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**RECURRENCE OF HUMERAL HEAD DECENTERING IN DIFFERENT GLENOID ANOMALIES  
AFTER ANATOMICAL SHOULDER ARTHROPLASTY WITH CEMENTLESS FULL-METAL  
GLENOID COMPONENTS**

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**Introduction**

Posterior or cranial decentering of the humeral head is considered a significant factor for early glenoid loosening due to asymmetric edge loading in cemented PE or metal-backed glenoids.

**Aim**

To determine whether correcting glenoid anomalies and reversing the articulating surfaces can contribute to improvements.

**Material and methods**

Among 80 shoulders (78 patients) treated with a novel system (stemless, cementless fixation of components in an anatomical shoulder arthroplasty with material reversal) between 2019 and 2022 (mean age 64), 21 cases exhibited preoperative posterior subluxation exceeding 80%, as determined by CT and 3D analysis. These cases were prospectively followed clinically and radiologically for 2–5 years. Glenoid dysplasia was excluded. The humeral head position was radiologically analyzed and clinical outcomes were assessed using the DASH and Constant scores.

**Results**

No recurrence of preoperative posterior decentering was observed in the mid-term follow-up, even in cases with significant anomalies ( $\geq 10^\circ$  inclination and/or  $\geq 20^\circ$  retroversion). Three patients exhibited clinical and sonographic signs of rotator cuff insufficiency, which was associated with a superior migration of the humeral head on radiographs. Apart from a low-grade infection with *Cutibacterium acnes*, no cases of glenoid loosening or radiolucent lines were detected. Bony integration of components and autologous grafts was observed even in severe B2-B3 deformities. There was no significant difference in clinical outcomes compared to patients with less preoperative decentering. No evidence of increased PE wear on the humeral head was found.

**Conclusion**

The structural stability of cementless ingrown full-metal glenoids may contribute to sustained centering, reduced PE wear and loosening rates and to functional improvement.

## **THE USE OF MIXED REALITY IN ARTHROSCOPIC ELBOW ARTHROLYSIS SURGERY. DESCRIPTION OF THE METHOD AND EARLY RESULTS**

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### **Introduction**

Elbow stiffness is a pathology that can have multiple causes. Degenerative changes are one of the most common, a specially in active population. Even a small restriction, of elbow movement particularly if painful can cause significant impairment of the patient's activity. Arthroscopic arthrolysis with removal of osteophytes have been effective treatment, however it relies on accuracy of bone resection. Mixed reality and holographic imaging offer potential guidance during these procedures.

### **Aim**

This study aimed to evaluate the effectiveness of mixed reality guidance during arthroscopic elbow arthrolysis for degenerative contracture.

### **Material and methods**

Study was based on prospective range of movement evaluation of 41 patients with degenerative elbow contracture underwent arthroscopic release, including resection of osteophytes and reshaping of fossae. 20 patients had the procedure done with mixed reality guidance (HOLO), and 21 without (NO-HOLO). Holograms were created from CT scans and used with a mixed reality viewing system (RSQ HOLO, RSQ).

### **Results**

Range of motion was significantly better in the HOLO group both intraoperatively ( $128^\circ \pm 10$  vs  $121^\circ \pm 12$ ,  $p = 0.016$ ) and at 1-week follow-up ( $110^\circ \pm 17$  vs  $96^\circ \pm 15$ ,  $p = 0.041$ ). The HOLO group also had a smaller intraoperative extension deficit ( $2^\circ$  vs  $6^\circ$ ,  $p = 0.02$ ). Gain of motion 6 months after arthroscopy was bigger in HOLO group by  $11^\circ$  ( $p = 0.039$ ).

### **Conclusion**

Mixed reality guidance enhances the restoration of range of motion during arthroscopic release of degenerative contractures and in the early follow-up period. It aids in identifying impinging osteophytes, contributing to more precise resection and better outcome.

## **ROTATOR CUFF TEAR WITH INCOMPLETE FOOTPRINT COVERAGE – EARLY RESULTS OF ARTHROSCOPIC REPAIR WITH THE USE OF BIOINDUCTIVE COLLAGEN MEMBRANE**

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### **Introduction**

Rotator Cuff tear with severe delamination and high retraction can lead to incomplete footprint coverage during arthroscopic repair. Despite advances in surgical techniques such injury is associated with a high risk of re-tear.

### **Aim**

The aim of this study was to evaluate the outcomes of patients with rotator cuff injuries, with incomplete footprint coverage, arthroscopically operated with the use of bioinductive membrane.

### **Material and methods**

24 patients (4 women) with traumatic supraspinatus tendon (SST) tears with or without damage to the infraspinatus tendon (IST), were enrolled to this study. Criteria included patients in whom complete tendon repair was possible, but with incomplete footprint coverage. All patients were treated arthroscopically with the use of bioinductive collagen membrane. Patients were assessed preoperatively at 4.6 and 12 months post-op. Each assessment included shoulder scales, isokinetic testing and imaging evaluation.

### **Results**

Re-tear rate for isolated SST was 30%. For massive rotator cuff re-tear rate of SST was 42% and 14.5% for IST. Six re-tears were type 1 and three were type 2. In 10 patients who have fully healed, new tendon tissue has been observed in MRI at the site of the previous footprint defect. All clinical scales examined improved. Patients with isolated injury had better biomechanical results.

### **Conclusion**

Rotator cuff repair with the use of bioinductive membrane is associated with significant clinical, biomechanical and radiological improvements. Bioinductive membrane placed partially on the tendon and partially on the footprint appears to stimulate tendon regrowth and reduce the number of type 2 re-tears.

## **MID-TERM RESULTS OF SUPERIOR CAPSULAR RECONSTRUCTION WITH THE LONG HEAD BICEPS TENDON REROUTING TECHNIQUE IN MASSIVE, IRREPARABLE ROTATOR CUFF TEARS**

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### **Introduction**

The gold-standard treatment option for massive irreparable rotator cuff tears (MIRCT) remains unknown.

### **Aim**

To assess results of superior capsular reconstruction with biceps rerouting technique (LHBT-SCR) in patients with MIRCT.

### **Material and methods**

Patients treated with LHBT-SCR due to MIRCT with at least 2 years follow-up were enrolled in this study. Shoulder ROM, pain in numeric rating scale (NRS) and shoulder function in Constant and SSI-ASES questionnaires were assessed. True-ap X-rays were analysed in terms of acromiohumeral distance (AHD) and cuff tear arthropathy (CTA) development in Hamada and Sirveaux classifications.

### **Results**

The study group involved forty-five patients (11F, 34M) with the mean age of 65 years (50–77) and the mean follow-up of 52 months (24–100). One patient was excluded due to conversion to arthroplasty. The mean ROM was 150° for flexion, 148° for abduction and 35° for internal rotation. The average pain in NRS was 1.0. The mean functional result was 83.9 pts in SSI-ASES and 71.2 pts in Constant Score (pain 11.4/15 pts, ADL 16.6/20 pts, ROM 34/40 pts, strength 9/25 pts). The average AHD was 5.6 mm (2.0–8.7mm). CTA was assessed as grade 1 in 23, grade 2 in 14, grade 3 in 3 and grade 4 in 4 patients. Glenoid erosion was observed in 9 patients and assessed as grade 1 in eight and grade 2 in one patient according to Sirveaux classification.

### **Conclusion**

In a mid-term observation LHBT-SCR provides excellent, pain-free ROM, despite persistent muscle strength deficits. During observation only 1 patient required conversion to RSA and 7 out of 44 patients developed significant CTA.

## **ASSESSMENT OF ELBOW PROPRIOCEPTION WITH INERTIAL MEASUREMENT UNITS- VALIDITY AND RELIABILITY STUDY**

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### **Introduction**

Proprioception is a key sensory function enabling individuals to perceive body position and movement. It is essential for optimal performance, particularly in athletes. However, accurately measuring proprioception remains a challenging task with the methods currently available.

### **Aim**

This study assessed the reliability of elbow proprioception measurement using inertial motion sensors- IMU and validating IMU against other angle measurements methods.

### **Material and methods**

Twenty healthy participants underwent active and passive proprioception assessments based on elbow joint position sense (JPS). Analyzed data was error of reproduction of joint position (ERJP). Angular measurements were performed using a single IMU (RSQ MOTION) and validated against BIODEX SYSTEM 4 moving frame.

### **Results**

Inter-rater reliability for passive proprioception was high, with a Kendall's coefficient of 0.77 ( $p < 0.05$ ) for both RSQ Motion sensors and BIODEX, while active proprioception measured with RSQ Motion sensors showed slightly lower reliability (Kendall's coefficient of 0.66,  $p < 0.05$ ). Intra-rater reliability had similar results, with Kendall's coefficients of 0.74 for passive BIODEX proprioception examination, 0.75 for passive RSQ Motion sensor testing and 0.65 for active proprioception ( $p < 0.05$ ) measured with RSQ Motion sensors. Bland-Altman analysis revealed that differences between the RSQ sensors and BIODEX were within the limits of agreement (LoA). Mean absolute value of the ERJP between RSQ sensors and BIODEX was  $0.88^\circ$  (95% CI: 0.79–0.98; SD: 0.71).

### **Conclusion**

These results suggest that elbow joint position sense assessment methodology using IMU is reliable and accurate. The study serves as a background for further research of joint proprioception in the human body.

## **CAN WE PREDICT RECOVERY AFTER SHOULDER ARTHROSCOPY REPAIR BASED ON PATIENTS' NARRATIVES?**

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### **Introduction**

Shoulder instability and rotator cuff tears are the primary indications for arthroscopic surgery. Given the demanding nature of these conditions and their treatments, psychological factors likely influence recovery. Analyzing patients' narratives offers a simple and accessible method to assess their psychological status.

### **Aim**

To identify elements of the narrative that have a statistically significant relationship with and may be predictors of recovery rates.

### **Material and methods**

73 patients (36 with instability, 37 with rotator cuff tears) underwent self-reported questionnaires and functional and biomechanical testing four months after surgery. Outcomes were compared between groups. Homogeneous parameters (ASES, Constant, UCLA, Biodex Deficits) were included in subsequent analyses. Patients also provided written narratives about significant turning points in their lives, which were coded for agency and communion motives. Effect size ( $d$ ) was used to analyse differences in statistically significant correlations between groups with varying agency and communion levels.

### **Results**

Patients with strong fulfilled agency reported significantly less pain, with large differences observed in pain levels (up to  $d_{\text{Constant Pain}} = 1.58$ ,  $p = 0.015$ ), overall recovery outcomes (up to  $d_{\text{UCLA Total}} = 1.23$ ,  $p = 0.035$ ), and average power deficit (up to  $d = 0.91$ ,  $p = 0.047$ ). Conversely, strongly thwarted communion negatively impacted function (up to  $d_{\text{Constant Function}} = 0.87$ ,  $p = 0.027$ ;  $d_{\text{ASES Function}} = 1.81$ ,  $p = 0.133$ ), increased related disability (up to  $d_{\text{UCLA Total}} = 2.01$ ,  $p = 0.028$ ) and deficit in average power in internal rotation (up to  $d = 1.81$ ,  $p = 0.003$ ).

### **Conclusion**

Fulfilled agency and thwarted communion in patient narratives may predict recovery outcomes, particularly pain and function. Strong agency appears to enhance pain resilience, while thwarted communion negatively affects the return to daily activities.

## **DYNAMIC ANTERIOR STABILIZATION USING LONG HEAD OF THE BICEPS TENDON IN ANTERIOR SHOULDER INSTABILITY – SHORT-TERM FOLLOW-UP RESULTS**

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### **Introduction**

Soft tissue stabilization procedures in anterior shoulder instability are associated with more important risk of recurrence than bony procedures. Dynamic anterior stabilization (DAS) with long head of the biceps (LHB) was introduced as a tool for the patients with risk factors, but with with no significant glenoid bone loss.

### **Aim**

Aim of the study was to retrospectively investigate the efficiency and patient satisfaction after arthroscopic soft tissue stabilization including the reinforcement with DAS stabilization using LHB.

### **Material and methods**

20 patients (14 males and 6 females) operated between 2018 and 2024 were included into the analysis. Mean age was 27 (14–46). Mean follow-up was 39 months (6–63) Patients were retrospectively questioned using SSV, VAS, WOSI and ASES questionnaires.

### **Results**

Preoperative mean SSV was 65% (40–80%) and mean VAS 3 (0–8). Postoperative results increased to mean SSV of 91% (80–100) and mean VAS score of: 0.7 (0–4). Mean pooperative WOSI score was 11/100 (1–44) and mean ASES score was 97 (82–100). None of the patients had recurrence of instability. In 1 patient postoperative irritation of the axillary nerve was reported – it resolved spontaneously within 6 weeks.

### **Conclusion**

Dynamic shoulder stabilization with LHB tendon provide satisfactory results in short- term follow- up and is a valuable tool in patients with anterior shoulder instability with no significant glenoid bone loss. No significant risk of the procedure was reported.

## **OPEN VERSUS ARTHROSCOPIC ELBOW ARTHROLYSIS FOR POST-TRAUMATIC ELBOW CONTRACTURE: EARLY PROSPECTIVE AND MID-TERM RETROSPECTIVE OUTCOMES WITH A MINIMUM 5-YEAR FOLLOW-UP**

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### **Introduction**

Elbow contracture is a common following elbow trauma. This condition significantly impairs activities of daily living.

### **Aim**

This study aimed to compare outcomes of open versus arthroscopic elbow arthrolysis for post-traumatic elbow contracture.

### **Material and methods**

Two groups of patients with arthroscopic – ASK (n = 61) and OPEN (n = 62) release of post-traumatic elbow contracture were followed prospectively for 6 months, with a final retrospective evaluation at a minimum 5-year follow-up.

### **Results**

Preoperatively, ASK had significantly better range of motion (ROM) vs open, respectively: Extension 38.3° vs. 50° (p < 0.0001), Flexion 124.2° vs. 100.3° (p < 0.0001).

Postoperatively: No significant differences in intraoperative ROM were observed between groups. Final ROM and MEPS (Mayo Elbow Performance Score) were significantly better in the ASK group: Extension: 15° vs. 20.9° (p = 0.03), Flexion: 137.4° vs. 130.1° (p < 0.05), MEPS: 95.9 ± 17.9 vs. 87.3 (p = 0.0001).

Subgroup Analysis by Severity of Contracture:

- Severe-to-very severe contractures: Both techniques had comparable outcomes.
- Moderate-to-minimal contractures: The ASK group had significantly better ROM and ROM gains at both early (1 week post-op) and final follow-up: Extension: 140° vs. 134° (p = 0.001), ARC: 125.1° vs. 115.9° (p = 0.01), ROM gain: 45.8° vs. 35.9° (p = 0.023) and function- MEPS: (96.9 vs. 90.3, p = 0.004). OPEN group had greater loss of gained ROM (21.6° vs. 8.1°, p = 0.002).

### **Conclusion**

Both open and arthroscopic elbow arthrolysis significantly improved ROM, function, and patient satisfaction in mid-term follow-up.

For moderate-to-minimal contractures, the arthroscopic technique demonstrated superiority, both in early and final assessments. Caution is required in drawing broad conclusions, as the groups were not entirely comparable, potentially reflecting diverse trauma severity.

## **RESULTS OF THE NERVE TRANSFERS TO RESTORE SHOULDER AND ELBOW FUNCTION IN TRAUMATIC UPPER BRACHIAL PLEXUS PALSY**

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### **Introduction**

Damage to the upper trunk of the brachial plexus, often caused by highenergy trauma, leads to significant functional impairment of the upper limb, resulting in paralysis of muscles critical for shoulder and elbow function. If spontaneous nerve regeneration does not occur within 3–6 months post-injury, surgical intervention, including nerve transfers, is recommended to restore function.

### **Aim**

This study evaluates longterm outcomes of nerve transfer around shoulder and elbow, on adult patients with post-traumatic brachial plexus injuries.

### **Material and methods**

Nerve transfer performed between 2013 and 2023 on 16 adult patients with brachial plexus injuries. The most common cause of injury was motorcycle accidents. Nerve transfers targeted shoulder and elbow function restoration, including transfer of the accessory nerve to the suprascapular nerve, the radial nerve branch to the triceps brachii to the axillary nerve, or the transfer of motor fascicles of the ulnar and median nerves (double Oberlin) to the brachialis and biceps brachii motor nerves.

### **Results**

Postoperative results showed varying degrees of functional recovery. In shoulder, most patients achieved stabilization and partial restoration of active movement, with average flexion up to 92° and abduction up to 78°. In the elbow, full flexion with M4 strength was achieved in 64% of patients. In both the shoulder and the elbow, double nerve transfers yield better long-term outcomes than single transfers. Secondary procedures, such as tendon transfers, were required in some cases to improve limb strength.

### **Conclusion**

Nerve transfers offer reliable outcomes in restoring upper limb function, although additional surgeries may be necessary in certain cases.

## **THE LATERALIZATION AND DISTALIZATION INDEX IS MORE RELIABLE THAN ANGULAR RADIOGRAPHIC MEASUREMENTS IN REVERSE SHOULDER ARTHROPLASTY**

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### **Introduction**

The lateralization shoulder angle (LSA) and distalization shoulder angle (DSA) are used to reproducibly measure lateralization and distalization after reverse shoulder arthroplasty (RSA). However, LSA and DSA may not offer a precise measurement of humeral lateralization and distalization and this relationship has not been explored.

### **Aim**

The aim of this study was to evaluate the validity of these measurements and to propose new measurement methods to estimate implant lateralization and distalization.

### **Material and methods**

3D models were constructed from computed tomography (CT) scans of 30 patients using a software platform. For each patient 24 different RSA modifications were created, resulting in 720 different RSA configurations. For each configuration LSA and DSA angles as well as lateralization and distalization distances were measured. Moreover, for each configuration two new measurements were done: the lateralization index (LI) and distalization index (DI). Correlations of the lateralization and distalization parameters were evaluated between measurements.

### **Results**

Weak correlations were founded between LSA and lateralization ( $r = 0.36$ ,  $p < 0.01$ ), whereas moderate correlations were observed between LI and lateralization ( $r = 0.72$ ,  $p < 0.01$ ). No significant correlations were found between DSA and distalization ( $r = 0.17$ ,  $p = 0.113$ ). In contrast, moderate correlations were identified between DI and distalization ( $r = 0.69$ ,  $p < 0.01$ ).

### **Conclusion**

LI and DI are more reliable methods to estimate implant lateralization and distalization compared to angular radiographic measurements. However, the prognostic significance in predicting clinical outcomes after RSA remains unknown.

## **EHLERS-DANLOS SYNDROME AND HYPERMOBILITY SPECTRUM DISORDER SHOULDER INSTABILITY PROFILE**

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### **Introduction**

Despite a recent increase in knowledge the management of atraumatic shoulder instability is still a major challenge. Acquiring knowledge of the first symptoms may, in the future, lead to a fast-track diagnosis or the elimination of risk factors that could contribute to the further development of instability.

### **Aim**

The aim of the study was to assess patients with shoulder instability among EDS and HSD.

### **Material and methods**

132 patients with EDS initial diagnosis were examined according to the study inclusion criteria. 45 patients with shoulder instability – 36W and 9M were examined according to their main complaints and undergo: hypermobility assessment, shoulder clinical examination and medical history summary such as: age during first shoulder dislocation, recurrency of the instability, pain during and after dislocation. To assess patients condition DASH and ASES questionnaires were taken.

### **Results**

84% of examined patients experienced first shoulder dislocation around 13–17 years old. Mean number of dislocations varied between 20–60 with low pain level during dislocation (VAS: 3). We observed significant increase of the pain level after (> 1–2 days) the dislocation (VAS: 6–7). There was significant correlation ( $p < 0.05$ ) between number of dislocations and recurrency of the instability and MRI results. 78% of patients MRI results revealed labrum tears and SLAP injury. DASH and ASES questionnaires revealed significant decrease of patients quality of life.

### **Conclusion**

There are several symptoms which may lead to the diagnosis of shoulder instability among patients with EDS and HSD such as: age during first dislocation or pain characteristic.

## **PRELIMINARY RESULTS OF THE TREATMENT OF COMPLEX RADIAL HEAD FRACTURES WITH BIPOLAR RADIAL HEAD ENDOPROSTHEOPLASTY TYPE KPS**

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### **Introduction**

Radial head fractures are frequently encountered in clinical practice and pose significant challenges due to their negative effects on the stability and function of the elbow joint.

### **Aim**

The purpose of this study was to evaluate the outcomes of treating complex radial head fractures using KPS type, bipolar radial head endoprosthesis.

### **Material and methods**

A single-center retrospective analysis was conducted, including patients with radial head fractures (primarily Mason type III and IV) treated surgically between 1998 and 2023, for whom endoprosthesis was the sole viable treatment option.

The study cohort comprised 460 patients who underwent surgery at least two years before the research began. Treatment protocols were analyzed, and patients were re-examined to assess the final treatment outcomes. Functional outcomes were evaluated through range of motion (ROM) measurements, pain scales, the Mayo Elbow Performance Score (MEPS), and the American Shoulder and Elbow Score (ASES-E). Diagnostic imaging, including radiography, dynamic computed tomography (CT), and ultrasound, was also utilized to further evaluate joint stability.

### **Results**

Preliminary results indicate that bipolar radial head endoprosthesis type KPS is an effective method for treating complex radial head fractures, yielding satisfactory functional outcomes.

### **Conclusion**

This study focuses on identifying potential factors that influence the results of the KPS endoprosthesis system to improve preoperative qualification, surgical protocols, and post-operative management.

## ARTHROSCOPIC TREATMENT OF LOCKED POSTERIOR DISLOCATIONS

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### Introduction

Posterior shoulder dislocation (PSD) is a rare injury, often neglected in initial diagnosis. Untreated cases after three weeks become chronic and locked, impossible to treat with closed reduction. This pathology is associated with posterior labral tear and Perthes fracture, which requires challenging surgical treatment.

### Aim

The aim of this study was to evaluate the outcome of arthroscopic treatment in locked posterior shoulder dislocations.

### Material and methods

Patients with locked PSD treated in our hospital in 2008–2024 were retrospectively analyzed. Treatment methods: closed or open reduction of GHJ, arthroscopic posterior labral repair with McLaughlin procedure (classic or modified). Functional outcomes were measured post-operatively: range of motion (ROM) and pain measurement in VAS (visual analogue scale). Failure was defined as a re-dislocation after surgery.

### Results

Data of 19 patients was analyzed. Mean age was 45.7 years (range 23 to 73) and mean follow-up was 25.6 months (range 1–144). There was a higher proportion of male patients. Etiology of PSD was related with injury ( $n = 15$ ), seizures ( $n = 3$ ) and electric shock ( $n = 1$ ). The mean duration of locked dislocation was 11.1 weeks (range 3 to 36). Bilateral dislocations - 3 cases. Reduction of dislocation was managed: arthroscopy assisted ( $n = 13$ ), closed ( $n = 4$ ), open reduction ( $n = 2$ ). 16 patients were treated surgically. Arthroscopic posterior labral repair was performed in 9 cases, McLaughlin procedure classic in 13, modified in 4 cases. Bilateral arthroscopy - 2 patients. 1 patient required posterior bone block and 1 primary RSA. All 19 patients reported no recurrent dislocation. Follow-up ROM: ER significantly improved from mean  $-10^\circ$  to  $36^\circ$  in adduction, ABD from mean  $28^\circ$  to  $70^\circ$  ( $p < 0.01$ ). FF increased from  $64^\circ$  to  $146^\circ$  ( $p < 0.01$ ).

### Conclusion

Arthroscopic closed reduction with labral repair and McLaughlin procedure (classic or modified) for patients with neglected locked posterior shoulder dislocation is an effective way of managing this complex and rare injury.

## **VALIDATION AND RELIABILITY OF SCAPULAR MORPHOLOGY ASSESSMENT USING MIXED REALITY**

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### **Introduction**

Recent advancements in Augmented (AR) and Mixed Reality (MR) have significantly impacted the orthopedic field, with hope of holographic tools to enhance surgical precision. This study validates and explores the reliability of a specially designed software tool, integrated with HoloLens2 for measuring anatomical structures of the shoulder girdle in orthopedic surgery.

### **Aim**

The purpose of this study was to validate and investigate the reliability of RSQ Holo software as a measurement tool integrated with Microsoft HoloLens 2 device.

### **Material and methods**

Fifty-one right human scapulas obtained from the Department of Zoology at Poznan University of Life Sciences were measured directly using a caliper, on 2D and 3D CT scans and with holographic instruments (RSQ Holo system). Glenoid height, glenoid width and scapular width were measured. Imaging methods were validated against direct caliper measurements. Intra-rater and inter-rater reliability was assessed among four testers.

### **Results**

Descriptive statistics indicated minimal measurement differences across all groups, with the majority of differences being under 1 mm. Comparison graphs, and descriptive statistics showed that in glenoid height and glenoid width RSQ Holo measurements are the closest to direct measurements. Scapula width measurements done with every technique were equal. ICC revealed excellent intra-rater reliability for scapula width (0.96) and glenoid width (0.91), and good reliability for glenoid height (0.85). Inter-rater reliability also showed promising results, particularly for scapular width (0.91) and glenoid width (0.78), although glenoid height (0.72) showed moderate agreement.

### **Conclusion**

Findings demonstrate that RSQ Holo software provides accurate and consistent measurements, supporting its potential use in preoperative planning and intraoperative navigation.

## **ADVANCED MRI PROTOCOL FOR LATERAL EPICONDYLITIS: DIAGNOSTIC ACCURACY AND TREATMENT MONITORING**

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### **Introduction**

Lateral epicondylitis (tennis elbow) is a degenerative tendinopathy of the common extensor tendon (CET), often affecting individuals engaged in repetitive upper-limb activities. While clinical diagnosis is standard, MRI enables objective assessment of tendon pathology and treatment response.

### **Aim**

This study aimed to develop a standardized MRI protocol for diagnosing and monitoring lateral epicondylitis, assess its reliability, and evaluate platelet-rich plasma (PRP) injections' efficacy.

### **Material and methods**

A double-blind, randomized, placebo-controlled study was conducted on 71 patients with chronic lateral epicondylitis. MRI scans were performed using a 3T scanner in the "Superman position," assessing CET integrity, tendon tears, soft tissue edema, and collateral ligament abnormalities. Patients received either leukocyte-rich PRP (LR-PRP), leukocyte-poor PRP (LP-PRP), or saline injections. MRI findings were correlated with clinical outcomes at six months. Interobserver reliability was measured using the intraclass correlation coefficient (ICC).

### **Results**

The MRI protocol demonstrated excellent reliability (ICC > 0.90). LR-PRP significantly reduced tendon tear size and soft tissue edema, whereas LP-PRP and saline injections resulted in partial improvements. MRI findings correlated with clinical recovery, supporting its use in treatment monitoring.

### **Conclusion**

This study presents a reproducible MRI-based assessment technique for lateral epicondylitis, enhancing diagnostic precision and treatment evaluation. Findings highlight the potential of LR-PRP in tendon healing and reinforce MRI's role in guiding clinical decisions.

## **IMPACT OF ADIPOSE-DERIVED AND AMNION-DERIVED MESENCHYMAL STEM CELLS ON MASSIVE ROTATOR CUFF TEARS IN AN ANIMAL MODEL**

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### **Aim**

Assessment of the ability of amnion-derived mesenchymal stem cells (anMSCs) and adipose-derived mesenchymal stem cells (adMSCs) to alter the process of fatty infiltration (FI) in massive rotator cuff tears in animal model.

### **Material and methods**

Research comprised of pilot and main studies. Pilot study focused at estimation of FI ( $\geq 3$  on the Goutallier scale) and included an analysis of 10 New Zealand, White Rabbits. Main study was performed on 52 species with rotator cuff tear  $\geq 3$ ; supraspinatus (SS) and infraspinatus (IS) muscles were randomly injected with 2ml of anMSCs ( $n = 14$ ), adMSCs ( $n = 13$ ), and 0.9% NaCl ( $n = 25$ ). After 4 weeks, both muscles of 52 animals were resected. Histopathological analysis was performed with a Goutallier scale assessment by two independent researchers.

### **Results**

Preliminary study indicated mean FI in 8th week 1.89(SD=0.80) in 10th 3.14 (SD=1.1), statistically significant difference was stated between the 4th, 6th, 8th, and 10th weeks ( $p < 0.00$ ). In main study, mean FI in anMSCs group equaled: for IS = 2.69 (SD = 1.38), SS = 0.55 (SD = 0.52), in adMSCs group IS = 3.38 (SD = 0.96), SS = 1.00 (SD = 1), for control group IS = 3.24 (SD = 0.66), SS = 0.72 (SD = 0.74). Both, SS and IS differed significantly in amount of developed fatty infiltration; anMSCs ( $p < 0.004$ ) and adMSCs ( $p < 0.0001$ ). No statistical significance was observed between control group and study groups for SS ( $p = 0.3238$ ) and IS ( $p = 0.3090$ ) respectively. There was also no significant difference between adMSCs vs control (SS  $p = 0.42$ , IS  $p = 0.38$ ), anMSCs vs control (SS  $p = 0.56$ , IS  $p = 0.39$ ).

### **Conclusion**

Neither anMSCs nor adMSCs demonstrated the ability to significantly alter the process of the fatty infiltration of the rotators cuff muscles. However, fatty infiltration level differed between SS and IS muscles.

## **HYPERMOBILITY, INSTABILITY AND PROPRIOCEPTION DEPENDENCY IN SHOULDER INSTABILITY CASES**

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### **Introduction**

Management of resultant shoulder instability is still a major challenge for medical practitioners. One of the challenges is to examine the relation between hypermobility and instability because it is often repeated that hypermobility lead to instability and its responsible for patients surgery and rehabilitation failure.

### **Aim**

The aim of the study was to assess the relation between hypermobility and instability among patients with shoulder instability.

### **Material and methods**

Three groups of patients were classified to the study: hypermobile with atraumatic shoulder instability (n = 31), hypermobile without shoulder instability (n = 27) and traumatic shoulder instability (n = 30). As a control group we examined 30 healthy subjects without any upper limb trauma. The examination was composed of clinical examination, hypermobility assessment – Beighton score and joint position sense examination as a part of proprioception examination.

### **Results**

There was no significant difference between error of active reproduction sense (EARJP) between instability groups. The result in hypermobile atraumatic shoulder instability group was 13.2 +/- 3.2, and in nonhypermobile traumatic group was 11.7 +/- 4.6.

There was no significant correlation between hypermobility and EARJP among patients. There was significant difference (p < 0.05) between both groups and hypermobile patients without instability and control group. The EARJP in hypermobile group with stable shoulder was 7.5 +/- 2.1 and the result was significantly higher in comparison with control group.

### **Conclusion**

Instability significantly increases the proprioception deficit among patients with shoulder instability. Hypermobility does not always have to mean joint instability.

## **REVERSE SHOULDER ARTHROPLASTY WITH MODULAR GLENOID BASEPLATE: CLINICAL AND RADIOLOGICAL OUTCOMES OF THE FIRST 20 PATIENTS**

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### **Introduction**

Reverse shoulder arthroplasty (RSA) has become a widely adopted technique for managing various shoulder pathologies. Modular glenoid systems (MGS) offer a range of component choices, allowing the procedure to be tailored to individual patients' needs. This study evaluates the outcomes, of the first 20 cases performed using an RSAMGS.

### **Aim**

To assess the clinical and radiological outcomes of RSA using an MGS and determine the repeatability of these results.

### **Material and methods**

A retrospective analysis was conducted on 20 patients who underwent RSAMGS. Clinical outcomes were assessed using forward flexion (FF), abduction (ABD), external rotation (ER), internal rotation (IR), and the Constant Score (CS). Radiological evaluation included B-angle, lateralization shoulder angle (LSA), and distalization shoulder angle (DSA). The patients were followed for an average of  $9.95 \pm 2.27$  months.

### **Results**

Significant improvements were observed across clinical parameters, with mean FF of  $153.16^\circ \pm 15.02^\circ$ , ABD of  $109.47^\circ \pm 10.79^\circ$ , ER of  $20.53^\circ \pm 6.21^\circ$ , and IR of  $84.74^\circ \pm 3.26^\circ$ . The mean Constant Score was  $78.53 \pm 3.26$ . Radiological findings demonstrated mean LSA of  $84.55^\circ \pm 4.27$ , DSA of  $51.25^\circ \pm 3.85$ , and B-angle of  $0.11^\circ \pm 1.66$ . Mean lateralization on glenoid side was  $3.89 \pm 1.24$  mm. No short- or mid-term postoperative complications were observed.

### **Conclusion**

RSA with an MGS provides reliable and repeatable clinical and radiological outcomes. These findings support the use of this modular design in RSA, with the potential to deliver predictable results tailored to individual patient needs. Further studies are recommended to validate these initial results.

## **ROTATIONAL OSTEOTOMY OF THE RADIUS IN THE TREATMENT OF CONGENITAL RADIOULNAR SYNOSTOSIS**

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### **Introduction**

Congenital radioulnar synostosis (CRUS) is a rare developmental anomaly. In most patients, the forearm is fixed in pronation, causing significant functional impairment.

### **Aim**

The aim of the study is to evaluate the effectiveness of rotational osteotomy of the radius in improving upper limb function and range of motion in patients with congenital radioulnar synostosis, as well as to assess the safety and long-term outcomes of the procedure.

### **Material and methods**

The study involved 5 patients with CRUS who underwent rotational osteotomy of the radius. The procedure included rotating the forearm to 90° supination and applying a plaster cast. Postoperatively, range of motion and upper limb function were assessed.

### **Results**

Six forearms in five patients with CRUS, who underwent rotational osteotomy of the radius, were monitored for an average of 3 years postoperatively. Preoperatively, the forearm was positioned in approximately 50° pronation (range: 30°–90°). The osteotomy was performed at the attachment site of the pronator teres muscle to the radial shaft. The forearm was then rotated to position the hand in 90° supination, and a plaster cast was applied. At the final follow-up visit, the hand was able to achieve an average range of motion from 25° pronation to 63° supination.

No neurological or vascular complications were observed postoperatively. A significant improvement in the ability to perform daily activities was noted, and all patients were satisfied with the surgical outcomes.

### **Conclusion**

Rotational osteotomy of the radius is a technically simple, safe procedure that provides good functional results.

## **SHOULD BEIGHTON SCORE BE A USEFUL TOOL FOR SHOULDER INSTABILITY ASSESSMENT?**

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### **Introduction**

Beighton score (BS) is wide known scale which enables the laxity assessment of children and adults. The score is very often used during clinical examination of patients with shoulder instability, and it is frequently suspected that patients with higher BS have increased tendency to develop the shoulder instability.

### **Aim**

The aim was to assess Beighton score results to the instability symptoms among patients with hypermobility and shoulder instability.

### **Material and methods**

40 patients with diagnosed hypermobility (34W and 6M) with age 12–48 have participated in the study. Patients were assessed according to their symptoms and BS results. The questionnaire was constructed according to their results performed by specialist, and they were asked to perform the Beighton score tasks individually. Additionally patients reported their symptoms and instability issues.

### **Results**

The BS was pointing out the hypermobility among 32 patients (> 4). There was no significant difference ( $p > 0.05$ ) between the BS assessed by professional and patients self-assessment. 90% of examined patients reported subjective shoulder instability issues and 56% reported shoulder dislocations more than 3 times in their life. There was no significant difference ( $p > 0.05$ ) between the BS assessed by professional and patients self-assessment. 90% of examined patients reported subjective shoulder instability issues and 56% reported shoulder dislocations more than 3 times in their life.

There was no significant difference between BS and patients shoulder instability diagnosis or number of shoulder dislocations. There was no correlation between BS or its components and the shoulder instability ( $p = 0.66$ ). There was no correlation between BS and the number of shoulder dislocations.

### **Conclusion**

Beighton score do not represent significant relation with shoulder instability symptoms among patients with soft tissue genetic mutation. Because of instability complex biomechanical changes BS should be considered only as soft tissue supplemental assessment.

## **ANALYSIS OF THE EFFECTS OF THE ULTRASOUND-GUIDED SUPRASCAPULAR NERVE BLOCK ON ROTATOR CUFF LESION**

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### **Introduction**

Rotator cuff lesions are common causes of shoulder pain. When not treated effectively, the functional loss associated with pain affects the quality of life. Conservative treatment is often prescribed for small lesions or as a preparatory step before surgery in larger ones.

### **Aim**

This study presents a prospective observational comparison of the effects of ultrasonography (USG)-guided suprascapular nerve block versus physical therapy in conservative treatment of rotator cuff lesions.

### **Material and methods**

The comparison involved three groups: physical therapy alone, nerve block alone, and nerve block followed by physical therapy. Patients were qualified for the study after a physical examination and MRI assessment. Based on MRI findings, the Patte and Goutallier scales were evaluated. Patients reported their pain and functionality using the VAS and WORC scales. Assessments were conducted at 2, 6, and 10 weeks after the initial visit. Each group consisted of 40 patients.

### **Results**

Before treatment, patients presented with a mean VAS score of 7.8 and a mean WORC score of 39.6. The primary physical examination findings included limited internal rotation and abduction (mean values: 49.2° and 84.3°, respectively). The best outcomes across all groups were observed in patients with Patte grade I lesions, particularly in the group receiving a combination of nerve block and physical therapy (VAS 2.9, WORC 82.7).

### **Conclusion**

In the short-to-medium term, pain control, shoulder functionality, and patient satisfaction were found to be higher in patients treated with a suprascapular nerve block combined with physical therapy for shoulder pain caused by rotator cuff lesions.

## **PERFORATOR AND PROPELLER FLAPS FOR MANAGEMENT OF DEEP TISSUE DEFECTS AROUND THE ELBOW AFTER TOTAL ELBOW ARTHROPLASTY AND OSTEOSYNTHESIS**

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### **Introduction**

Management of deep soft tissue defects can be challenging for the orthopaedic-trauma surgeons. If possible, to get the best results, free flaps provide the best coverage by plastic surgeons, thus having an orthoplastic approach. As plastic- and microsurgions are not everywhere available, local flaps can be a good choice of treatment, without microsurgical knowledge for the coverage of elbow defects, that can occur after total elbow arthroplasty or osteosynthesis.

### **Aim**

Our aim is to present two possible flap options for the treatment of elbow deep tissue defects without microsurgical knowledge.

### **Material and methods**

Between 2022 and 2024 there were 4 patients, who needed more complex tissue coverage as a split thickness graft, that means a fasciocutan flap. Most of the flaps were lateral arm reverse flow flaps, and one patient had a radial artery pedicled forearm flap.

### **Results**

In our results, from the 4 patients all of them were males, age between 35 and 70 years. Only elbow soft tissue defects were included in the cohort, 3 patients had a defect regarding the olecranon, 1 at the radial aspect of the elbow. Out of the 4 local, perforator-based flaps we had perfect outcomes in 3 cases. In one case, we lost our lateral forearm flap, and we needed to treat that with an anterolateral thigh free flap with the help of plastic surgeons.

### **Conclusion**

Local, propeller flaps or perforator flaps can be a safe and reliable method for treating soft tissue defects around the elbow if orthoplastic approach is not available with microsurgical technique.

## **FULLY ARTHROSCOPIC TRANSFER OF LATISSIMUS DORSI AND TERES MAJOR TENDON IN MASSIVE NOT-REPERABLE ROTATOR CUFF TEAR IN PATIENTS WITH PSEUDOPATALYTIC SHOULDER – TECHNIQUE DESCRIPTION AND COST ANALYSIS – IS IT WORTH IT?**

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### **Introduction**

Massive not-reperable rotator cuff tears in patients without glenohumeral joint arthritis remain the problem for shoulder surgeons. Several options are offered to improve patients' shoulder function including tendon transfers which are difficult procedures and their benefits comparing to more simple techniques remains debatable.

### **Aim**

The goal of this study was to present the fully arthroscopic technique of the latissimus dorsi (LD) and teres major (TM) tendon transfer. This arthroscopic procedure is time consuming and requires advanced surgical skills. The goal was to present both technical aspects and financial and logistics effort required to perform this operation.

### **Material and methods**

Three male patients (62, 63 and 68 years old) with massive, not-reperable rotator cuff tears with flexion and rotation shoulder pseudoperesis were operated on by a single surgeon. The arthroscopic technique was divided into 3 steps including posterior compartment muscles visualisation, anterior compartment tendons liberation and transfer posteriorly and finally partial reconstruction of the posterior rotator cuff associated with transferred tendons fixation.

### **Results**

2 patients were already very satisfied with the results. They reported no pain and function improvement. Their range of motion was average 120/120/10/LS with no external rotation lag sign. The time of surgery was from 240 to 340 minutes, 3 to 5 implants were used. The average cost was evaluated about 23 000 PLN (> 5000 Euros) without the surgeon fee.

### **Conclusion**

Fully arthroscopic LD and TM transfer is expensive and time-consuming procedure. It can be done fully arthroscopically, but its real benefit should be thoroughly evaluated comparing to other less complicated procedures.

## **ARTHRODESIS IN TREATMENT OF SHOULDER INSTABILITY IN A PEDIATRIC PATIENT**

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Karola Marcinkowskiego w Poznaniu

### **Introduction**

Hypermobility, as an increase in the range of motion within a joint, occurs in the course of diseases with connective tissue disorders. Susceptibility to injury can result in joint instability, including recurrent dislocations and pain. In cases of severe hypermobility, where traditional rehabilitation methods prove ineffective, surgical interventions are considered.

### **Aim**

This case report presents the results of surgical treatment of the right shoulder instability in a 9-year-old female with hypermobility and habitual dislocations of this joint in the course of Ehlers-Danlos syndrome.

### **Material and methods**

A 9-year-old female wheelchair user with hypermobility due to Ehlers-Danlos syndrome, experiencing significant right shoulder instability and right brachial plexus birth palsy. Instability caused habitual dislocation of the right shoulder since birth with a high pain component, preventing effective rehabilitation. After establishing the indications, shoulder arthrodesis was performed, including stabilization with Kirschner wires and supplementation with bone grafts. Nine months post-surgery, range of motion, pain, and radiological evaluation were conducted.

### **Results**

The arthrodesis resulted in the stabilization of the shoulder. Nine months after the procedure, no passive motion and a significant reduction in shoulder pain were observed. Diagnostic imaging did not provide sufficient evidence to confirm permanent bone fusion in the joint.

### **Conclusion**

Arthrodesis achieved very good outcomes in this patient. Despite restricting the joint's mobility, the procedure significantly improved the patient's condition and enhanced the quality of her life.

## **HOW NOT TO MISS THE CORRECT DIAGNOSIS OF OSTEOLYTIC BONE DESTRUCTION OF UNKNOWN ORIGIN. A CASE OF A 49-YEAR-OLD WOMAN WITH OSTEOLYTIC DESTRUCTION OF THE HUMERAL HEAD**

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Ortopedyczno-Rehabilitacyjny Szpital Kliniczny im. W. Degi Uniwersytetu Medycznego im.  
Karola Marcinkowskiego w Poznaniu

### **Introduction**

Bone osteolytic lesions can be caused by benign, malignant, or infectious processes. The differential diagnosis for these conditions is important but can also be challenging. One rare yet significant condition to consider during the diagnostic process is tuberculosis (TB) of the bone.

### **Aim**

The diagnostic process for bone tumours is complex, highlighting the importance of differential diagnostics, particularly when considering infections caused by tuberculosis bacilli. It is crucial to collect tuberculosis samples when osteolytic bone changes of unknown origin occur, as tuberculosis should be considered in such cases.

### **Material and methods**

An analysis of the literature and a clinical case involving a 49-year-old woman is presented. The patient was referred for a suspected tumour in the distal humerus. Imaging studies, including X-rays, MRI, and PET scans, suggested the possibility of a malignant bone lesion. A thorough examination of the patient's clinical history was conducted, and the differential diagnosis was broadened to consider the potential for bone tuberculosis.

### **Results**

Bacteriological and histological examination of the biopsy tissue confirmed the diagnosis of bone tuberculosis, which caused extensive destruction of the humeral head and resulted in severe disability of the arm. The patient was referred for pharmacological therapy.

### **Conclusion**

This case emphasizes that other diseases, such as tuberculosis (TB), can initially mimic osteolytic bone tumours, which can delay the diagnostic and treatment process. A diagnostic algorithm for osteolytic bone lesions of unknown origin could be a valuable tool in establishing an accurate diagnosis.

## **RADIAL NERVE ENTRAPMENT WITH TOTAL PARESIS ASSOCIATED WITH SUPRA-CONDYLAR HUMERUS FRACTURE IN 6 YEARS OLD BOY. CASE REPORT. REVIEW OF ACTUAL LITERATURE ABOUT THE TOPIC**

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### **Introduction**

In the years 2021–2023, 20 children with sequelae after supracondylar humerus fracture were admitted to the Department.

Among them were cases: varus-position healed fractures (treated with French osteotomy), Volkmanns contractures (in two cases free neurovascular transfer of gracilis muscle to lost FDS and FDP muscles was performed), 3 cases of children with ulnar neuropathy (neurolysis were performed with full recovery), 1 case with the median nerve neuropathy (neurolysis of the nerve was performed resulting in incomplete return of sensory nerve function). Radial neuropathy was the cause of 2 admissions, where – one underwent osteosynthesis of a supracondylar fracture without neurolysis of the nerve whose function was fully restored in 4 months. The second child underwent neurolysis of the nerve after healed fracture, but complete nerve entrapment needed excision of the nerve and repair in form of suturing end to end.

### **Aim**

Presentation of a very rare case: radial nerve paresis because of nerve entrapment in supracondylar humerus fracture in a child.

### **Material and methods**

Case presentation. Presentation of actual english literature review about the topic.

### **Results**

The excellent result of radial nerve repair “end to end” is presented.

### **Conclusion**

Diagnostic with ultrasound and/or MRI, supported with ENG may be with some help, but not necessary conclusive. In lack of recovery after 4–6 months nerve revision should be performed.

## **LONG HEAD OF THE BICEPS TENDON AUGMENTATION (LHBT+) ENHANCED WITH A BIO-INDUCTIVE COLLAGEN IMPLANT (REGENTEN) FOR MASSIVE AND RETRACTED ROTATOR CUFF TEARS**

Hubert Laprus, Bartłomiej Juszcak, Aleksander Łapaj, Grzegorz Słota  
Szpital Św Łukasza, Bielsko-Biała

### **Introduction**

Massive and retracted rotator cuff tears (RCTs) are challenging to treat, with high rates of re-tear. Current surgical techniques strive to restore full function by addressing biomechanical complexities of these injuries. Additional use of long head of the biceps tendon augmentation (LHBT+) and bio-inductive implants may lower the re-tear rate by promoting healing of the construct.

### **Aim**

To evaluate the efficacy and safety of a novel surgical technique combining double-row rotator cuff repair, LHBT+ and a bio-inductive collagen implant (REGENTEN) for the treatment of massive and retracted RCTs.

### **Material and methods**

Four patients with massive and retracted RCTs (defined as involving at least two full-thickness tendons, retracted to degree 3 by Patte classification) underwent the combined surgical procedure. Post-operative assessment included range of motion, pain scores (Constant scale), and MRI imaging to assess tendon healing (Sugaya scale).

### **Results**

All four patients demonstrated improved ROM and elimination of pseudo-paralysis with improved Constant Scores (68–86 points). Three of four patients exhibited satisfactory tendon healing on MRI (Sugaya scale 1–3). One patient showed no healing despite maintained painless function. No re-tears were observed during 7–16 months follow-up in all patients.

### **Conclusion**

This novel surgical approach combining mechanical properties of double-row, LHBT+ repair along with bio-inductive collagen implant showed clinical outcomes in the treatment of massive and retracted RCTs. Collagen patches are hoped to promote tissue healing in retracted RCTs, though evidence supporting their effectiveness is still limited and studies with longer follow-up and larger population are necessary.

## **ARTHROSCOPIC MUSCLE ADVANCEMENT AND BICEPS TENDON AUGMENTATION FOR MASSIVE RETRACTED ROTATOR CUFF RE-TEARS**

Hubert Laprus, Aleksander Łapaj, Grzegorz Słota  
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### **Introduction**

Revision rotator cuff surgeries are particularly critical as they address failures from initial repairs, which can arise from various factors. Additionally, in cases of massive rotator cuff revision repair, new challenges such as tendon quality, retraction, stiffness, and fatty atrophy must be addressed.

### **Aim**

To present a new technique of arthroscopic muscle advancement combined with biceps tendon augmentation as a revision strategy for complex rotator cuff re-tears.

### **Material and methods**

Two patients, aged 36 and 67 years, with massive and retracted postero-superior rotator cuff re-tears, underwent surgery. They were operated on two years after the initial procedure and six months, respectively. Post-operative functional assessments were performed using the Constant scale (CS). Tendon healing was evaluated using the Sugaya scale (SS) via MRI imaging.

### **Results**

Follow-up for both patients was conducted at two months post-surgery. Both patients demonstrated clinical improvement; the younger patient increased from 64 to 78 points on the CS, while the older patient improved from 62 to 84 points. MRI results indicated no healing of the supraspinatus tendon in the younger patient (SS 5) and partial healing of the infraspinatus tendon (SS 3–4). In contrast, the older patient exhibited complete healing of both the supraspinatus and infraspinatus tendons (SS 2).

### **Conclusion**

The new technique of arthroscopic muscle advancement combined with biceps tendon augmentation shows promise in treating massive and retracted revision rotator cuff tears, especially in instances where traditional methods without muscle advancement result in irreparability. However, longer follow-up and larger studies are necessary to confirm the long-term efficacy of this technique.

## **MULTIFOCAL FRACTURES OF UPPER LIMB TREATED WITH ORTHOSIS, PROSTHESIS AND PLATE**

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### **Introduction**

Trifocal fractures are rare entity as statistical research shows.

### **Aim**

We would like to present a case of a patient, who were admitted to our department due to triple level fractures of upper limb and present applied treatment - orthosis, prosthesis and LCP plate and Kirschner pin.

### **Material and methods**

The patient (F, 88 years old) suffered a fall in 11.2023 from her own height as a result of tripping and supporting with the upper right limb. She reported to the Emergency Department, where after clinical examination and routine radiological process the following fractures were stated: fracture of the acromial end of clavicle, comminuted transarticular fracture of the distal humerus, comminuted fracture of the distal radius and the head of ulna. The X ray results show characteristic features of osteoporosis. The injury was of a closed nature, there were no features characteristic of hand tendons laceration, distal blood supply or nerves damage. At the very start patient was treated with external fixation of elbow and wrist and after 2-days period treatment plan was proposed, to which the patient agreed: conservative treatment of clavicle, total elbow arthroplasty and open reposition of the radius with the internal fixation using LCP devices and stabilization of the ulna using a Kirschner pin.

### **Results**

X-rays performed during treatment process and after 12 months follow up will be presented along with short video and photos of patient's ROM and results of functional questionnaires.

### **Conclusion**

Distal humerus fractures treated with total elbow prosthesis still might have satisfactory final result.

## **ARTHRODESIS IN TREATMENT OF SHOULDER INSTABILITY IN A PEDIATRIC PATIENT**

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im. Karola Marcinkowskiego w Poznaniu

### **Introduction**

Hypermobility, as an increase in the range of motion within a joint, occurs in the course of diseases with connective tissue disorders. Susceptibility to injury can result in joint instability, including recurrent dislocations and pain. In cases of severe hypermobility, where traditional rehabilitation methods prove ineffective, surgical interventions are considered.

### **Aim**

This case report presents the results of surgical treatment of the right shoulder instability in a 9-year-old female with hypermobility and habitual dislocations of this joint in the course of Ehlers-Danlos syndrome.

### **Material and methods**

A 9-year-old female wheelchair user with hypermobility due to Ehlers-Danlos syndrome, experiencing significant right shoulder instability and right brachial plexus birth palsy. Instability caused habitual dislocation of the right shoulder since birth with a high pain component, preventing effective rehabilitation. After establishing the indications, shoulder arthrodesis was performed, including stabilization with Kirschner wires and supplementation with bone grafts. Nine months post-surgery, range of motion, pain, and radiological evaluation were conducted.

### **Results**

The arthrodesis resulted in the stabilization of the shoulder. Nine months after the procedure, no passive motion and a significant reduction in shoulder pain were observed. Diagnostic imaging did not provide sufficient evidence to confirm permanent bone fusion in the joint.

### **Conclusion**

Arthrodesis achieved very good outcomes in this patient. Despite restricting the joint's mobility, the procedure significantly improved the patient's condition and enhanced the quality of her life.

## **KNOTLESS STABILISATION OF HAHN-STEINHAL CAPITELLUM FRACTURE – NOVEL TECHNIQUE**

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### **Introduction**

Fractures of the capitellum often result in substantial osteochondral fragments requiring internal fixation to restore the anatomical structure of the elbow joint. Accurate reduction is crucial to ensure optimal articular congruence and to minimize the risk of post-traumatic arthrosis. Various techniques have been described for the fixation of these injuries, including metallic screws, bioabsorbable screws, bioabsorbable implants, and suture-based devices.

### **Aim**

This case report presents a surgical method for fixing a capitellum chondral fracture using knotless all-suture anchors – a technique previously described only for knee osteochondral lesions.

### **Material and methods**

The patient was a 40-year-old male who sustained an elbow extension injury. He was qualified for the procedure after X-ray and CT imaging.

### **Results**

The surgery was performed under general anesthesia using a lateral approach to the elbow. After visualizing the fracture, reduction was performed. Two opposing anchors were stabilized in the bony bed of the humeral fracture. The opposite threads were secured within the knotless mechanism, creating an interconnection that provided final stabilization of the fracture. Postoperatively, the range of motion (ROM) was fully restored. The follow-up period lasted 6 months, during which X-ray and CT evaluations confirmed successful outcomes. Full recovery was achieved.

### **Conclusion**

Fixation of traumatic osteochondral injuries with suture anchors is a reliable and effective technique, offering stable fixation of fracture fragments. This approach facilitates early joint mobilization while reducing the need for additional surgical interventions.

## **NANOSCOPIC LHBT TENOTOMY AMONG ELDERLY – A FEASIBILITY STUDY**

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Uniwersytet Medyczny w Łodzi

### **Introduction**

The pathology of the long head of the biceps in elderly patients is an indication for biceps tenotomy. To date, needle arthroscopy allows a direct diagnosis of shoulder lesion. Few studies so far have demonstrated the potential use of nanoscopy in therapeutic processes as well.

### **Aim**

We aimed to evaluate the technical feasibility of nanoscope biceps isolated tenotomy by needle arthroscopy. The procedure was performed under local anesthesia, including suprascapular nerve block and additional eventual admission of benzodiazepines. The patient was discharged from the hospital after 4 hours after the surgery.

### **Material and methods**

Patients over 70 years of age with LHBT lesions were qualified for the study. The patients mainly complained of symptoms characteristic of LHBT injuries. The lesion was confirmed in MRI. Prior to the surgery Constant Score, VAS and SSI score was assessed. To the study 10 patients were included. The follow-up period was at least 3 months.

### **Results**

The patients presented prior to the surgery mean Constant score 43.2, VAS 8.2 and SSI 37.5. After surgery the results improved to Constant score 82.8, VAS to 1.9 and SSI to 82.3. The patients underwent the procedure without complications.

### **Conclusion**

Advantages were found in the fast-track process and the high rate of satisfaction in our selected patients. Nanoscopy appears to be an excellent tool for patients with low functional demands, where the primary goal is pain management.

## **ARTHROSCOPIC ROTATOR CUFF REPAIR WITH TRANSOSSEOUS FIXATION. PRELIMINARY RESULTS, TECHNICAL TIPS AND TRICKS ON THE USE OF NOVEL TRANSOSSEOUS GUIDING DEVICE**

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### **Introduction**

Multiple techniques of rotator cuff repair are currently in use. Regardless the type, usually different implants are required to stabilise the repair. However, historically implantless transosseous repairs has proved its safety, reproducibility and results that are stable over time. Currently, there is a new dawn for arthroscopic devices allowing for the use transosseous repair technique, gaining attention from orthopaedic community.

### **Aim**

The aim of this report is to give a short a description of novel device Drillbone Tunneler designed for arthroscopic transosseous rotator cuff repair. Authors present surgical steps, technical tips and tricks alongside short description of case series.

### **Material and methods**

Case series of 12 patients (10 arthroscopic, 2 open) that were subjected to transosseous rotator cuff repair from 06.2024 to 12.2024 with the use of new device Drillbone Tunneler.

### **Results**

All patients underwent surgical treatment, with no hardware - side complications. No neurological or vascular injury were observed. Surgical time did not differ significantly from "standard" rotator cuff repair. The use of transosseous fixation led to limited implant use.

### **Conclusion**

A renewed interest in transosseous repair is justified by surgical simplicity, safety profile, cost-effectiveness and reproducibility of the new hardware in the field of shoulder surgery.

## **ASEPTIC INFLAMMATION OF THE CLAVICLE**

Wiktoria Nogalska, Ewa Kowalów, Adrianna Adamek, Piotr Koschel, Michał Harasymczuk  
Student Research Group of Hand Surgery,  
Poznań University of Medical Sciences, Poland

### **Introduction**

Chronic recurrent multifocal osteomyelitis (CRMO) is a rare, autoinflammatory bone disorder that typically affects pediatric patients. It is characterized by relapsing pain, swelling, and inflammation in multiple skeletal sites or involving a single bone. The exact cause of CRMO remains unclear, and its management is not standardized.

### **Aim**

The aim of this study is to present a 14-year-old female with chronic post-traumatic clavicle pain, who underwent surgery, received antibiotic treatment, and is currently undergoing Pamidronate therapy for persistent symptoms.

### **Material and methods**

Our case involves a patient with persistent chronic pain in the right clavicle following a contusion. On examination, there was widening of the right clavicle's outline, a 10 degrees limitation of flexion and abduction, internal and external rotation of the shoulder were possible without restriction. The elbow, wrist, and hand demonstrated a full range of motion without pain. The limb exhibited normal blood supply and innervation. Initial biopsy of the clavicle revealed chronic inflammation. The patient underwent surgery involving part of the clavicle resection and inflammatory lesions removal. Further antibiotic treatment for persisting symptoms was unsuccessful. Given the ongoing symptoms and a family history of osteochondromas, we started pamidronate therapy.

### **Results**

The patient reported significant improvement in symptoms following pamidronate therapy. After the first cycle, pain symptoms recurred only three times during three months.

### **Conclusion**

This case highlights pamidronate's potential in managing CRMO in pediatric patients, significantly reducing pain severity and recurrence. It also underscores the diagnostic challenges posed by confounding factors, such as a history of trauma, which can obscure the clinical picture.

**ANALYSIS OF THE RESULTS OF SURGICAL TREATMENT OF PATIENTS WITH SHOULDER JOINT INSTABILITY TREATED WITH THE LATARJET METHOD (OPEN TECHNIQUE) AND TRANSPLANTATION OF AN AUTOLOGOUS BONE BLOCK FROM THE ILIAC CREST (ARTHROSCOPIC TECHNIQUE) USING A SINGLE OSTEOCONNECT SMITHS & NEPHIEW ENDOBUTTON**

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Klinika Silesia Opole

**Introduction**

Shoulder instability treatment sometimes includes filling the bone defect of the scapular glenoid.

**Aim**

The purpose of the study is to analyze the results of treatment of patients with shoulder joint instability treated with the Latarjet method and autologous bone block transplantation with a single Osteoconnect S&N endobutton.

**Material and methods**

The study included 8 patients with the bone-block and 10 with the Latarjet technique. The indication for the use of the bone graft technique was a glenoid defect of > 15%. Clinical results analyzed taking into account ROM, pain (VAS scale) and functional scales: SST, Constant Score and Walch Duplay – before the and one year after the procedure. Radiological examinations included MRI/CT before, X-ray 6 weeks after and CT 12 months after the procedure.

**Results**

In all patients clinical stability of the shoulder was achieved. In one-year observations, pain persisted longer in the Latarjet group. The limitation of ROM, 12 months after the procedure, concerned abduction and external rotation, greater in the group treated with the Latarjet method, but was not greater than 10° compared to the range before the procedure. In both groups, there was an improvement in the results according to the Simple Shoulder Test, Constant Score and Walch Duplay for Instability the Shoulder scales. We observed two radiological failures (incomplete union in the BB and implant destabilization in the Latarjet group).

**Conclusion**

The obtained results allow us to positively evaluate the stabilization method with a single Osteoconnect S & N endobutton. We plan to continue our study with additional comparative assessment of progressive arthritic changes in both techniques.

## **DETERMINING THE RECOVERY PACE AFTER ARTHROSCOPIC ROTATOR CUFF REPAIR**

Maciej Pawlak  
Rehasport Clinic

### **Introduction**

Rotator cuff tears are a widespread medical problem and cause an important rate of morbidity and inability in workplace and sport activities. Arthroscopic rotator cuff repair is a gold standard in treatment of this pathology, but rehabilitation and recovery post operation is said to be hard and slow.

### **Aim**

To determine recovery timing of patients who undergone rotator cuff repair.

### **Material and methods**

A prospectively maintained institutional database was retrospectively reviewed for consecutive patients who underwent rotator cuff repair (RCR). Analysis of the following parameters was performed: UCLA score (3 questions and global score), SST (12 questions), Constant Score (10 questions and global score), ASES (12 questions and global score), ROM (flexion, abduction, and external rotation), strength assessed with BIODEX system. The analysis was performed for all patients together (1 group) at 3 months follow-up, 6 months follow-up, and 12 months follow-up.

### **Results**

Range of motion was assessed and statistical significance was calculated between particular shoulder scores: 3 months vs 6 months, 3 months vs 12 months, 6 months vs 12 months.

### **Conclusion**

Majority of patients regain full ROM after 12 months post operation and are satisfied with a treatment already after 3 months post operation.

## **PATHOLOGICAL HUMERAL FRACTURE IN A PEDIATRIC ATHLETE TRIGGERED BY THROWING A BALL**

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### **Introduction**

Among fractures in pediatric patients, humeral fractures are the most frequent. They are typically associated with direct external trauma. However, non-accidental trauma and pathological lesions should not be overlooked.

### **Aim**

The aim of this study is to highlight the statistically rare non-neoplastic, serous fluid-filled bone lesion known as a unicameral bone cyst.

### **Material and methods**

To describe the case, we utilized data from our hospital's system. We analyzed database entries, imaging studies, and histological examinations. Then we reported available literature.

### **Results**

A 14-year-old male amateur athlete presented to our hospital with a preliminary diagnosis of a pathological right humeral fracture after throwing a water ball during training. Imaging studies revealed a spiral fracture of the distal shaft of the right humerus with bone fragments. Additionally, there was thinning of the cortical bone at the site of the fracture, as well as a change in the proximal two-thirds of the humeral shaft with heterogeneous contrast enhancement, which was suspected to be fibrous dysplasia. The patient underwent surgery with closed reduction and stabilization using TEN rods. Three months later, the patient required reoperation due to hardware irritation. Finally, after oncological consultation, the patient underwent an excision of the bone cyst, with the defect being filled using an allograft bone. Histopathological examination confirmed a cavernous hemangioma of the bone.

### **Conclusion**

Simple bone cyst is a rare pathology. However, the orthopedic surgeon should keep it in mind to enable early and accurate diagnosis as well as appropriate treatment.

## **A FEASIBILITY STUDY COMPARING NANOSCOPY AND CONVENTIONAL ARTHROSCOPY FOR VISUALIZING SPECIFIC ANATOMICAL STRUCTURES OF THE KNEE JOINT IN HUMAN CADAVERS**

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### **Introduction**

In shoulder arthroscopy, a wide variety of endoscopes are currently available. However, 30° optics have become the standard for the procedure. The nanoscope has occasionally been used as a diagnostic tool. To date, no study has compared the performance of the nanoscope versus the standard arthroscope in terms of anatomical landmark visibility.

### **Aim**

This prospective feasibility study aimed to evaluate predefined anatomical landmarks of the knee joint using a nanoscope with 0° optics and conventional knee arthroscopy with 30° optics, comparing their effectiveness during shoulder arthroscopy in human cadavers.

### **Material and methods**

Examinations were performed on ten cadavers by two surgeons. The focus was on anatomical landmarks visible during conventional diagnostic shoulder arthroscopy. The quality of visibility was assessed using a questionnaire with a grading scale of 1 to 5.

### **Results**

The average visibility score for all anatomical landmarks was 4.62/5 for arthroscopy and 4.42/5 for the nanoscope. Comparatively, the nanoscope demonstrated slightly reduced visibility for the posterior recess (4.46/5 vs. 4.1/5) and the bare area (4.38/5 vs. 4.17/5). However, the nanoscope slightly outperformed in visualizing the subacromial space (4.68/5 vs. 4.53/5).

### **Conclusion**

The nanoscope offers significant potential as a technology, providing advantages such as minimally invasive access and clear visualization of anatomical structures. However, it does have limitations, particularly when navigating complex anatomical configurations or requiring a wide field of view.

## **ASSESSMENT OF ELBOW PROPRIOCEPTION WITH INERTIAL MEASUREMENT UNITS- VALIDITY AND RELIABILITY STUDY**

Szymon Stupnicki, Grzegorz Mulski, Łukasz Żytka, Jakub Kaszyński, Cezary Baka, Bartłomiej Lubiowski, Przemysław Lubiowski  
Rehasport Clinic, Poznan, Poland

### **Introduction**

Proprioception is a key sensory function enabling individuals to perceive body position and movement. It is essential for optimal performance, particularly in athletes. However, accurately measuring proprioception remains a challenging task with the methods currently available.

### **Aim**

This study assessed the reliability of elbow proprioception measurement using inertial motion sensors- IMU and validating IMU against other angle measurements methods.

### **Material and methods**

Twenty healthy participants underwent active and passive proprioception assessments based on elbow joint position sense (JPS). Analyzed data was error of reproduction of joint position (ERJP). Angular measurements were performed using a single IMU (RSQ MOTION) and validated against BIODEX SYSTEM 4 moving frame.

### **Results**

Inter-rater reliability for passive proprioception was high, with a Kendall's coefficient of 0.77 ( $p < 0.05$ ) for both RSQ Motion sensors and BIODEX, while active proprioception measured with RSQ Motion sensors showed slightly lower reliability (Kendall's coefficient of 0.66,  $p < 0.05$ ). Intra-rater reliability had similar results, with Kendall's coefficients of 0.74 for passive BIODEX proprioception examination, 0.75 for passive RSQ Motion sensor testing and 0.65 for active proprioception ( $p < 0.05$ ) measured with RSQ Motion sensors. Bland-Altman analysis revealed that differences between the RSQ sensors and BIODEX were within the limits of agreement (LoA). Mean absolute value of the ERJP between RSQ sensors and BIODEX was  $0.88^\circ$  (95% CI: 0.79–0.98; SD: 0.71).

### **Conclusion**

These results suggest that elbow joint position sense assessment methodology using IMU is reliable and accurate. The study serves as a background for further research of joint proprioception in the human body.

## **MODERN TECHNOLOGY APPLICATION IN UPPER LIMB REHABILITATION PROCESS**

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Zakład Fizjoterapii Uniwersytetu Medycznego im. Karola Marcinkowskiego w Poznaniu

### **Introduction**

Modern technologies are more often used as an integral part of rehabilitation procedures. Different type of exercises and therapy in form of games and tasks are interesting activities especially among young patients. It allows to increase patients range of motion and to stimulate proprioception and muscles activation during different tasks. The innovative systems give also an opportunity to work with patients' cognitive abilities.

### **Aim**

The aim of the study was to assess modern technology use in instability rehabilitation program.

### **Material and methods**

23 patients due to their upper limb issues were included into the study (16F, 7M, age: 15–44). All participants underwent clinical diagnosis and upper limb assessment with isometric strength examination and stability examination. Each of participants received individual program of upper limb rehabilitation adjusted to their symptoms and complains. In the study we used 3 devices which were constructed by Technomex® – Capri, X-Cogni, and Leap Motion. Games were concentrating on wrist exercises consisting movements of palmar and dorsal flexion, ulnar and radial deviation and DTM plane exercises. All patients were collecting every time points for each session which were compared to assess the effectiveness of rehabilitation process.

### **Results**

76% of participants assessed the modern technologies as interesting type of rehabilitation procedure with satisfaction rate 60–77%. There was no significant increase of patients shoulder isometric strength or global grip strength. Patients reported increase (30–45%) in muscle control and subjective proprioception improvement.

### **Conclusion**

Modern technologies application may be an attractive type of rehabilitation process and allow to increase patient's involvement and therapy effectiveness.

## **PROFESSIONAL CLASSIC WRESTLING ATHLETES – BIOMECHANICAL EVALUATION OF ROTATOR CUFF PARAMETERS**

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Clinical Physiotherapy Students Scientific Group Poznan University of Medical Sciences, Poland

### **Introduction**

Classic wrestling is a dynamic sport in which it is necessary to overpower the rival in order to move on to the techniques and actions for which points are scored. In this aspect it is necessary to have great grip strength and stability of the shoulder girdle thanks to which the athletes gain an advantage over their opponents.

### **Aim**

The purpose of this study is to assess the specific grip strength of classical wrestling, the strength of the rotator muscles of the upper limb, and to determine the biomechanical profile of the athletes.

### **Material and methods**

The study included 30 male classical wrestling athletes with national/international performance in the 6 months prior to the study with no history of a currently diagnosed injury. The Biodex System 4 Pro was used to measure isokinetic strength rotator muscles. A hand dynamometer was used to assess grip strength.

### **Results**

There was significant difference ( $p < 0.05$ ) between rotator cuff muscles biomechanical parameters. The average PQ/BW value at an angular velocity of  $60^\circ/s$  for external rotation was 43.5 for the dominant upper limb and 43.7 for the non-dominant upper limb, internal rotation was 78.2 for the dominant upper limb and 75.1, for the non-dominant upper limb. The average grip strength was 51 for the right hand and 49.3 for the left hand.

### **Conclusion**

Classical wrestling athletes are characterized by high grip strength, external and internal rotators of the arm regardless of lateralization. Due to the sports characteristic the internal rotators biomechanical parameters are significantly increased.

## **PROFESSIONAL WRESTLING ATHLETES- BIOMECHANICAL EVALUATION OF ELBOW STRENGTH: CROSS-SECTIONAL STUDY**

Marcin Rybnik, Kornel Pękala, Marcin Redman, Marta Jokiel

Clinical Physiotherapy Students Scientific Group Poznan University of Medical Sciences

### **Introduction**

Wrestling is a martial art and combat sport that involves grappling with an opponent and striving to obtain a position of advantage through different throws or techniques, within a given ruleset. This study attempts to analyze the Greco-Roman wrestling athletes.

### **Aim**

The aim of this study was to compare the elbow biomechanical profiles of Greco-Roman wrestling athletes using muscle strength, endurance and the agonist/antagonist ratio as outcome measures.

### **Material and methods**

A cross-sectional study was conducted on 33 male Greco-Roman wrestling athletes (ages 16–30) who competed at least at the national championship level. Upper extremity isokinetic strength was assessed using the Biodex System 4 Pro®. An isokinetic dynamometer was used to evaluate elbow flexion and extension.

### **Results**

There was no significant difference ( $p > 0.05$ ) in average peak torque relative to body weight, total work and agonist/antagonist ratio between the dominant and non-dominant limb during elbow flexion and extension. The average peak torque/body weight during extension was 73.7 NM in dominant and 72.9 NM in non-dominant extremity and 63.3NM in dominant and 63.4 NM in non-dominant extremity during flexion. The average total work was 744.9NM in dominant and 752.3 NM in non-dominant in extension and 903.1NM in dominant and 880.7 NM in non-dominant extremity in flexion. The average agonist/antagonist ratio was 86.2% in dominant and 86.4% in non-dominant extremity.

### **Conclusion**

Consequently, optimal muscle strength and endurance in both limbs are essential for athletic wrestling performance and may play a key role in the overall neuromuscular development of wrestlers.

## **VALIDATION AND RELIABILITY OF SCAPULAR MORPHOLOGY ASSESSMENT USING MIXED REALITY**

Szymon Stupnicki, Mikołaj Zakryś, Bartosz Gołembiewski, Stanisław Komisarczyk, Jan Klincewicz, Anna Maria Kubicka, Bartłomiej Lubiowski, Przemysław Lubiowski  
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in Poznań, Poland

### **Introduction**

Recent advancements in Augmented (AR) and Mixed Reality (MR) have significantly impacted the orthopedic field, with hope of holographic tools to enhance surgical precision. This study validates and explores the reliability of a specially designed software tool, integrated with HoloLens2 for measuring anatomical structures of the shoulder girdle in orthopedic surgery.

### **Aim**

The purpose of this study was to validate and investigate the reliability of RSQ Holo software as a measurement tool integrated with Microsoft HoloLens 2 device.

### **Material and methods**

Fifty-one right human scapulas obtained from the Department of Zoology at Poznan University of Life Sciences were measured directly using a caliper, on 2D and 3D CT scans and with holographic instruments (RSQ Holo system). Glenoid height, glenoid width and scapular width were measured. Imaging methods were validated against direct caliper measurements. Intra-rater and inter-rater reliability was assessed among four testers.

### **Results**

Descriptive statistics indicated minimal measurement differences across all groups, with the majority of differences being under 1 mm. Comparison graphs, and descriptive statistics showed that in glenoid height and glenoid width RSQ Holo measurements are the closest to direct measurements. Scapula width measurements done with every technique were equal. ICC revealed excellent intra-rater reliability for scapula width (0.96) and glenoid width (0.91), and good reliability for glenoid height (0.85). Inter-rater reliability also showed promising results, particularly for scapular width (0.91) and glenoid width (0.78), although glenoid height (0.72) showed moderate agreement.

### **Conclusion**

Findings demonstrate that RSQ Holo software provides accurate and consistent measurements, supporting its potential use in preoperative planning and intraoperative navigation.

## **ARTHROSCOPIC LATARJET-BANKART PROCEDURE FOR RECURRENT ANTERIOR DISLOCATION OF THE SHOULDER: PROSPECTIVE AND RETROSPECTIVE STUDY WITH 5 YEAR FOLLOW-UP**

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Rehasport Clinic Poznań

### **Introduction**

The Latarjet-Bankart procedure is one of the most effective techniques for the treatment of recurrent anterior instability of the shoulder joint. Indications for this type of surgery are not homogeneous but the most important is bone loss of the glenoid. The procedure is based on transferring the coracoid process to the anterior rim of the glenoid. The arthroscopic technique is much more demanding than the open technique and its long-term results are still poorly studied.

### **Aim**

The aim of the study was to clinically and biomechanically assess the condition of the shoulder joint of patients at least five years after the arthroscopic Latarjet procedure.

### **Material and methods**

We conducted the prospective and retrospective assessment of 10 patients (1 women) at least 5 years after the Latarjet procedure. The evaluation included biomechanical testing and clinical assessment using shoulder scores (UCLA, ASES, SST, WOSI). Additionally, the presence of degenerative changes was investigated after 5 years based on X-ray imaging.

### **Results**

No patient developed a recurrence of shoulder dislocation during the follow-up period, but one patient had a positive apprehension test. 3 patients had slight degenerative changes on X-ray (I in Samilson-Prieto scale). Biomechanical testing showed no external rotation deficit. The range of external rotation was minimally reduced (7.7 +/- 7.5 degrees). UCLA scale was almost perfect (32.2 +/- 3.5 points) as well as the other scales.

### **Conclusion**

Patients 5 years after arthroscopic Latarjet have very good shoulder function without significant restrictions. Degenerative changes are relatively few and of low intensity.

## **ASEPTIC INFLAMMATION OF THE CLAVICLE**

Wiktoria Nogalska, Ewa Kowalów, Adrianna Adamek, Piotr Koschel, Michał Harasymczuk  
Student Research Group of Hand Surgery, Poznan University of Medical Sciences, Poland

### **Introduction**

Chronic recurrent multifocal osteomyelitis (CRMO) is a rare, autoinflammatory bone disorder that typically affects pediatric patients. It is characterized by relapsing pain, swelling, and inflammation in multiple skeletal sites or involving a single bone. The exact cause of CRMO remains unclear, and its management is not standardized.

### **Aim**

The aim of this study is to present a 14-year-old female with chronic post-traumatic clavicle pain, who underwent surgery, received antibiotic treatment, and is currently undergoing Pamidronate therapy for persistent symptoms.

### **Material and methods**

Our case involves a patient with persistent chronic pain in the right clavicle following a contusion. On examination, there was widening of the right clavicle's outline, a 10 degrees limitation of flexion and abduction, internal and external rotation of the shoulder were possible without restriction. The elbow, wrist, and hand demonstrated a full range of motion without pain. The limb exhibited normal blood supply and innervation. Initial biopsy of the clavicle revealed chronic inflammation. The patient underwent surgery involving part of the clavicle resection and inflammatory lesions removal. Further antibiotic treatment for persisting symptoms was unsuccessful. Given the ongoing symptoms and a family history of osteochondromas, we started pamidronate therapy.

### **Results**

The patient reported significant improvement in symptoms following pamidronate therapy. After the first cycle, pain symptoms recurred only three times during three months.

### **Conclusion**

This case highlights pamidronate's potential in managing CRMO in pediatric patients, significantly reducing pain severity and recurrence. It also underscores the diagnostic challenges posed by confounding factors, such as a history of trauma, which can obscure the clinical picture.

## **ARTHRODESIS IN TREATMENT OF SHOULDER INSTABILITY IN A PEDIATRIC PATIENT**

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Karola Marcinkowskiego w Poznaniu

### **Introduction**

Hypermobility, as an increase in the range of motion within a joint, occurs in the course of diseases with connective tissue disorders. Susceptibility to injury can result in joint instability, including recurrent dislocations and pain. In cases of severe hypermobility, where traditional rehabilitation methods prove ineffective, surgical interventions are considered.

### **Aim**

This case report presents the results of surgical treatment of the right shoulder instability in a 9-year-old female with hypermobility and habitual dislocations of this joint in the course of Ehlers-Danlos syndrome.

### **Material and methods**

A 9-year-old female wheelchair user with hypermobility due to Ehlers-Danlos syndrome, experiencing significant right shoulder instability and right brachial plexus birth palsy. Instability caused habitual dislocation of the right shoulder since birth with a high pain component, preventing effective rehabilitation. After establishing the indications, shoulder arthrodesis was performed, including stabilization with Kirschner wires and supplementation with bone grafts. Nine months post-surgery, range of motion, pain, and radiological evaluation were conducted.

### **Results**

The arthrodesis resulted in the stabilization of the shoulder. Nine months after the procedure, no passive motion and a significant reduction in shoulder pain were observed. Diagnostic imaging did not provide sufficient evidence to confirm permanent bone fusion in the joint.

### **Conclusion**

Arthrodesis achieved very good outcomes in this patient. Despite restricting the joint's mobility, the procedure significantly improved the patient's condition and enhanced the quality of her life.