Bilateral Superior Labrum Anterior to Posterior (SLAP) Tears With Abnormal Anatomy of Biceps Tendon

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Abstract

There have been several descriptions of variant anatomy of the long head of the biceps tendon (LHBT). A recent literature review identified 8 cases of anomalous intracapsular attachment of the LHBT.

In this report, we discuss a distinctive case of a young athlete who presented with symptoms consistent with bilateral superior labrum anterior to posterior (SLAP) tears that were unresponsive to conservative measures. Magnetic resonance imaging and arthroscopic findings of this patient confirmed that the patient had type II SLAP tears, a Buford complex anteriorly, and perhaps most important, confluence of the biceps tendon itself to the undersurface of the capsule within the rotator interval.

Our case proposes that anomalous insertion of the LHBT, as well as other labral and biceps anchor variations, are not always a benign finding at the time of arthroscopy. In this particular case, the tethering of the biceps tendon to the capsule is thought to have increased stress on the superior labrum and contributed to the development of the bilateral symptomatic type II SLAP tears that were identified and treated in this young athlete.

The biceps brachii derives its name from the 2 heads of the muscle. The short head originates from the coracoid apex, with the coracobrachialis muscle. The long head of the biceps tendon (LHBT) starts within the capsule of the shoulder joint, running from the supraglenoid tubercle or labrum.[1] The tendon typically runs free along its intra-articular course, but it is also extrasynovial and ensheathed by a continuation of the synovial lining of the articular capsule that extends to the inferior-most extent of the bicipital groove.[2] Congenital anomalies of the LHBT are uncommon, although several atypical forms have been described. A literature search for anomalous LHBT identified several variations in anatomic descriptions, including Y-shaped variant, complete absence of tendon, extra-articular attachment, and a variety of intracapsular attachments. In all, 8 case reports of aberrant intracapsular attachment of LHBT[3-12] were identified. These cases presented with a variety of clinical manifestations and pathologic changes. Often, these anatomic variations are considered innocuous, yet some present with pathologic findings.

We present the clinical, magnetic resonance imaging (MRI), and arthroscopic findings of a relatively young athletic patient who was experiencing symptoms of bilateral superior labrum anterior to posterior (SLAP) tears that were unresponsive to conservative management. A unique anatomic variant of the LHBT that involved confluence of the LHBT with the undersurface of the anterosuperior capsule at the rotator interval, as well as a Buford complex anteriorly, was identified and treated. We believe that the tethering of the biceps tendon to the capsule combined with the Buford complex created increased stress on the superior labrum and biceps anchor variant, leading to the development of bilateral symptomatic type II SLAP tears. Knowledge of this variant, though perhaps rare, may be relevant for diagnostic recognition of young athletic patients who present with recalcitrant shoulder symptoms. The patient and the patient's parents provided written informed consent for print and electronic publication of this case report.

Case Report

A 15-year-old healthy and active athletic boy presented with pain in the right shoulder without history of trauma. He was active in both swimming and baseball. He complained of pain that was present with activities, such as lifting weights, swimming, and throwing. His treatment prior to the office visit consisted of nonsteroidal anti-inflammatory medication, rest, and a therapy program initiated by his high school athletic trainer.

Physical examination demonstrated tenderness to palpation over the posterior capsule and biceps. Motion was full, cuff strength was normal, and SLAP signs (O'Brien, Speed, and Jobe relocation) were positive. A radiograph showed no sign of fracture or dislocation, and no evidence of bony abnormality.

The patient was sent for an MRI arthrogram, which showed a SLAP tear extending from 1 o'clock anteriorly to 10 o'clock posteriorly without intra-articular displacement. No rotator cuff tear was noted. The biceps tendon was noted to be un-

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remarkable and located within the bicipital groove, although retrospective review of the MRI showed that the intra-articular biceps tendon was somewhat confluent with the adjacent tissues.

The patient underwent right shoulder arthroscopy. The shoulder was stable to ligamentous examination under anesthesia. Arthroscopic evaluation revealed that there was a type II SLAP tear extending from the 11-o'clock to the 2-o'clock positions. The superior glenohumeral ligament was identified as it arose from the upper pole of the glenoid labrum and then ran parallel and inferior to the tendon of the biceps towards the lesser tubercle. Surprisingly, there was a very unusual attachment of the intracapsular LHBT to the undersurface of the rotator interval, which restricted biceps excursion in relation to the rotator cuff. Additionally, there was a thick cord-like middle glenohumeral ligament anteriorly that lacked the normal glenoid attachments, thus representing a Buford complex. Interestingly, the labral tear could not only be displaced with a probe, but placing the shoulder through a range of motion also led to increased displacement of the labrum from the glenoid, likely because the biceps tendon was tethered to the undersurface of the capsule.

At the time of arthroscopy, the LHBT was released from its attachment to the capsule at the rotator interval with a radiofrequency wand and shaver. A labral repair was performed using three 2.9-mm bioabsorbable suture anchors, placing 2 posterior and 1 anterior to the biceps tendon. The integrity of the labral repair was observed while placing the shoulder through range of motion.

Postoperatively, the patient was kept in a sling for 5 weeks. Home exercises were initiated at 2 weeks, and outpatient physical therapy was implemented at 4 weeks. The patient resumed swimming, throwing, and other activities—with minimal discomfort—at 6 months postoperatively.

Three years after his initial visit, the patient returned to the office with a similar complaint of pain and limitation of function in his left shoulder after returning to full athletic competition. Once again, there was no history of injury, and history, physical examination, and MRI arthrogram (**Figures 1A, 1B**) evaluation proved to be very similar to this young athlete's right shoulder work-up.

The patient once again underwent shoulder arthroscopy and treatment. Although this was now the left shoulder, the findings were essentially identical to the right shoulder. Once again, the labrum was detached from the 11-o'clock to 2-o'clock positions, and a Buford complex was present anteriorly (**Figure 2A**). The labral tear was easily displaceable from the glenoid with a probe, and placing the shoulder through a range of motion led to increased displacement of the labrum from the glenoid. There was also confluence of the intra-articular LHBT with the undersurface of the capsule within the rotator interval (**Figure 2B**). A radiofrequency wand, shaver, and elevator were used to define the biceps tendon and separate it from the undersurface of the capsule. The SLAP repair was performed using three 2.9-mm absorbable suture anchors with 2 posterior and 1 anterior to the biceps tendon insertion. The labral repair was observed while placing the shoulder through range of motion and the shoulder was seen to be free of any undue tension on the labrum.

Postoperatively, the patient's sling and rehabilitation protocol was identical to that of the right shoulder. The patient progressed well, was released to full activity at 6 months, and has not returned with any further complaints of left or right shoulder pain. Approximately 3 years after treatment the patient was contacted via phone and asked about symptoms, pain, and activity. He denies current symptoms of clicking or instability and has no pain that he can identify as being related to previous pathology or treatment. Since the surgery, he has ceased competitive sports and weight lifting, which he attributes to deconditioning associated with postsurgical immobilization and lack of motivation.

Discussion

Of the 8 case reports in the literature that identified variable intra-articular biceps insertional anatomy, only 2 reports represented confluence of the biceps within the rotator interval.[7] Interestingly, of the cases identified, the single case that presented a patient with similar pathology of a type II SLAP

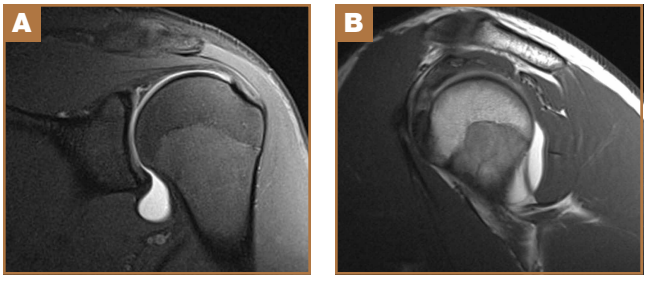

Figure 1. (A) Gadolinium-enhanced T1-weighted sagittal magnetic resonance arthrography (MRA) of left shoulder, which shows confluence of the long head of the biceps tendon (LHBT) and rotator cuff at the interval. Similar to MRA of right shoulder, note the absence of fluid surrounding the tendon. (B) Gadolinium-enhanced T2-weighted coronal MRA of left shoulder shows tear of the superior labrum.

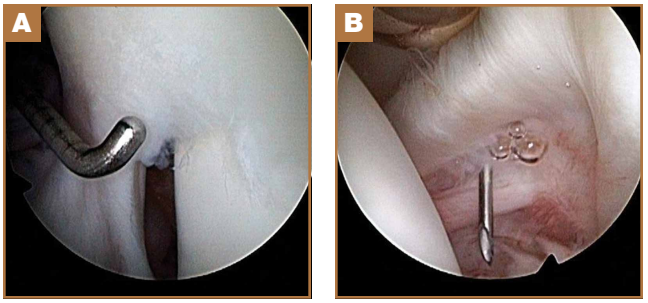

Figure 2. (A) Arthroscopic view from posterior portal, showing detached superior labrum, thickened middle glenohumeral ligament attached to superior labrum, and absent anterosuperior labrum. (B) Arthroscopic view from posterior portal exhibiting confluence of the intra-articular portion of the long head of the biceps tendon with the undersurface of the rotator cuff.

lesion had an almost identical anatomical variant presentation consisting of both the anomalous insertion of the LHBT into the undersurface of the rotator interval and a Buford variant of the anterosuperior glenohumeral ligament complex. To our knowledge, our bilateral case of an altered intra-articular biceps insertion and a concomitant SLAP tear supports the theory that this pattern of anomalous insertion may very well have altered the biomechanics of the tendon, resulting in acquired pathology to the superior labrum.

The literature reviewed showed the prevalence of anatomic variations of the LHBT ranged from 1.9% to 7.4%.[13,14] These variations are generally considered benign; however, in some cases—as in the cases of the young athletes presented by Wahl and MacGillivray[7] and in this report—anatomic variation may play an important role in pathogenesis of different injury patterns. The primary function of the LHBT is the stabilization of the glenohumeral joint during abduction and external rotation.[15] When the insertion diverges from normal (eg, when the tendon is tethered to the undersurface of the rotator cuff), the biomechanical stresses on the tendon likely change. As a result of the anomalous position of the LHBT origin, there may be a change in the shoulder joint's biomechanics, with increased strain on the glenohumeral ligament and its attachment onto the glenoid.[16]

This case report differs from publications on variable superior glenohumeral ligament attachments because a discrete superior glenohumeral ligament structure was isolated from the biceps tendon. Although a larger case series or patient cohort, as well as more involved biomechanical analysis, would certainly be necessary to prove our hypothesis, we believe that this case suggests certain anatomic LHBT and labral variations can contribute to the develop of SLAP tears in younger individuals.

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This paper will be judged for the Resident Writer's Award.