

6 of 8 specimens (Group 1). Average torque to failure for Group 1 was 31.35 N-m. Average torque to failure for Group 2 was 25.10 N-m. The difference is statistically significant ($p = 0.0001$).

Conclusion: Subpectoral drill holes were shown to be a stress riser for humeral fracture. Suprapectoral drill holes were shown to be significantly less of a stress riser. The torque required to fracture the humerus through the subpectoral drill holes was less than was required to fracture the shaft of the humerus with a suprapectoral drill hole. Clinically, the risk for fracture potential should be considered when selecting tenodesis location and technique.

Is Coraco-Clavicular Stabilisation Alone Sufficient for the Endoscopic Treatment of Severe Acromio-Clavicular Separation (Rockwood Types III, IV, and V)?

SS-25

April 15, 9:50 AM

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Introduction: The primary objective was to evaluate correlations linking anatomical to functional outcomes after endoscopically assisted repair of acute acromio-clavicular joint disruption (ACJD). Our hypothesis was that at 1 year combined acromio-clavicular and coraco-clavicular stabilisation improves radiological outcomes compared to coraco-clavicular stabilisation alone.

Methods: A prospective multicentre study evaluated clinical outcome (pain, QuickDASH, and Constant's score), and anatomical outcomes (standard XRays and dynamic radiographs).

Results: 116 patients (48% type III, 30% type IV, 22% type V), minimal FU was 1 year. Coraco-clavicular stabilisation was achieved using a double endobutton in 93% of patients, and concomitant acromio-clavicular stabilisation in 50%. The Constant's score $\geq 85/100$ and a subjective QuickDASH functional disability score ≤ 10 in 75% of patients. The radiographic analysis showed significant improvements and in the horizontal plane. The anatomical outcome correlated significantly with the functional outcome (absolute R value = 0.19 and $p=0.045$). Implantation of a biological graft significantly improved both the anatomical outcome in the vertical plane ($p=0.04$) and acromio-clavicular stabilisation in the horizontal plane ($p=0.02$). The coraco-clavicular ratio on the antero-posterior radiograph was adversely affected by a longer time from injury to surgery ($p=0.02$).

Conclusion: This study demonstrates that acute ACJD requires stabilisation in both planes, i.e., at the coraco-clavicular junction and at the acromio-clavicular joint. Implantation of a biological graft should be considered when the time from injury to surgery is longer than 10 days.

Arthroscopic Sternoclavicular Joint Discectomy for Acute and Chronic Tears

SS-26

April 15, 9:55 AM

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Introduction: The sternoclavicular joint (SCJ) has a complete intra-articular disc which can be damaged either following trauma or as part of on-going degenerative joint disease. Although often asymptomatic, SCJ disc tears may lead to mechanical symptoms and pain. This study's aim is to assess the outcome of arthroscopic SCJ discectomy in patients with a symptomatic disc tear.

Methods: Between April 2010 and January 2015 fifteen patients underwent an arthroscopic excision of a torn SCJ disc. Their average age at surgery was 32 years (19–48). Pre-operative diagnosis was made by a combination of history, examination and MRI or CT scan. All of the patients complained of clicking with varying levels of pain. Ten of the patients had been symptom free prior to a specific incident following which they developed SCJ symptoms. The other 5 patients developed a gradual onset of symptoms. The average duration of symptoms was 35.7 months (6 – 60). All of the patients underwent an arthroscopic SCJ discectomy. Three patients had significant degenerative changes and underwent additional excision of the medial end of the clavicle. Post-operatively no immobilisation was required. Patients were assessed pre-operatively, at 3 and 6 months and at final follow-up post surgery using the Rockwood and the Quick DASH scores.

Results: At a mean follow-up of 27.6 months (9 – 63) there was a significant improvement in the Rockwood score from 6.7 (5 – 9) to 13 (9 – 15). The mean Quick DASH score was 83.4. One patient continued to have significant pain and underwent subsequent arthroscopic SCJ excision. There were no reported complications and specifically no instability. All of the patients reported that they would be happy to have this procedure again.

Conclusion: The results of this series suggest that arthroscopic SCJ discectomy is a safe and reproducible procedure for the treatment of symptomatic SCJ disc tears.

Biceps Pathology and Its Relation to Humeral Torsion in Professional Baseball Pitchers

SS-27

April 15, 10:00 AM

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Introduction: Biceps pathology is common in the dominant arm of professional pitchers. Repetitive throwing

causes increased mechanical stress that has been associated with altered bony morphology. There have been no clinical studies assessing the characteristics of the biceps tendon in relation to humeral torsion in professional baseball pitchers. This study was used to examine humeral torsion in those pitchers presenting with abnormal versus normal biceps tendons.

Methods: A bilateral ultrasound examination was performed on 30 pitchers from one professional baseball club. The biceps was characterized as normal if the biceps appearance was hyperechoic and uniform thickness. It was abnormal if the biceps was subluxed or dislocated from the groove, the tendon was thickening with abnormal echo texture, the tendon presented with a halo sign or demonstrating fluid distension around the sheath. The reliability for humeral torsion measures was acceptable with ICC's =.99 and SEM=1.3. The inter rater reliability for characterization of the biceps tendon was Kappa =.89. A one-way ANOVA was performed to determine the difference in humeral torsion between those with abnormal versus normal biceps tendons.

Results: Eighty percent of the dominant biceps tendons were characterized as abnormal. The dominant shoulders with abnormal biceps tendons had a significantly more antetorsion on the dominant side than those presenting with normal biceps. (15.1 ± 9.7 vs. 5.4 ± 11.1 ; $P = 0.05$).

Conclusion: Eighty percent of the dominant shoulders in professional baseball pitchers had abnormal biceps. Professional pitchers with abnormal biceps also displayed less humeral retrotorsion compared to pitchers with normal biceps. Recently we have shown that pitchers with less humeral retrotorsion are more at risk for shoulder pain. The lack of humeral retrotorsion and associated pathological imaging of the biceps may represent subclinical findings in these pitchers. Our results suggest future studies should examine the influence of humeral torsion and biceps abnormalities in professional pitchers.

Effectiveness of a Preseason Prevention Program on Arm Injury Risk Factors: An Randomized Control Trial in Adolescent Pitchers

SS-28

April 15, 10:05 AM

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Introduction: Deficits in posterior shoulder flexibility and strength have been identified as risk factors for pitching injuries. This study assessed the effectiveness of a preseason prevention program to resolve these deficits in adolescent pitchers.

Methods: Pitchers ($n=143$ age= 15.7 ± 1.2 ; height= 165.0 ± 43.8 cm; weight= 72.2 ± 12.6 kg) participating in team activities were block randomized by school to intervention (INV $n=88$) or control (CON $n=76$). INV received

an ATC supervised program (3x/week for 8-weeks). The CON had their usual training. All pitchers participated in a 4-week interval-throwing program immediate to the start of practice. Pre-post supine bilateral ER, IR, and HA ROM and strength were assessed using a digital inclinometer with the scapula stabilized at 90° of abduction. Muscle testing was used for strength assessments via held dynamometer with arm at the side and in supine $90^\circ/90^\circ$ then normalized to body weight (BW). Injuries were recorded over the subsequent baseball season. Two trials were averaged to calculate deficits (non-dominant-dominant) and pre-post change to determine if the program to ameliorate baseline deficits. A one-way ANOVA compared change scores between groups and a 2-way ANOVA (group by injury) compared change scores influence on injury ($\alpha=0.05$).

Results: The INV group displayed a greater reduction in IR deficit (INV= $7.3^\circ \pm 11$; CON= $1.8^\circ \pm 9$; $F(1,106)=5.1$, $P=0.01$) $P=0.05$) and HA deficit (INV= $3.3^\circ \pm 13$; CON= $-2.4^\circ \pm 11$; $F(1,106)=6.7$, $P=0.01$) compared to the CON group. The INV group also maintained their dominant ER-0:IR-90 ratio (INT= $-1.6 \pm 5\%$ BW; CON= $-3.5 \pm 5\%$ BW; $F(1,106)=2.1$, $P=0.09$) compared to the CON group. There were 19 arm injuries over the subsequent season (INV=11; CON=8 arm injuries). Control group pitchers with an injury did not decrease their HA deficit (Uninjured= $3.0^\circ \pm 10$; Injured= $-9.5^\circ \pm 14$; $F(1,106)=3.3$, $P=0.03$) or their IR deficit went on to suffer an injury (Uninjured= $-1.7^\circ \pm 8$; Injured $8.5^\circ \pm 13$; $F(1,106)=3.8$, $P=0.02$). There were no other differences between or among groups ($P>0.05$).

Conclusion: Adolescent pitchers displayed clinically meaningful improvements in posterior shoulder flexibility (HA and IR) and maintenance of their ER:IR ratio during an Athletic Trainer supervised preseason program. The improvements were associated with decreased injury risk over the course of the subsequent season.

Post-operative Alpha Angle Not Associated with Outcomes 5 Years following Hip Arthroscopy for FAI

SS-29

April 15, 1:30 PM

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Introduction: The alpha angle is currently the most used parameter for defining cam type femoroacetabular impingement (FAI). The purpose of this study was to determine if post-operative alpha angle is a predictor of patient outcomes 5 years following hip arthroscopy for FAI. Our hypothesis was that post-operative alpha angle (AA) would not influence clinical outcomes in patients with FAI.

Methods: 230 patients had primary hip arthroscopy for FAI. Average age was 38 (range 18 to 69). All patients had preoperative and post-operative alpha angles recorded. At 5 years following arthroscopy, all patients completed