

SUPERIOR LABRUM ANTERIOR AND POSTERIOR LESIONS OF THE SHOULDER

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Lesions of the superior glenoid labrum and biceps anchor are a well-recognized cause of shoulder pain.

Advances in shoulder arthroscopy have led to improvements in Management.

Recent biomechanical studies have postulated several theories for the pathogenesis of SLAP tears in throwing athletes and the effect of these injuries on normal shoulder kinematics.

However, the diagnosis of clinically relevant SLAP tears **remains challenging** because of the lack of specific examination findings and the frequency of concomitant shoulder injuries.

Definitive diagnosis of suspected SLAP tears is confirmed on arthroscopic examination. Advances in surgical techniques have made it possible to achieve secure repair in selected patterns of injury.

Recent outcomes studies have shown predictably good functional results and an acceptable rate of return to sport and/or work with arthroscopic treatment of SLAP tears.

Definition: SLAP Detachment of the "superior labrum from anterior to posterior"

Introduction

Superior labrum anterior and posterior (SLAP) lesions have been recognized as a cause of shoulder pain since the mid-1980s. Controversy regarding what is a normal variant and what is an abnormality that could be consistently associated with a patient's symptoms surfaced almost immediately thereafter. Snyder established the current understanding of the pathological anatomy of SLAP lesions, especially the concept that some lesions require repair rather than debridement.

Demographics

It is the authors' impression that the percentage of cases of SLAP lesion repairs reported by young orthopaedic surgeons is high and that complications associated with this are not insignificant.

There were 4975 SLAP repairs, **representing 9.4% of** all applicants' shoulder cases.

There were 78.4% who were men, and 21.6% of patients were women.

Mean age of male patients was 36. years, with a maximum of 85 years.

Mean age of female patients was 40 years.

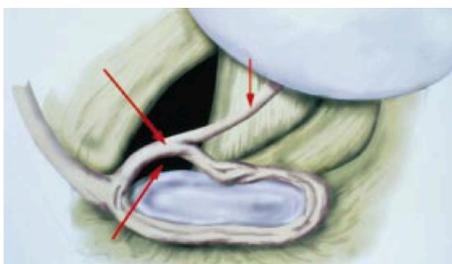
Pain was reported as absent in only 26% of patients at follow-up and function as normal in only 13%.

There were 40% of applicants who self-reported their patients to have an excellent result.

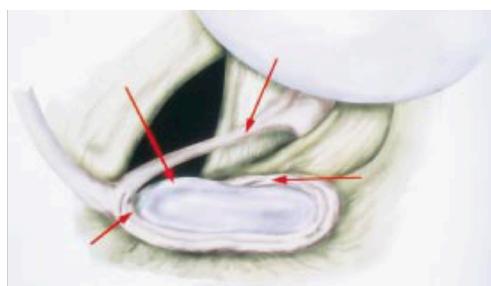
The self-reported complication rate was 4.4%.

Anatomy and Function

1. The labral vascular supply arises successfully manage SLAP tears. from the suprascapular artery, branch of circumflex scapular subscapular artery, and the posterior humeral circumflex artery. These vessels arborize in a radial and circumferential pattern. The inner portion of the glenoid labrum is known to be avascular.
2. The articular cartilage extends over the glenoid rim superiorly. The superior labrum may attach to the glenoid rim, but more commonly it attaches medial to this articular margin.
3. The medial attachment of the superior labrum and the biceps tendon anchor at the supraglenoid tubercle creates a subsynovial recess extending several millimeters from the superior glenoid edge. Forty percent to 60% of the biceps tendon originates from the supraglenoid tubercle, with the remaining fibers inserting directly into the superior labrum.
4. Variants include a sublabral foramen or absence of the anterosuperior labrum, both of which are often noted in conjunction with a cord-like middle glenohumeral ligament.



Sublabral hole



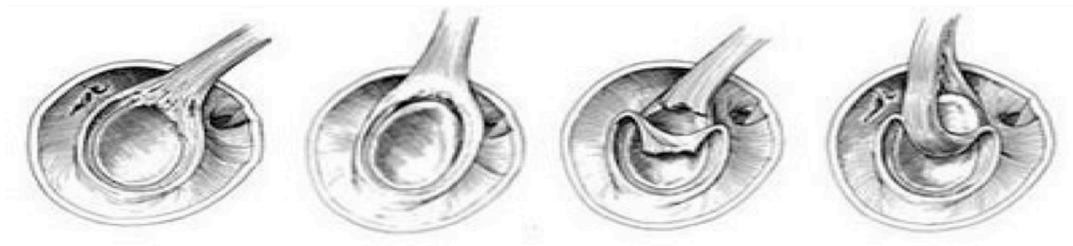
Buford complex

The function of the superior labrum/biceps complex is not fully understood. An intact labrum improves joint stability by enhancing concavity compression and increasing the effective diameter

of the glenoid. Several studies have examined the role of the superior labrum in augmenting glenohumeral joint stability, particularly with simulated throwing.

Classification

Snyder's original classification of SLAP tears remains the most widely recognized.



Type I

Lesions are described as superior labral fraying with localized degeneration. The superior labral and biceps anchor attachments remain intact. These lesions are common in middle-aged persons and are usually asymptomatic. No treatment is required.

Type II

Lesions are the most common clinically significant SLAP tears. These tears are characterized by detachment of the superior labrum and biceps anchor from the glenoid. Type II lesions demonstrate abnormal mobility of the labrum and biceps anchor. The majority of overhead athletes present with posterosuperior lesions while individuals who have traumatic SLAP lesions typically present with anterosuperior lesions.

Type III

Lesions result in a bucket-handle type tear of the superior labrum with an intact biceps anchor. Depending on the size of the tear, the mobile labrum may displace into the joint, creating mechanical symptoms.

Type IV

Lesions have a bucket-handle tear of the superior labrum with extension of the labral tear into the biceps tendon. A significant portion of the biceps attachment to the glenoid usually remains intact.

The original classification of SLAP tears has been expanded

Clinical Presentation

The clinical diagnosis of SLAP tears is often difficult.

Patients with SLAP tears frequently have coexistent pathology.

Additionally, the physical examination tests proposed to detect SLAP tears lack sensitivity and specificity.

Of these tears, 88% were found to have coexistent shoulder pathology.

The clinician must carefully interpret the physical examination findings and imaging studies in the context of the patient's history, age, and activity level.

Frequently, the onset of symptoms is insidious.

1. forceful traction loads to the arm, direct compression loads, and repetitive overhead throwing activities.
2. Impaction loading in cadaver shoulders has shown that SLAP tears are more consistently created when the shoulder is forward flexed.
3. Direct traction injury to the biceps tendon may also create a SLAP lesion.

In both studies, SLAP tears were seen more frequently in the late cocking position. Another study examined how simulated loads on the biceps, as a result of throwing, generate strain in the superior labrum.

This is especially true of SLAP lesions resulting from overuse activities such as overhead sports.

Pain is the most frequent report of patients with SLAP tears. The pattern and location of pain are often nonspecific.

Pain may be sharp or aching and may be located deep within the shoulder.

The pain may localize or radiate to the anterior or posterior aspects of the shoulder, mimicking symptoms from biceps pathology, anterior and posterior labral tears, or acromioclavicular joint disease.

Typically, the symptoms are worse with **heavy lifting, pushing, and overhead motions.**

Occasionally, patients note a sensation of giving way with overhead motion. Weakness may manifest secondary to pain or as a result of ganglion cyst formation and suprascapular nerve compression. In overhead athletes, the initial symptoms may include loss of throwing velocity and control.

Although the physical examination can be suggestive of a SLAP tear, it is rarely conclusive. No single examination finding is accurate for diagnosis of SLAP tears. The shoulder is inspected for asymmetries in scapular posture and muscle development. Atrophy of the supraspinatus and infraspinatus muscles can be a sign of suprascapular nerve compression.

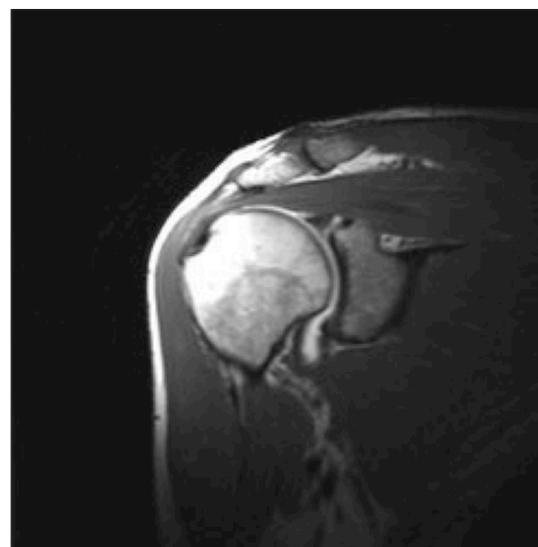
Active range of motion (ROM) of the shoulder is usually preserved in the patient with a SLAP tear. Patients often note pain in positions of internal impingement (eg, external rotation of the abducted and externally rotated shoulder).

Stability examination of the shoulder should be performed to rule out associated patterns of instability.

These tests include the anterior apprehension and relocation tests as well as the posterior load-and-shift test.

The patient should also be evaluated for the sulcus sign.

The O'Brien test is one of the most commonly used maneuvers for evaluating patients with suspected SLAP tears. For this test, the shoulder is positioned in 90° of flexion, slight horizontal adduction, and internal rotation. The test is considered positive when, on resisted shoulder flexion, the patient experiences deep or anterior shoulder pain that is decreased when the maneuver is repeated with the shoulder in external rotation.



MRI is the preferred imaging technique for patients with suspected SLAP tears. MRI is also helpful in identifying other abnormalities that are frequently coexistent in the shoulder.

The indications for MRI are variable and patient-specific **but include persistent pain, mechanical symptoms, and a history of trauma combined** with a physical examination that is concerning for intraarticular pathology. Whether high-resolution noncontrast MRI or magnetic resonance arthrography is more accurate for detecting SLAP tears is a subject of debate.

Compared with arthroscopic findings, the reported sensitivity, specificity, and accuracy of conventional MRI range from 84% to 98%, 63% to 91%, and 74% to 96%, respectively.

Management

Nonsurgical

Goals of rehabilitation include improving posterior capsular flexibility and strengthening the rotator cuff and scapular stabilizers.

Abnormalities in scapular mechanics should be addressed.

Intraarticular glenohumeral injections may aid in the diagnosis and potential treatment of patients with suspected SLAP tear.

Surgical

Arthroscopy remains the preferred method of diagnosis.

Surgery should be considered after failure of nonsurgical treatment lasting ≥ 3 months in a patient with clinically suspected SLAP tear.

In an overhead-throwing athlete, this may include one or two periods of rest from throwing followed by a graduated throwing progression

Technique

The beach-chair position

Unstable type II lesions Repaired

Type III lesions Resection of the unstable labral fragment

Type IV tears <30% of the tendon is involved treated with débridement of the labral tear and of its extension into the biceps.
>30% of the biceps tendon generally are treated with biceps tenodesis and labral repair in younger patients

Labral fixation options include bioabsorbable tacks, suture anchors,

Bioabsorbable tacks have fallen out of favor because of concern regarding synovitis and cartilage damage caused by degradation and release of loose bodies.

Paralabral ganglion cysts associated with SLAP tears can usually be addressed arthroscopically. The cyst should be decompressed with an instrument or shaver under the labral edge or aspirated with a spinal needle.

Issues

1. The high incidence of false-positive radiological interpretations of (MRI) scans.
2. High as 35% of community-read MRI scans were interpreted as either labral tear or “possible labral tear.” Significant clinical findings on shoulder examination of patients with SLAP lesions are also inconsistent.
3. No validated clinical test
4. Disagree on what findings represent a normal variant requiring no treatment and those that benefit from repair.
5. More recent studies have focused on complications and found that patients often have residual symptoms after SLAP repair. Because arthroscopic SLAP repair is a technically demanding arthroscopic procedure that may be associated with significant complications, it is important to undertake the procedure in those cases where the potential reward from the procedure outweighs

the
risk.

Self-Reported Complications in Superior Labrum Anterior and Posterior (SLAP) Repair

Complication	n
Surgical unspecified (2004-2008)	71
Medical unspecified	31
Surgical procedure intervention	28
Anesthetic complication	28
Implant failure	18
Infection	14
Nerve palsy/injury	14
Dislocation	6
Wound dehiscence	6
Pneumonia	5
Tendon/ligament injury	3
Skin ulcer/blister	3
Implant fracture	3
Pulmonary embolism	2

The diagnosis and treatment of SLAP lesions remain challenging.

The high rate of MRI results positive for SLAP lesions makes it important for the surgeon to be discriminate in operating on patients with SLAP findings on radiological review alone.

The outcome data in regard to pain and function are also worrisome, as only 26% of patients were pain free, and only 13% were self-reported as showing normal function. The results suggest that SLAP repair may not be the benign procedure that casual inspection of the literature would suggest.

Weber reported: of failed SLAP repairs in which 2 of 24 shoulders had severe iatrogenic arthritis.

One half of male patients in this review were over 36 years of age, and one half of female patients were over 40 years of age. Increasingly, patients over 40 years of age have been shown to be better served by biceps tenodesis as opposed to a SLAP repair.

In this light, SLAP repair is best performed when the patient's age, physical examination findings, and response to differential injection indicate that the procedure is warranted rather than the MRI appearance or visual appearance at surgery.

SLAP with cuff tear [Forsythe]

Controversy surrounds the treatment of a SLAP lesion with concomitant treatment of a full-thickness rotator cuff tear. This study suggests that, in middle-aged patients, the results of combined SLAP lesion and rotator cuff repair can be comparable with those achieved with rotator cuff repair alone.

SLAP with cuff [Kanati]

The arthroscopic repair of symptomatic type II SLAP lesions yields favorable outcomes in patients over 45 years of age and the presence of accompanying rotator cuff tears has a negative effect on the results.

SLAP with cuff [Abbott]

In patients over the age of 45 years with a minimally retracted rotator cuff tear and associated SLAP lesion, arthroscopic repair of the rotator cuff with combined debridement of the type II SLAP lesion may provide greater patient satisfaction and functional outcome in terms of pain relief and motion.

SLAP with Cuff [Maffuli]

There are no advantages in repairing a type II SLAP lesion when associated with a rotator cuff

tear in patients over 50 years of age. The association of rotator cuff repair and biceps tenotomy provides better clinical outcome compared with repair of the type II SLAP lesion and the rotator cuff.

SLAP with Cuff [Franceschi]

Concomitant rotator cuff repair in addition to SLAP repair has been shown to yield good clinical outcomes with reasonable motion and high patient satisfaction. In patients aged >50 years with superior labral and rotator cuff tears, however, a combination of biceps tenotomy and rotator cuff repair has been shown to yield clinical outcomes superior to those with combined rotator cuff and SLAP repair.

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