

Physical Examination in SLAP lesion

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Introduction

Isolated SLAP (superior labrum anterior posterior) lesions are uncommon¹⁾. Unfortunately, it is combined with other common shoulder pathology. Some claim that besides overthrowing athletes there is no such pathology. Recently too much diagnosis of SLAP and too much surgery of SLAP repair is being performed. However we should be more prudent on such diagnosis and treatment.

As with the history, the physical examination is often nonspecific secondary to other associated abnormalities associated with SLAP lesions. There are numerous tests to help diagnose SLAP lesions. However, many report that no single or combination of tests could conclusively and reliably predict when and what type of lesion would be found at arthroscopy. Furthermore, unfortunately, very few of these new tests have undergone independent analysis of their efficacy. Several of the tests are very similar in appearance and there has been no anatomic study performed to assess the effect of the tests on the biceps/labral complex²⁾.

One observation, which may be reasonably made, is that none of these tests is absolutely diagnostic for any one pathologic entity. This implies that we should not rely blindly on the clinical examination but use it as a part of the diagnostic procedure, in conjunction with the history. It must be remembered, that it is not appropriate for the clinician to use every test on every patient. It is to provide the original descriptions of a number of tests along with statistical analysis, if available, to allow clinicians to decide which tests are worth using, how they should be performed, and how to interpret the results³⁾.

1. Speed test (Biceps tension test)⁴⁾

Some claim that Speed's biceps tension test is an accurate examination for SLAP lesions.³ This is performed by having the patient resist downward pressure with his or her arm in 90° of forward elevation with the elbow extended and the forearm supinated. This examination produces pain when the biceps tendon or its attachment site at the superior labrum is inflamed or damaged. Although this test is more suggestive of biceps tendon damage, it reproduces symptoms with an unstable anchor

2. Yergason test

The elbow is flexed to 90°, and the forearm is pronated. While holding the patient's wrist, the examiner directs the patient to actively supinate against resistance; a positive test result should produce pain into the biceps region.

3. Kibler test (Anterior Slide Test):

(Sensitivity 78.4% Specificity 91.5%)

The anterior slide test was first described by Kibler in 1995.⁵ The patient is examined standing or sitting with his or her hands on the hips and with the thumbs pointing posteriorly. One of the examiner's hands is placed across the top of the shoulder from the posterior direction, with the last segment of the index finger extending over the anterior aspect of the acromion at the glenohumeral joint. The examiner's other hand is placed behind the elbow and forward, and slightly superior force is applied to the elbow and upper arm. The patient is asked to push back against this force. Pain localized to the front of the shoulder under the examiner's hand and/or a pop or click in the same area is considered a positive result.

4. Superior Load and shift test⁶

The patient's arm is extended posteriorly to the scapular plane, and arm is abducted and external rotated. The patient is asked to elevate the arm while the examiner is resisting elevation. If the patient feels pain on the shoulder, the test is considered positive.

5. Whipple test⁷

The arm is flexed 90° and adducted until the hand is opposite the other shoulder. The physician pushes downward on the arm, and the patient resists the downward pressure. A positive test result is one that elicits pain in the shoulder or down the arm.

6. Crank Test:

(Sensitivity 91% and Specificity 93% PPV 94% NPV 90%)

Liu et al.⁸ described the crank test in 1996: "The crank test is performed with the patient in the upright position with the arm elevated to 160° in the scapular plane. Joint load is applied along the axis of the humerus with one hand while the other performs humeral rotation. A positive test is determined either by 1) pain during the maneuver (usually during external rotation) with or without a click or 2) reproduction of the symptoms, usually pain or catching

felt by the patient during athletic or work activities. This test should be repeated in the supine position, where the patient is more relaxed. Frequently, a positive crank test in the upright position will also be positive in the supine position. “Tricks in performing this test are to make sure elevation is kept as extreme as possible (not at 90° for the apprehension or relocation test), and axial load is applied followed by stress relocation.”

7. Passive Compression Test⁹⁾

The patient was asked to lie down in a lateral position with the affected shoulder up and the physician standing behind the patient. The physician stabilized the patient's affected shoulder by holding the acromioclavicular (AC) joint and controlled the patient's elbow with the other hand. The examiner rotated the patient's shoulder externally with 30° of abduction and then pushed the arm proximally while extending the arm, which resulted in passive compression of the superior labrum onto the glenoid. The patient was instructed to stay relaxed during this maneuver. The test finding was considered positive if pain or a painful click was elicited in the glenohumeral joint. The same test was repeated separately by the other examiner without knowing the results obtained by the previous examiner to evaluate the reproducibility of the test.



Figure 1. The physician rotates the patient's arm externally with 30° of abduction (A) and then pushes the arm proximally while extending the shoulder (B), which results in the passive compression of the superior labrum onto the glenoid.

8. O'Brien test– Active Compression Test:¹⁰⁾

(Sensitivity 100% Specificity 99%, PPV 95%, NPV 100% O'Brien,
McFarland et al. Sens 47%, Spec 55%, PPV 10%, NPV 91%)
(ACJ– Sensitivity 100%, Specificity 97%, PPV 89%, NPV 89%)

The patient is asked to forward flex the shoulder 90° with the elbow extended and then bring the arm an additional 15° toward the midline. The patient is then instructed to maximally

internally rotate the shoulder so that the thumb is pointing down. Finally the patient is asked to resist a downward force supplied by the examiner. The patient is told to note the presence and location of pain during this maneuver. The patient then externally rotates the shoulder so that the palm is up, and the procedure is repeated. The test is considered positive and reliable if the patient experiences pain during the thumbs down portion of the test and an improvement or absence of pain in the thumbs up position. The location of the pain is thought to identify the site of the pathology: pain sensed on top of the shoulder usually implicates the acromioclavicular joint, whereas pain deep in the shoulder implies an injury to the glenoid labrum.

9. Compression rotation test

Snyder et al first described the rotation-compression test.¹¹ The compression-rotation test is performed with the patient supine, the shoulder abducted 90° and the elbow flexed at 90°. A compression force is applied to the humerus, which is then rotated, in an attempt to trap the torn labrum. Labral tears may be felt to catch and snap during the test, as meniscal tears do with MacMurray's test." No observation was made as to the accuracy of these tests;

10. Biceps load test I²⁾

SLAP lesions in the presence of anterior instability
(Sensitivity 91%, Specificity 97%, PPV 83%, NPV 98%)

Kim et al first described the biceps load test I in 1999. The test is performed with the patient in the supine position. The examiner sits adjacent to the patient on the same side as the affected shoulder and gently grasps the patient's wrist and elbow. The affected arm is abducted at 90°, with the forearm in the supine position. The patient is allowed to relax and an anterior apprehension test is performed. When the patient becomes apprehensive during the external rotation of the shoulder, external rotation is stopped. The patient is then asked to flex the elbow while the examiner resists flexion with one hand and asks how the apprehension has changed, if at all. If the apprehension is lessened, or if the patient feels more comfortable than before the test, the test is negative for a SLAP lesion. If the apprehension has not changed, or if the shoulder becomes more painful, the test is positive. The test is repeated and the patient is instructed not to pull the entire upper extremity, but to bend the elbow against the examiner's resistance. The examiner sits adjacent to the affected shoulder at the same height as the patient, and he or she also faces the patient at a right angle. The direction of the examiner's resistance should be on the same plane as the patient's arm so as not to change the degree of abduction and rotation of the shoulder. The forearm is kept supine during the test.

11. Biceps Load Test II⁽³⁾

(Sensitivity 90%, Specificity 97%, PPV 92%, NPV 96%)

Kim et al first described the biceps load test II in 2001. The test is conducted with the patient in the supine position. The examiner sits adjacent to the patient on the same side as the shoulder and grasps the patient's wrist and elbow gently. The affected arm is elevated to 120° and externally rotated to its maximal point, with the elbow in 90° of flexion and the forearm in the supine position. The patient is asked to flex the elbow while resisting the elbow flexion by the examiner. The test is considered positive if the patient reports pain during the resisted elbow flexion or if the patient reports more pain from the resisted elbow flexion regardless of the degree of pain before the elbow flexion maneuver. The test is negative if pain is not elicited by the resisted elbow flexion or if the preexisting pain during the elevation and external rotation of the arm is unchanged or diminished by the resisted elbow flexion.

12. Pain Provocation Test⁽⁴⁾

The pain provocation test was first described by Mimori et al in 1999. The test is performed with the patient in the sitting position. During testing, the abduction angle of the upper arm is maintained at 90° to 100° and the shoulder is rotated externally by the examiner. This maneuver is similar to the anterior apprehension test. The new pain provocation test is performed with the forearm in two different positions: maximum pronation and maximum supination. The examiner evaluated the severity of provoked pain based on the subjective rating by the patients when the shoulder was rotated externally with the forearm in the two positions. Patients were asked "in which position of the forearm do you feel more severe pain, in pronation or in supination?" When the patient was not clearly aware of a difference in the severity of pain, the examiner considered the severity of provoked pain the same for both positions. We defined the new pain provocation test as positive for a superior labral tear when pain was provoked only when the forearm was prone or when pain was more severe in this position than with the forearm supine.

13. Resisted Supination External Rotation Test⁽⁵⁾

The resisted supination external rotation test was first described by Myers et al in 2005. The patient is placed in the supine position on the examination table with the scapula near the edge of the table. The examiner stands at the patient's side, supporting the affected arm at the elbow and hand. The limb is placed in the starting position with the shoulder abducted to 90°, the elbow flexed 65° to 70°, and the forearm in neutral or slight pronation. The patient is asked to attempt to supinate the hand with maximal effort as the examiner resisted. The patient

forcefully supinates the hand against resistance as the shoulder is gently externally rotated to the maximal point. The patient is then asked to describe the symptoms at maximum external rotation. The test is positive if the patient has anterior or deep shoulder pain, clicking or catching in the shoulder, or reproduction of the symptoms that occur during throwing. The test is negative if the patient has posterior shoulder pain, apprehension, or no pain.

14. Forced Abduction Test^{†6)}

Forced abduction test was first described by Nakagawa et al in 2005. The arm is forced into maximal abduction in the vertical position. The patient is asked about pain. The elbow is then flexed. A positive test is pain that occurs at the posterosuperior aspect of the shoulder with maximal abduction and diminished pain with elbow flexion.

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