



QUESTION | IS IT NECESSARY TO REPAIR A LARGE SLAP LESION IN A STABLE SHOULDER? IF THE SLAP LESION IS NOT REPAIRED AND A BICEPS TENOTOMY IS DONE (TO REDUCE THE STRESS ON THE LABRUM), WHAT ARE THE LONGER TERM FUNCTIONAL IMPLICATIONS?

ANSWER |

Andrews et al initially described tearing of the anterosuperior labrum from the glenoid. The original pathology was described in throwing athletes and occurring during the follow-through phase as traction was placed on the biceps tendon.¹ Snyder et al later coined the phrase SLAP to represent lesions of the superior labrum from anterior to posterior.² SLAP lesions have been commonly associated with trauma and overhead athletics.

There have been ten SLAP lesions described, based on the location of torn labrum and biceps involvement. By far the most common SLAP lesion encountered is the Type II SLAP. Type II SLAP lesions are characterised by the combined detachment of the superior labrum and biceps tendon from the peripheral edge of the glenoid. They can often be found in isolation of other pathology and can be a primary source of shoulder pain.

SLAP lesions are caused by either a traction or compression type injury to the labrum. Mechanisms include a fall on the outstretched arm, chronic acceleration/deceleration of the shoulder in throwing sports or labourers who constantly used their arms overhead.

Patients with a stable glenohumeral joint and a SLAP lesion will often have a main complaint of shoulder pain. Pain usually occurs with use of the arm, especially with overhead or throwing activities. Clinical exam can raise suspicion of a SLAP tear by demonstrating positive special tests such as the Speed's or O'Brien's tests. MR arthrogram is helpful in demonstrating fluid under the superior labrum. Ultimately, a SLAP is diagnosed at arthroscopy, with the superior labrum detached from the glenoid and an unstable biceps anchor.

The standard treatment for a SLAP II tear over the last ten years has been arthroscopic repair with suture anchors. This form of repair has yielded excellent results in several studies.^{3,4,5} There has been recent concern with results of SLAP repairs in older patients due to postoperative stiffness. In addition, some studies have shown that overhead athletes did poorer than non-overhead athletes after SLAP repair. Overhead athletes had less success in return to their level of sport.^{3,4,6}

Cadaveric studies have shown that the superior labrum and biceps tendon contribute to stability of the glenohumeral joint. Creation of a SLAP tear in a cadaveric model caused a significant increase in range of motion and translation to the glenohumeral joint. Repairing the tear restored stability to the shoulder.^{7,8} Rodosky et al evaluated the role of the long head of the biceps muscle and superior glenoid labrum in anterior instability of the shoulder. In a cadaver model, creation of a SLAP lesion resulted in 102% increased strain at the anterior superior band of the inferior glenohumeral ligament. They concluded that the increased strain can result in anterior inferior instability.⁹ Cadaveric studies suggest that the long head of biceps tendon functions as a humeral head depressor, compressor, anterior stabiliser, posterior stabiliser, and protector of the inferior glenohumeral ligament.¹⁰

Although cadaveric studies have demonstrated a stabilising role for the superior labrum and biceps complex, clinical presentation of a SLAP lesion has failed to demonstrate instability (except in the presence of a more extensive labral tear) as a significant problem. Symptoms associated with SLAP lesions mostly consist of pain rather than instability. Furthermore, clinical instability or functional deficit has not been demonstrated after biceps tenotomy. Rather, good results have been reported from this technique.¹¹

There is very little evidence for biceps tenotomy as a treatment for SLAP tears. Boileau et al. performed a prospective study comparing two groups with isolated SLAP tears. One group had a standard SLAP repair, and the other had a biceps tenodesis with no repair of the SLAP lesion. In the repair group, 60% of patients were disappointed due to persistent pain, and only 20% returned to previous level of sport. In the tenodesis group, 93% were satisfied, and 87% returned to their previous level of sport. Four patients in the failed repair group underwent subsequent biceps tenodesis, resulting in a successful outcome and full return to their previous level of sports activity.

They concluded that arthroscopic biceps tenodesis could be considered an effective alternative to SLAP repair. Also, biceps tenodesis may provide a viable alternative for the salvage of a failed SLAP repair. Biceps tenodesis did not affect stability in these patients, even in overhead athletes.⁶

In answer to your question, I would always repair a large SLAP lesion in a stable shoulder if the main complaint is that of pain related to the SLAP lesion, provided the patient was active and less than fifty years of age. In patients older than fifty, I would be concerned about stiffness and would be more inclined to perform a biceps tenodesis and leave the SLAP tear.

There is little written on the long term implications of a biceps tenotomy, but clinical results have been excellent. Cadaveric studies have demonstrated a stabilising role for the superior labrum and biceps complex. However, this has not been demonstrated clinically. Boileau's study looking at biceps tenodesis for SLAP tears supports early good results with this procedure without any implications even in throwing athletes.⁶

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- September, 2010

1. Andrews JR, Carson W Jr, McLeod W. Glenoid labrum tears related to the long head of biceps. *Am J Sports Med.* 1985;13:337-341

2. Snyder SJ, Karzel RP, Del Pizzo W, Ferkel RD, Friedman MJ. SLAP lesions of the shoulder. *Arthroscopy* 1990;6:274-9.

3. Gorantla K et al. The Outcome of Type II SLAP Repair: A Systematic Review. *Arthroscopy*, vol 26, no 4, 2010: pp 537-545.

***A systematic review of the literature regarding outcome of arthroscopic repair of type II SLAP lesions. They concluded that arthroscopic repair of type II SLAP tears results in overall excellent results for individuals not involved in throwing or overhead sports. Patients in overhead sports had poorer outcomes and less predictable results.

4. Rhee YG et al. Unstable Isolated SLAP Lesion: Clinical Presentation and Outcome of Arthroscopic Fixation. *Arthroscopy*, vol 21, no 9, 2005, 1099 e1-e7.

This study was a retrospective review of 44 unstable isolated SLAP lesions treated with repair. Pain and clicking were the most common symptoms. Arthroscopic treatment resulted in 86% good to excellent results. Throwing athletes did better than non-throwing athletes

5. Friel NA et al. Outcomes of type II superior labrum, anterior to posterior (SLAP) repair: Prospective evaluation at a minimum two-year follow-up. *J Shoulder Elbow Surg* 2010, 1-9.

This study looked at 48 patients who underwent arthroscopic SLAP repair and clinical results at a minimum 2-year follow-up. Repair of SLAP lesion provided a significant improvement in outcome scores, pain and range of motion for nonathletes, nonoverhead athletes, recreational overhead athletes, and collegiate overhead athletes. No differences were seen between outcomes for all levels of athletic participation.

6. Boileau et al. Arthroscopic Treatment of Isolated Type II SLAP Lesions: Biceps Tenodesis as an alternative to Reinsertion. *Am J Sports Med.* 2009, vol 37, no 9, 929-936.

A prospective study comparing Isolated SLAP repair vs. Biceps tenodesis. They explored a different approach to SLAP lesions as they found that overhead athletes had inconsistent return to previous level of sport and poor satisfaction following standard arthroscopic SLAP repair. 60% of patients were disappointed in the repair group due to persistent pain, and only 20% returned to previous level of sport. In the tenodesis group, 93% were satisfied, and 87% returned to their previous level of sport. Four patients in failed repair group underwent subsequent biceps tenodesis, resulting in a successful outcome and full return to their previous level of sports activity. They concluded that arthroscopic biceps tenodesis can be considered an effective alternative to SLAP repair. Also, biceps tenodesis may provide a viable alternative for the salvage of a failed SLAP repair.

*** Biceps tenodesis did not affect stability in these patients, even in overhead athletes.

7. McMahon, PJ et al. Glenohumeral translations are increased after a type II superior labrum anterior-posterior lesion: A cadaveric study of severity of passive stabilizer injury. *J Shoulder Elbow Surg*, Volume 13, Number 1, 2004, pp 39-44.

A cadaveric study was performed assessing the glenohumeral translation after a type II SLAP lesion. They found that translation significantly increased with a type II SLAP lesion of any severity.

8. Panossian VR et al. Biomechanical analysis of isolated type II SLAP lesions and repair. *J Shoulder Elbow Surg*, Volume 14, Number 5, 529-534, 2005.

A cadaveric study to assess the glenohumeral translation after creation of a SLAP II lesion and subsequent repair. This study demonstrated significant increases in total range of motion, external rotation, internal rotation, anterior-posterior translation, and inferior translation. After arthroscopic repair of the type II SLAP, ranges of motion all returned to expected values. They concluded that type II SLAP lesions may cause significant glenohumeral instability, which can be effectively treated with current arthroscopic techniques.

9. Rodosky MW, Harner CD, Fu FH. The role of the long head of the biceps muscle and superior glenoid labrum in anterior stability of the shoulder. *Am J Sports Med.* 1994;22:121-130.

10. Youm T et al. The effect of the long head of the biceps on glenohumeral kinematics. *J Shoulder Elbow Surg* (2009) 18, 122-129.

A cadaveric study assessing glenohumeral rotational range of motion and translation comparing loading the biceps tendon to not loading the biceps tendon. They found that a load to the biceps significantly affected glenohumeral rotational range of motion, translations, and kinematics.

11. Gill TJ et al. Results of biceps tenotomy for treatment of pathology of the long head of the biceps brachii. *J Shoulder Elbow* vol10, number 3, 247-249.

Retrospective review revealed significant reduction in pain and improvement in function after biceps tenotomy.