

Results: 48 patients participated in sports within the 3 years prior to surgery. Average age at surgery was 29.6 years with an average follow-up of 4.6 years. Kujala pain score improved from 51.2 preoperatively to 82.6 postoperatively ($p < 0.0001$). 83.3% were able to return to at least 1 sport postoperatively, 62.5% were able to resume more than 1 sport, and 60.4% were able to return to 100% of the sports they participated in preoperatively. The average time to return to sport was 7.8 months (range, 3-19 months). Patients most commonly returned to weightlifting (16/17), cycling (11/12), soccer (7/8), elliptical (13/16), running (24/33), and yoga (6/8) (Figure). 77.5% who returned to sports felt that they returned at the same or a higher level compared to preoperatively. 77% felt that their physical fitness stayed the same or improved. 78.9% were satisfied to very satisfied with their surgical results.

Conclusion: Patients undergoing AMZ TTO for patellofemoral pain or arthritis had an 83.3% rate of return to 1 or more sports at an average of 7.8 months after surgery, with many patients returning at the same or higher level of intensity compared to their preoperative state.

Allograft versus Autograft for Medial Patellofemoral Ligament Reconstruction



SS-22

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Introduction: Isolated medial patellofemoral ligament (MPFL) reconstruction has emerged as an effective treatment of recurrent patellar dislocations that occur in the absence significant patellofemoral malalignment or osseous abnormalities. Both allografts and autografts have been successful used for MPFL reconstruction. We hypothesize that MPFL reconstruction with allograft or autograft tissue yields similar low rates of recurrent dislocation and subjective patellar instability.

Methods: Chart review identified 117 MPFL reconstructions (80 allograft and 37 autograft) without concurrent bony procedures (such as tibial tubercle osteotomy) performed between 2008 and 2014 by four sports medicine fellowship trained orthopedic surgeons at our center. Patient demographics (age and sex) and surgical data (graft type) were identified by chart review. Chart review and patient interviews were undertaken to identify recurrent patellar dislocations as well as recurrent subjective patellofemoral instability. Recurrent dislocation and subjective instability risk were compared between the allograft and autograft groups.

Results: 53 patients (45%) with complete baseline data and minimum 1 year follow-up were contacted at a mean of 4.5 years following isolated MPFL reconstruction, including 37 patient with allograft reconstructions and 16 with autograft reconstructions. No significant differences

in patient sex, age at reconstruction, body mass index, or time to follow-up were noted between groups. Recurrent dislocation occurred in 1 patient in the allograft group (2.7%) and 0 patients in the autograft group (0%), ($p = 0.51$). Recurrent subjective instability occurred in 9 patients in the allograft group (24.3%) and 5 patients in the autograft group (31.2%), ($p = 0.74$).

Conclusion: The use of either allograft or autograft tissue for MPFL reconstruction results in a very low (<3%) risk of repeat dislocation. Recurrent subjective instability occurs more frequently (1/4 to 1/3 of patients) at a similar rate for both graft types.

The Anterior-Posterior Distance Between the Tibial Tuberosity and Trochlear Groove in Patients with Patellar Instability



SS-23

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Introduction: Tibial tuberosity osteotomy is often performed to correct excessive lateralization of the tuberosity in patients with patellar instability. An anteriorizing component has been recommended in the setting of chondral pathology, yet the ideal anterior-posterior relationship of the tibial tuberosity to the trochlear groove is unknown.

Methods: Knees with symptomatic patellar instability underwent static CT imaging, and were compared to age- and gender-matched controls. All knees were imaged in full extension. Tibial-tuberosity-trochlear-groove (TTTG) distance was measured to quantify lateralization of the tuberosity, and APTTTG distance represented the anterior-posterior distance between these two points. Lateral trochlear inclination (LTI), sulcus angle (SA) and trochlear depth (TD) were measured as indicators of trochlear dysplasia. Measurements were compared between the symptomatic and control groups using paired t-tests. Correlations between APTTTG with LTI, SA and TD were assessed using linear regression analyses.

Results: 22 knees in 18 patients with symptomatic patellar instability were included in the study group, with 22 control knees. TTTG and APTTTG distances were 19.9 mm and 8.3 mm in the symptomatic group, versus 16.8 mm and -0.5 mm in the control group, with a difference of 3.1 mm ($p=0.002$) and 8.8 mm ($p<0.0001$) respectively. The symptomatic group displayed greater trochlear dysplasia with lower LTI (13.0° vs 21.9° , $p<0.0001$), higher SA (152.7° vs 137.7° , $p<0.0001$) and lower TD (1.3mm vs 6.0mm , $p<0.0001$). There was strong correlation between APTTTG and TD ($r=0.62$, $R^2=0.39$, $p<0.0001$).

Conclusion: Our findings demonstrate that the trochlear groove is almost 9mm more anterior to the tibial tuberosity

in patients with patellar instability, and this distance correlates with measurements of trochlear dysplasia. While further studies are needed to determine the significance of APTTTG distance, these findings suggest that the anterior-posterior relationship between the trochlea and tuberosity may be a factor to consider when planning for tibial tuberosity osteotomy in patients with trochlear dysplasia.

A Novel Non-Operative Protocol for the Acute Management of In-Season Acromioclavicular Separations

SS-24

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Introduction: Acromioclavicular (AC) joint separations are a common injury in contact athletes. Historically, treatment of these acute injuries have focused on rest, sling immobilization, anti-inflammatory medication, and a gradual return to sporting activities. We have developed a novel treatment protocol utilizing a corticosteroid injection and a static scapular retraction and stabilization brace to anatomically reduce the AC joint and safely and quickly return these athletes to the playing arena.

Methods: Data was prospectively collected and retrospectively reviewed on the in-season management of all football acromioclavicular separations at an NCAA division I university. Inclusion criteria were all consecutive in-season AC separations sustained during football activities that requiring medical attention. Exclusion criteria include fractures, glenohumeral dislocations, rotator cuff tears, nerve injuries, other concomitant shoulder injuries, and injuries sustained during the last game of the season. The end points measured were number of games missed and time to full return to play.

Results: During seven football seasons (2008-2014), 56 acromioclavicular separations occurred. Fifty-two are included in the current study. Full return to play averaged 5.7 days (range 0-31 days), and athletes missed 0.25 games (range 0-3 games). Quarterbacks missed the most time. After an AC separation to the throwing shoulder, the quarterback missed a mean 26 days (range 22-31 days) and 3 games. After an AC separation to the non-throwing shoulder, the quarterback missed a mean 7.3 days (range 4-9 days) and 0.6 games (range 0-1 games).

Conclusion: This study describes a specific non-operative protocol for in-season management of AC injuries. The unique aspect of this protocol is the use of a static, 3-point brace to rotate and reduce the entire forequarter back to the clavicle, utilizing fracture reduction principals. This anatomically reduces the AC joint, alleviates pressure on

the rotator cuff, and allows athletes to safely and quickly return to play.

Long Head of the Biceps Tenotomy and Tenodesis: Does Technique, Location, or Implant Influence Outcomes and Complications?

SS-25

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Introduction: Surgical treatment of long head of the biceps tendon (LHBT) lesions due to pain or structural damage (partial tear, dislocation) is controversial. Post-operative complications including cosmetic "Popeye" deformity, biceps cramping, biceps weakness, persistent anterior shoulder pain, and proximal humerus fracture have been reported with these techniques. We present the largest series of surgical LHBT procedures and analyze their complications.

Methods: Records of patients who underwent a LHBT tenotomy +/- tenodesis at an integrated health care system by 84 surgeons were retrospectively analyzed. Inclusion criteria were patients who underwent a shoulder arthroscopic procedure where the LHBT was surgically released. Exclusion criteria included revision tenodesis, arthroplasty, neoplastic, or fracture surgery, age below 18, or incomplete data. Fixation methods, location of tenodesis, as well as indication for LHBT procedure (anterior shoulder pain versus structural), and post-operative complications were recorded.

Results: 1635 patients (1722 shoulders) were included. 1132 patients were male (69%). The average age was 54.5 years (range from 18-91). The average follow-up duration was 10.8 months. Biceps related complications are summarized in Table 1. 18 (1.04%) nerve injuries were encountered, which all completely resolved. Subpectoral tenodesis techniques had a significantly higher rate nerve injury ($p = 0.016$). One subpectoral tenodesis (0.12%) with a unicortical button and a 3.2mm tunnel suffered a proximal humerus fracture. Open and mini-open techniques demonstrate a significantly higher rate of superficial infection compared with arthroscopic techniques (2.32% versus 0.60%, $p = 0.029$).

Conclusion: We present the largest study analyzing LHBT procedures. While tenotomy and tenodesis provide reliable pain relief, we found no difference in persistent post-operative anterior shoulder pain between tenotomy versus tenodesis, regardless of whether the technique left the LHBT in the groove or not. However, tenotomy had a significantly higher rate of biceps related post-operative complications compared with tenodesis. The overall nerve injuries were low and all recovered.