

# ALPSA Lesion or Bankart does it Really Matter in Shoulder Instability? A Review of Literature with Surgical Technique for ALPSA Repair

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## Abstract

The anterior labroligamentous periosteal sleeve avulsion (ALPSA) lesion has been described as a distinct pathology from the classic Bankart lesion in anterior glenohumeral instability. ALPSA lesions are associated with younger patients, patients with more chronic symptoms, more episodes of pre-operative instability and associated with increased humeral and glenoid bone loss as compared to Bankart lesions. After surgery, ALPSA lesions also have a higher risk of redislocations and greater loss of range of motion. In this article, we outline some surgical pearls in dealing with ALPSA lesions.

**Keywords:** Anterior labroligamentous periosteal sleeve avulsion, bankart, traumatic anterior shoulder instability, labrum.

## Introduction

### Introduction

Traumatic anterior glenohumeral instability is the most common shoulder pathology in the young active population, with an overall incidence of 1.7% [1]. The Bankart lesion, described by Arthur Bankart in 1923, is considered the essential pathology [2] and accounts for more than 80% of such cases [3]. This lesion is described as the detachment of the anterior inferior labral ligamentous complex [2]. However, a whole multitude of Bankart variant pathologies could account for the symptoms of anterior instability [14, 15, 20, 21].

The Anterior Labroligamentous Periosteal Sleeve Avulsion (ALPSA) is a Bankart variant lesion described by Neviaser [4] in 1993 and represents an avulsion of the anterior inferior labrum with an intact periosteum; this labral ligamentous complex retracts medially and heals in a mediatized position on the

glenoid neck, leading to incompetence of the complex, and resulting in instability.

### Epidemiology

Yiannakopoulos et al. [2] looked at the intraoperative pathology of 127 patients undergoing arthroscopic surgery for anterior shoulder instability. The classic Bankart lesion accounted for 83.7% of the cases, while ALPSA lesions consisted of 10.23% of the cases. Other studies have shown that ALPSA lesions are 4 to 6 times less common than the standard Bankart Lesions [5, 6].

## Clinical Significance

ALPSA lesions are more commonly associated with younger patients, with more chronic symptoms [2], and more episodes of preoperative instability (12.3 vs. 6.9 episodes) [2, 5, 6]. Other studies have also showed that ALPSA lesions are associated with increased amounts of glenoid bone loss (11.4% vs. 4.3%) [7], increased incidence of glenoid bone loss (49% vs. 14.9%), and increased incidence of engaging Hill-Sachs Lesions (24.5% vs. 10.3%) [6]. Ozbaydar et al. [5] in his review of 93 shoulders following

arthroscopic shoulder stabilization surgery found that ALPSA lesions were also associated with a higher post-operative redislocation rate of almost three times that of a standard Bankart lesion after surgery (19.2% vs. 7.4%). This is likely related to the difficulty in restoring the anatomic foot print of the labrum in these mediatized and scarred lesions [8].

In addition to the above, Lee et al. [6] in a retrospective study with 222 patients, also noted recurrence rates were double in the ALPSA group (15.1%) compared to the Bankart group (7.4%) and patients had greater loss of external rotation in the ALPSA group (13.1°) compared to the Bankart group (8.6°). They also noted that patients in the ALPSA group had poorer capsulolabral tissue quality and this was a risk factor for dislocation.

ALPSA lesions thus have important implications in the management of anterior glenohumeral instability. Pre-operative identification of such lesions is important, as it allows for more accurate risk assessment and counseling of the patient. It may also warrant further imaging to look for glenoid and humeral head bone loss, and the consideration for

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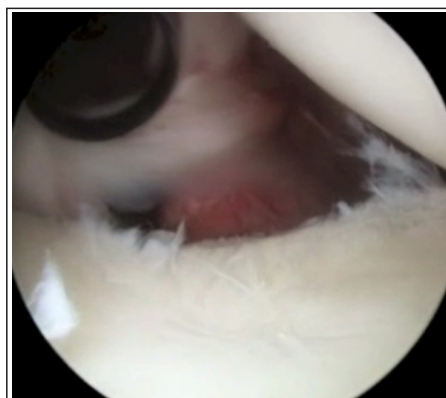
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**Figure 1:** Bankart lesion. Axial cut of T2-weighted MR arthrogram, showing complete separation of the anterior inferior labrum, with contrast leak separating the labrum, and the glenoid rim.



**Figure 2:** ALPSA lesion. Axial cut of Fat suppressed T1 weighted MR arthrogram, showing a medially retracted labroligamentous complex with an intact overlying periosteum. There is also a noticeable cleft between the labrum and the glenoid neck.



**Figure 3:** View of the anterior glenoid rim from the posterior portal with a 30 arthroscope. It is difficult to visualize the medially retracted labroligamentous complex in an ALPSA lesion from the posterior portal as the glenoid rim blocks the view of the arthroscope.

adjunct procedures like a Remplissage type or a Latarjet procedure in certain more high risk patients [9].

### Pre-operative evaluation

Standard imaging of the shoulder should include a true scapular AP view with the humerus in internal and external rotation as well as an axillary view of the shoulder, to look for any associated fractures, and associated bone loss. However, the main way to differentiate between the two pathologies is through the use of magnetic resonance imaging. Various radiological studies have shown even

with the use of high resolution 3 Tesla scans, increased sensitivity in the diagnosis of anterior labral lesions with MR arthrography compared to standard MRI imaging (98% vs. 83%) [13].

MR arthrography involves distending the capsule with contrast medium which helps with delineating anatomy and pathology more accurately [10, 11, 12]. MR arthrography was able to correctly classify the Bankart and ALPSA pathologies 80% and 77% of the time, respectively.

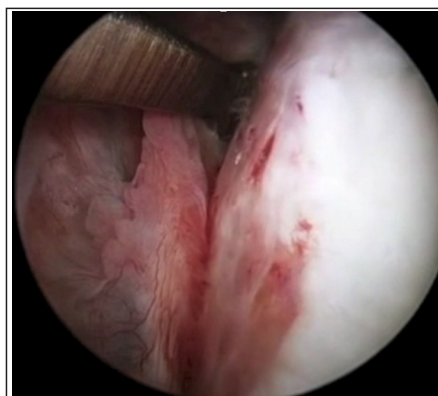
Bankart lesions are seen on MRI as a linear high T2 signal or contrast between

the labrum and the anteroinferior glenoid rim with complete detachment from the periosteum. This is best seen on the axial view (Fig. 1).

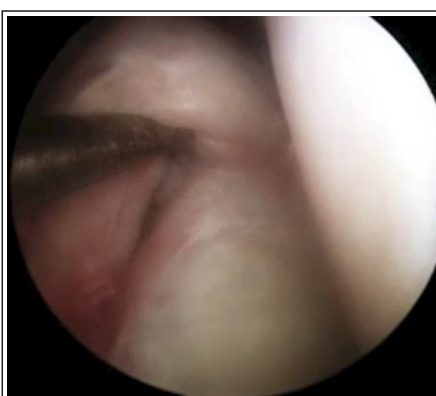
ALPSA lesions are seen on axial views on MRI as a deformed and medially retracted labrum still attached to the scapular periosteum (Fig. 2).

### Operative technique

We typically perform arthroscopic instability surgery in the lateral position. Examination under anesthesia of the glenohumeral joint with the arm in various degrees of abduction and



**Figure 4:** View of the anterior glenoid rim and retracted labroligamentous complex from the anterior superior portal with a 30 degree arthroscope. The retracted labroligamentous complex in an ALPSA lesion can be clearly visualized, to allow for careful mobilization of the scarred complex.



**Figure 5:** View of the anterior glenoid rim and the mobilized labroligamentous complex from the anterior superior portal with a 30 arthroscope. After good mobilization of the labroligamentous complex, it is easy to pull the labrum back onto the articular surface.



**Figure 6:** View of the anterior glenoid rim from the posterior portal with a 30 arthroscope. The labroligamentous complex is reduced and secured to the anterior glenoid rim with a sliding knot.

external rotation is performed to confirm the degree and direction of instability before moving patient to a lateral position.

Arthroscopy is then performed by use of the standard portals and a standard 30 arthroscope. The posterior portal is created 1.5 cm inferior and medial to the posterolateral corner of the acromion. A stepwise evaluation of the shoulder joint is performed examining the following structures in order:

1. Subscapularis
2. Biceps tendon and pulley
3. Supraspinatus
4. Infraspinatus
5. Bare area and Hill- Sachs Lesion
6. Posterior labrum
7. Superior labrum
8. Anterior labrum
9. Degree of humeral head subluxation.

An anterior inferior portal is created as inferior and lateral as possible, just above the subscapularis. The trajectory should be such that an easy approach can be made to the anterior inferior rim of the glenoid for anchor placement, preparation of the repair surface, and capturing of the labrum. A 8 mm cannula is used for this portal.

When dealing with an ALPSA lesion, we recommend using the anterior superior portal as a viewing portal during the evaluation, mobilization of the ALPSA

lesion, and preparation of the repair surface.

In an ALPSA lesion, the labrum has retracted medially from the glenoid rim and is usually scarred down under the periosteum. The view down the glenoid neck from the posterior portal would be obscured by the glenoid and the glenoid rim (Fig. 3). Viewing from the anterior superior portal provides much better exposure to the pathology as the line of sight is more direct and as such allows for much better visualization of the retracted and mediatized labrum.

It is important to place the anterior superior portal as far away as possible and more medial to the anterior inferior portal. The two portals should be divergent from each other outside the shoulder to ensure a large skin bridge between the portals. These two maneuvers will help to avoid the portals clashing with one another, when visualizing and working from the front during this important step. Switching sticks are then used to switch the arthroscope to the anterior superior portal. Alternatively, some other authors advocate the use of a 70 degree arthroscope from the posterior portal during this step [5, 19].

With the view from the anterior superior portal, the retracted labrum can almost always be identified. One way of identifying this is by identifying the anterior inferior glenohumeral ligament and tracing it to the anterior inferior labrum. Care must be taken during this stage to use a liberator to gently release the scarred labrum from the glenoid neck subperiosteally to prevent iatrogenic injury to the labrum (Fig. 4). Adequate mobilization is achieved, when the labrum can be pulled back easily onto the surface of the glenoid with a grasper, or using the suction on a shaving device (Fig. 5). The repair surface is then prepared with decoration of the repair site with a rasp and shaver.

Although, some other authors would

complete the rest of the surgery with the anterior superior portal as the viewing portal, it is our preference to re-establish the view from the posterior portal for anchor placement, as this view gives a better overview of the relative clock positions on the glenoid surface through referencing from the biceps anchor at the superior labrum. A 5.5 mm portal is then placed into the anterior superior portal for suture management.

We usually use 3 double loaded 1.9 mm all suture anchors for our anterior labral repairs. The small footprint size relative to strength provided by these anchors allows for more anchors to be used if necessary and also results in less bone loss if patient were to require a revision. The double sets of sutures allow us to capture the labrum and capsular tissue differentially.

The first anchor is routinely placed between the 5 o'clock and 6 o'clock positions or lowers on the edge of the articular cartilage. The first set of sutures from this anchor is then placed in an inferior and lateral position through the labrum to anatomically restore the position of the labrum. The second set of sutures is used to capture the inferior glenohumeral ligament and a capsule in an effort to also shift the capsule from inferior and lateral to superior and medial. A retrograde suture hook passer is used for this purpose (Fig. 6).

Assessment is made at this stage, to ensure centering of the humeral head on the glenoid (Fig. 7). If needed, another accessory anchor can be placed at the 5 o'clock position to further reinforce the repair or to provide further capsular shift. Additional anchors are placed at the 4 o'clock and 3 o'clock positions. For these subsequent anchors, only the labrum is captured.

### Summary of steps

- Diagnostic Scope
- Switch scope to anterior-superior portal
- Identify mediatized anterior



**Figure 7:** View of the glenohumeral joint from the posterior portal with a 30 arthroscope. The humeral head is well centered on the glenoid.



inferior labrum

- Mobilization of the labrum and preparation of the repair surface
- Re-establish view from posterior portal
- Anchor placement, labral repair, and capsular shift
- Ensure centering of humeral head
- Complete anchor replacement and repair

### Post-operative care

The goal of rehabilitation after surgery is to protect the soft tissue repair during healing and restore motion, strength, and proprioception. There is little consensus on the ideal postoperative rehabilitation program for instability surgery [16].

In our practice, the shoulder is immobilized in a sling for 3 weeks after arthroscopic anterior labral repair. Pendular exercises, with scapular stabilization

exercises, are started immediately. This is followed by passive below shoulder range of motion (ROM) exercises with limited external rotation at 3 weeks. Active assisted exercises are started at 6 weeks. At week 8, ROM exercises are progressed to regain full ROM by week 12. Sport specific activities are started 6 months after surgery.

### Conclusion

The ALPSA lesions are one of the more common variants of Bankart lesions. They are known to be associated with more chronic injuries, higher incidence of pre-operative dislocations and associated with humeral and glenoid bone loss. There is also evidence to show that there is about 2–3 times higher redislocation rate following arthroscopic surgery. As such ALPSA lesions are not as benign as the classic Bankart lesions.

These lesions can be identified reliably preoperatively with MRI arthrograms, and it is important to do so, such that patients expectations can be managed appropriately and other adjunctive procedures can be considered. During surgery, the lesion needs to be treated with respect with proper visualization from the anterior superior portal, adequate mobilization of the retracted labrum to achieve a tension free repair. There should also be a low threshold to add in a superior medial capsular shift to further restore the incompetency of the anterior restraints. It is also important to ensure restoration of the normal relationship of the humeral head and glenoid and to treat associated bone deficiencies accordingly.

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