degrees (95% CI 3.0 to 6.7) in extension deficit to 3.7 degrees (95% CI 2.7 to 4.6) at follow-up were found. A subgroup of 14 participant reviewed more than one MUA, showing a mean increase from before MUA to follow up were found. A subgroup of 14 participant reviewed more than one MUA, showing a mean increase from before MUA to follow-up o of 24,3 (95% CI 10.8 to 37.8) in flexion a and a mean decrease of 6.8 (95% CI 2 2.4 to 11.0) in extension deficit. The mean increase in flexion was 9.3 degrees (95% CI: -4.7 to 23.2), from f first to last MUA. Mean flexion at final f follow up was 99.6 degrees (95% CI: 8 88.1 to 111.2). The mean decrease in e extension the was 3.2 degrees (95% C CI: 7.5 to 1.1) from first to last MUA. M Mean extension deficit at final follow u up was 2.0 degrees (95% CI: 0.2 to 3 3.8) Patients with DM showed significant improvement in flexion at mean 33.5 degrees (95% CI: 21.8 to 45.2) to mean flexion at 100.9 degrees (95% CI; 94.2 to 107.6) at final follow-up. The extension-deficit reduced with 3.9 degrees (95% CI: -8.9 to 1.1) to a mean deficit at 5 degrees (95% CI: 0.2 to 9.8) at final follow-up.
Conclusions: A clinical important increase in flexion an and reduction in extension deficit was se seen, even in those failing the first MU MUA and patient with DM.

The effect of 3D-printing proximal tibia fractures in preoperative planning

168.

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Background: 3D-printing of bones is novel way in preoperative planning giving the surgeon a real-size fracture to evaluate by hand. There are studies from China showing shorter operation time, decreased intraoperative blood loss, and better functional outcome but there are no studies assessing the impact on the preoperative plan.
Purpose / Aim of Study: To assess the effect of 3D-printed proximal tibia fractures in the preoperative plan. Secondarily, to perform sub analyses of the effect divided on operative experience.
Materials and Methods: Data on bicondylar proximal tibia fractures treated with open reduction and internal fixation including dual plating was retrieved for 2019. We included 9 consultants in traumatology to do a preoperative plan twice on the basis of CT-scan, thereafter the 3D-print and divided them in to senior (>10 years consultant) and junior (<10 years consultant). Data was entered in an electronic database. We defined an alteration in the preoperative plan as a change in the operative starting point, arthroscopic use, posterior plate, solitary screws, elevation of joint surface through fenestra, and auto-/allograft. Length of plates were also assessed and the surgeons evaluated their confidence after each preoperative plan. Chi-square test was used for categorical group comparison between the 3D- print and the second preoperative plan on the CT-scan.
Findings / Results: There were 9 3D-printed proximal tibia fractures, mean age 60.1 (95% confidence interval, 52.4;67.8), 4 were female and 90% were min. Schatzker type 4. The 3D-print lead to a change in 47% of the preoperative plans with no difference between junior or senior surgeons ($p<0.29$). The amount of changes was median 1 (1-4). Including changes to the length of plate, there was a change in 81% of the preoperative plans with no differences among the surgeon groups ($p<0.512$). There was a significant improvement in the level of confidence with the preoperative plan among junior surgeons ($p<0.001$) but not among senior surgeons ($p<0.24$).
Conclusions: 3D-print of proximal tibia fractures has a significant effect leading to a change in 47% of the preoperative plans with no difference due to the surgeons' experience.

Longterm follow-up with a Custom Triflanged Implant In Reconstruction Of Severe Acetabular Bone Loss With Pelvic Discontinuity After Total Hip Arthroplasty.

169.

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Background: Revision of a failed total hip arthroplasty with massive acetabular bone loss and pelvic discontinuity is a reconstructive challenge. Treatment options includes morselized bone graft and structural allograft used with uncemented hemispherical acetabular components, cages, porous metal augments, and cup- cage reconstruction. A custom-made triflanged implant has recently been introduced as a new option of treatment.
Purpose / Aim of Study: The purpose of this study was to evaluate the use of a Custom made Triflanged Implant in cases with pelvic discontinuity. We monitored healing rate, migration and overall survivorship defined as revision of the implant for any reason.
Materials and Methods: We reviewed 42 consecutive patients, mean age 68.7 (48-85 years) with a failed THA and pelvic discontinuity. Mean follow-up was 45 (12-120) months. The implant for acetabular reconstruction was custom manufactured on the basis of a three- dimensional model of the hemi-pelvis created from computed tomography (CT). The Harris Hip score was performed and the acetabular bone defects were all classified as type V according to the Gross classification. Center of rotation (COR) was calculated. Postoperative radiographs were analyzed in relation to: Healed or unhealed discontinuity and stable/unstable fixation.
Findings / Results: Mean per-operative blood loss was 1500 ml (235-6500) and mean surgery time was 147 min. (72-331). COR was established in 36 of the patients and no major intraoperative complications occurred. Mean Harris Hip score was 80 (47-96). The discontinuity healed in 40 (95%) of the cases. Thirty-five patients (83%) had no additional procedures. Seven patients experienced dislocation (16%) five for these treated with a constrained liner. We observed two septic loosening (5 %) revised in 2 stage procedures, and one re-infection (2%) treated with life-long antibiotic. 40 (95%) of the implants was defined as stable without any revision for aseptic loosening.
Conclusions: The 3D costum made Triflanged Implant makes it possible to optimized screw and implant positioning with high accuracy and with rigid fit on bone fixation thus permitting healing of the discontinuity and biological fixation of the acetabular component.

Outcome after treatment of distal fibula fractures using one-third tubular plate, Locking compression plate or distal anatomical locking compression plate.

170.

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Background: Surgical treatment of lateral distal fibula fractures is associated with a high rate of reoperation and complications. Within the last decade anatomical plates have been introduced.
Purpose / Aim of Study: The aim of this study is to report risks of reoperation and wound healing problems ≤ 1 year after treatment with one-third tubular plate, Locking compression plate or distal anatomical locking compression plate.
Materials and Methods: From 1. January 2010 until 31. December 2015 all patients having osteosynthesis of distal fibula with a one-third tubular plate, LCP or distal anatomical LCP plate at Copenhagen University Hospital, Bispebjerg, Denmark, were identified and retrospectively evaluated with a follow up of at least 1 year. Data on patient characteristics, fracture classification, surgical time, surgical delay and weight bearing are registered.
Findings / Results: 601 patients were included. 417 were treated using a one-third tubular plate with a reoperation risk of 11% (95% CI 8-14) (n=46) and 21% (95% CI 18-25) (n=89) had wound healing problems. 114 received an LCP plate with a reoperation risk of 20% (95% CI 13-28) (n=23) and 31% (95% CI 23-40) (35) had wound healing problems. 57 had a distal anatomical LCP plate with a reoperation risk of 23% (95% CI 14-35) (n=13) and 40% (95% CI 29-53) (n=23) had wound healing problems. No difference was seen in fracture classification (Weber) between one-third tubular plate and distal anatomical LCP plate
Conclusions: Distal anatomical LCP plates seems to be associated with higher risk of reoperation and wound healing problems compared to the one-third tubular plate. Further analysis including patient and fracture related risk factors will be performed before congress presentation.

Fast-track Total Ankle Replacement – A Single Center Experience

171.

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Background: Total ankle replacement (TAR) is a rapidly growing treatment for end-stage ankle arthritis. TAR is generally performed as an inpatient procedure with an average length of stay between 2.5-3.2 days. Previous studies have shown that out-patient TAR is safe and cost-effective but others have found increased complication rates associated with out- clinic surgery but the literature is sparse on this topic.

Purpose / Aim of Study: To evaluate the admission length together with complication, re-admission and non-scheduled contact to the out-patient clinic rates in patients operated with TAR at Hvidove University Hospital. The study also aims at identifying risk factors associated with admission length >1 day.

Materials and Methods: Since 11th of December 2015 all patients treated at Hvidovre University Hospital with TAR have been subjected to the fast track setting where discharge is planned the first post-operative weekday after cast application. For this study data was collected on all patients treated during the period 11th of December 2015 to 1th of October 2019 with a minimum of three months follow-up. Data was collected regarding age, sex, ASA-score, BMI, co-morbidity, complications-, re-admission rates and non-scheduled contact to the out-patient clinic.

Findings / Results: 151 patients were included. No difference was found between patients discharged after one day when compared with those admitted >1 day. 54.3% was discharged one day after surgery while 32.4 % was discharged after 2 days and 13.3 % after >2 days. The overall readmission rate was 1.95 % while 5.96 % had a complication and 16.65 % had a non- scheduled contact to the out-patient clinic. None of the included variables was found associated with admission length >1 day in both uni- and multivariate logistic regression analysis.

Conclusions: Fast track TAR seems safe even though only 50 % of the patients could cohere to this. The main reasons for prolonged admission was soft-tissue swelling not allowing cast application or surgery at the end of the week delaying cast application. Also, special attention has to be made regarding analgesic treatment and cast application, in order to reduce the number of non-scheduled contacts to the out-patient clinic.

Reverse total shoulder arthroplasty in younger patients (≤ 65 years) versus older patients (>65 years): short term results.

172.

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Background: Reverse total shoulder arthroplasty (RTSA) was originally designed for older patients with rotator cuff arthropathy and has over the years proven good results in this patient group. Therefor indications are expanding, and the prosthesis is now also used for osteoarthritis - with glenoid deformity, fracture sequela, rheumatoid arthritis etc. The age group is also expanding especially so that the prosthesis is now also used in younger patients, thus here is a concern that the RTSA might not prove as good results, as in the group of older patients as recent publications point to this. Ek el al from 2013 and S. Vancolen et al.

Purpose / Aim of Study: The objective was to assess if there was a clinically relevant difference between RTAS in younger and older patients patients.

Materials and Methods: Younger patients, age below 65, and older patients, age above 65, receiving a RTSA from 2014 to 2020 with follow-up data at University Hospital of South West Jutland. WOOS and Constant score was used for assessing results. Continuous data are reported as means with standard deviations if normal distributed, else interquartile ranges, categorical data was reported as numbers and proportions. WOOS was dichotomized according to the Danish WOOS validation where a score higher than 50% (950) is considered "good". Relative risk (RR) of patients reaching 50% in the age-groups were compared. Bivariate comparisons and multivariate analyzes was performed mixed linear and poisson regression with robust SE.

Findings / Results: 566 RTSA, 366 females and 200 males. Clinically relevant improvements were found, and there was a multivariate statistically significant but not clinically relevant difference in the change over time between groups, 12 months WOOS was 58 in the young and 71 in the older age-group, Constant score change was 44 in the young compared to 43 in the older age group. The young age-group had a non-significant RR of 1.8 of not reaching good WOOS compared to the old age-group.

Conclusions: RSA in younger patients seem to be a safe procedure with good results, that provides clinically relevant improvement in both WOOS and Constant scores.

Intervariability in radiographic parameter and general evaluation of a low dose fluoroscopic technique in patients with idiopathic scoliosis.

173.

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Background: Adolescent idiopathic scoliosis (AIS) is a frequent occurring spinal disorder in the adolescent female. Serial radiographs are used to monitor for progression but has a potential radiation-induced oncogenic effect. We examined a low-dose fluoroscopic technique (LDT) to perform radiographs of AIS with inherent lower risk for malignancy.
Purpose / Aim of Study: The aim of the present study is to compare the LFT with traditional radiographs for scoliosis (ORT), to see if LFT is adequate for clinical radiographic evaluation of AIS as well as having lower radiation dose.
Materials and Methods: Image quality were evaluated using a pediatric trunk phantom for LTF and ORT. We measured primary physical characteristics for image quality evaluation of noise, contrast, spatial resolution, SNR and CNR. Three independent raters evaluated the images quality by observer-based methods of ICS and VGAS of 25 phantom images. Radiation doses were evaluated by DAP measurements. Two raters performed measurements of 6 radiographic parameters once and separately for 342 LFT images of 136 patients with AIS.
Findings / Results: The average noise and contrast were approximately 15-fold higher for the LFT. The SNR and CNR was similar. Evaluating the 25 images of the phantom, the overall ICS and VGAS were 3-fold higher for ORT compared to LFT for L3 and similar for Th6. For the clinical radiographs, the average measurement of CA was 16.4 degrees (dg) with a standard deviation of 12 dg. The absolute average difference (MAD) was 1.67 dg. The standard error of the mean of CA was 2.72 dg for the ORT and 2.69 dg for the LFT. ICC for CA (0.852) was almost perfect, but for the other radiographic parameters fair or worse. For radiation dose, the average DAP and effective dose for the LFT were 8-fold lower than for ORT.
Conclusions: In conclusion, the LFT are reliable for CA measurements, thus being useful for follow-up evaluation of scoliosis progression as in a clinical setting. LFT is not adequate for appreciating details and pathology of the spinal skeletal structures, thus not useful for the initial evaluation of AIS. Even though the image quality is lower for LFT than ORT, the merits are the marked less radiation, thus in accordance with the principles of ALARA.

Patient and public involvement in the Danish PROHIP trial: A thematic exploration of key stakeholder input, experiences, and perceptions.

174.

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Background: Total hip arthroplasty (THA) and exercise provide improved function and reduced pain for hip osteoarthritis. Current treatment selection is based on low evidence as no randomised controlled trials (RCTs) are available. Furthermore, low recruitment rates and intervention crossover are common in RCTs comparing surgery to exercise. Patient and public involvement (PPI) may improve trial design and implementation of research findings. Thus, a PPI protocol was embedded into the Progressive Resistance Training versus Total Hip Arthroplasty in Patients with End-stage Hip Osteoarthritis (PROHIP) trial.
Purpose / Aim of Study: To explore context-relevant key stakeholder input in order to optimise the design and execution of a planned comparative RCT.
Materials and Methods: Fourteen patients undergoing THA, two orthopaedic surgeons and two physiotherapists, and four political stakeholders were recruited. Six focus group interviews were conducted according to group status using semi-structured interview guides. Interviews were recorded, transcribed verbatim and thematic analysed.
Findings / Results: Three key themes emerged: (1) Patient recovery expectations, (2) The influence of professional authority, and (3) Inconsistent health care provider communication. Theme 1 suggested that patients experienced their hip problem as disabling and considered recovery without THA unlikely. However, after THA, expectations for a quick return to activities of daily living were high. Theme 2 highlighted that both surgeons and physiotherapists claimed expert knowledge and clashed regarding explanatory and management frameworks. Therefore, patients may feel pressured into choosing between THA or exercise. Finally, theme 3 indicated that health care providers tended to use a management narrative best suited to their preferred intervention. Therefore, patients risk being medicalised differently.
Conclusions: Patients, orthopaedic surgeons and physiotherapists may introduce systematic bias into the PROHIP trial. Methodological considerations to improve trial design may include development of a neutral patient information narrative delivered by an independent health care provider group during enrolment and a prospective cohort study investigating the external validity.

Results of operative treatment of posterior ankle impingement syndrome in ballet dancers

175.

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Background: Posterior ankle impingement syndrome (PAIS) is a syndrome characterized by pain in the hind foot that occurs in forced plantar flexion, mostly seen in ballet dancers. Dancing ballet requires extreme plantar flexion of the talocrural joint and these positions may lead to PAIS. Impingement syndrome can be secondary to a painful os trigonum, which is a common morphological variation associated with PAIS in dancers.
Purpose / Aim of Study: The purpose of this literature review is to provide knowledge about PAIS and to evaluate the results of operative treatment of PAIS in ballet dancers.
Materials and Methods: A systematic search of PubMed was undertaken, using the search words 'posterior ankle impingement syndrome' and 'ballet'. A total of 29 publications were found of which af total of 10 publications evaluated the results of operative treatment in ballet dancers. Reviews were excluded, and in the end nine studies were included. Primary outcome was the subjective degree of satisfaction with the surgery from poor to excellent. Secondary outcome was the time from surgery until returning to dance.
Findings / Results: All of the included publications found post-operative outcome better compared to pre-surgery in most cases. Three studies graduated satisfaction on a scale. Two evaluated the degree of satisfaction on a scale from poor to excellent with an average of 80,1% in the good or excellent group, ranging from 73,2% to 90%. One study reported better or much better post-operative outcome in 90,8% of cases. All publications reported most patients back into dance after surgery, ranging from 73,2% to 100%. 6 of 9 studies investigated the period of return to dance after surgery, ranging from 5 to 10 weeks. Only one study investigated time until pain free dance with an average time of 17,7 weeks.
Conclusions: Operative treatment of PAIS in dancers, either open or endoscopic, is a succesfull surgery providing satisfactory pain relief and return to dance, in most cases within a few months. Future research should have a prospective design, evaluating pre-operative pain score compared to post-operative.

Lateral hip pain due to gluteal tendon pathology. 176.

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Background: Tendinopathy and tendon lesions of m. gluteus medius and/or minimus insertions insertions at the greater trochanter are often often under- or misdiagnosed in patients with lateral hip pain (LHP), and thus, treated insufficiently.
Purpose / Aim of Study: The purpose of this study was to evaluate evaluate baseline data in patients with MRI-verified gluteal pathology, in order to enhance the knowledge of this patient group in the orthopedic co community.
Materials and Methods: Data were prospectively collected between between September 2017 and June 2019. Patients with a positive MRI for gluteal gluteal pathology were included in the study study. Baseline testing included a patient interview, pain scoring, clinical tests, a 30-second chair stand test (30-s CST) and patient reported outcome outcome measures (Copenhagen hip and groin score (HAGOS), Oxford Hip score (OHS) and EQ-VAS.
Findings / Results: The cohort included 93 patients (94% women women) with a median age of 53 years years. Median duration of symptoms was was 24 months. Typical complaints were were present. Most patients had an insidious insidious onset of LHP. Pain (NRS, 0-10) at rest was 3.8 (SD 2.6), during activity activity 5.8 (SD 2.5), and worst pain at any any given time 8.5 (SD 1.4). Two different different pain profiles were identified. Palpation Palpation of the greater trochanter was positive in all patients, the Trendelenburg Trendelenburg test was positive in 87% and the FADER test in 84%. Hip range of motion and hip strength assessed assessed by a handheld dynamometer showed showed side-to-side differences. Patients were able to perform 12 repetitions in the 30-s CST on average. Patient reported outcomes showed showed a decreased physical function and quality of life.
Conclusions: This study indicates that patients with LHP with an MRI-verified gluteal pathology pathology display characteristic symptoms, impaired physical function, and poor subjective outcomes. The results results are based on a heterogeneous study study population in terms of stages of gluteal gluteal pathology and co-morbidities and should be interpreted with this in mind.

Surgical conversion rate and patient-reported outcome after treatment with a physiotherapy-led progressive exercise program plus a PCL support brace in patients with an acute injury of the posterior cruciate ligament

177.

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Background: PCL injuries can be treated surgically or with progressive exercises in combination with a PCL support brace. However, larger prospective studies reporting outcome of exercise-related treatment are lacking.
Purpose / Aim of Study: We aimed to investigate changes in patient-reported and functional outcome of a physiotherapy-led progressive exercise program plus a PCL support brace in patients with an acute injury of the PCL over a 24- months follow-up. Furthermore, to report conversion to surgical reconstruction.
Materials and Methods: In a prospective case-series study, 50 patients were treated with a PCL support brace for 12 weeks and underwent a 16-week physiotherapy- led progressive exercise program. Changes in patient-reported outcome was investigated with the International Knee Documentation Committee Subjective Knee Form (IKDC-SKF) from baseline to 1 and 2 years. Furthermore changes in isometric knee flexion and extension strength was measured from 16 weeks to 1 year. Mean changes were analyzed with a mixed effect model with patients as a random factor and time as a fixed factor.
Findings / Results: Seven patients converted to PCL reconstruction and one patient dropped out resulting in 42 patients for 1-year follow-up that completed the combined brace and rehabilitation treatment. Of the patients converting to reconstruction, two patients had an isolated ligament injury and five patients had dislocation of the knee. The IKDC-SKF score at baseline was 35 (SD 9.7) and at 2 years 62 (SD 15). Isometric knee flexion strength of the injured knee increased statistically significantly from 0.93 (SD 0.36) Nm/kg to 1.1 (SD 0.36) Nm/kg, corresponding to an increase of 17%. In contrary isometric knee extension strength of the injured knee did not change (0.10 (-0.022-0.21) Nm/kg, p=0.107).
Conclusions: Treatment resulted in a 14% conversion rate to surgical treatment. The treatment demonstrated clinically relevant improvements in patient- reported outcome and an improvement of 17% in flexor strength. Consequently, limited need for conversion to surgical treatment, clinically relevant improvements in subjective outcome and strength after PCL support brace treatment and a progressive exercise program can be expected in patients with an acute PCL injury.

Thumb Amputations Treated With Osseointegrated Percutaneous Prostheses

178.

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Background: Amputation of the thumb around the MP-joint, leaves the patient without a pinch-grip which is a severe handicap. Reconstructions have been performed with a free toe graft, elongation of the 1. metacarpal bone or an external prosthesis fixed to the hand with belts. Implantation of an osseointegrated (OI) prosthesis is another alternative which restores the pinch-grip and gives the patient an osseoperception. The OI-prosthesis, consists of a fixture implanted in the 1. metacarpal bone and an abutment protruding through the skin which is connected to a custom made external prosthesis
Purpose / Aim of Study: To present our experience with reconstruction of the amputated thumb with an OI-prosthesis.
Materials and Methods: 8 patients (3 female), median age 54 yrs (27-65) were operated from november 2012 to july 2017. Time since amputation was 9.3 yrs (2-27). After 3 weeks the patients were equipped with an external individually fit costum made prosthesis (prosthetist). The patients went through a 3 months rehabilitation program with gradually increased mechanical loading of the prosthesis (occupational therapist).
Findings / Results: The patients restored the abduction/adduction and opponens movement of the thump and got a pinch grip enabling them to perform even heavy physical activities. Transferral of the load from the prosthesis to the bone gives the patients an osseoperception allowing them to graduate the strength of their regained grip force. The prosthesis can be worn permanently and the patients describe it as an integrated part of their body. 2 patients have been operated after 7 resp. one year with removal of granulation tissue at the interface between skin and prosthesis. In 3 patients a Z-plasty of the interstitial tissue was performed to increase the range of abduction. In one patient the abutment was removed four years after primary surgery due to permanent pain. No patients had infection of the prosthesis.
Conclusions: OI-prosthesis results in a firm and functional reconstruction, with a restored pinch grip in thumb amputees. The patients regain several daily activities including return to work and report an increased quality of life. The preoperative planning, surgery and rehabilitation needs a multimodal team setup.

Demography and Complications of Surgical Treated Talar Fractures

179.

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Background: More than 60-65% of the surface area of the talus bone is covered with articular cartilage, which limits the intra-osseous blood supply. Talus account for 0.5 % of all fractures, and only 3% of all foot fractures. The primary mechanism of injury is often severe, and includes high energy, often making the patient group multi-traumatic. Associated skeletal lower leg injuries has been reported in 54% of all talus fractures, and 8% were multi-traumatic with injuries at other locations of the body. Sequelae such as avascular osteonecrosis (54%) and post-traumatic arthritis (25%) are common complications seen after treatment of all types of talus fractures.
Purpose / Aim of Study: Describe the demography and early complication rate after surgical treatment of both talar neck and corpus fractures.
Materials and Methods: In 2010-2013 we operated 29 consecutive patients (34 (14-54) years, F/M= 11/18) with 33 talus fractures, 19 corpus fractures and 14 neck fractures. All fractures were evaluated pre- and post- operatively with plain X-rays and CT. The operative technique was selected by the surgeon and was either ORIF (n=29), external fixation (n=3) or primary arthrodesis (n=1).
Findings / Results: Corpus fractures were classified by the Sneppen classification (type 1 (n=3), type 2 (n=3), type 3 (n=3) type 5 (n=10)) and neck fractures by the Hawkins classification (type 1 (n=7), type 2 (n=3), type 3 (n=3) type 4 (n=1). 19 patients sustained their injury in a high-energy trauma, 7 patients had an open fracture, and 4 patients had bilateral fractures. The number of associated injuries found were: 1-2 (n=15), 3-4 (n=5), 5 or more (n=2). 11 patients required more than one surgery in order to gain soft tissue coverage, infection control and ultimate heling. 2 patients had secondary arthrodesis of the ankle joint caused by AVN.
Conclusions: We found a higher number of associated injuries in patients with talus fractures than seen in other studies. The number of AVN was lower than otherwise reported, however, we experienced a high number of surgical interventions in order to archive healing.

No joint destruction in patients with prolonged septic arthritis induced by a communicating intraosseous abscess

180.

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Background: Septic arthritis demands prompt intervention due to risk of cartilage destruction when treatment is delayed.
Purpose / Aim of Study: We present seven cases of septic arthritis in combination with a communicating intraosseous abscess. Our goal was to assess the impact on the affected joints.
Materials and Methods: Seven male patients with median age 4 (range; 1-22) years, were identified in a period from 2010 to 2018. Data from journals, radiology, blood samples and cultures were retrospectively collected.
Findings / Results: All patients presented with a history of minor pain from affected joints as well as subfebrilia and discomfort. Median treatment delay was 2 months (range; 1 day-12 months). None of the patients were septic at admission, and median CRP was 30 (2-102 mg/L). Knee joint was involved in 5 cases and further 2 cases affecting elbow- and subtalar joints respectively. Radiographs and MRI showed juxta-articular intraosseous abscess communication into the joint with effusion, synovitis and revealed no evidence of joint destruction. 3 patients were treated with arthroscopic synovectomy and debridement of the abscess, 3 were treated with just debridement and washout of the joint, one with open synovectomy. Biopsies were taken from abscesses and synovia: Staph. aureus was responsible for 3 cases, Salmonella for one, and the remaining 3 cases had negative cultures. All patients received antibiotics for 6 weeks.
Conclusions: Patients with septic arthritis due to a communicating intraosseous abscess seem to avoid joint destructions even in situations with considerable therapeutic delay.

Patients operated for Spinal Stenosis with Degenerative Spondylolisthesis achieve a clinically meaningful effect, and the effect is sustained 5 years after surgery.

181.

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Background: Lumbar Spinal Stenosis (LSS) with degenerative spondylolisthesis (DS) is a common condition in the elderly population which is associated with significant morbidity and decreased quality of life. For patients where pain and disability are unacceptable, surgical intervention with lumbar decompression is a commonly used treatment option, shown to provide relief of symptoms and pain. Few studies have examined if a clinically relevant difference in function is obtained, and whether this effect is sustained at long term.
Purpose / Aim of Study: The aim of this study was to evaluate the patient reported outcomes, whether patients obtain a clinically relevant effect of surgery, and if the effect of treatment is sustained at one, two and five years postoperatively.
Materials and Methods: The study was performed as a multicentre registry-based retrospective cohort study, in collaboration between Silkeborg, Køge and Middelfart hospital, using data collected prospectively in the Danish national surgical spine database; DaneSpine. All patients underwent decompression and un-instrumented fusion due to LSS with DS. This study evaluates both preoperative and postoperative outcomes. All PRO measures were filled out preoperatively and at 1, 2 and 5 years postoperatively. Based on the outcome measures, the patients who obtained a minimal clinically relevant difference in outcome (MCID) were identified at one, two- and five- years post-surgery. Outcome measures for the study included the Oswestry Disability Index (ODI), EuroQoL-5D-3L (EQ-5D), Visual Analogue Scale Leg Pain (VAS-leg) and Visual Analogue Scale Back Pain (VAS-back).
Findings / Results: We found a mean change from surgery to 5 years of -18.9 on ODI; a mean change of 0.29 on EQ.5D, -29.2 on VAS leg and -21.3 on VAS back. We found that 83% of patients obtained a clinically relevant increase in one or more PROs. Apart from EQ-5D, there was no statistical difference in percentage of patients who obtained MCID at one, two- and five-years post-surgery.
Conclusions: Surgery for LSS with DS has favourable results, with many patients experiencing a clinically important change in outcome measures, and this change is maintained for at least 5 years.

Rehabilitation after anterior cruciate ligament reconstruction

182.

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Background: Anterior cruciate ligament reconstruction (ACLR) is a frequent surgery, that is performed 2500- 3000 times annually in Denmark. Rehabilitation after ACLR is crucial to achieve satisfactory results after the surgery.
Purpose / Aim of Study: The aim of this litterature study is to explore the scientific basis behind key physiotherapeutic modalities connected to ACLR rehabilitation. Futhermore the purpose is to examine, how long time the patient is associated with physical therapy aswell as what allows return to sports.
Materials and Methods: The literature-search was performed in PubMed. Five systematic reviews was included in this study and the scientific quality was assessed using AMSTAR-checklist.
Findings / Results: No significant benefit is found using bracing, and the effect of neuromuscular stimulation is inconclusive. Home-training and supervised training is equally effective. Early activation of the knee in full ROM and isometric exercises from week 1 are concluded to be beneficial. The difference in efficiency of CKC and OKC seeks further studies. EMS statistic significantly increases quadriceps-strength, but long-term follow-up studies are required. The optimal length of the rehabilitation program is concluded to be 9-12 month, with a criterion of goal- based progression and return to sports after satisfactory results in a test-battery. Further studies of what test-battery should contain are required.
Conclusions: Rehabilitation after ACLR is concluded to have a optimal length of 9-12 months, the progression should be goal-based and no brace is needed. Return to sport is possible when satisfying evalation in test-battery is obtained. Further studies are required.

Patient involvement in evaluation of the Hip Disability and Osteoarthritis Outcome Score (HOOS) in patients undergoing total hip arthroplasty.

183.

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Background: The Hip disability and Osteoarthritis Outcome Score (HOOS) has previously been recommended as a patient reported outcome measure for patients with hip osteoarthritis (OA) undergoing total hip arthroplasty (THA). The HOOS is an adaptation of the Knee injury and Osteoarthritis Outcome Score which again is an adaptation of the Western Ontario and Macmaster Universities Osteoarthritis index. The HOOS was developed 18 years ago with only partial patient involvement.
Purpose / Aim of Study: We aimed to evaluate if the HOOS contains items that present-day patients undergoing THA find relevant preoperatively and postoperatively in a patient involvement study.
Materials and Methods: Patients aged 60-75 years, diagnosed with primary OA, and receiving a THA was included. We recruited patients for focus group interviews preoperatively and at 3, and 12 months after primary THA from a university and a regional hospital. We conducted 6 focus group interviews with 28 patients in total. The interviews were transcribed and analyzed using qualitative inductive thematic content analysis.
Findings / Results: When comparing items identified from the transcripts to the items of the HOOS, we showed that 7 of 40 items were very important or important at all 3 time periods. They included walking, pain, awareness of the hip and light domestic duties. 8 of 40 items, including bending the hip and rising from the bed, were not mentioned at neither of the time periods. 25 items mentioned by the patients and identified from the transcripts were not represented in the HOOS. 5 of these, including cycling and the ability to get on the floor, were found to be very important at all 3 time periods. Furthermore, 3 items related to psychological health, including fear of dislocation, were found to be important at all 3 time periods.
Conclusions: According to present-day patients in a Danish population, we showed that the HOOS lacks several dimensions. Furthermore, we showed that the HOOS still have some items that are relevant to present-day patients but also contains several items not mentioned by the patients. In perspective, this study shows that patient preferences may change over time and may indicate a need for revision of the HOOS score to get better content validity.

Mega-prosthetic joint replacement of the distal femur in non-tumour cases.

184.

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Background: Mega-prosthetic joint replacement of the distal femur is also an option for management of massive bone loss in revision total knee arthroplasty (TKA) and for fractures. Even though this surgery is challenging with high rate of infection, patellar complications, and implant failure it is often the only option to avoid knee arthrodesis or amputation.
Purpose / Aim of Study: The purpose of this study was to evaluate the complications and outcome after implantation of mega-prostheses of the distal femur in non-tumour cases.
Materials and Methods: We retrospectively reviewed 65 patients mean age 66 (38-84) years, F/M=47/18, mean follow-up 41 (12-220) months that received a distal femoral resection and reconstruction with a mega-prosthesis because of a failed TKA due to aseptic/septic loosening, periprosthetic fracture or complications after a complex fracture with failed osteosynthesis. 41 patients (64 %) had previous TKA revision surgery and 19 patients (29%) previous periprosthetic infection. In this cohort 19 patients were revised for aseptic loosening and 12 patients for septic loosening. 18 patients were diagnosed with periprosthetic fracture and 6 patients with pseudarthrosis. 6 cases with instability, 1 case with a comminute distal femur fractur and in in 3 cases pain were the reason for revision.
Findings / Results: We found good patient satisfaction and low pain scores with moderate to low activity level. During the follow-up period 39 patients (60%) had no additional procedures. 18 patients (27%) had major revision defined as removal or exchange of the femoral component because of aseptic loosening (n=11), periprosthetic fracture (n=4), septic loosening (n=2) and amputation (n=2), and 13 patients had minor revision due to instability, pain or patellar complications. Survival analysis shows that 70 % was free of major revision after 5 years.
Conclusions: Mega-prosthetic joint replacement of the distal femur is a good option for management of non-tumor cases (revision TKA and fractures) with massive bone loss, and thus amputation and knee arthrodesis can be avoided in most patients. However, there is a high risk that the patients have to undergo future additional surgery including major revision.

Cementless one-stage revision in early periprosthetic hip joint infection (PJI) - A single-center, retrospective case series.

185.

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Background: Treatment of early PJI remains a substantial challenge to the orthopedic surgeon. Until now debridement, antibiotics and implant retention (DAIR) has been the gold standard, but with a frequently reported infection control rate of 60% there is room for improvement. Cementless one-stage revision of chronic PJI by the CORIHA protocol has been evaluated positively with a 93% success rate. Whether this protocol can be used advantageously in early PJI due to a more thorough debridement and removal of colonized implants needs to be evaluated.
Purpose / Aim of Study: To evaluate effectiveness of cementless one-stage revision for early PJI in primary THA regarding the risk of re-infection and re-operation with exchange of implants.
Materials and Methods: We identified 19 patients in our center with early (≤ 6 weeks postoperative) PJI after primary THA treated with one-stage cementless revision in the period January 2012 - March 2018. Treatment followed the CORIHA-protocol. Primary outcome was retention of implants at most recent follow up. Secondary outcome was re-operation for other reasons than infection. Patients were followed for a minimum of 2 years.
Findings / Results: Mean follow up was 47,5 months (range: 24-97 months). 19 of 19 patients (100%) retained their implants, but two required superficial soft tissue debridement due to persistent wound seepage. One patient was re-operated due to a periprosthetic fracture, not related to the PJI treatment. The patient was treated with open reduction and internal fixation with no exchange of implants and no signs of persistent infection.
Conclusions: Cementless one-stage revision appears to be an effective treatment of early PJI after primary THA, and at least an equal choice of treatment compared with DAIR. Whether the potential benefit of a lower re-revision rate for postoperative PJI, outweighs the increased surgical complexity of the CORIHA procedure needs further evaluation.

Rehabilitation with blood-flow restricted resistance exercise to enhance recovery after knee surgery or injury: A retrospective study of 324 patients

186.

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Background: Blood flow restriction (BFR) resistance exercise is considered to be a safe and effective rehabilitation modality in increasing muscle mass and strength.
Purpose / Aim of Study: The aims of this study were to report changes in thigh muscle mass and knee pain, as well as adverse events during rehabilitation with BFR in a large cohort of patients seen in clinical practice after knee surgery or injury.
Materials and Methods: In this descriptive, retrospective, practice-based study, we included 324 patients who performed rehabilitation with BFR resistance exercise after knee surgery or injury at an outpatient rehabilitation center. From medical records, we extracted: Thigh circumference (muscle mass proxy) and knee pain during self-reported activity ((11-point numerical rating scale (NRS)) before and after rehabilitation, and any adverse events recorded.
Findings / Results: Thigh circumference difference between non- affected and affected leg was significantly smaller post- than pre-rehabilitation (1.1 vs 2.4; mean difference, -1.3 cm, [95% CI = -1.7 to -0.9], $p < 0.0001$, n=76). Knee pain during activity was lower post- compared to pre-rehabilitation (2.0 vs 3.7; mean difference, -1.9 NRS-points, [95% CI = -2.3 to -1.5], $p < 0.0001$, n=159). One patient fainted in relation to BFR resistance exercise during the rehabilitation period (n=324).
Conclusions: In this retrospective study, rehabilitation with BFR resistance exercise applied in clinical practice after knee surgery or injury appeared to increase thigh muscle mass while reducing knee pain during activity. Very few harms were reported suggesting underreporting.

Patient Involvement in Evaluation Of The Forgotten Joint Score (FJS-12) - Based On Preoperative And Postoperative Interviews Of Patients Undergoing Total Hip Arthroplasty

187.

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Background: The forgotten joint score (FJS-12) is a questionarie developed in 2012, based on the patient's ability to forget their artificial joint in everyday life. During the development the patients were used as experts and generated questions with content that is important for them. FJS-12 was tested postoperatively and is primarily used postoperatively beyond 6 months. Therefore, the items may not be representative for all periods of the pre- and postoperative phase and may not represent the patients experience with getting an artificial joint.
Purpose / Aim of Study: We performed focus group interviews with patients to evaluate if the FJS-12 contains relevant items preoperatively, and postoperatively at 3 and 12 months after THA.
Materials and Methods: Patients with primary osteoarthrosis, receiving a THA aged 60-75 years, were recruited for focus group interviews from Two Danish hospitals. We recruited seven patients preoperatively, nine patients at three months postoperatively, and twelve patients at twelve months postoperatively, totaling 28 patients.
Findings / Results: By comparing the items identified in the interviews with items from FJS-12, we showed that all items from the FJS-12 is mentioned in one or more time periods. Sleeping, housework or gardening, and favorite sport were very important items in all three time periods. Three items were identified as being very important by the patients in all three time periods and were not covered by the FJS-12: walking, pain in general, and reaching down/getting up from the floor. Walking was a very important item for patients in all time periods.
Conclusions: We showed that the FJS-12 contain items relevant to the present-day patients both pre- and post- operatively. Some additional categories to the FJS- 12 were identified, mainly pain and reaching down/getting up from the floor. Because walking is mentioned in two of the items in FJS-12 it was difficult to assess in what category the patient answered and it may be confusing for the patient. Pain is indirectly linked to all items as patients have to be free of pain to forget their artificial joint.**Improved range of motion after surgery for**

Non-traumatic elbow joint stiffness in patients with and without previous surgery.

188.

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Background: Non-traumatic elbow stiffness is a relatively rare condition, occurring in only a small fraction of the population. Osteoarthritis due to prior trauma and arthritic changes are the main causes. Many patients undergo several surgical procedures of the elbow. Knowledge of the long-term outcomes is essential in determining the best course of treatment for these patients.
Purpose / Aim of Study: The objective was to report the functional outcome after release for non-traumatic elbow stiffness.
Materials and Methods: A total of 32 patients underwent surgery at Herlev Hospital from 2010-2015, whereof 7 were lost to follow-up. 25 were included in the study, 23 patients had open release and 2 patients had arthroscopic surgery. 11 patients had had no previous surgery in the elbow, and 14 had undergone surgery at least once, primarily arthroscopic capsular release and removal of osteophytes. At follow-up, patients were examined using the Mayo Elbow Performance Score (MEPS), flexion/extension arc, pain and the Oxford Elbow Score (D-OES).
Findings / Results: The mean flexion/extension arc was 91° preoperatively and 112° at follow-up. The improvement of 21° was statistically significant ($p < 0.001$). The subgroup of patients with no previous elbow surgery improved their flexion/extension arc from 98° to 119° ($p = 0.056$), and the subgroup of patients with previous elbow surgery improved from 86° to 106° ($p < 0.006$). Pain was reduced in 16 patients, unchanged in 4 patients, and worsened in 2 patients. At follow-up the average MEPS was 74.4. It was 84.5 for the patients without previous surgery and 66.4 the patients with previous surgery. The average D-OES was 36.1. It was 42.2 for the patients without previous surgery and 31.3 the patients with previous surgery.
Conclusions: Capsular release and debridement done for non-traumatic stiffness of the elbow is associated with improved flexion/extension arc and reduced pain. Patients with and without previous surgery had similar improvements, but the latter had a better functional outcome. Both subgroups probably benefit from surgical treatment.

Unicompartmental knee arthroplasty in a fast-track setup: utilization, length of stay and readmission – a prospective cohort study of 3,927 procedures

189.

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Background: Unicompartmental knee arthroplasty (UKA) is a treatment option for patients with unicompartmental osteoarthritis, with up to 50% of patients scheduled for knee replacement being eligible for UKA. It has been shown that utilization of UKA >20% is required in order to avoid unacceptably high revision rates, however the effect of utilization on LOS as well as other benefits of UKA has not been investigated. Despite the potential advantages of UKA, and recommended minimal usage, UKA is only utilized in 9% of knee arthroplasty cases in UK, and its role in a fast-track setup is not well-established

Purpose / Aim of Study: The aim of this prospective multicenter study was to describe trends in length of stay (LOS) and early complications and readmissions following UKA performed at 8 different fast-track centers in Denmark and to compare LOS between centers with high and low utilization of UKA

Materials and Methods: We included data from 8 dedicated fast-track centres all reporting UKA procedures to the same database during 2010-2018. Complete (>99%) data on LOS and 90-day readmission and mortality was obtained over the entire time period. Specific reasons for LOS > 2 days; LOS > 4 days; 30-day and 90-day readmission were recorded. Utilization of UKA were dichotomized into ≥ 20% UKA versus < 20% UKA () and ≥ 52 UKA annually versus < 52 UKA annually

Findings / Results: A total of 3,927 procedures was included. LOS (mean 1.3 days, median 1) was unchanged over the period. The proportion of procedures with LOS > 2 days was also largely unchanged other the period. The percentage of patients discharged on day of surgery varied greatly between centers (12-50%), with centers with high UKA utilization (both usage and volume) having a larger proportion on DOS discharge. 30- and 90-days readmission was 4.2% and 6.9% with 90 days mortality being 0.08%

Conclusions: Our findings suggest general underutilization of the potential for quicker recovery following UKA in a fast-track setup

Does magnetically controlled growing rods lead to low bone mineral density in vertebrae within the instrumentation? – a feasibility study

190.

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Background: Studies show morphometric changes of vertebrae in the treatment of early-onset scoliosis with distraction-based growth instrumentation. However, no studies have assessed the bone quality of vertebrae within the instrumentation with dual- energy X-ray absorptiometry (DXA).
Purpose / Aim of Study: To investigate the feasibility of measuring bone mineral density (BMD) in vertebrae within the instrumentation of patients treated with magnetically controlled growing rods (MCGR). Secondly, to compare this with BMD vertebrae below the instrumentation and total hip.
Materials and Methods: We conducted a cross-sectional study of BMD in patients treated with MCGR at our institution. Exclusion criteria were structural deformities at the vertebrae of interest, conversion cases, inability to stand and walk or patients who had undergone definitive spinal fusion. Eleven patients fulfilled the study criteria and underwent DXA scans during 2018. We measured aBMD (g/cm2) of both hips and in the spine using a software to exclude high density pixels from implant metal. aBMD was measured on the 3 vertebrae above the lower anchor point within the instrumentation and the 3 vertebrae below the instrumentation. We calculated individual age-adjusted aBMD Z-scores (aBMDage Z- score) and height-for-age adjusted aBMD Z- scores (aBMDHAZ Z-score) from a reference population. Results are reported with medians and inter-quartile range [iqr].
Findings / Results: Age at examination was 13.5 [10.0-14.4] years. aBMD-HAZ Z-score for total hip was 0.9 [0.6, 1.2] and for vertebrae within the instrumentation -2.5 [-3.1, -1.9]. We found a statistically significant lower aBMD in the vertebrae within the instrumentation ($p = 0.002$) and vertebrae below the instrumentation ($p = 0.031$) compared with total hip aBMD. We found a lower but not statistically significant aBMD for vertebrae within the instrumentation compared with vertebrae below the instrumentation ($p = 0.063$).
Conclusions: Measuring BMD of the instrumented vertebrae is feasible; however, it comes with several limitations. We found a lower aBMD of vertebrae within the instrumentation compared with total hip aBMD but no association with time from MCGR index surgery.

Maximal hip muscle strength and rate of torque development 6-30 months after hip arthroscopy for femoroacetabular impingement syndrome: A cross-sectional study

191.

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Background: Reduced sports function is often observed after hip arthroscopy for femoroacetabular impingement syndrome (FAIS).
Purpose / Aim of Study: Impaired muscle strength could be reasons for this. We aimed to investigate hip muscle strength after hip arthroscopy for FAIS and its association with levels of sports function and participation.
Materials and Methods: We included 45 patients (34 males; mean age: 30.6 ± 5.9 years) after unilateral hip arthroscopy for FAIS (mean follow-up [range]: 19.3 [9.8-28.4] months). Maximal isometric hip muscle strength (Nm/kg) including early- (0-100 ms) and late-phase (0-200) rate of torque development (Nm/kg/s) for adduction, abduction, flexion, and extension was measured with an externally fixated handheld dynamometer and compared between operated and non-operated hip. Associations between muscle strength and self- reported sports function and return to sport were investigated.
Findings / Results: For maximal hip muscle strength, no between-hip differences were observed for adduction, abduction, flexion, and extension ($p \geq 0.102$). For rate of torque development, significantly lower values were observed for the operated hip in flexion at both 0- 100 ms (mean difference: 1.58 Nm/kg/s, 95% CI [0.39; 2.77], p=0.01) and 0-200 ms (mean difference: 0.72 Nm/s/kg, 95% CI [0.09; 1.35], p=0.027). Higher maximal hip extension strength was significantly associated with greater ability to participate fully in preinjury sport at preinjury level (Odds ratio: 17.71 95% CI [1.77; 177.60]).
Conclusions: After hip arthroscopy for FAIS subjects show limited impairments in maximal and explosive hip muscle strength between operated and non-operated hip. Higher muscle strength was positively associated with higher sports function and ability to participate in sport.

Reoperation rates for the Dual Mobility Cup in Total Hip Arthroplasty

192.

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Background: Total hip arthroplasty (THA) is used to treat osteoarthrosis in the hip as well as fractures of the femoral neck. Instability followed by dislocation is a common indication for THA revision surgery. A dual- mobility acetabular component (DMC) has been designed to address this issue and lower dislocation rates in THA. A major concern with the DMC is increased stress on the implant components and therefore, accelerated polyethylene (PE) wear. It has been proposed that the increased PE wear will lead to a shorter survival of the prosthetic components, but long-term follow-up studies on DMC THA have yet to be performed. Viborg Regional Hospital has since 2001 primarily used the dual mobility cup in THA for patients over the age of 70, presenting a unique possibility to study the long-term revision rate for the DMC.
Purpose / Aim of Study: The aim of the study is to investigate the revision rate of the dual mobility cup in total hip arthroplasty. Furthermore we wish to investigate if the indication for THA had any effect on survival of the prosthetic components.
Materials and Methods: A retrospective cohort study of all patients who received a primary THA with a DMC at Viborg Regional Hospital between 2001 and 2018 was conducted. Information regarding revision arthroplasty were obtained from the National Registry of Patients and the Danish Hip Register.
Findings / Results: We found the 10-year survival rate for the DMC in THA to be 91% (95% CI=7.43% to 10.90%). We found no significant difference in revision rate between THA performed due to arthrosis and THA performed due to fractures (HR=1.28, CI 0.90 to 1.82)
Conclusions: Our findings suggest that, when performing a primary THA, the DMC is level with the conventionally used liner regarding long-term component survival.

Usual care for Osgood Schlatter: A mixed-methods study to understand what caretakers are delivering and patients are receiving

193.

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Background: One of the most common knee complaints during adolescence, a crucial time for staying physically active, is Osgood Schlatter. The recommended types of modalities for conservative management of Osgood Schlatter is abundant and conflicting, and no level 1 evidence is available. For this emerging area of research, knowing the contents of usual care and its providers, are key to develop uniform and effective management strategies.
Purpose / Aim of Study: To gain knowledge directly from Osgood Schlatter patients and clinicians on what care is delivered in clinical practice.
Materials and Methods: Semi-structured interviews and surveys were conducted in a specialized orthopedic clinic with OS patients, and across sectors and professions with clinicians managing OS patients.
Findings / Results: Thirty-three patients (age 13.5±1.7 years, symptom-duration 23.6±16.1 months) and 8 clinicians (Physiotherapists, GPs, Pediatric Orthopedic Surgeons) with a mean of 12.5 year practicing and seeing median 15 (IQR:14-25) OS patients per year, participated. Most patients had been in the care of their GP (72%), a physiotherapist (45%), or an orthopedic surgeon (33%), among a total of 13 different professions. For patients, the most common modalities received where exercises (42%), advice to take a break from sports (24%), topical analgesics (24%), and cryotherapy (21%); followed by stretching, taping, acupuncture, laser therapy, shockwave therapy, and massage (12-18%); and 20 other types of modalities (>9%). Among the eight clinicians the most common modalities where cryotherapy (n=8), stretching of knee- extensors (n=6), exercises (n=6), and NSAIDs (n=5). All clinicians adviced on good/self-limiting prognosis (n=8); and most (n=7) adviced on 'change to less aggravating activities', 'only participate with little pain', 'adjust physical activity according to pain', or that 'increased activity will increase pain'.
Conclusions: Numerous different modalities are received by Osgood Schlatter patients, but a set of modalities/advice seems to be the most prevalent in usual care: exercises, cryotherapy, stretching, topical/oral analgesic, advice on favorable prognosis, and advising a cautious approach to physical activity/sports.

Injuries sustained during training in Danish mixed martial arts (MMA)

194.

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Background: MMA is a full-contact sport that involves intensive training, sparring and competition, which have raised concerns regarding risk of serious injuries. Currently there are no studies available on the topic from Scandinavia and there is an ongoing debate whether the sport should be legalized or not due to its violent appearance.
Purpose / Aim of Study: To describe injuries sustained during adult MMA training in Denmark.
Materials and Methods: All data was collected using a questionnaire developed in cooperation with experts from the MMA medical community. Data was collected from October 2019 until April 2020. Participants were recruited by using an information flyer/form distributed to MMA clubs, during events and facebook pages with link to an online questionnaire. Data was collected and managed using Research Electronic Data Capture (REDCap). The questionnaire retrieved data on the participants' demographics and injuries within the last 12 months. Descriptive data was performed as well as chi-square tests on categorical data.
Findings / Results: 88 participants completed the questionnaire with a median age of 25 years (18-50) and 95% were male. There were 6% professional athletes but 41% had combat experience. 34% trained at least 7 hours per week and 41% had at least 6 years of experience. 52% had sustained an injury within the last 12 months with a median of 2 (1-5) injuries. 47% resulted in training pause of less than 14 days, and 41% did not seek professional help. 52% of the injuries were to the lower extremity, especially the knee. 65% did not wear protective gear when sustaining the injury. There was a trend between higher amount of weekly MMA training and risk of sustaining an injury ($p<0.059$) but not with increasing age ($p<0.53$).
Conclusions: There is a high risk (52%) of sustaining injury during training among MMA athletes but almost half of the injuries were of minor character. The risk of sustaining an injury trends to be higher the more an athlete does MMA training.

How Many Surgical Patients Report Patient Acceptable Symptom State (PASS) 12-24 months after Hip Arthroscopy? – a Cross-sectional Study Including PASS Cut-Off Values for HAGOS and iHOT-33

195.

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Background: Several studies show clinically relevant improvements in hip function and pain after hip arthroscopy for femoroacetabular impingement syndrome. However, it is less clear how many patients achieve an acceptable symptom state.
Purpose / Aim of Study: We aimed to investigate the proportion of patients with an acceptable symptom state (PASS) 12-24 months after hip arthroscopy. Additionally, we aimed to determine the cut-off scores of the two recommended and valid patient-reported outcome measures (the Copenhagen Hip and Groin Outcome Score; (HAGOS) and the International Hip Outcome Tool-33; (iHOT-33)) for which patients are most likely to achieve PASS.
Materials and Methods: Eligible subjects were identified in the Danish Hip Arthroscopy Registry. PASS, HAGOS, and iHOT-33 were collected with an online questionnaire. PASS was measured using the anchor question: "Taking into account your hip and groin function and pain, and how it affects your daily life including your ability to participate in sport and social activities, do you consider that your current state is acceptable if it remained like that for the rest of your life?" Receiver Operating Characteristic curve analyses were applied to identify the PASS cut-off values of HAGOS and iHOT-33 scores.
Findings / Results: 137 patients (mean age at surgery: 35.3 ±9.4 y). At follow-up, 64 subjects (46.7 %; 95 % CI [38.6; 55.1]) reported an acceptable symptom state (PASS). HAGOS subscale and iHOT-33 cut-off scores showed excellent to outstanding discriminative ability in predicting PASS (Area Under the Curve: 0.82-0.92). These scores ranged from 42.5 for the HAGOS QOL to 82.5 for the HAGOS ADL subscales.
Conclusions: Forty-six percent of subjects having hip arthroscopy for femoroacetabular impingement syndrome reported an acceptable symptom state at 12-24 months follow-up. Cut-off values at HAGOS subscales and iHOT-33 showed excellent to outstanding discriminative ability in predicting subjects who have an acceptable symptom state.

Clinical Dorsal Wrist Ganglion: New findings after histopathological assessment and preliminary results after 1-year follow-up

196.

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Background: Clinical dorsal wrist ganglion is the most common soft tissue tumour of the hand, found in about 20% of patients with wrist pain. Recurrences have been documented from 1-50% and are a burden to the patient and healthcare system.
Purpose / Aim of Study: This study seeks to further our currently limited understanding of the condition, thereby improving patient outcomes.
Materials and Methods: 43 patients with previously untreated clinical dorsal ganglia were consecutively included in the study over 2 years. Standard radiology, ultrasound and MRI of the wrist was performed before open surgical excision in the 38 eligible patients. 5 patients with remission of symptoms were not admitted for surgery. Excised tissue was examined microscopically after specific tissue staining (hematoxylin/eosin and immunohistochemical staining with vimentin, CD68, and D2-40). Of those who were operated, three patients later dropped out of the study for personal reasons. A clinical examination was performed three and six months postoperatively and a clinical examination as well standard ultrasound and standard MRI was planned one and two years postoperatively. 21 of the 35 operated patients (60%) still included in the study have currently been seen at 1-year follow-up.
Findings / Results: Two different histopathologic changes were seen. 45% were ganglion cysts and 42% synovial cysts/bursa cysts. In 13% of cases the excised tissue was not diagnostic. Preliminary results show that recurrences only occurred in patients with synovial cysts (4 patients with clinical recurrence, 3 requiring reoperation and 1 patient with ultrasound- verified recurrence, not requiring surgery). This accounts for 24% of the patients seen at the 1-year follow-up. MRI and ultrasound is able to diagnose but does seem to differentiate the type of cysts.
Conclusions: The histological findings could be a help in finding the patients that are of the risk of recurrence. We propose to use the well-known histopathologic changes of the ganglion and synovial cysts to facilitate further study of clinical outcome and attempt to optimize MRI and ultrasound.

Can Length of Stay be reduced to much

197.

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Background: Ortogeriatric units are well accepted Worldwide as quality improvement in treatment of frail elderly patients with hip fracture. The population of people +65 years are expected to rise significantly in the Next decades and the incidence of hip fracture as well. The consequence is a highpressure on the Hospitals and that challenge the ortogeriatric Wards capacity.
Purpose / Aim of Study: In our Aim to improve treatment of the frail hip fracture pt.,we were able to reduce Length of Stay(LOS), but is there a limit, where LOS is to short and interact with mortality and readmission
Materials and Methods: Improvement in treating the frail hip fracture patients by intervention in several aspects over time. Involving a limited Group of doctors with special interest in ortogeriatric treatment, doing the Ward rounds. Increasing exercise in Hospital. Reducing time to Theatre. Teamwork with Primary after admission for 14 day's(Safe Discharge) Participating in Learning and Quality Teams in DK, learning from other Hospitals an focus on improvement in local Teams.
Findings / Results: We were able to reduce mortality from 2018 12% to 2019 6.6% Reducing LOS 2018 6 to 2019 4.9. Re-admission rate 2018 15% in 2019 14%
Conclusions: In spite of continuous improvement of quality in treatment of the frail patient with hip fracture, that reduces the LOS, we didn't see higher mortality or an increasing re-admission rate. We think that the combination of faster way to Theatre and Teamwork both between the team at Ward and the teamwork with acute nurse in primary sector, the first 14 days after discharge, were of great importance.

Status of rheumatoid forefoot deformity surgery in Aarhus

198.

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Background: The classic Rheumatoid Arthritis (hereafter RA) deformities include Hallux Valgus, hammertoes and a collapse of the transverse arch. The typical patient presents with metatarsalgia as the main complaint, but also pressure points from shoewear on bunion and hammertoes. The goal of rheumatoid forefoot surgery is to reduce pain and normalize the foot to fit common shoewear by correcting deformities. In our department, this surgical correction has consisted of first ray metatarsophalangeal arthrodesis, small metatarsal head resection and hammertoe correction by proximal interphalangeal arthrodesis.
Purpose / Aim of Study: To establish a basic understanding of patient satisfaction and surgical outcome of this surgical procedure in our institution.
Materials and Methods: We report from a consecutive retrospective self-controlled cohort study of 33 patients (50 feet) operated with the same technique.
Findings / Results: 30 of the 33 patients confirmed willingness to repeat surgery. 16 of 33 patients wore hand- sewn shoes before surgery, postoperatively this was reduced to 7 of 33. Solid metatarsophalangeal fusion of the great toe was found in 47 of 50 feet and the metatarsal parabola was acceptable by radiological assessment.
Conclusions: This cohort showed a high level of patient satisfaction and outcome. This cohort is non- comparative and allows no conclusions on the effects of surgery, but patient willingness to repeat is good and we will continue to offer this procedure to our patients with severe rheumatoid forefoot deformities.

Preliminary Radiological and Clinical Assessment of Guided Growth Hip Surgery in Children With Cerebral Palsy After 1 Year

199.

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Background: Hip subluxation occurs especially for the children with severe cerebral palsy (CP), and surgical procedures such as unidirectional pelvic and varising femoral osteotomies may be necessary. Guided growth surgery of the hip (GGH) by one eccentric transphyseal screw might be an alternative minor procedure for prevention of hip subluxation.
Purpose / Aim of Study: We wanted to examine the preliminary clinical and radiological effects of GGH to see, if GGH is a safe and effective procedure.
Materials and Methods: Children with CP, predominantly gross motor function classification system (GMFCS) III–V and hip subluxation of 30-40 % were included. GGH and soft tissue releases were performed. Clinical, radiological follow-up and radiostereometric analyses (RSA), were obtained postoperative, after 6 and 12 months.
Findings / Results: Twelve hips of 8 children with CP, GFMCS 3-5 were included and analysed. The median age was 9 years (5-11, male:female ratio was 1:1 and mean follow-up 11.2 months. One child was excluded due to a postoperative fracture. All eccentric screws, but 1 were adequately placed transphyseally. Seven screws showed signs of slippage from the epiphyseal plate and in two cases the screw was replaced. RSA analyses: five hips had medial growth, 4 lateral and 2 were excluded. The medial migration of the femoral head was a mean of 0.29 mm (-2.44 - 1.89) mm. All hips had superior migration with mean 3.23 mm (0.66-5.35). The mean condition number was 624 and no further analyses of rotation were performed. Analyses of radiographs: NSA improved in 8 of 11 (mean; -7.0 dg.,), epiphysial tilt worsened in 6 of 11 (mean; 3.2 dg.), Southwick angle improved in 8 of 11 (mean; 5.2 dg.) and the articulotrochanteric distance decreased in 6 of 11 (mean; 3.2 mm).
Conclusions: Effective guided growth of the hip by regular cannulated screw 7.5 mm was not as yet clearly demonstrated, and it is too soon from our preliminary results to conclude whether or not GGH is a safe and effective procedure, but our results are indicative of that. However, surgical improvements are warranted, and we have already implemented a new custom made transepiphyseal screw.

Comparison of 5 year outcomes between wide laminectomy, segmental bilateral laminotomies and unilateral hemi-laminectomy for lumbar spinal stenosis

200.

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Background: The optimal procedure for lumbar spinal stenosis remains controversial. Studies have shown no difference in short term outcomes among micro- laminectomy, hemi-laminotomies, broad laminectomy and laminectomy with instrumented fusion.
Purpose / Aim of Study: To report on outcomes in Lumbar spinal stenosis patients who underwent wide laminectomy, segmental bilateral laminotomy or unilateral hemilaminectomy
Materials and Methods: Patients with spinal stenosis who were enrolled in the DaneSpine database from January 2010 until May 2014 and underwent wide laminectomy, segmental bilateral laminotomy or unilateral hemilaminectomy were identified. Patients completed standard questionnaires preoperatively and 1, 2 and 5 years after surgery that included the Oswestry Disability Index (ODI). Peri-operative data, including ASA score, body mass index and smoking status were also collected.
Findings / Results: Five hundred ten patients (265 males and 245 females) were included. Most patients were operated with segmental bilateral laminectomy over one level (n=283). Operative method (p=0.07) was not found to be a predictor for patients achieving MCID for ODI (12point change) from baseline to one, two and five years follow up. ASA score (p=0.036) and smoking status (p=0.015) were associated with change in ODI above MCID after one and two year. Twenty-eight patients were re-operated on same level after primary decompression alone, either because of disc prolapse (n=3), dural tear (n=3), re- decompression (n=17), hematoma (n=4) or fusion (n=1). We did not find reoperation to be associated with operative method (p=0.60), although age at operation time seems to predict reoperation (p=0.039)
Conclusions: There is no difference in MCID change in ODI with either broad laminectomy, segmental bilateral laminotomy or unilateral hemi laminectomy after one, two and five years. Factors associated with achieving ODI MCID were smoking status and ASA score at one and two years follow up but without significant difference at five years post-op. Age at surgery was found to predict risk of reoperation after five years.

Management of olecranon fractures prior to modern surgery (1750-1850): an illustrated historical review

201.

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Background: Recently, it has been proposed that stable fractures of the olecranon (Mayo Type II) in elderly with low functional demand can be managed non-surgically. When non-surgical management is considered, functional aspects of bandaging as well as biomechanics and pathoanatomy are taken into account. We hypothesized that a thorough understanding of these aspects can be found in the rich late 18th and early 19th century medical literature.
Purpose / Aim of Study: To provide a review of historical approaches to the biomechanics, pathoanatomy, functional bandaging and complications of olecranon fractures in the pre-surgery period (1750-1850) and to discuss whether the historical sources can inform current non-surgical management.
Materials and Methods: We searched in bibliographical databases, national libraries and historical medical encyclopedias. References from potentially eligible monographs and articles were hand searched. Drawings and engravings were analyzed qualitatively by the authors.
Findings / Results: We found a comprehensive knowledge of diagnostics, biomechanics and pathoanatomy in the period 1750-1850. The deforming force of the triceps muscle on the proximal fragment was well understood. Reduction of the fragment was attempted, but retention was difficult. Several ingenious devices and functional bandages in different degrees of extension and with direct pressure were proposed for keeping the fragments together. Anchylosis was a known complication. A debate on osseous versus fibrous healing of olecranon fractures and the functional consequences of fibrous healing can be found in the early 19th century sources. A collection of previous unknown illustrations will be presented.
Conclusions: A rich literature on the biomechanics, pathoanatomy, functional bandaging and complications after olecranon fractures can be found in the late 18th and early 19th century. The discussion on fibrous versus osseous healing as well as principles of functional bandaging may have interest for a modern reader.

Outcome of shoulder arthroplasty at University Hospital of South West Jutland.

202.

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Background: With an increasing elderly population and longer life expectancy, shoulder complications have become a more common topic. Studies has shown a marginal increase in surgical interventions like total shoulder arthroplasty and revers total shoulder arthroplasty in the last two decade.
Purpose / Aim of Study: This cohort study aims to describe the post- operative outcome for patients with a shoulder arthroplasty and determine the associations with factors like age, diagnoses, sex and type of arthroplasty of an "unfavorable" outcome.
Materials and Methods: All patients receiving a shoulder arthroplasty from 2014 to 2020 with follow-up data at University Hospital of South West Jutland. WOOS and Constant score was used for assessing results. Continuous data are reported as means with standard deviations if normal distributed, if not as medians with interquartile ranges, categorical data was reported as numbers and proportions. WOOS was dichotomized according to the Danish WOOS validation as reported by Rasmussen et al., where a score higher than 50% (950) is considered "good". Bivariate comparisons and multivariate analyzes was performed mixed linear and logistic regression.
Findings / Results: 533 females, 330 males received a shoulder arthroplasty, age was from 33 to 93, baseline WOOS and Constant score 28 and 23, 1-year scores 70 and 43. Mean WOOS on all diagnoses reached good (above 50%), with the best results in osteoarthritis patients. Whereas when comparing arthroplasties, hemiarthroplasty for fracture treatment did not reach WOOS above 50%. The multivariate marginal 12 months WOOS for fractures were for hemiarthroplasties 31.1 and for Reverse arthroplasties 65.1. There were 61 complications, 24 major.
Conclusions: The PRO-scores after shoulder arthroplasty showed good results except for hemiarthroplasty used in fracture treatment, where the results were clearly inferior compared to when the Reverse-arthroplasty was used.

Establishing research priorities related to osteoarthritis care through stakeholder input from patients

203.

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Department of Pharmacy, University of Copenhagen; Section of General Practice, Department of Public Health, University of Copenhagen; Department of Orthopaedic Surgery, Copenhagen University Hospital, Hvidovre

Background: Patient and public involvement in research is emphasized to increase clinical relevance and quality.
Purpose / Aim of Study: We aimed to identify, define and prioritize important research topics, by including the point of view of patients with osteoarthritis (OA).
Materials and Methods: We invited 1315 members of The Danish Rheumatism Association user panel to complete an electronic survey. The survey included; a) an open-ended question on important research topics (free-text response option), b) 15 pre-defined research topics to be rated for importance, and c) the pre-defined topics grouped into four categories in which the most important was prioritized. The four categories consisted of 1) Aetiology, prevention and diagnosis, 2) Treatment, 3) Information and shared decision-making, 4) Course of treatment and societal consequence. Free text responses were analysed using qualitative content analysis. Importance ratings and prioritization were calculated as percentages.
Findings / Results: Out of the 850 (65 %) respondents, 483 (57 %) had self-reported OA in any joint (mean (SD) age 60.3 (±10.2) years, 91 % female). The remaining 43 % with exclusively other primary rheumatic diseases than OA were excluded. From the free-text responses, we identified seven main research topics; 1) diagnosis, 2) prevention, 3) side-effects, 4) treatment, 5) aetiology, 6) being young with OA and 7) quality of life. For treatment, we identified seven subtopics. Out of all topics and subtopics, pain management was the most frequently highlighted research topic. All pre-defined topics were rated as "very important" or "somewhat important" by more than 75 % of the respondents. The top prioritized topics within each category were 1) improving the diagnosis, 2) individualized treatment, 3) shared decision-making and 4) improving the collaboration between health care professionals.
Conclusions: Using a survey approach proved a fruitful way to identify important research topics in the eyes of patients with OA. Pain management was particularly emphasized as an important research topic. Our findings will contribute to the Clinical Academic Group Research in OsteoArthritis Denmark's (CAG ROAD) future research in OA.

Septic arthritis of the pubic symphysis

204.

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Background: Septic arthritis and osteomyelitis of the pubic symphysis are rare conditions with nonspecific symptoms, leading to delay in diagnostic and treatment.
Purpose / Aim of Study: By presenting our experiences, focusing on diagnosis and surgical treatment, we want to draw attention to these rare conditions.
Materials and Methods: Retrospective analysis of patients records, radiology and cultures.
Findings / Results: Twenty-four patients, 15 males, with median age 70 years (range; 48-89 yr), were surgically treated in our department from 2009 to 2020. Prior surgery for pelvic malignancy (prostate, vulva, cervix, bladder and anal), or surgery for benign conditions (prostate hypertrophy and urine incontinence) were performed in all but two patients, which presented with probably hematogenous infection after sepsis. Patients experienced pubic pain (65%), intermittently fever (35%), pain with hip motion (30%), painful gait (26%), groin pain (26%) and lower back pain (17%). Diagnostic delay was up to 1 year. The diagnosis was confirmed by using different imaging modalities (MRI, CT and PET-CT), which showed joint accumulation and bony destructions, edema and/or abscess in bone and/or muscles. All patients underwent surgical debridement with resection of the symphysis. Most surgeries were performed with colleagues from other specialities. Five patients had at least one revision surgery, due to post-operative hematoma, relapse or wound- healing problems in patients who had previously undergone radiotherapy treatment. Cultures from 7 patients were negative. The remaining 17 showed a variety of different pathogens, in some cases polymicrobial. All patients received at least 2 weeks of intravenous antibiotic, followed by 4 weeks of oral therapy. The pain subsided postoperatively and after six weeks most patients were able to walk without walking aids.
Conclusions: Arthritis and osteomyelitis of the symphysis pubis are rare conditions, occurring often after pelvic surgery and presenting with symptoms such as pelvic pain and impaired gait. The extend and severity of the infection can be visualized by MR, CT or PET-CT. Treatment of choice is early surgical debridement, often in collaboration with surgeons from other specialities, followed by antibiotics.

Exercise as medicine during the course of hip osteoarthritis - a narrative review

205.

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Background: Exercise may be a preventive, disease- modifying, or alleviating treatment at different stages of hip osteoarthritis (OA); pre-clinical, mild-moderate hip OA, severe hip OA and after hip arthroplasty (THA).
Purpose / Aim of Study: To summarize the effects of exercise as primary, secondary and tertiary prevention at different stages of hip OA and in patients undergoing THA.
Materials and Methods: In a narrative review, we summarized the evidence investigating exercise as a risk factor in the development of hip OA (primary prevention). Then, we summarized secondary and tertiary preventive effects of exercise in patients having mild-moderate or severe hip OA. Finally, we evaluated the effects of exercise after THA (tertiary prevention).
Findings / Results: High exposure to exercise and sports injuries can increase the risk of developing hip OA, while moderate levels of exercise oppositely can decrease the risk of developing hip OA. In mild to moderate hip OA, exercise can reduce pain and improve function, while sparse evidence suggest no effect on quality of life. In severe hip OA in patients scheduled for THA, preoperative exercise may reduce pain and improve function prior to THA, while the postoperative effects remain inconsistent or uncertain. We found no results indicating that exercise has a secondary preventive effect on hip OA. However, it has been shown in mild to moderate hip OA that avoidance of exercise over time results in a reduction of hip abductor muscle strength, leading to functional limitations. Postoperative exercise initiated within one year after THA show improved functional capacity and muscle strength, while having little effect on patient-reported function and quality of life.
Conclusions: Being moderately physically active and maintaining muscle strength is primary prevention of hip OA. Furthermore, exercise may offer tertiary prevention in mild-moderate and severe OA, as well as in patients undergoing THA. There is no data on exercise as secondary prevention of hip OA. We propose shifting the exercise paradigm towards an increased focus in the pre-clinical and mild-moderate stage where least is known but the most profound effects are observed.

Treatment of inverted labral lesions after traumatic hip dislocation in children: use of the safe surgical dislocation technique

206.

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Background: Traumatic dislocation of the hip in children is rare. Immediate closed reduction is important. Imaging after reduction is important as tissue is at risk at becoming intertwined in the joint space. Open repair is usually necessary to address the posterior part of the acetabulum. It is important to assure that the surgical technique used takes into consideration the need to protect the blood supply to the femoral head.
Purpose / Aim of Study: To present technical and clinical reasons for use of safe surgical dislocation for treatment of inverted labral lesions in children.
Materials and Methods: We present to cases (boys 9y + 11y) with inverted labral lesions following traumatic hip dislocation after high energy motocross injuries. Safe surgical dislocation of the hip joint was performed in both cases using paediatric technique.
Findings / Results: Use of safe surgical hip dislocation gave full access to the acetabulum. The lesions were repaired using suture anchors. In both cases the postoperative course was uneventful. No signs AVN were observed.
Conclusions: This rare traumatic lesion of the hip joint in children can be repaired using safe surgical dislocation technique. We advocate referral to a paediatric trauma center with experience in the use of the technique.

Knee Range of motion increases after manipulation under anesthesia followed by continuous passive motion and physiotherapy: a register study

207.

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Background: Total knee arthroplasty (TKA) is one of the most common surgical interventions in Denmark, with around 8.500 TKA performed every year. Despite a good prognosis some patients experience reduced knee range of motion (ROM) after rehabilitation. The treatment is intensive physiotherapy and in case of insufficient effect, manipulation under anesthesia (MUA) followed by a combination of continuous passive motion (CPM) and physiotherapy.
Purpose / Aim of Study: To investigate the effect of MUA followed by CPM and physiotherapy on knee ROM after TKA.
Materials and Methods: Patients were identified from electronical records using diagnostic code KNGT19 for MUA between December 2014 and December 2019 at Hospital of South West Jutland, Denmark. The following data was extracted: use of CPM, ROM before MUA, at discharge and follow- up. Assuming missing data were at random, a multiple imputation was performed. Analysis were performed in Stata 16.1.
Findings / Results: Of 97 patients identified, 27 were excluded as MUA was performed in an addition to other surgical procedures. Mean age of the remaining 70 patients were 58 years (SD: 9) and 63% were women. Before MUA extension deficit was 5 degrees (95% CI: 3 to 6) and flexion 80 degrees (95% CI: 77 to 83). At discharge the extension deficit was 7 degrees (95% CI: 5 to 9) and flexion 105 degrees (95% CI: 103 to 108). Extension deficit increased with 0.6 degrees (95% CI: -2.8 to 1.9) and flexion increased with 17 degrees (95% CI: 12 to 21) at follow-up. Twenty-three patients received a regime with CPM from 7 a.m. to 22 p.m., and 7 patients used CMP for 48 hours, with only 3-4 hours break at night. The difference between the groups were at follow-up 2 degrees extension deficit (95% CI: -2 to 6) and 11 degrees flexion (95% CI: -24 to 2), in favors of the intensive group.
Conclusions: MUA combined with CPM improved knee flexion with 17 degrees, but no reduction in extension deficit was seen. Results show no difference between the groups, which may be due to lack of statistical power. Results may be biased by using different type of measurement tool (goniometric or visual), and it was not always clear if ROM were active or passive. Additionally, there were no adjustments for potential confounders like age and sex.

Changes in preference for surgery in patients signed up for arthroscopic procedures: COVID-19 pandemic effect on arthroscopic patients in a Danish university hospital.

208.

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Background: The effects of COVID-19 have permeated all aspects of society. In Danish hospitals, the impact of COVID-19 has extended to elective orthopedic surgical procedures, with most arthroscopic procedures being delayed for months. It is widely accepted that symptoms leading to arthroscopic orthopedic intervention often change. Because all elective surgery has been postponed in Denmark, this is a unique opportunity to further investigate into these patients' potential changes in preferences for surgery over time.
Purpose / Aim of Study: To investigate the impact of extended time on waiting list under the COVID-19 pandemic on the preference for surgery among patients planned for arthroscopic surgery.
Materials and Methods: We included all patients over the age of 18 years planned for arthroscopic procedures in knee or shoulder in Zealand University Hospital Køge, who were postponed because of the Covid-19 outbreak. The patients were asked by digital letter (e-boks) about their preference for surgery before their operation were re-scheduled. Patients who did not answer the letter were contacted by telephone twice and patients who did not answer the telephone call were classified as non-responders.
Findings / Results: 56 consecutive patients were identified. One patient had received treatment at another hospital leaving 55 patients for inclusion. Mean period on waiting list was 68 days (range 37-190). 23 patients were scheduled for shoulder arthroscopy (mean waiting period 73 days (range 39-190)) and 33 were scheduled for knee arthroscopy (mean waiting period 64 days (range 37-133)). In total one patient changed preference for surgery (1,8%). This patient was scheduled for knee arthroscopy. Furthermore 2 patients in this group were non-responders. Including these as changing preference for surgery makes a total of 5,5% of knee arthroscopic patients changing preference. No patients scheduled for shoulder arthroscopy changed preference.
Conclusions: In this single center cohort only few patients scheduled for arthroscopic surgery changed preference for surgery due to the extended waiting period under the COVID-19 pandemic.

Humeral Lengthening with Intramedullary retrograde nailing - a surgical technique and a review of three cases

209.

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Background: Seeking to improve the treatment, we present a modified retrograde surgical technique to correct short humeral length on a congenital or acquired (syndromic, malignant, traumatic, infectious) background.
Purpose / Aim of Study: Our suggestions for indications is presented. The retrograde surgical technique is presented and discussed, compared to the antegrade technique.
Materials and Methods: 3 cases were retrospectively reviewed for functional parameters, ROM (flex/ext, abduction) pre- and post-op, complications are presented and discussed.
Findings / Results: Range of motion normalized at 1,5 year follow-up for all patients. One patient needed nail replacement due to implant failure. All 3 patients experienced excellent results and only mild, temporary complications (temporary parestesias, temporary drophand). Shoulder function improved in two.
Conclusions: The presented cases suggest that the retrograde humeral technique is superior to antegrade because it allows osteotomy below the insertion of the deltoid muscle and thus reduces pressure on rotator cuff and tension on axillary nerve. Additional lengthening is possible. Lengthening over 5 cm requires a more careful approach, monitoring nerve function and range of motion in the affected joints. Smaller defects should only be corrected with specific functional problems

Surgical treatment of osteochondritis dissecans in the adolescent athlete

210.

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Background: Osteochondritis dissecans (OCD) is a rare but debilitating condition with uncertainty about both incidence, epidemiology and pathogenesis. Surgical treatment for the unstable lesion does not guarantee a good outcome. For the adolescent athlete, this can be the end of a possible future career in sports. Furthermore, the challenge despite operative treatment may be secondary development of osteoarthritis (OA). This challenge physicians when diagnosing and especially treating the disease. This study illustrates juvenile osteochondritis dissecans (JOCD) and the surgical treatment of osteochondritis dissecans in young athletes.

Purpose / Aim of Study: This study presents a case of juvenile osteochondritis dissecans (JOCD) in a professional soccer player along with a concise report of the literature regarding surgical treatment of osteochondritis dissecans in young athletes.

Materials and Methods: A systematic search in PubMed was performed. Furthermore, a case of JOCD in the medial femoral condyle of a young professional soccer player is presented. The following MeSH terms were chosen and combined: OCD knee, pathology, etiology, adolescence, surgery. The 39 publications were dissected and publications relevant regarding the research question were selected. Studies were included if they met the inclusion criteria

Findings / Results: Stable lesions are treated conservatively in 70% of patients. Unstable lesions and those who failed conservative treatment are treated surgically. A variety of surgical techniques are innovated and utilized when the lesion is unstable. Different validated outcome questionnaires are used to access the functional outcomes of patients and the effectiveness of treatment. ICRS and Lysholm score is widely used. The functional outcome may regress over time and therefore long term follow up is important

Conclusions: JOCD is a multifactorial disorder were repetitive microtrauma and genetic predisposition are believed to be a major factor. Based on the level of evidence the challenges lie in accurate MRI, advanced surgical techniques and management. There are numerous publications on all aspects regarding JOCD in different joints but there is a lack of scientifically reliable prospective randomized studies.

Limb salvage utilizing ring fixation and negative pressure wound therapy with instillation

211.

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Background: Negative pressure wound therapy with instillation (NPWTi) diminishes the number of bacteria in chronic wounds and is thus effective in its treatment, the more so when soft tissue defects are substantial (Goss 2014, Lessing 2011).
Purpose / Aim of Study: Case report
Materials and Methods: A 56-year-old man with diabetic ulcer of the heel (Ø 6 cm) and osteomyelitis of the calcaneus presented with a bimalleolar fracture and acute cellulitis. The limb was scheduled for amputation due to the severity of the 3 concomitant local threats to the limb in conjunction with dis-regulated diabetes, micro- and macroangiopathy, neurophathy, BMI = 44, depression and colostomy. The toe pressure was 65 mmHg. Open reduction and internal fixation was not a viable option, however the patient refused amputation.
Findings / Results: Initial treatment consisted of wound debridement, spanning the ankle with external ring fixation, and intravenous antibiotics. Kamme biopsies verified Enterococcus faecalis, Proteus mirabilis and Escherichia coli. NPWTi treatment (V.A.C. VERAFLO™) was initiated after 7 days. NPWTi treatment consisted of Cleanse Choice™ dressings and instillation of 20 ml isotonic saline solution for 10 min followed by 210 min of NPWT with 125 mmHg. Vacuum dressings were changed every 3-4 days. After 11 days of NPWTi the ulcer and the exposed calcaneus were covered by granulation tissue and split skin transplantation was performed. Ring fixation spanning the ankle joint with weightbearing as tolerated continued for 11 weeks in total facilitating fracture- and soft tissue healing. At frame removal, additional screw fixation of medial malleolus was performed to allow full weightbearing after 2 weeks of immobilization in a cast.
Conclusions: The combined effect of NPWTi, ring fixation and IV-antibiotics salvaged the limb despite severe local (acute ankle fracture, chronic foot ulcer and severe erysipelas) and systemic threats (dysregulated diabetes incl. neuropathy, colostomy, obesity). In the present case, NPWTi was effective in the management of a severe, multibacterial wound infection and provided continued postsurgical debridement and granulation within a short time frame of less than two weeks.

Rehabilitation after non-operatively treated proximal humerus and distal radius fractures. A systematic review and meta-analysis assessing the benefits and harms of early mobilisation

212.

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Background: Proximal humerus fractures (PHF) and distal radius fractures (DRF) are common among the elderly. Recent randomised controlled trials (RCTs) support non-surgical treatment. However, the evidence on the most optimal rehabilitation strategy is sparse and does not support clinical guidelines describing when to initiate the post-fracture mobilisation.
Purpose / Aim of Study: To conduct a systematic review and meta-analysis to assess the benefits and harms of early mobilisation compared to late mobilisation after PHF and DRF.
Materials and Methods: A systematic search was performed in 8 electronic databases. The study population consisted of adults (>= 18 years) sustaining a PHF or DRF. The intervention and comparison were defined as early mobilisation (<2 weeks post fracture) vs. late mobilisation. The outcome measures of interest were function, pain and health-related quality of life (HRQoL). Two independent reviewers conducted the screening, eligibility assessment, inclusion and data extraction. The overall quality of evidence of the included studies was assessed using the Cochrane Risk of Bias tool. Meta-analysis was conducted when possible.
Findings / Results: Six RCTs with a total number of 348 participants were included. A significant difference in favour of early mobilisation after PHF was found in function (standardized mean difference 0.73 (0.35;1.11) at 3 months follow-up. HRQoL was presented only in one study reporting that two dimensions of the Short-Form-36 were significantly higher after early mobilisation at 3 months follow-up No nonunions were reported. Meta-analysis could not be conducted on early mobilisation after DRF. Overall, none of the included studies presented significant differences in function or pain between early and late mobilisation after DRF. One study reported a higher proportion of algoneurodystrophy (19% vs. 4%) after late mobilisation. The quality of the studies was low.
Conclusions: Early mobilisation after PHF resulted in a moderate effect on function, whereas there was insufficient evidence after DRF. The included studies show, that it is safe to start the mobilisation within two weeks after the fracture. To support the non-surgical treatment strategy, there is a need for more high quality RCTs.

Patient-Reported Outcomes of 7,133 Distal Femoral, Patellar, and Proximal Tibial Fracture Patients: A National Cross-Sectional Study with 1-, 3-, and 5-Year Follow-Up

213.

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Background: Few studies have described patient-reported outcomes (PROMs), prognoses and the current state of care of the knee fracture population. Studying risk factors of poor PROM scores is important in understanding the key drivers of poor outcome and in directing future quality reported outcomes (PROMs), prognoses and the current state of care of the knee fracture population. Studying risk factors of poor PROM scores is important in understanding the key drivers of poor outcome and in directing future quality-improvement initiatives.
Purpose / Aim of Study: 1) Report knee-specific and generic median PROM scores after knee fracture. 2) Identify risk factors for poor outcome defined by low median PROM scores.
Materials and Methods: In a Danish cross-sectional study of 7,133 distal femoral, patellar, and proximal tibial fracture patients during 2011-2017, OKS, FJS-12, EQ5D-5L Index and EQ5D-5L Visual Analogue Scale (VAS) were collected electronically via a national, CPR-linked digital mail system (response rate 53%; median age 60 years; 63% female). Poor outcome was defined as score lower than median PROM score. Poor outcome risk factors were estimated as odds ratios with 95% confidence intervals from binary logistic regression models. linked digital mail system (response rate 53%; median age 60 years; 63% female). Poor outcome was defined as score lower than median PROM score. Poor outcome risk factors were estimated as odds ratios with 95% confidence intervals from binary logistic regression models.
Findings / Results: At 0-1 years after knee fracture, median PROM scores were 31 (OKS), 27 (FJS-12), 0.50 (EQ5D-5L Index) and 74 (EQ5D-5L VAS). All four PROM scores plateaued at 3-5 years after knee fracture. At >5 years after knee fracture, median PROM scores were 40 (OKS), 54 (FJS-12), 0.76 (EQ5D-5L Index) and 80 (EQ5D-5L VAS). Age >40 years was associated with poor OKS and FJS-12 scores at both short- and long-term follow-up after knee fracture. Comorbidity burden, distal femoral fracture and treatment with external fixation and knee arthroplasty were risk factors for poor outcome at long-term follow-up, for all four PROMs.
Conclusions: Knee fracture patients have relatively high knee function and quality of life (OKS, EQ5D-5L Index and EQ5D-5L VAS), while their ability to forget about the knee joint after knee fracture is compromised (FJS-12). Risk factors for poor outcome vary depending on the PROM and follow-up period studied. This study will further research in ensuring high quality of care for all patient groups regardless of their associated patient-, fracture- and treatment-related factors and in informing patients on varying aspects of expected outcome after knee fracture, including the presented risk factors which modulate their outcome.

"Technical note: Patella fractures treated with suture tension band fixation: The novel KnotMe technique"

214.

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Background: Patella fractures requiring surgery are traditionally treated using metallic implants, which are associated with high re-operations rates, mainly due to implant prominence.
Purpose / Aim of Study: To overcome the problem of prominent metallic implants, we present a technique based purely on braided sutures – the novel "KnotMe technique".
Materials and Methods: The suture is passed through soft tissue solely, that is: the quadriceps tendon, the patellar ligament, and the medial and lateral retinacula. Upon reposition the first and second sutures are passed through soft tissue in two distinct ways: "the modified circular suture" and "the modified figure-of-eight" suture, respectively. Both sutures start in the upper lateral corner of the quadriceps tendon where knots are likewise tied. If comminution is present the fracture is converted into a simple two-part fracture with one or two "box sutures" around the upper and lower pole, respectively.
Findings / Results: This technique is here described on our first six patients treated with this technique at our institution along with their clinical and radiological follow up. It is furthermore described in a step-wise, standardized way that can be adapted to all types of patella fractures. The described suture configuration allows maintenance of inter-fragmentary reduction until bony union without symptoms from the suture material.
Conclusions: We believe that the "KnotMe" technique is a safe and promising alternative to traditional metallic fixation methods.

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