

femoral ligament (MQTFL) has been described in the treatment of patellar instability. The purpose of this study was to identify and describe the anatomic midpoint of the anterior attachment of the combined MPFL and MQTFL (termed the medial patellofemoral complex [MPFC]).

Methods: Photographs of 31 cadaveric knee dissections were available for computer-assisted analysis. Using AutoCAD software, a bisecting line was created to identify the midpoint of the MPFC attachment. An anatomic reference point was identified at the intersection of the line along the medial border of the quadriceps tendon and the superior articular border of the patella (P1), and the distance to the midpoint was calculated on the basis of the patellar articular length (PAL).

Results: Of the 31 cadaveric knee photographs, 25 had appropriate quality and landmarks for digital analysis. Of these 25 knees, 22 had MPFL and MQTFL fibers, 2 had MQTFL fibers only, and 1 had MPFL fibers only. The midpoint of the MPFC was 3.2 ± 5.9 mm ($9.0\% \pm 16.4\%$ PAL) proximal to P1. After exclusion of the 2 knees with MQTFL fibers only, the MPFC midpoint was 1.9 ± 3.1 mm ($5.3\% \pm 8.6\%$ PAL) proximal to P1. In all knees, the anatomic midpoint of the MPFC was at or proximal to the level of P1.

Conclusion: In our anatomic study, the midpoint of the MPFC was found to be at or proximal to the junction of the medial border of the quadriceps tendon and superior pole of the patella. Given the risk of patellar fracture after traditional MPFL reconstruction, further consideration should be given to the analogous MQTFL reconstruction as a potentially safer and more anatomic alternative in the treatment of patellar instability.

Anisometry of Medial Patellofemoral Ligament Reconstruction in the Setting of Patella Alta and Increased Tibial Tubercle-Trochlear Groove (TT-TG) Distance

SS-23

April 14, 3:45 PM

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Introduction: To assess the effect of increased lateralization and proximalization of the tibial tubercle (TT) on isometry of the reconstructed medial patellofemoral ligament.

Methods: Ten fresh-frozen cadaveric knees were placed on a custom testing fixture. A tunnel was drilled under fluoroscopic guidance from Schottle's point through the lateral femoral cortex. A suture anchor was placed at the upper 41% of the medial border of the patella and the sutures were shuttled through to the lateral side and attached to a pulley with a 1N weight. Retroreflective markers were attached to the suture and MPFL length change, as measured by suture marker motion, was assessed using a 3D motion capture system through

a range of motion between 0deg and 110deg with the native TT anatomy. Recordings were repeated after a flat TT osteotomy and transfer to TT-TGs of 20mm and 25mm and Caton Deschamps (C/D) ratios of 1.2 and 1.4, including all combinations. Generalized estimating equation (GEE) modeling technique was used to analyze and control for the clustered nature of the data. SAS version 9.3 was used for all data analyses.

Results: Analysis was performed on 9 specimens secondary to significant deviations in the baseline normative data. Intact knees showed MPFL isometry through 20-70 degrees range of motion. Tibial tubercle lateralization significantly altered MPFL isometry with a threshold TT-TG of 25mm ($p=0.045$). Patella alta significantly altered MPFL isometry with a threshold C/D of 1.4 ($p=0.025$). The effect of TT lateralization combined with patella alta compounded the anisometry, lowering the threshold for patella alta to a C/D of 1.2 when combined with a TT-TG of 25mm ($P<0.001$).

Conclusion: An isolated MPFL reconstruction may be prone to failure in the setting of patella alta and/or elevated TT-TG given the anisometry demonstrated. Consider a tibial tubercle transfer in these patients.

Biomechanical Comparison of Torque to Humeral Fracture Between Two Biceps Tenodesis Locations

SS-24

April 15, 9:45 AM

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Introduction: Tenodesis of the long head of the biceps is the preferred surgical treatment for pathology of the tendon. Several case reports have shown fracture of the humerus following subpectoral biceps tenodesis; the location of the tenodesis was implicated as a stress riser for fracture. The purpose of our study is to compare the likelihood of spiral fracture of the humerus following biceps tenodesis at the position of arthroscopic supra-pectoral tenodesis versus the subpectoral meta-diaphyseal location.

Methods: 16 fresh-frozen humeri (8 matched pairs) were dissected and intraosseous tenodesis was performed. Unicortical tenodesis holes were drilled at the bottom of the bicipital groove (Group 1, suprapectoral), or just below the pectoralis major tendon insertion (Group 2, subpectoral) in the humeral diaphysis. The tenodesis was performed in a bone tunnel with a validated technique using suture fixation. Each humerus was mounted to a load frame and rotation torque was applied distally until fracture occurred, with torque measured (N-m).

Results: Fracture occurred at the subpectoral cortical drill hole in 8 of 8 specimens (Group 2). Only two fractures occurred through the tenodesis hole in Group 1, with spiral fracture resulting in the diaphysis of the humerus in

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