2023 Congress Abstracts - Elbow/Wrist/Hand

The Bony Morphology of the Intertubercular Groove Influences the Development and Type Of Pulley Lesions

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Summary:
Medial and bilateral pulley lesions are associated with a dysplastic shallow intertubercular groove.

Data:
Purpose: To investigate the influence of the bony morphology of the intertubercular groove (IG) on the development of different types of biceps reflection pulley (BRP) injuries. Methods: 221 Patients with a preoperative diagnosis suspecting BRP injury, who underwent arthroscopy, were retrospectively analysed. Surgeons described the presence or absence as well as type of pulley injury (medial, lateral or bilateral) in the operative report. The intertubercular groove was evaluated on MRIs after a standardised triplanar reconstruction: The axial plane was reconstructed in 3 planes at the level of and in line with the highest points of both the greater and lesser tuberosity and aligned perpendicular to the floor of the IG. The IG depth, width, medial wall angle (MWA), lateral wall angle (LWA) and total opening angle (TOA) were measured. IG depth and width were expressed relative to the diameter of the average humeral head. All measurements were performed by two clinicians independently and averaged. Results: Of 166 included cases 43 had bilateral, 65 medial and 38 lateral BRP lesions as confirmed during arthroscopy. 20 patients had intact BRPs and represented the control group. The interrater correlation coefficient showed a high degree of reliability (0.843 – 0.955). Shoulders with a medial or bilateral BRP injury had a flatter MWA (38.8° or 40.6° vs. 47.9°, p < 0.001), wider TOA (96.1° or 96.6° vs. 82.6°, p < 0.001), greater width (12.5 or 12.3 vs. 10.8 mm, p < 0.01) and shallower depth (5.5 or 5.4 vs. 6.2 mm, p < 0.001) compared to the control group. There was no significant difference in the IG morphology of patients with medial vs bilateral BRP lesions. The IG morphology of those with lateral BRP injuries was not significantly different from those with intact BRPs in any measurements. The odds ratio for a medial or bilateral BRP injury when the TOA exceeded 95° was 6.8 (CI 3.04 – 15.2). Conclusion: A dysplastic type of IG morphology with a wide TOA, flat MWA, decreased depth and increased width is associated with the presence of medial and bilateral BRP injuries. A TOA of > 95° increases the odds for a medial or bilateral BRP injury 6.8-fold, which makes this a useful diagnostic marker. In contrast, lateral BRP injuries are not associated with dysplastic IG morphology. This knowledge can help inform a decision to perform concomitant biceps tendon surgery during rotator cuff repair.

Category: Elbow/Wrist/Hand

Does Translation of the Proximal Radius Relative to the Capitellum Predict Need for Collateral Ligament Reconstruction in Transolecranon Fracture Dislocations?

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Summary:
In this first clinical series, displacement of the proximal radius relative to the capitellum on initial radiographs predicted the need for collateral ligament repair in transolecranon fracture dislocations. 0-5mm displacement did not require ligament repair, 5-10mm sometimes required ligament repair and those with more than 10mm displacement all required ligament repair at the time of fixation.

Data:
BACKGROUND: Biomechanical studies have shown inferior translation of the proximal radius relative to the capitellum in the sagittal plane can predict integrity of the collateral ligaments in a transolecranon fracture model, no studies have examined this in clinical practice. METHODS: Nineteen consecutive transolecranon fracture dislocations were retrospectively reviewed. Data collection included: patient demographics, fracture classifications, surgical management and failure with instability. Distance between the centre of the radial head and the centre of the capitellum was measured on initial radiographs by 2 independent raters on several occasions. Statistical analysis was used to compare the mean inferior displacement between patients who required collateral ligament repair and those who did not. RESULTS: Sixteen cases with a mean age of 57 years (32-85) were analysed with an inter-rater Pearson coefficient of 0.89. 3 cases were excluded due to inadequate imaging. Mean inferior displacement where collateral ligament repair was needed was 16.3mm (SD ± 4.5) compared with 7.1mm (SD ± 7.5) where collateral ligament repair was found not to be needed intra-operatively; p=0.024, 75% of cases with ligament repair were classified as Wrightington D+, Ring III or Jupiter IIB types. Older patients more likely required ligament repair (63 vs 50 years; p=0.108). In 3 cases, ligament repair was not performed initially but deemed necessary later. Of these, the mean inferior displacement was 14.48mm (SD ± 2.50) and 2 of these required revision fixation. CONCLUSION: This clinical study can offer some guidance of the impact of radiographic sagittal inferior displacement on management of transolecranon fracture dislocations. Where inferior displacement on initial radiographs exceeded 10mm lateral collateral ligament repair was required in all cases, except for one. If less than 5mm, ligament repair was not required in any of the cases. Older patients, associated radial head fractures and posterior apex injuries showed trend towards ligament repair.

Category: Elbow/Wrist/Hand

Muscle Activity of the Extensor Carpi Ulnaris in the Left and Right Wrists of Sub-Elite Golfers During the Golf Swing

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Summary:
EMG activity of lead ECU was higher in the trail arm in backswing and follow through, however EMG activity of trail arm was greater than the lead arm in downswing.

Data:
Background Wrist injuries are the most common upper limb injuries in sub-elite and elite golfers. The left wrist accounts for 67% of all wrist injuries, of which...
52% are associated with overuse, extensor carpi ulnaris (ECU) pathology. Injuries suffered by this tendon in golfers lead to an average of 3 missed tournaments. Despite ECU being the most frequently injured structure in the wrist/forearm of elite and sub-elite golfers, no study has captured its activity during the golf swing. It is unknown when ECU is most active in the golf swing and whether it is more active in the lead or trail wrist. The purpose of this study was to assess the timing and magnitude of muscle activity in the ECU muscle in the lead and trail forearms tri-planar angular velocity of the lead and trail hands during the golf swing in sub-elite golfers. Methods: Fifteen sub-elite right-handed golfers were recruited for this study. Data was collected utilising an indoor swing studio with a simulator. Trials were conducted by hitting five pitching wedges, five iron and 5 drivers. To assess muscle activity, two wireless EMG sensors (Delsys TrignoTM Mini Sensors, MA, USA) were fixed using double-sided tape directly over the midpoint of the muscle belly of the ECU on the left and right forearm with the sensor electrodes aligned perpendicular to the muscle fibre direction. Maximal voluntary contraction from the highest driver value was used as a reference for each player. Performance variables which were collected for analysis were, angle of attack (degs), swing direction (degs) and swing speed (miles per hour). Following the completion of the swings, the highest peak half-second EMG signal during the driver swings was used as the normalizing value (100%). Swing phases were divided into backswing, downswing and follow through using the interia measurement units (IMU) sensors placed on each distal forearm and dorsum of the hands. Statistical parametric analysis was used to compare the 303 data points for the lead and trail arms throughout the swing. Results: The mean handicap of the players was 1 (SD 2). Left ECU activity in the backswing and follow-through was significantly higher than the right for all clubs (p<0.001 and p=0.024 respectively). Right ECU activity in the downswing was significantly higher than left for all clubs (p=0.001)(Figure 1-3). During the downswing, ECU activity of the lead side progressively increased towards impact, however in the trail side, ECU activity sharply peaked and then began to decline until impact. The driver had significantly higher ECU recruitment than the iron and pitching wedge (p<0.001). There was no association between ECU activity in both arm and performance characteristics. Conclusion: Despite lead sided injuries being more common, it would appear that the trail side has greater peak activity during the downswing and therefore the peak velocity of the golf swing. Knowledge surrounding the nature of tendon contraction and wrist kinematics during the downswing would be beneficial in further explaining the asymmetric nature of injuries to this tendon.

Category: Elbow/Wrist/Hand

Similar Clinical Outcomes Between Double Cortical Button and Docking Techniques for Ulnar Collateral Ligament Reconstruction in Baseball Players

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Summary:
Post-operative outcomes were similar between baseball players who underwent UCLR with the double button technique and the docking technique.

Data:
Objectives: A double button technique using a cortical button on both the humeral and ulnar sides of the UCLR for fixation has recently been proposed, with advantages including greater control over graft tensioning and decreased risk of bone tunnel fracture. This double cortical button technique was recently evaluated biomechanically and found to be non-inferior to the traditional docking technique regarding strength, joint stiffness, and graft strain. However, clinical outcomes have not been compared between the double cortical button technique and standard UCLR techniques such as the docking technique. Therefore, the purpose of this study was to determine whether baseball players who underwent UCLR with a double cortical button (double button) technique have similar return to sport (RTS) rates, time to RTS, and subjective outcomes compared to baseball players who underwent UCLR with the traditional docking (Docking) technique. Methods: Competitive baseball players that underwent primary UCLR from 2011-2020 at across two institutions were identified using the CPT code

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Summary:
Arthroscopic suprapectoral (ASPTB) and open subpectoral (OSPBT) techniques via interference screw (IS) fixation demonstrated the least tendon migration, while OSPBT with one all-suture anchor with a single suture fixation yielded the most.

Data:
Purpose: To quantitatively and compare the postoperative migration of the BT construct between arthroscopic suprapectoral (ASPTB) and open subpectoral (OSPBT) techniques via interference screw (IS) or all-suture anchor with a single suture (SSSA) fixation with radiostereometric analysis (RSA). Methods: Distal migration of the biceps tendon following OSPTB with a Polyetheretherketone (PEEK) IS, OSPBT with one SSSA, ASPTB with PEEK IS, and ASPTB with two SSSAs was measured prospectively. Patients with symptomatic biceps tendinopathy and preoperative Patient-Reported Outcome Measures (PROMs) including CMS, SANE, or PROMIS-UE scores were included. A tantalum bead was sutured on the proximal end of the long head biceps tendon before fixation. AP radiographs were performed immediately post-operatively, 1 week, and 3 months. Bead migration was measured, and PROMs were compared. Results: Of 115 patients, 94 were available for final follow-up (82%). Average age was 52.1±10.5 years, and BMI was 30.8±5.4 kg/m2. There was no difference in tendon migration between OSPBT and ASPTB performed with an IS