

**Program og abstracts**

**Dansk Selskab for Skulder- og Albue Kirurgi**

**DSSAK Årsmøde**

19.-20. april 2018

**Sjællands Universitetshospital, Køge**



## Velkommen til DSSAK Årsmøde 2018 i Køge.

DSSAK, ortopædkirurgisk afdeling og fysioterapien Sjællands Universitetshospital, Køge byder velkommen til Årsmøde 2018.

Vi er stolte af at kunne præsentere deltagerne for et spændende videnskabeligt program. Temaet for årsmødet er rotator cuff og størstedelen af programmet handler om rotator cuff problematikker. Der er dog også et par afstikkere til andre emner. Det er også glædeligt, at DSSAK igen i år kan præsentere nogle spændende abstracts, som vidner om videnskabelig aktivitet rundt omkring på afdelingerne.

Mødet foregår i to parallelle spor, et overvejende for læger og et for fysioterapeuter. Lægedelen strækker sig over to dage og fysioterapeutdelen en dag. Sidste del af mødet - fredag efter frokost er fælles for fysioterapeuter og læger. Det er naturligvis muligt at kigge indenfor hos hinanden.

DSSAK Årsmøde 2018 afholdes på Sjællands Universitetshospital, Køge. Hospitalet er i øjeblikket under ombygning på vej mod det nye supersygehus, som forventes at stå færdigt i 2022. Udvidelsen betyder en øgning fra 64.500 m<sup>2</sup> til 185.000 m<sup>2</sup>, fra 2 etager til 10 etager, fra 296 til 831 sengepladser, fra 57.000 til 520.000 årlige ambulante besøg og fra 1.600 til 4.100 ansatte.

Udvidelsen vil betyde, at en stor del af patientbehandlingen i Regions Sjælland kommer til at foregå på Sjællands Universitetshospital, Køge og at flere patienter kan behandles i regionen. Sammen med udvidelsen vil regionen øge indsatsen for forskning og uddannelse.

Kort over Sjællands Universitetshospital, Køge findes på

<http://www.regionsjaelland.dk/sundhed/geo/koegeygehus/findvej/Sider/default.aspx>

Auditoriet er ved hovedindgangen. Udstilling og findes i lokaler på svalegangen 1. sal i ankomsthallen ligeledes tæt ved hovedindgangen. Undervisningslokale for fysioterapeutdelen ligger bag udstillingslokalet ved personalekantin.

Årsmødemiddagen foregår torsdag aften på Hotel Comwell Køge Strand, hvor der også er mulighed for overnatning.

Hotel Comwell Køge Strand

Strandvejen 111, 4600 Køge

tlf. 56653690

[hotelkogestrand@comwell.dk](mailto:hotelkogestrand@comwell.dk)

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

Arrangørerne takker DSSAK for at give årsmødet til Køge. Vi har glædet os meget til at være værter for jer til et par forventeligt spændende og givende faglige dage her i Køge.

Endnu engang velkommen til alle fysioterapeuter, læger, firmarepræsentanter m.fl.

### Videnskabelige programudvalg

Birgit Juul-Kristensen (fysioterapeutdel)

Anne Kathrine Belling Sørensen

Torsten Warming

Henrik Aagaard

### Lokale arrangørudvalg

Linda K. Fisher

Susanne M. Jensen

Rikke T. Sigvardt

Zaid Issa

Henrik Aagaard

Kim Schantz

# DSSAK Annual Meeting 2018

## Program - doctors

Theme: Rotator cuff

Program - [physiotherapists](#) at p. 5-6

### Sjællands Universitetshospital Køge, Auditorium

<b>Thursday, April 19th</b>		
12.00-12.25	Registration, coffee, sandwich and welcome Exhibition area 1 <sup>st</sup> floor hallway	Steen Lund Jensen
	<b>Biology and biomechanics</b> Auditorium near the main entrance	<i>Chair: Anne Katrine B. Sørensen, Henrik Aagaard</i>
12.25-12.30	Velkommen til SUH Køge	Kim Schantz
12.30-13.00	Tendon biology, degeneration and regeneration	Michael Kjær
13.00-13.20	Tendon and shoulder biomechanics	Henrik Aagaard
13.30- 13.50	Rotator cuff tears. How tendon and muscle pathology affect outcome	Lars Henrik Frich
13.50-14.00	Discussion	
14.00-14.45	Coffee and exhibition 1 <sup>st</sup> floor hallway	
	<b>Diagnostics</b>	<i>Chair: Lars Blønd. Inge Hvass</i>
14.45-15.05	Diagnostics; value of clinical tests and diagnostic algorithm	Klaus Bak
15.05-15.25	Ultrasonography of the rotator cuff	Morten Boesen
15.25-15.45	Discussion	
15.45-16.45	<b>How to manage rotator cuff tears</b>	<i>Chair: Anne Katrine B. Sørensen, Kim Schantz</i>
15 min	Rotator cuff pathology in athletes	Klaus Bak
15 min	Rotator cuff surgery - tips, tricks	Klaus Bak
10 min	Rotator cuff repair: surgical technique (video)	Lars Blønd
20 min	Cases and Discussion	Lars Blønd
17.00-18.00	DSSAK General Assembly	
19.00	Dinner, <a href="#">Hotel Comwell Køge Strand</a>	Strandvejen 111, Køge

## DSSAK Annual Meeting 2018

### Program - **doctors**

Below please find Program - [physiotherapists](#) at p. 5-6

#### Sjællands Universitetshospital Køge, Auditorium

<b>Friday, April 20th</b>		
08.30-09.30	<b>When and how to operate? Indications and considerations</b>	<i>Chair: Henrik Aagaard, Andreas Quist</i>
20 min.	<i>Mini-battle:</i> conservative vs operative treatment of rotator cuff lesion: Indications, timing, trauma, size, age, etc.	Hans Viggo Johannsen vs. Hans Viggo Johannsen
10 min.	The patient: indications and considerations	Anne Kathrine B. Sørensen
30 min.	Cases and Discussion	Anne Kathrine B. Sørensen
09.30-10.10		<i>Chair: Kim Schantz</i>
20min.	Professor Lecture	Stig Brorson
20 min.	Free papers, abstract 1-2	Abstract program
10.10-10.40	<i>Coffee and exhibition 1<sup>st</sup> floor hallway</i>	
10.40-12.00	<b>Management of irreparable tears</b>	<i>Chair: Theis Muncholm Thillemann, Morten Boesen</i>
10 min.	Experience with Matrix augmentation	Rodolfo Santos
10 min.	Experience with Inspace Ballon	Rolf Bondesen
10 min.	Tendon transfers for irreparable rotator cuff tears	Bo S. Olsen
10 min.	10 y. results of latissimus dorsi transposition	Magnus Bjarnason
40 min.	Free papers, abstract 3-6	Abstract program
12.00-13.00	<i>Lunch and exhibition 1<sup>st</sup> floor hallway</i>	
	Program continues at next page.	

	<b>Friday, April 20<sup>th</sup></b> - continued	
13.00-14.30	<b>Rehabilitation and evaluation tools</b> Joint program for physiotherapists and doctors. Auditorium	<i>Chair: Steen Lund Jensen, Birgit Juul-Kristensen</i>
10 min.	Rotator cuff disease in a historical perspective.	Stig Brorson
13.10-14.30	<b>Is there a role for physiotherapy?</b> Conservative treatment, active PT guided training, progression, outcome.  Postoperative rehabilitation, immobilisation, passive/active ROM, load bearing, progression criteria. Clinical outcome; evaluations tools, scores, PROMs, MRI, US.	Michael Krogsgaard /Rikke Høffner
14.30-15.00	Rotator cuff cases, Patienterstatningen.	Michael Krogsgaard
15.00	Completion	Steen Lund Jensen
15.15	Departure	

**DSSAK Annual Meeting 2018**  
**Program - physiotherapists**  
**Theme: Rotator cuff**

**Sjællands Universitetshospital Køge, Room 4 by staff canteen, 1<sup>st</sup> floor**

	<b>Friday, April 20<sup>th</sup></b>	
08:30-09:15		<i>Chair: Birgit Juul-Kristensen, Susanne Malene Jensen, Linda Kjær Fischer</i>
15 min	Scapular dyskinesia and self-reported outcomes in patients with subacromial impingement, is there a relationship?	David H Christiansen, Associate Professor/ Senior Researcher Department of Clinical Medicine, Aarhus University/Department of Occupational Medicine, Regional Hospital West Jutland
20 min	How do we develop an optimum post-operative training program for patients, after ASD operation?	
10 min	Discussion	

09:15-10.00		<i>Chair: Birgit Juul-Kristensen, Susanne Malene Jensen, Linda Kjær Fischer</i>
15 min	Glenohumeral and scapulothoracic strength impairments in patients with subacromial impingement. Which impairments are most pronounced and how are these related to patient-reported pain and function?	Mikkel Bek Clausen, PhD-stud., Metropol, Department of Orthopaedic Surgery, Hvidovre hospital
20 min	Conservative treatment of subacromial impingement: Do impairments improve with current care or could we do it better?	
10 min.	Discussion	
10:00-10:30	<i>Coffee and exhibition 1<sup>st</sup> floor hallway</i>	
10:30-12:00		<i>Chair: Birgit Juul-Kristensen, Susanne Malene Jensen, Linda Kjær Fischer</i>
40 min.	Which post-operative exercises should be offered to patients after surgical rotator cuff repair?	Birgitte Hougs Kjær, PhD-stud., Dept. of Physiotherapy, Institute of Sports Medicine Copenhagen, Bispebjerg Hospital, University of Southern Denmark
10 min	Discussion	
30 min	Primary and recurrent shoulder dislocation. Do they both need treatment?	Birgit Juul-Kristensen Ass. Prof., University of Southern Denmark
10 min	Discussion	
12.00-13.00	<i>Lunch and exhibition 1<sup>st</sup> floor hallway</i>	
13.00- 15.00	Joint program PTs and doctors. <i>Auditorium near the main entrance</i>  Below please find Program at p. 5	
15.45	Completion	
16.00	Departure	

## **Exhibitors**

DSSAK would like to thank the exhibitors for participation in the meeting. The company exhibits are located on the [Room 1-2 1<sup>st</sup> floor of the hallway](#). The participants at the Annual Meeting are invited to visit exhibitors actively during all breaks.

Arthrex

Zimmer/Biomet

DJO Nordic

Linvatec/ConMed

Protosekompagniet Depuy/Synthes

Smith & Nephew

Storz

Stryker

Swemac/Osmedic/Lima

Nordicare

## **Abstract DSSAK 2018**

### Oversigt

#### **1. Cross-cultural translation, validation, reliability and responsiveness of the Danish version of Western Ontario Rotator Cuff Index**

Lone D. Brix, Karen T. Bjørnholdt, Lone Nikolajsen, Kirsten Kallestrup, Theis M. Thillemann

#### **2. Time dependent supraspinatus muscle inflammation following experimental rotator cuff lesion.**

Kira Stengaard Larsen, Peter Toft Jensen, Matilda Degn, Thi My Linh Ta, Eva Kildall Heibøl, Henrik Daa Schrøder, Allan Stensballe, Ditte Caroline Andersen, Kate Lykke Lambertsen, Lars Henrik Frich

#### **3. Cost-utility Analysis of Operative versus Nonoperative Treatment of Displaced Midshaft Clavicular Fractures.**

Anne-Kathrine Rosenkrans Sørensen, Lianna Hede Hammeken, Andreas Haubjerg Qvist, Steen Lund Jensen, Lars Ehlers

#### **4. Can endogenous pain modulation capacity predict pain six months after shoulder arthroscopy?**

Lone D. Brix, Theis M. Thillemann, Karen T. Bjørnholdt, Lone Nikolajsen

#### **5. Elbow biomechanics, radiocapitellar joint pressure, and interosseous membrane strain before and after radial head arthroplasty**

Chalotte Hemmingsen, Theis Thillemann, Brian Elmengaard, Sepp de Raedt, Maiken Stiling

#### **6. Reverse shoulder arthroplasty has a higher risk of revision due to infection than anatomical shoulder arthroplasty. 17,730 primary shoulder arthroplasties from the Nordic Arthroplasty Register Association**

Sahar Moeini, Jeppe V. Rasmussen, Björn Salomonsson, Erica Arverud, Randi Hole, Trygve Methlie, Steen Lund Jensen, Stig Brorson



## 1. Cross-cultural translation, validation, reliability and responsiveness of the Danish version of Western Ontario Rotator Cuff Index

Lone D. Brix, MHSc PhD<sup>1\*</sup>; Karen T. Bjørnholdt, MD, PhD<sup>2</sup>; Lone Nikolajsen, MD, DMSc<sup>3</sup>; Kirsten Kallestrup, MSN<sup>1</sup>; Theis M. Thillemann, MD, PhD<sup>4</sup>

<sup>1</sup> Department of Anesthesiology, Horsens Regional Hospital, Horsens, Denmark. <sup>2</sup> Department of Orthopedic Surgery, Horsens Regional Hospital, Horsens, Denmark. <sup>3</sup> Department of Anesthesiology and Intensive Care, Aarhus University Hospital, Aarhus, Denmark. <sup>4</sup> Department of Orthopedic Surgery, Aarhus University Hospital, Aarhus, Denmark

**Background:** The Western Ontario Rotator Cuff Index (WORC) is a self-reporting, disease-specific, quality-of-life assessment tool and has shown good validity, reliability and responsiveness.

**Purpose:** The purpose of this study was to translate and adapt the WORC into a Danish version (D-WORC) and evaluate the validity, reliability and responsiveness of the D-WORC in a cohort of native Danish-speaking patients undergoing surgery for arthroscopic subacromial decompression (ASD) or rotator cuff repair (RCR).

**Study design:** Cohort study (diagnosis).

**Material and methods:** In accordance with standard procedure, the original WORC version was translated and cross-culturally adapted into Danish. To test validity, 126 patients undergoing ASD or RCR were evaluated using the D-WORC, the Disabilities of Arm, Shoulder and Hand (DASH), Oxford Shoulder Score (OSS) and Short Form-36 (SF-36). The D-WORC was repeated three days later to evaluate test-retest reliability. Three months after surgery patients were asked to complete D-WORC, DASH, OSS, SF-36 and a Global Rating Scale to determine the responsiveness of D-WORC. Furthermore, construct validity, internal consistency, interclass correlation (ICC), limits of agreement (LOA) and an anchor Minimal Important Change (MIC) were assessed.

**Results:** Cross-cultural adaptation was performed successfully concerning content and language. The correlation between D-WORC and DASH was high (PCC=0.71; 95% CI 0.60-0.79) and moderate between D-WORC and OSS (PCC=0.67; 95% CI 0.55-0.76). Reliability analysis revealed an ICC of 0.80 (95% CI 0.69-0.87) and an internal consistency ( $\alpha$ ) of 0.94 (95% CI 0.92-0.95). The test-retest mean difference was 76.4 (SD 201.40) and LOA ranged from -318.3 (95% CI -387.8- -248.9) to 471.2 (95% CI 401.7-540.6) for the total WORC score. The MIC was a reduction of 211 in the total score.

**Conclusion:** D-WORC is a valid, reliable, and responsive questionnaire that can be used in Danish populations.

## 2. Time dependent supraspinatus muscle inflammation following experimental rotator cuff lesion

Kira Stengaard Larsen<sup>1</sup>, Peter Toft Jensen<sup>1,2</sup>, Matilda Degn<sup>3</sup>, Thi My Linh Ta<sup>2</sup>, Eva Kildall Heibøl<sup>4</sup>, Henrik Daa Schrøder<sup>4</sup>, Allan Stensballe<sup>5</sup>, Ditte Caroline Andersen<sup>6</sup>, Kate Lykke Lambertsen<sup>1,7,8</sup>, Lars Henrik Frich<sup>2,9\*</sup>

<sup>1</sup>Department of Neurobiology Research, Institute of Molecular Medicine, University of Southern Denmark, Odense, Denmark, <sup>2</sup>The Orthopaedic Research Unit, Department of Clinical Research, University of Southern Denmark, Odense, Denmark. <sup>3</sup>University of Copenhagen. <sup>4</sup>Department of Pathology, Odense University Hospital, Odense, Denmark. <sup>5</sup>Department of Health Science and Technology, Aalborg University, Denmark. <sup>6</sup>Clinical Biochemistry, Odense University Hospital, Odense Denmark. <sup>7</sup>Department of Neurology, Odense University Hospital, Odense, Denmark. <sup>8</sup>BRIDGE – Brain Research – Inter-Disciplinary Guided Excellence, Department of Clinical Research, University of Southern Denmark, Odense, Denmark. <sup>9</sup>Department of Orthopaedics, Odense University Hospital, Odense, Denmark.

**Background:** The prevalence of rotator cuff (RC) tears is wide and increases with age, mainly due to degeneration of the RC followed by trauma to the shoulder. Tear of the supraspinatus tendon is most often involved, either solely or in combination with two or more tendons.

Treatment of RC tear often is conservative, but full thickness tears may require operative treatment. The general healing of the RC post-surgery is often poor and re-tears of the tendon are common. Main reasons are timing of surgery and biology in the sense that the normal tendon-bone interface is not recreated; hence a fibrocartilaginous scar will be produced instead.

The biology and altered biomechanics of the tendon and muscle during RC tear and healing are far from fully understood. Greatest focus has been on the tendon lesions whereas the inflammatory response and regeneration of muscle tissue fairly have been studied. From a RC tear model in rats, macrophages and inflammatory cytokines have been shown to accumulate in the muscle tissue, indicating that chronic inflammation mediated by macrophages might be involved in RC muscle atrophy and degeneration. The hypothesis behind this project is that the supraspinatus (SS) muscle will show signs of inflammation and degeneration following experimental RC tear. We also predict that satellite cells will increase in number following SS tendon tear, as a consequence of muscle regeneration.

**Methods:** An experimental SS lesion was created in the adult mouse shoulder (C57BL/6 mice). Animals were then sacrificed at day 1, 3, 5, 7, 9, 14 and 28 post-surgery. Both SS muscles was removed from the mouse and processed for histology, immunofluorescence, flow cytometry, proteomics and multiplex analysis. The contra-lateral supraspinatus was used as a control.

Haematoxylin and Eosin was used to visualize inflammation, Oil Red O to visualize fatty infiltration, Sirius Red to visualize changes in collagen, and CD68 to visualize infiltrating macrophages. In addition flow cytometry was performed to investigate infiltration of CD45<sup>+</sup>CD11b<sup>+</sup>Ly6C<sup>+</sup>Ly6G<sup>+/−</sup> leukocytes and CD45<sup>+</sup>CD3<sup>+</sup> T cells into the injured muscle post-surgery. CD45<sup>+</sup>CD31<sup>−</sup>Sca-1<sup>−</sup>CD34<sup>+/−</sup>Integrin- $\alpha$ 7<sup>+</sup> cells were identified as resting and activated muscle stem cells. Proteomics was used to identify significantly up- and down-regulated proteins and multiplex ELISA to detect changes in cytokines in the musculature 5 days post-lesion.

**Results:** We found a time-dependent infiltration of leukocytes into the SS musculature, mostly dominated by macrophages. peaking at day 5-7. At this time point, cytokine levels were significantly upregulated in the ipsilateral shoulder. We also found that the SS musculature showed signs of fatty infiltration already 14 days post lesion and that collagen expression changed over time. The percentage of stem cells was found to change significantly over time on both the injured and non-injured sides.

**Perspectives:** The results of this project has increased the understanding of the inflammatory and regenerative responses in the SS muscle following a RC tear, which ultimately can help us identify better treatment strategies and help to avoid re-tearing and ensure improved healing of the RC.

### 3. Cost-utility Analysis of Operative versus Nonoperative Treatment of Displaced Midshaft Clavicular Fractures

Anne-Kathrine Rosenkrans Sørensen MSc<sup>1</sup>, Lianna Hede Hammeken MSc<sup>1</sup>, Andreas Haubjerg Qvist MD<sup>2</sup>, Steen Lund Jensen MD, PhD<sup>2</sup>, Lars Ehlers MSc, PhD<sup>1</sup>

<sup>1</sup> Department of Business and Management, Danish Center for Healthcare Improvements, Aalborg University, Aalborg, Denmark. <sup>2</sup> Department of Orthopaedic Surgery, Aalborg University Hospital, Aalborg, Denmark

**Aim:** To assess the cost-utility of plate fixation compared with nonoperative treatment of displaced midshaft clavicular fractures in Danish adults.

**Background:** Conventional treatment of displaced midshaft clavicular fractures is nonoperative. Recent studies have implied that operative treatment might result in a faster return to work, resulting in a decreased productivity loss for society. The cost-utility of operative versus nonoperative treatment has not previously been investigated utilizing a societal perspective.

**Methods:** Decision analytic modelling of incremental costs and quality adjusted life years was applied. Data was primarily retrieved from a recent Danish randomized controlled trial (RCT), additional RCT's identified through a systematic literature review and field observations. A one-year time horizon was applied and all prices reported in 2016-level. Both a health sector and a societal perspective were applied.

**Results:** Operative treatment is associated with a larger gain in quality adjusted life years (QALYs) and a higher cost compared to nonoperative treatment. The incremental cost effectiveness ratio was estimated to DKK 1,273,455 (£ 142,764) per QALY from a health sector perspective and DKK 1,241,364 (£ 139,166) per QALY from a societal perspective. Considering a subgroup analysis of patients with a high-load shoulder profession, operative treatment is associated with a lower gain in QALYs and a higher cost compared to nonoperative treatment from a health sector perspective. Considering a societal perspective, the incremental cost effectiveness ratio was estimated to DKK -1,100,927 (£ -123,422) per reduction of one QALY.

Univariable and probabilistic sensitivity analyses showed that all results were subject to uncertainty.

**Conclusion:** Operative treatment is not cost-effective, considering a threshold of £ 30,000 per QALY as reported by NICE. However, for a subgroup of patients with a high-load shoulder profession, operative treatment might be cost-effective considering productivity costs.

#### 4. Can endogenous pain modulation capacity predict pain six months after shoulder arthroscopy?

Lone D. Brix, PhD<sup>1\*</sup>; Theis M. Thillemann, PhD<sup>2</sup>; Karen T. Bjørnholdt, PhD<sup>3</sup>; Lone Nikolajsen, DMSc<sup>4</sup>

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**Background and purpose:** Arthroscopic shoulder surgery, e.g. subacromial decompression (ASD) and acromioclavicular (AC) resection, usually results in significant improvement in pain and shoulder function; however, some patients report persistent pain after surgery. The aims of this prospective study were to determine the incidence of pain six months after outpatient ASD and/or AC resection, to reveal causes of the pain, and to investigate whether endogenous pain modulation capacity was a preoperative risk factor for unexplained persistent pain.

**Patients and methods:** Before surgery, 150 patients were enrolled and 95 patients were tested for endogenous pain modulation capacity using the cold pressor test. Patients with pain six months after surgery were examined by an experienced orthopedic surgeon to reveal medical explanations, if any, for the pain.

**Results:** Data from 101 patients were available for analysis six months after surgery. Thirty-six patients (35.6%) had persistent pain, and 32 underwent examination by the surgeon who identified medical reasons for the pain in ten patients (9.9%), but not in the remaining 22 (21.8%). Endogenous pain modulation capacity was not found to be risk factor, in the 22 patients with unexplained persistent pain.

**Interpretation:** Present results were unable to demonstrate that patients with unexplained persistent pain had a more inefficient endogenous pain modulation capacity than patients without persistent pain. These findings may be because of an already altered endogenous pain modulation capacity due to the high preoperative pain intensity.

## 5. Elbow biomechanics, radiocapitellar joint pressure, and interosseous membrane strain before and after radial head arthroplasty

Chalotte Hemmingsen, Theis Thillemann, Brian Elmengaard, Sepp de Raedt, Maiken Stiling.

**Aim:** To compare the elbow kinematics before and after anatomic RHA in an experimental study.

**Methods:** 8 human native elbows (mean age of 82 years, range 61-89) were recorded with dynamic radiostereometric analysis (dRSA) during forearm flexion motion in a motorized fixture with neutral rotation, and further in supination and pronation with/without a 10N varus-valgus stress. Model-based RSA (RSACore, The Netherlands) was used for calibration and initialization of the bone models on the first frame of the dRSA series, and further analyses were conducted using non-commercial AutoRSA software. Standardised anatomical axes and coordinate systems of the forearm were used. Translations of the radial head in the x-, y- and z-directions relative to the humerus and ulna were measured and kinematics were calculated. The contact pressure in the RCJ was measured using a thin-film pressure sensor (Tekscan) and the tension within the IOM was measured using a custom-made strain gauge. The experiment was repeated after insertion of an anatomical RHA (Acumed).

**Results:** After RHA the radial head was displaced approximately 1.8mm medially and 1.4mm distally compared with the native radial head. During unloaded flexion motion the mean difference in translation between the native radial head and the RHA was <1mm (CI95 +/- 0.5mm) (p=0.00), and with varus-valgus loading the difference was <1.5mm (CI95% +/- 1.5mm) (p=0.00). The mean difference in RCJ contact pressure was <0.30 MPa (CI95% ± 0.40 MPa) during unloaded flexion motion (p=0.00). The tension in the IOM in supinated (p=0.03) and pronated (p=0.00) forearm position was higher for the RHA compared with native elbows. Varus-valgus stress in supinated and pronated forearm position decreased the IOM tension in the RHA elbows (p=0.00).

**Conclusion:** There were only submillimeter kinematic changes and small joint pressure increases in the RCJ after optimal insertion of an anatomical RHA in an experimental setting

## **6. Reverse shoulder arthroplasty has a higher risk of revision due to infection than anatomical shoulder arthroplasty - 17,730 primary shoulder arthroplasties from the Nordic Arthroplasty Register Association**

Sahar Moeini, MD, Jeppe V. Rasmussen, MD Ph.d., Björn Salomonsson, MD, Ph.d., Erica Arverud, MD, Randi Hole, MD, Trygve Methlie, MD, Steen Lund Jensen, MD, Ph.d., Stig Brorson, MD, Ph.d., DMSc. Orthopedic Department, Herlev Hospital, Denmark

**Background:** The use of reverse shoulder arthroplasty has increased and the indications have expanded, but the incidence of revision due to infection may be higher than for other arthroplasty designs. The aim of this registry-based study was to estimate the risk of infection after primary reverse shoulder arthroplasty compared to anatomical designs.

**Methods:** The Nordic Arthroplasty Register Association (NARA) is a common set of prospectively collected data from the national shoulder arthroplasty registries in Denmark, Norway and Sweden. The national registers are designed to capture every shoulder arthroplasty thus providing a large dataset with individual-based data on diagnosis, arthroplasty design, revision and reason for revision. For the present study we included 17,730 primary shoulder arthroplasties reported between 2004 and 2013. The Kaplan Meier method was used to illustrate the 10-year cumulative rate of revision due to infection, and the Cox regression model was used to calculate the hazard ratios as a measure of the relative risk of revision due to infection.

**Results:** There were 188 (1.1%) number of revisions due to infection with a mean follow-up of 3 years and 9 months. The 10-year cumulative rate of revision due to infection was 1.4 % (standard error, <0.01) overall, but 3.1% (standard error, <0.01) for patients with reverse shoulder arthroplasty and 8.0% (standard error, 0.02) for men with reverse arthroplasty. Patients with reverse shoulder arthroplasty had an increased risk of revision due to infection (unadjusted relative risk, 3.78, [95% confidence interval, 2.23 to 6.41];  $p < 0.01$ ), also when adjusted for age, gender, primary diagnosis and year of surgery (relative risk, 2.41, [95% confidence interval, 1.26 to 5.59];  $p < 0.01$ ).

**Conclusions:** The overall incidence of revision due to infection was low. However, specific attention is required on the risk associated with reverse arthroplasty, especially in men.