

FRIE FOREDRAG

DSSAK ÅRSMØDE 2023



Titel/Title:

High Cefuroxime Concentrations and Long Elimination in an Orthopaedic Surgical Deadspace—A Microdialysis Porcine Study

Forfattere: Sara Kousgaard Tøstesen, Maiken Stilling, Pelle Hanberg, Theis Muncholm Thillemann, Thomas Falstie-Jensen, Mikkel Tøttrup, Martin Knudsen, Emil Toft Petersen og Mats Bue

Introduktion/introduction: Deadspace is the tissue and bony defect in a surgical wound after closure. This space is presumably poorly perfused favouring bacterial proliferation and biofilm formation. In arthroplasty surgery, an obligate deadspace surrounding the prosthesis is introduced and deadspace management, in combination with obtaining therapeutic prophylactic antibiotic concentrations, is important for limiting the risk of acquiring a periprosthetic joint infection (PJI).

Formål/aim: This study aimed to investigate cefuroxime distribution to an orthopaedic surgical deadspace in comparison with plasma and bone concentrations during two dosing intervals (8 h x 2).

Metode/method:

In a setup imitating shoulder arthroplasty surgery, but without insertion of a prosthesis, microdialysis catheters were placed for cefuroxime sampling in a deadspace in the glenohumeral joint and in cancellous bone of the scapular neck in eighteen pigs. Blood samples were collected as a reference. Cefuroxime was administered according to weight (20 mg/kg). The primary endpoint was time above the cefuroxime minimal inhibitory concentration of the free fraction of cefuroxime for *Staphylococcus aureus* ($fT > MIC$ (4 $\mu\text{g}/\text{mL}$)).

Resultater/results: During the two dosing intervals, mean $fT > MIC$ (4 $\mu\text{g}/\text{mL}$) was significantly longer in deadspace (605 min) compared with plasma (284 min) and bone (334 min). For deadspace, the mean time to reach 4 $\mu\text{g}/\text{mL}$ was prolonged from the first dosing interval (8 min) to the second dosing interval (21 min), while the peak drug concentration was lower and half-life was longer in the second dosing interval.

Konklusion/conclusion: In conclusion, weight-adjusted cefuroxime $fT > MIC$ (4 $\mu\text{g}/\text{mL}$) and elimination from the deadspace was longer in comparison to plasma and bone. Our results suggest a deadspace consolidation and a longer diffusions distance, resulting in a low cefuroxime turn-over. Based on theoretical targets, cefuroxime appears to be an appropriate prophylactic drug for the prevention of PJI.

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**Titel/Title:**

Tre områder undersøgt ved Midt-EPJ-data 2013-2022: Bankart operationer, frossen skulder og klavikelfrakturer.

Forfattere:

Karen Toftdahl Bjørnholdt

Introduktion/introduction: Rutinemæssig registrering af sundhedsdata foregår i meget stort omfang, hvilket forpligtiger til at gøre brug heraf til gavn for patienterne. Denne undersøgelse vil tage udgangspunkt i tre kliniske problemstillinger af interesse for skulderkirurger med anvendelse af data fra Region Midtjyllands elektroniske patientjournal (Midt-EPJ).

Formål/aim:

1. Hvad er re-operationsraten og re-luksationsraten efter Bankart operation?
2. Hvor mange blokader og operationer udføres ved frossen skulder?
3. Hvor mange opereres indenfor 1 måned efter klavikelfrakstur, og hvor mange opereres senere?

Metode/method: Sammen med en datamanager fra BI-portalen, Regionshospitalet Horsens, blev data trukket for relevante kontakter og operations- og diagnosekoder. Data blev opgjort for offentlige sygehuse i Region Midtjylland fra 2013 til og med 2022.

Resultater/results: 1. I perioden undergik 1683 patienter en bankart operation, og 310 (18 %) af disse havde efterfølgende mindst en kontakt med endnu en registreret skulderprocedure (operation eller lukket reposition). Re-operationsraten var højere ved skopisk end ved åben bankart ($p=0.02$, 284/1473 skopisk vs. 26/210 åben). Af de bankart-opererede havde 121 patienter (7 %) mindst en efterfølgende skadestuekontakt under diagnosen skulderluxation.

2. Af de 7539 patienter med diagnosen frossen skulder fik 3585 (48 %) hverken blokade eller operation, 2736 (36 %) fik en eller flere blokader, 858 (11 %) blev opereret med løsning af adhærencer/incision af kapsel, og 360 (5 %) fik både blokade(r) og operation. Der blev oftest givet en enkelt blokade, og sjældent over 3 blokader.

3. 10.281 patienter fik diagnosen klavikelfrakstur mindst en gang i perioden, og af disse blev 613 (6 %) opereret indenfor 30 dage og 198 (2 %) opereret mere end 30 dage efter diagnosen. Der var signifikante forskelle på hospitalerne i regionen.

Konklusion/conclusion: Med forbehold for registreringspraksis kan der opnås estimater på fx operationsrater og visse prognostiske statistikker. Mange nuancer i registreringerne og forskelle på sygehusniveau kan udforskes nærmere.

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DSSAK ÅRSMØDE 2023



Titel/Title:

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

Forfattere: Johanne Frost Teilmann, Emil Toft Petersen, Theis Muncholm Thillemann, Chalotte Krabbe Hemmingsen, Josephine Olsen Kipp, Maiken Stilling

Introduktion/introduction: Radial head arthroplasty (RHA) is a hemiprosthesis used in the treatment of complex elbow dislocation fractures where osteosynthesis is not possible. Improper RHA size may result in pain, joint stiffness, and osteoarthritis, which is likely caused by unfavorable biomechanical changes. The ideal size of the radial head arthroplasty is unknown and knowledge concerning elbow stability after different head sizes is warranted. The aim of this experimental cadaver study was to evaluate elbow kinematics of different sizes of radial head implants after RHA using dynamic radiostereometric analysis (dRSA).

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Metode/method: Eight cadaveric donor arms were examined with dRSA during a motor-controlled elbow flexion-extension movement with the forearm in unloaded neutral and 10N varus loaded supinated positions. The elbows were examined before and after RHA. Collateral ligaments were kept intact by use of a sagittal step-cut humerus osteotomy for repeated exchange and test of RHA head diameters of anatomical size, +2mm (oversize) and -2mm (undersize). Implant stem length was kept anatomically sized. Bone models were obtained from computed tomography scans and AutoRSA software was used to match the bone models with dRSA recordings. Coordinate systems were applied to the radius and humerus, to describe elbow kinematics.

Resultater/results: The anatomical sized RHA diameter did not reveal statistically significant different kinematics in the radiocapitellar joint compared to the native elbow in both forearm positions. With the forearm in a loaded supinated position, an oversized RHA shifted the radial position 2mm radially ($p < 0.001$), and an undersized RHA angled the radius 2.5 degrees in varus direction ($p < 0.001$). All the RHA sizes showed increased joint distraction ($p < 0.05$) between 1-2mm in the radiocapitellar joint compared to the native elbow in both forearm positions.

Konklusion/conclusion: The kinematic changes with oversized and undersized RHA diameters were small, and few were statistically significant, which could suggest a leeway when choosing RHA diameter size. However, a few degrees or mm changes in elbow kinematics could increase stress to the interosseous membrane and pressure within the joint, making analysis of these important. The anatomically sized RHA maintained the kinematics of the native elbow the best.

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**Titel/Title:**

Scapular winging after fracture of the inferior angle of scapula: A case report

Forfattere: Rasmus Abildtrup Hestehave ; Niels Clausen

Introduktion/introduction:

Fractures of the Inferior Angle of Scapula (IAS) are very rare. This case-report presents a 47 year old male, who sustained a fracture of the Inferior Angle of the Scapula (IAS).

Metode/method: The fracture, initially undisplaced, was treated conservatively and physiotherapy was initiated. 26 months after trauma, the patient was referred to orthopedic outpatient clinic, complaining of loss of function, left sided backpain and winging of left scapula. X-rays showed 50 mm ventral displacement of the IAS fragment. Further specialized physiotherapy was attempted with no effect. 37 months after the trauma, open reduction and osteosynthesis with sutures was performed.

Resultater/results: 1 year postoperative CT scan showed 3 mm diastasis and no osseous union, but the patient had complete remission of symptoms, minimal scapula winging and had returned to work in construction.

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**Titel/Title:**

High complication and revision rates in anatomical total shoulder arthroplasty with cementless metal-backed glenoid components: A retrospective cohort study

Forfattere: Klaus Hanisch

Introduktion/introduction: Metal-backed (MB) glenoid components in anatomical total shoulder arthroplasty (aTSA) were prone to failure primarily due to loosening between the metal and the bony surface. However, newer generations of MB glenoid components have been shown to perform well in reverse shoulder arthroplasty (RSA). Convertibility is considered to be the most significant benefit of MB. Theoretically, MB components may be a viable option in “cuff at risk” cases

Formål/aim: The intent of this study is to highlight a new problem regarding the polyethylene (PE) inlay in combination with MB glenoid components in aTSA

Metode/method:

From December 2015 to September 2018, 32 patients received stemless aTSA with the MB Eclipse from Arthrex, with follow-up (FU) at a mean time of 55.9 months (43–76). For each patient, demographic data, complications and revisions, Western Ontario Osteoarthritis of the Shoulder (WOOS) index, subjective shoulder value (SSV), and Constant-Murley (CS) data were recorded.

Resultater/results: High rates of complications and revisions (11/32) in the MB group led to the stopping and abandoning of the procedure in this cohort. Six problems were correlated to the PE, including loosening, luxation, or wear. Five complications were not directly associated with the MB component. There was no loosening on the metal-bone interface side. Conversion to RSA was possible in three cases, non because of secondary cuff failure. High infection rates (2/32) led to a different strategy for antibiotics and preoperative preparations.

Konklusion/conclusion: MB glenoid components in aTSA caused unacceptably high complication and revision rates. Polyethylene wear, luxation, or loosening were the main reasons for revisions. As a result, procedures were stopped with MB glenoid components in aTSA.

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DSSAK ÅRSMØDE 2023

**Titel/Title:**

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

Forfattere: Anne Marie Nyholm, MD, PhD, Department of orthopaedics, Herlev/Gentofte University Hospital, Denmark Adam Witten, Denmark, MD, Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital Hvidovre, Denmark. Kristoffer Weisskirchner Barfod, Denmark, MD, PhD, Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic surgery, Copenhagen University Hospital Hvidovre, Denmark.

Introduktion/introduction: A clavicle fracture changes the mechanical axes of the shoulder girdle, potentially leading to scapular protraction and decreased subacromial space. A previous clavicle fracture could therefore predispose to later development of subacromial impingement syndrome (SIS).

Formål/aim: The purpose of this study was to investigate if a previous clavicle fracture was correlated with a higher incidence, or earlier diagnosis, of SIS.

Metode/method: This was a retrospective case-control study with data from the Danish National Patient Register. All persons aged 18-60 years, with a hospital contact due to a clavicle fracture (DS420) between 1.1.1996 and 31.12.2005 were identified and included as cases. For each case, five controls matched on sex and age were identified. Primary outcome was the first hospital contact with a SIS diagnosis (DM751-755) registered >180 days following a clavicle fracture. Persons were followed until 01.11.2021.

Resultater/results: 21.973 cases and 109.865 controls were included. The incidence of a clavicle fracture in this population was 76 fractures per 100.000 persons per year. 23% were female. 1.640 (7.46%) cases and 8.072 (7.35%) controls later received a SIS diagnosis, demonstrating no significant difference in incidence of SIS diagnosis ($p=0.56$).

1614 cases underwent surgical fixation. This subgroup had a statistically significant higher incidence of receiving a SIS diagnosis later in life (205 cases, 13%, $p<0.001$), with a bit lower incidence with surgical fixation within 21 days of diagnosis (62 with SIS diagnosis out of 643 cases, 9,6%) versus later fixation (161 with SIS diagnosis out of 971 cases, 16,6%).

Mean time from fracture to SIS diagnosis was shorter for cases compared to controls (4040 vs. 4442 days, $p<0.001$), and cases were slightly younger when receiving the diagnosis (51.3 vs 53.6 years, $p<0.001$).

Konklusion/conclusion: Clavicle fracture patients did not have an increased incidence of a later SIS diagnosis compared to matched controls, but were slightly younger at time of diagnosis. Surgical treatment was correlated with higher incidence of SIS diagnosis.

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**Titel/Title:**

Postoperative rehabilitation parameters and evaluation of supraspinatus tendon and muscle 1-year after rotator cuff surgery – data from the CUT-N-MOVE trial

Forfattere: Kjær BH, Magnusson SP, Warming S, Krogsgaard MR, Al-Hamdani A, Juul-Kristensen B

Introduktion/introduction: It is not clear when is it safe to start loading the repaired tendon (s) to reach an optimal clinical outcome during postoperative rehabilitation after rotator cuff (RC) surgery? The quality of tendon and muscle tissue 1-year after RC surgery can be decisive for the patient's long-term prognosis. Factors influencing this can be shoulder/ hand dominance and tendon re-tear.

Formål/aim: The aim of this trial was to compare twelve-weeks of progressive active exercise therapy (PR) on shoulder function, pain, and quality of life, with usual care (UC) after RC surgery. Secondly to investigate whether shoulder/hand dominance or tendon re-tear affects the quality of supraspinatus tendon and muscle tissue 1-year after RC surgery.

Metode/method: The study was a prospective randomized, controlled, clinical, multicenter trial. Patients with surgically repaired RC tears were recruited from the orthopedic departments at Bispebjerg-Frederiksberg and Herlev-Gentofte Hospital. Patients were randomized to PR or UC and evaluated on function, shoulder pain, range of motion (ROM), strength, and ultrasound (US) at 6 weeks, 12 weeks and 1 year. At 1-year follow-up 79 patients had both their shoulders examined by US, measuring the thickness of the supraspinatus tendon and muscle and the acromio-humeral distance (AHD).

Resultater/results: 82 patients (randomized to PR=41; UC=41) participated in the 12-weeks assessment and 79 in 1-year follow-up. There was no significant difference between the groups in change from baseline in WORC, DASH, pain, ROM, and strength at 1-year. Both groups showed significant improvements over time in all outcomes. In total, there were 13 re-tears (17 %) at 1-year follow-up. Patients with re-tear have significantly reduced supraspinatus muscle thickness on operated side compared to the healthy side, whereas patients with intact tendons had no side-to-side difference.

Konklusion/conclusion: Conclusively, PR did not result in superior patient reported and objective outcomes compared with UC at long-term follow-up. Occurrence of re-tear means a significant reduction in muscle thickness, which does not occur with intact tendon.

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The following three abstracts (pages 8-10) are incorporated into one presentation

Titel/Title:

The ISAKOS subclassification of Rockwood type III AC joint dislocations in a stable type A and an unstable type B is not clinically relevant. A prospective cohort study of 95 patients primarily treated non-surgically.

Forfattere: Haugaard KB, Bak K, Ryberg D, Muharemovic O, Hölmich P, Barfod K

Introduktion/introduction: ISAKOS upper extremity committee has suggested a subclassification of Rockwood type III acromioclavicular(AC) joint dislocations in a stable type A recommended non-surgical treatment and an unstable type B recommended surgical treatment.

Formål/aim: The objective of this prospective cohort study was to investigate if this subclassification is clinically relevant

Metode/method: Inclusion criteria were patients aged 18-60 with acute AC joint dislocation and >50% superior displacement of the clavicle. Patients were treated non-surgically with 3m of home-based training and the option of delayed surgical intervention. Assessment was at baseline and 6w, 3m, 6m and 1y after the injury. At 6w, patients were classified as stable if they presented with no scapular dyskinesis (SD) and no overriding of the clavicle to the acromion on radiographs, and unstable if they presented with any of the two. The primary outcome was the Western Ontario Shoulder Instability Index(WOSI).

Resultater/results: Eighty-eight patients contributed data for the subclassification at 6w; 20 patients were classified as stable and 68 as unstable. There was a statistically significant but not clinically relevant difference in WOSI between the two groups at 6m ($p=0.03$), but not at 3m and 1y. No patients from the stable group had surgery. From the unstable group, 9/68 (13%) had surgery. Patients presenting with SD had worse WOSI at all time-points compared to those without SD.

Konklusion/conclusion: The ISAKOS subclassification of Rockwood type III in a stable type A and an unstable type B is not clinically applicable. The presence of SD was associated with a worse result.

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DSSAK ÅRSMØDE 2023



Titel/Title:

Patient-reported, clinical and radiological factors associated with the result after non-surgical management of acute AC joint dislocations

Forfattere: Haugaard KB, Bak K, Ryberg D, Muharemovic O, Hölmich P, Barfod K

Introduktion/introduction: The treatment of Rockwood type III/V acromioclavicular(AC) joint dislocations is debated.

Formål/aim: The objective of this prospective cohort study was to investigate the association between demographical, clinical, patient-reported and radiological variables at baseline/6w with the results after 3m, 6m and 1y.

Metode/method: Inclusion criteria were patients aged 18-60 with acute AC joint dislocation and >50% superior displacement of the clavicle. Patients were treated non-surgically with 3m of home-based training and the option of delayed surgical intervention. The primary outcome was the Western Ontario Shoulder Instability Index(WOSI). Secondary outcome was surgery yes/no. Patients were evaluated at baseline and 6w, 3m, 6m and 1y after the injury. Demographical, clinical, patient-reported and radiological variables were investigated for association with the outcomes. A model to identify patients at risk of surgery was suggested.

Resultater/results: Ninety-five patients with Rockwood type III/V AC joint dislocation were included. Pre-injury participation in overhead/collision sports and reduced range of motion (ROM) at baseline were associated with reduced WOSI and increased risk of surgery. At 6w, reduced ROM, reduced WOSI and increased SPADI were associated with the outcomes. Radiological measurements were not associated with the result. At 6w, all patients eventually requiring surgery could be detected with a sensitivity of 100% and a specificity of 94% based on a SPADI score>30 and a ROM≤140 degrees in flexion/abduction.

Konklusion/conclusion: ROM was the only factor consistently associated with both WOSI and risk of surgery. Six weeks after the injury, patients in need of surgery could be detected based on ROM and SPADI.

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