Case Q & A

Shoulder Pain, Part II

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Project Editor: Ivan Oransky, MD

Medscape Orthopaedics & Sports Medicine eJournal 6(1), 2002. © 2002 Medscape

Posted 02/27/2002

Introduction & Question 1

Introduction

A 25-year-old, right-hand-dominant volleyball player complains of right shoulder pain during overhead activities. She recalls falling on an outstretched hand while diving for a ball. Her symptoms began approximately 3 months ago and have been worsening. She does not have pain at rest. Anti-inflammatory medications have not provided relief.

On physical examination, she has full range of motion of her shoulders, full strength of the rotator cuff, and generalized laxity. She has slightly increased anterior and posterior translation in her right shoulder. With her shoulder abducted to 90° and externally rotated in the supine position, she does not feel that her shoulder wants to "come out" (negative apprehension sign). Posterior pressure applied by the examiner on the humerus does not provide relief of apprehension (negative relocation sign).

Question 1

Based on the above presentation, what is the most likely diagnosis?

A. Glenohumeral instability

B. Rotator cuff tear

C. Adhesive capsulitis

D. Superior labral tear

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Answer 1 & Question 2

Answer 1

D. Superior labral tear.

The patient most likely has a superior labral anterior-posterior (SLAP) tear. These patients often do have signs of instability (increased translation) and impingement.[1] Patients with adhesive capsulitis usually have pain at rest and have loss of range of motion. Because the patient has full strength with rotator cuff strength testing, rotator cuff injury is ruled out. Similarly, she is not suffering from instability because she has negative apprehension and relocation signs.

Question 2

What physical examination test or maneuver would help confirm the diagnosis?

Answer 2 & Question 3

Answer 2

The active compression test described by O'Brien and colleagues[2] and commonly referred to as O'Brien's sign is sensitive and specific for SLAP tears. It is performed with the patient standing. The arm is forward-flexed to 90° with the elbow in full extension, and is then adducted 10° to 15° medial to the sagittal plane of the body. The forearm is then pronated and the arm is internally rotated so that the thumb points downward. The physician applies a downward force to the arm and, while maintaining the overall position of the arm, supinates the arm and repeats the maneuver.

The test is positive if the patient experiences pain during the first maneuver and the pain decreases or disappears with the second. It is very important for the examiner to ask the patient and distinguish pain "on top" of the shoulder, referring to the acromioclavicular joint, as opposed to "inside" the shoulder, which would indicate labral pathology. In a prospective study of 318 patients in which O'Brien test results were compared with operative findings, 53 of 56 patients whose preoperative examinations indicated a labral tear had labral tears that were repaired at the time of surgery, while 55 of 62 patients who had pain in the acromioclavicular joint and whose preoperative examinations indicated abnormalities in the joint had positive clinical, operative, or radiographic evidence of acromioclavicular injury. There were no false-negative results in either group.[2]

This patient had a positive O'Brien's sign and stated that it hurt her "inside."

Question 3

What are the different types of SLAP tears?

Answer 3 & Question 4

Answer 3

Snyder and colleagues[3] first described the SLAP lesion in 1990, and named 4 types of lesions (Figure 1).

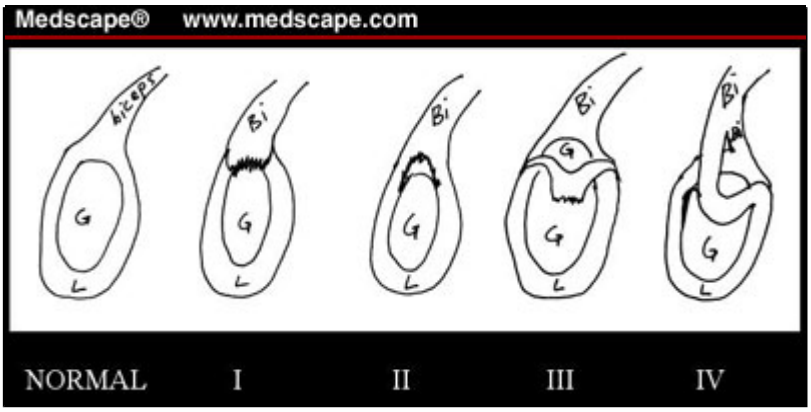

Figure 1. Types of SLAP tears. From left to right: normal, type I, type II, type III, type IV. G=glenoid, L=labrum, Bi=biceps.

Treatment varies by lesion type:

- A type I lesion is a degeneration of the superior labrum. The treatment of type I tears is arthroscopic debridement of the frayed tissues of the labrum.
- A type II lesion is an avulsion of the superior labrum and biceps anchor from the superior glenoid. Repair is indicated.
- In a type III tear, the superior labrum has a bucket-handle tear much like the knee meniscus when it is torn. The biceps anchor and the peripheral portion of the superior labrum remain intact. Treatment of type III tears is shaving of the bucket handle (torn) portion of the labrum.

- In a type IV tear, the bucket-handle-type tear seen in type III tears extends into the biceps tendon. If the torn portion of the biceps is less than 30%, it can be shaved, because the remainder of the biceps tendon is still firmly attached to the labrum. If the torn portion of the biceps is greater than 30%, a biceps tenodesis is usually performed in older patients, while an attempt at repair with suture anchors is made in younger patients.

Morgan and colleagues[4] further divided 102 type II SLAP lesions (Figure 2) into 3 distinct groups based on anatomic location: anterior (37%), posterior (31%), and combined anterior and posterior (31%).

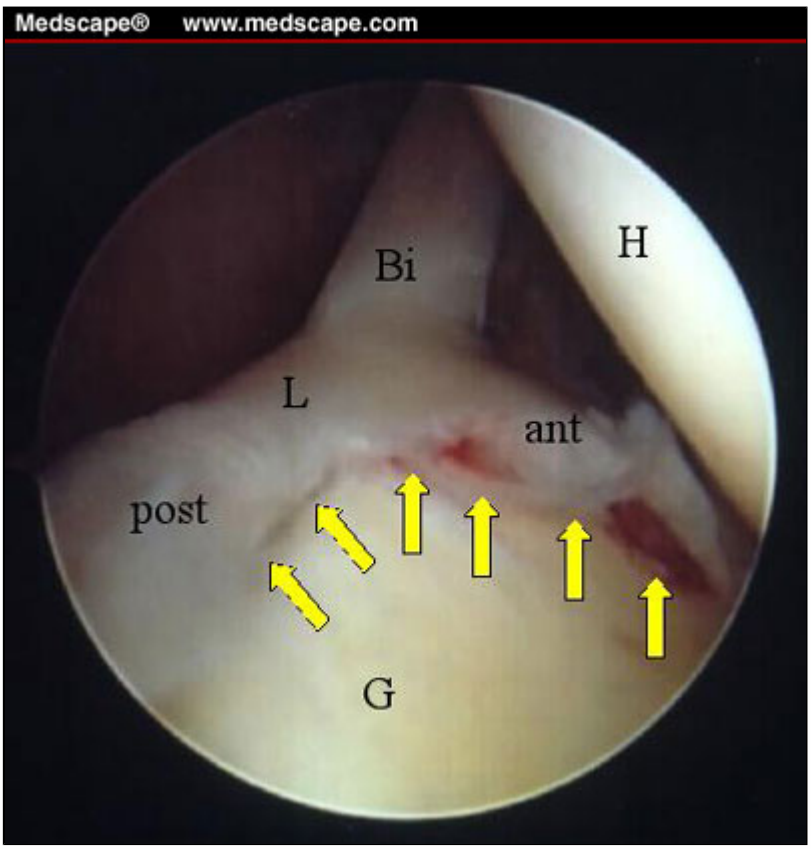

Figure 2. Arthroscopic view of a type II tear. H=humeral head, Bi=biceps, G=glenoid, ant=anterior, post=posterior. Arrows point to separation of labrum from glenoid.

The patient's tear was classified as a type II.

Question 4

What is the incidence of SLAP lesions?

Answer 4 & Question 5

Answer 4

Snyder and colleagues[5] reported that between 1983 and 1993, 2375 shoulder arthroscopies were performed at their institution. A SLAP lesion was seen in 140 shoulders (6%). Of these, 55% were type II lesions, 21% type I, 9% type III, 10% type IV, and 5% were complex.

Question 5

What types of injuries are commonly associated with SLAP tears?

Answer 5 & Question 6

Answer 5

SLAP tears are often not isolated lesions. In Snyder's[3] report, 72% of SLAP lesions had concomitant injuries, most frequently partial-thickness rotator cuff tears (29%), full-thickness rotator cuff tears (11%), and anterior Bankart lesions (22%).

Question 6

What are the causes of SLAP lesions?

Answer 6 & Question 7

Answer 6

The exact cause of SLAP tears is unknown, but several theories have been proposed. In the first report on SLAP lesions, the most common mechanism of injury was a fall on an abducted and extended arm.[3] This type of fall could compress the humeral head into the superior labrum and force the labrum to detach from the superior glenoid. In another study, the most common mechanism of injury was a fall or direct injury.[5] In the cases involving throwing and overhead athletes, a mechanism involving traction on the biceps tendon and its insertion on the superior labrum has been advocated.[6,7] Another theory is compromised blood supply. Cooper and colleagues[8] studied the vascular anatomy of the glenoid labrum in 23 healthy shoulder specimens. In general, the superior and anterosuperior parts of the labrum had less vascularity than the posterosuperior and inferior parts, which could explain the increased frailty of the superior labrum compared with other parts of the labrum.

Question 7

Would any imaging tools be useful in confirming this diagnosis?

Answer 7 & Question 8

Answer 7

When Snyder and colleagues[3] first reported on SLAP tears, they noted that "no imaging test accurately defined the superior labral pathology preoperatively." Since that time, several diagnostic imaging techniques have been assessed. Initially, CT arthrograms were used, but most recently MRI has become accepted as the best imaging tool for making the diagnosis.[9-11] Bencardino and colleagues[11] performed MRI arthrography in 159 patients; 52 subsequently underwent surgery. MRI indicated that 47 (90% of those who underwent surgery) had SLAP tears. SLAP injuries were diagnosed at surgery in 19 of the 52 patients (37%). Six of the 19 lesions (32%) were classified as type I, 9 (47%) as type II, 1 (5%) as type III, and 3 (16%) as type IV. Their findings showed that MR arthrography had a sensitivity of 89%, a specificity of 91%, and an accuracy of 90%.

Question 8

What is the treatment of choice for this patient?

Answer 8

The treatment of type II lesions is to repair the labrum to the glenoid with suture anchors or bioabsorbable tissue tacks, which compress and hold the labrum against the bone and allow it to heal. First, it is important to determine whether the patient truly has a type II tear, or whether it is a normal anatomic variant of the superior labrum,[12] which is sometimes difficult to do and is dependent on the experience of the arthroscopist. Usually, in an acute tear, there is evidence of bleeding between the glenoid and the labrum. In normal anatomic variants in which the biceps anchor/superior labrum is not firmly attached to the glenoid, one can usually see the articular cartilage extend from the face of the glenoid over the top of the glenoid and underneath the labrum. The second important step in this procedure is to use the burr to get down to the bony bed which the labrum will be fixed to by the anchors or tacks, which allows mesenchymal cells to migrate to the area and heal the labrum to bone (Figures 3-6).

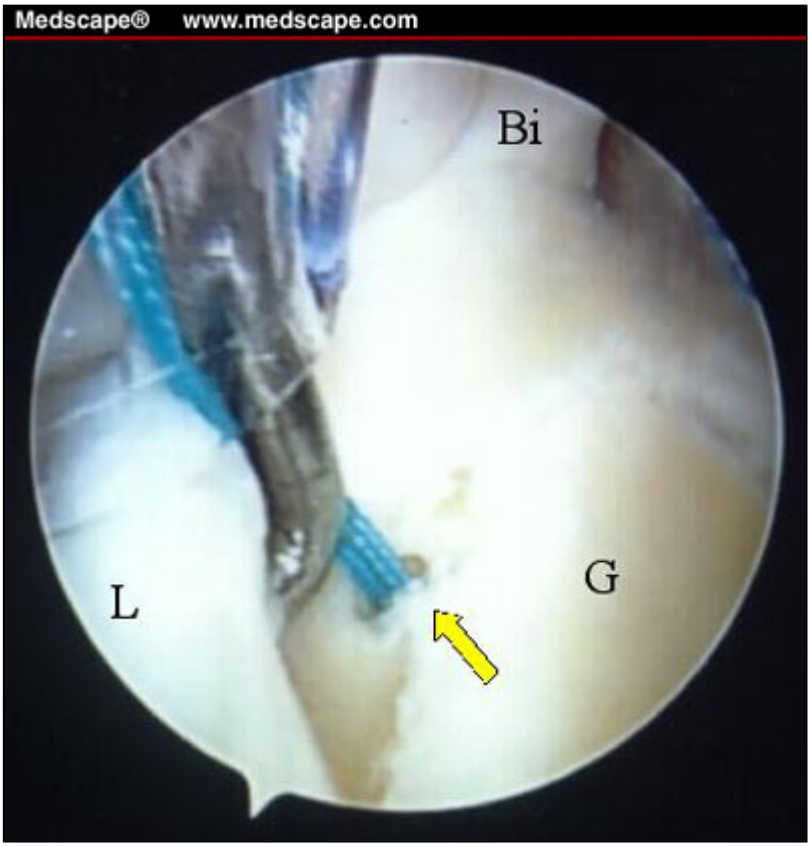

Figure 3. Arthroscopic view of the suture anchor placed into glenoid (arrow).

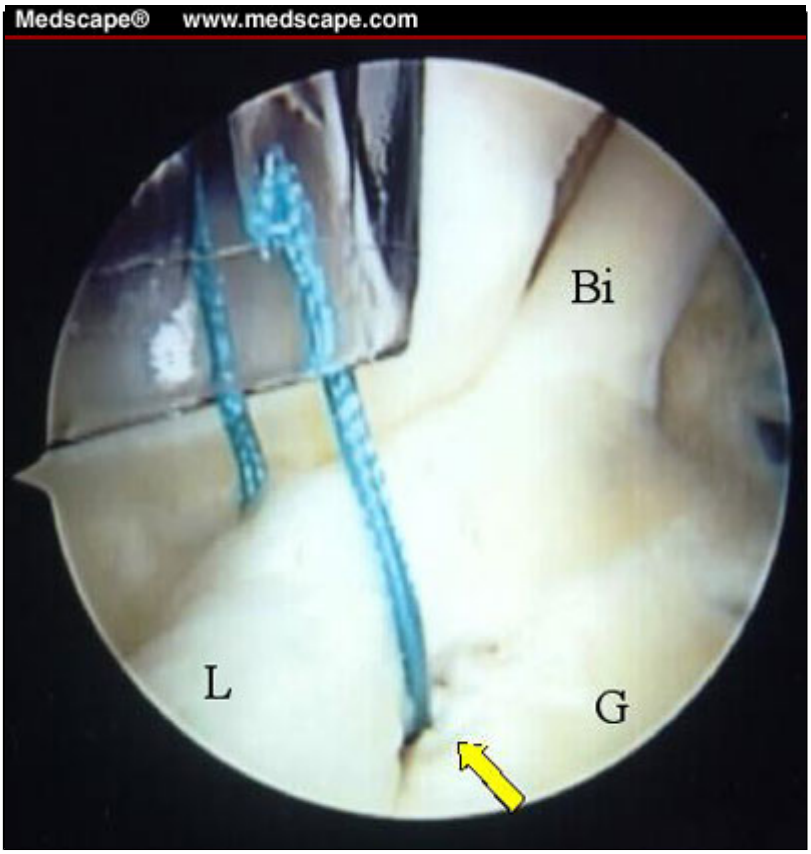

Figure 4. Arthroscopic view of one limb of suture passed through the labrum.

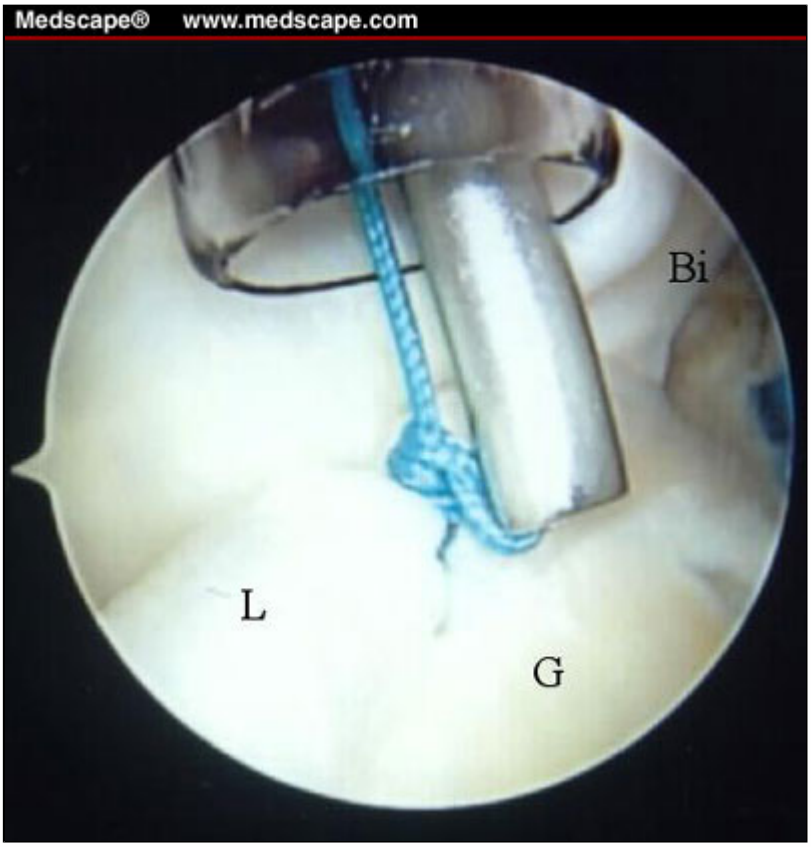

Figure 5. Arthroscopic knots placed through cannula and tightened with a knot pusher.

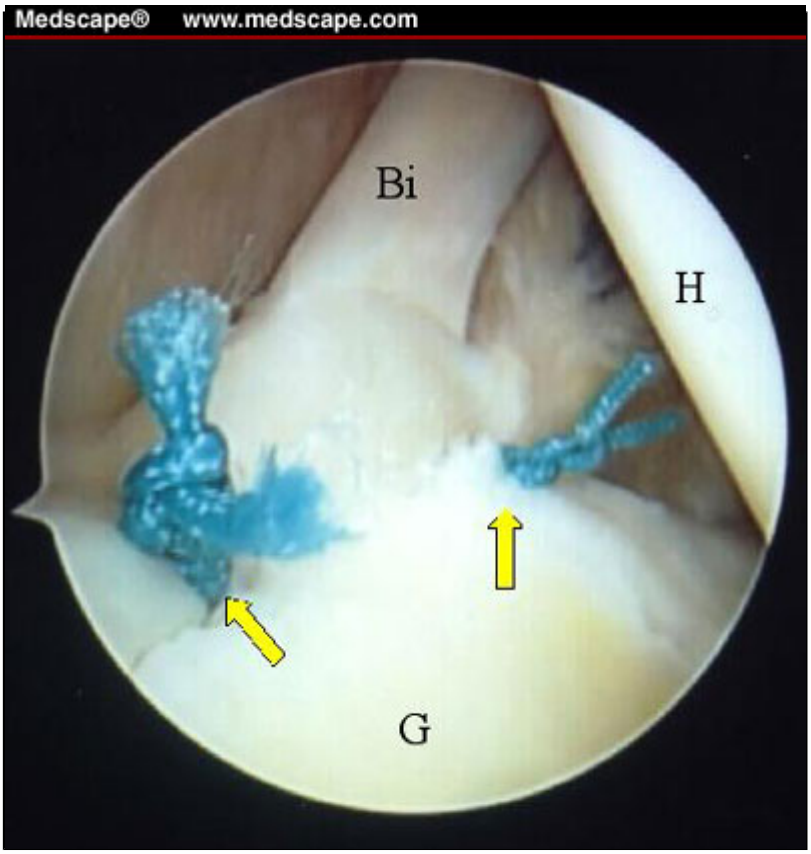

Figure 6. Arthroscopic view of a second suture anchor placed, and torn SLAP lesion repaired.

References

1. Davidson PA, Elattrache NS, Jobe CM, Jobe FW. Rotator cuff and posterior-superior glenoid labrum injury associated with increased glenohumeral motion: a new site of impingement. J Shoulder Elbow Surg. 1995;4:384-390.
2. O'Brien SJ, Pagnani MJ, Fealy S, McGlynn SR, Wilson JB. The active compression test: a new and effective test for

diagnosing labral tears and acromioclavicular joint abnormality. Am J Sports Med. 1998;26:610-613.
3. Snyder SJ, Karzel RP, Del Pizzo W, Ferkel RD, Friedman MJ. SLAP lesions of the shoulder. Arthroscopy. 1990;6:274-279.
4. Morgan CD, Burkhart SS, Palmeri M, Gillespie M. Type II SLAP lesions: three subtypes and their relationships to superior instability and rotator cuff tears. Arthroscopy. 1998;14:553-565.
5. Snyder SJ, Banas MP, Karzel RP. An analysis of 140 injuries to the superior glenoid labrum. J Shoulder Elbow Surg. 1995;4:243-248.
6. Andrews JR, Carson WG. The arthroscopic treatment of glenoid labrum tears- the throwing athlete. Orthop Trans. 1984;8:44.
7. Pradhan RL, Itoi E, Hatakeyama Y, Urayama M, Sato K. Superior labral strain during the throwing motion. A cadaveric study. Am J Sports Med. 2001;29:488-492.
8. Cooper DE, Arnoczky SP, O'Brien SJ, Warren RF, DiCarlo E, Allen AA. Anatomy, histology, and vascularity of the glenoid labrum. An anatomical study. J Bone Joint Surg Am. 1992;74:46-52.
9. Jee WH, McCauley TR, Katz LD, Matheny JM, Ruwe PA, Daigneault JP. Superior labral anterior posterior (SLAP) lesions of the glenoid labrum: reliability and accuracy of MR arthrography for diagnosis. Radiology. 2001;218:127-132.
10. Karzel RP, Snyder SJ. Magnetic resonance arthrography of the shoulder. A new technique of shoulder imaging. Clin Sports Med. 1993;12:123-136.
11. Bencardino JT, Beltran J, Rosenberg ZS, et al. Superior labrum anterior-posterior lesions: diagnosis with MR arthrography of the shoulder. Radiology. 2000;214:267-271.
12. Vangsness CT Jr, Jorgenson SS, Watson T, Johnson DL. The origin of the long head of the biceps from the scapula and glenoid labrum. An anatomical study of 100 shoulders. J Bone Joint Surg Br. 1994;76:951-954.

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