The Trans-Rotator Cuff Approach to SLAP Lesions: Technical Aspects for Repair and a Clinical Follow-up of 31 Patients at a Minimum of 2 Years

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Purpose: To discuss a new technique for the surgical treatment of type II SLAP lesions as well as the evaluation of the technique's effectiveness with a minimum 2-year follow-up. **Type of Study:** Retrospective clinical follow-up study. **Methods:** We present a clinical follow-up of 31 patients who were treated arthroscopically for type II SLAP lesions using a trans-rotator cuff portal at an average follow-up time of 3.7 years. Patients were screened for concomitant procedures including rotator cuff repairs, shoulder stabilizations, thermal capsullographies, and previous surgeries. These patients were subsequently excluded from the study. Patients were given a standard physical examination of the upper extremity at our institution and they completed both the L'Isalata and American Shoulder and Elbow Surgeons questionnaires. **Results:** All 31 patients identified were available for follow-up at an average time of 3.7 years postoperatively (range, 2.0 to 7.4 years). The average L'Insalata score was 87.0 points (range, 46.1-100 points); the average ASES score was 87.2 points (range, 46.7-100 points). The average pain score was 1.5 (range, 0-5) and only 4 of the 31 patients complained of moderate pain with activity. Sixteen of the 31 patients returned to their preinjury level of sports; 11 of the 31 patients returned to limited activity and 2 patients were inactive at the time of follow-up. Overall satisfaction with the procedure averaged 3.79 points (range, 0-5 points): 22 patients rated overall satisfaction as good or excellent, 6 patients reported a fair outcome, and only 3 patients were unsatisfied with the results of the surgery. One patient who was unsatisfied with the procedure had reinjured his superior labrum and required a second operation. None of the 31 patients had symptoms suggestive of rotator cuff pathology. Of the 30 patients found to have a positive Active Compression test preoperatively, 26 of these patients now had a negative sign. **Conclusions:** The trans-rotator cuff approach allows for a more optimal placement of a biodegradable fixation device and/or suture anchors into the superior labrum. Furthermore, we believe that this approach does not compromise the function of the rotator cuff. The trans-rotator cuff technique is an effective and safe modality to address superior labral pathology. **Key Words:** Shoulder—Arthroscopy—SLAP—Labral repair—Trans-rotator cuff approach—Clinical follow-up.

The glenoid labrum represents the fibrocartilaginous transition between the joint capsule and the glenoid. It functions to increase the depth of articulation and, hence, the stability of the glenohumeral joint, analogous to the role of the meniscus in the knee.[1,2] By effectively increasing the surface area available for articulation, the labrum decreases the contact stresses in the joint, especially posteriorly and inferiorly.[3] Labral lesions are associated with glenohumeral instability, shoulder pain, and locking and catching in the joint.[4-7]

Snyder et al. initially described the superior labrum anterior posterior (SLAP) lesion in 1990.[8] It represents an injury to the superior labrum that begins posteriorly and extends anteriorly, and often includes

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the anchor of the biceps tendon. The typical mechanisms of injury include traction, compression, avulsion, shear forces across the glenohumeral joint, and degenerative changes of the superior labrum.[8] Associated injuries include chondral lesions, rotator cuff tears, and occult instability of the glenohumeral joint.[8,9]

Traditionally, the SLAP lesion has been classified into 5 types. Type 1 is a degenerative tear of the superior labrum with an intact labral and biceps anchor. Type 2 is a detachment of the superior labrum along with the biceps anchor. The biceps labral complex is unstable. Type 3 is a bucket-handle tear of the superior labrum with an intact biceps tendon anchor. Type 4 is a bucket-handle tear of the superior labrum with extension into the biceps tendon and a displaced labrum flapped into the joint. Type 5 is a complex tear, including a detached superior labrum along with a bucket-handle tear.[8] More recent reports have supported that this is more complex than previously described.[9]

Arthroscopic treatment has been recommended for some SLAP lesions. Although good results have been reported with debridement alone for type 1 and type 3 lesions, surgical repair is preferred for type 2 lesions when the biceps anchor is unstable. We prefer the Suretac device (Acufex Microsurgical, Mansfield, MA) for the repair of labral lesions, as it is relatively easy to position and provides secure fixation.[10,11]

Traditionally, a posterior portal is used to visualize the labrum and an anterior-superior or anterior-inferior portal, through the rotator interval, is used for fixation of the lesion. These portals limit access to the more posterior superior aspect of the glenoid labrum and usually do not allow placement of the anchors posterior to the biceps anchor. Accessory portals, which have been used in an attempt to access the posterior aspect of the superior labrum, include the Nevaiser and transacromial portals. There is a potential risk of injury to the suprascapular nerve with use of the Neviaser portal. Stanish and Peterson,[12] in reviewing nerve injuries associated with arthroscopic portal placement, warn against the potential risk to the suprascapular nerve with a superior-medial (Neviaser) portal. Acromial fractures and injury to the deltoid are potential complications with the use of the transacromial portal. In a cadaveric study, Coen et al.[13] found that the transacromial portal reduces the structural integrity of the acromian to 60% of its original strength. More recently, Warner et al. have described the use of an anterolateral portal to access the superior-posterior aspect of the glenoid labrum; however, this portal requires an incision in the rotator cuff tendon in order to access the superior aspect of the labrum.[14]

The senior author (S.J.O.) has developed a trans-rotator cuff approach to superior labral lesions that allows access to the anterior and posterior-superior regions of the glenoid labrum by using a needle localization technique. We feel that this is a reliable and reproducible technique to access the posterior aspect of the superior labrum. We present the clinical results of 31 patients with greater than 2 years' follow-up who were treated arthroscopically with Suretac fixation for isolated type 2 SLAP lesions using the trans-rotator cuff portal.

METHODS

Thirty-one patients underwent arthroscopic repair of a type 2 SLAP lesion using the trans-rotator cuff portal between 1992 and 1998. Patients were excluded for instability, full-thickness rotator cuff tears, and additional injuries to the labrum or for chondral defects. Patients were not excluded for a diagnosis of impingement; 6 of the 31 patients had an arthroscopic acromioplasty at the time of their SLAP repair.

All 31 patients identified were available for follow-up at an average time of 3.7 years postoperatively (range, 2.0 to 7.4 years). The patients were evaluated clinically using the L'Insalata Shoulder Rating Questionnaire (100 point system), a physical examination that was scored using the American Shoulder and Elbow Surgeons (ASES) evaluation form (100 point system), and with the Active Compression Test of O'Brien.[15] In a study of 318 patients, the Active Compression Test was 100% sensitive and 98.5% specific in diagnosing a SLAP lesion. Patients also used a visual pain scale (0-5 points) and were asked to rate their overall satisfaction with the procedure at the time of follow-up. Eight of the 31 patients underwent magnetic resonance imaging (MRI) of the operated shoulder at an average of 2.3 years postoperatively; the MRIs were evaluated for evidence of rotator cuff pathology.

Surgical Technique

We use the beach-chair position for shoulder arthroscopy (Fig 1). Diagnostic arthroscopy is performed using a standard posterior portal for visualization and a superolateral portal for working, as described by Laurencin et al.[16] When the arthroscope is placed through the superolateral portal, it allows for a pan-

Figure 1. The beach-chair position for shoulder arthroscopy. The medial border of the scapula is exposed and draped free.

oramic head-on view of the glenoid labrum and the biceps anchor. The posterior and anterior aspects of the labrum can be viewed simultaneously. Next, the type of SLAP lesion is classified and the associated injuries are documented and addressed appropriately. The anteriorly detached portion of the labrum is secured with the Suretac device through the superolateral portal. The technical aspects of Suretac placement have been described previously.[17]

If the SLAP lesion is located anterior to the biceps anchor, needle localization can be used to determine the best position for an anterior portal through the rotator interval. However, if the SLAP lesion lies posterior to the biceps anchor, the injured labrum may not be accessible through the standard anterior portal; a trans-rotator cuff portal is ideal in this situation.

To place the trans-rotator cuff portal, the arthroscope is first placed in the standard posterior or superolateral portal and a spinal needle is placed from the lateral or posterior lateral aspect of the shoulder, through the rotator cuff, and on to the posterior superior aspect of the labrum. The needle should be placed to determine the best position and angle for placement of the drill (Suretac device). The location of the portal varies with the patient's anatomy and the nature of the posterior labral detachment. In some patients, this will be a straight lateral portal, similar to that used for arthroscopic subacromial decompression, and will allow access to either side of the biceps tendon. Depending on the patient's anatomy, this provides a direct access to the posterior labrum, relatively close to the biceps anchor. The drill will be angled approximately 60° to 70° to the superior region of the glenoid.

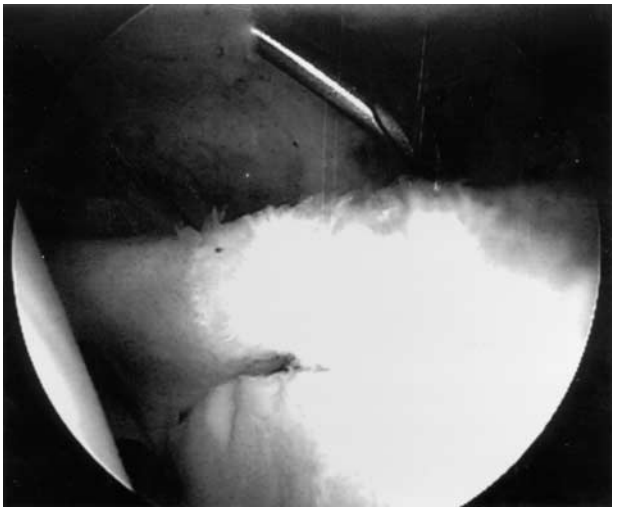

Figure 2. Optimal placement of the trans-rotator cuff portal is achieved via a spinal needle introduced through the supraspinatus or infraspinatus musculotendinous unit.

For more posterior lesions, a spinal needle is passed through the supraspinatus or infraspinatus musculotendonous junction to determine the optimal location of the portal. This may require several passages of the needle before the ideal site of the portal is located (Fig 2). Using a No. 11 blade, a vertical incision, approximately 5 to 8 mm in length, is made through the deltoid and the rotator cuff (Fig 3). A cannula is introduced into the joint through this portal (Fig 4). To minimize the degree of rotator cuff violation, the procedure can be performed without the use of a

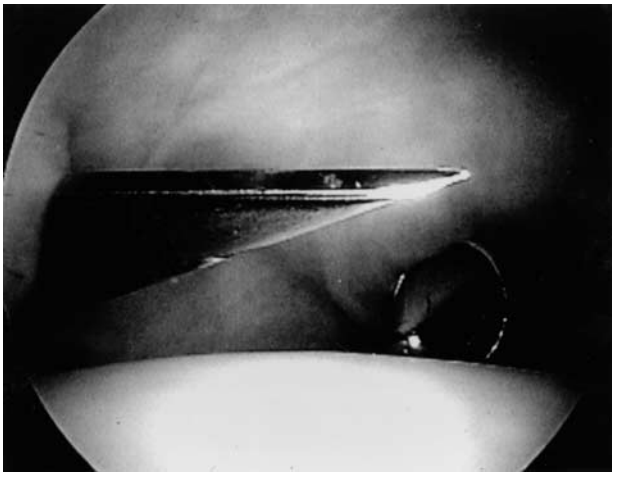

Figure 3. A No. 11 blade is used to incise the supraspinatus at the musculotendinous junction. This can be achieved by abduction of the arm.

FIGURE 4. A cannula can be inserted through the portal to facilitate Suretac fixation of the superior labrum. In some cases, the size of the trans-rotator cuff portal can be minimized by placing the drill directly through the portal without the use of a cannula.

cannula. The bed of the glenoid is prepared and, if necessary, the labrum is debrided (Fig 5). The cannulated drill bit, with the guidewire, is used to pierce the labrum and the glenoid is drilled to the appropriate depth (Fig 6). The drill is removed and the Suretac is impacted in place over the guidewire (Fig 7). With the arthroscope in the superolateral portal, there is excellent visualization of the posterior labrum during the procedure (Fig 8). Two Suretacs can be placed in the

FIGURE 5. The superior glenoid rim is decorticated to create a bleeding bony surface.

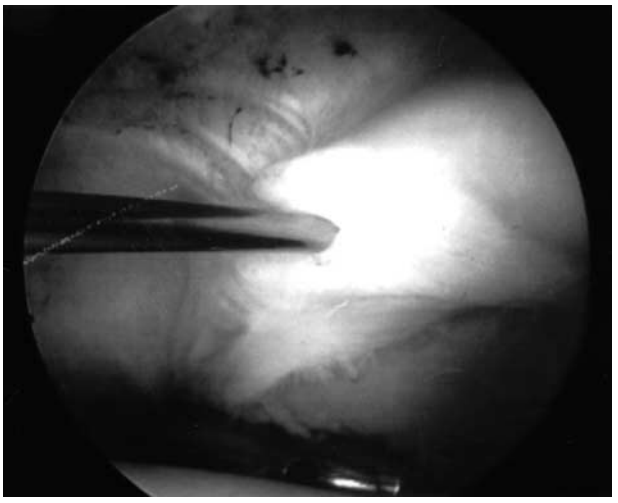

FIGURE 6. The Suretac drill and guidewire assembly is used to transfix the superior labrum to the glenoid.

posterior aspect of the labrum if necessary (Fig 9). The arthroscope can then be switched to the posterior portal and probing via the superolateral portal can assess the quality of the fixation.

RESULTS

Twenty-eight of the patients were men and the average age of the patients was 39 years (range, 16 to 71 years). The mechanism of injury was sports related in 18 patients, a motor vehicle accident in 2 patients, and unknown in 11 patients. The injury was reported to be acute in 16 of the patients and chronic in the

FIGURE 7. The Suretac is then impacted into position over the guidewire.

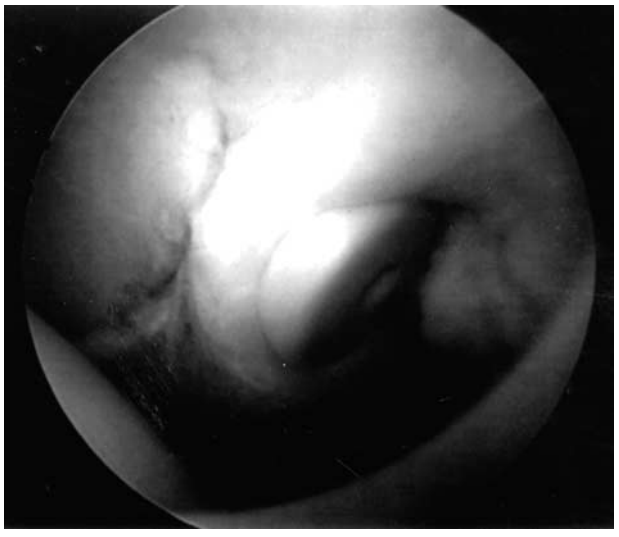

FIGURE 8. Arthroscopic view from the trans-rotator cuff portal provides excellent visualization of the posterior labrum.

remaining 15 patients. The predominant symptom on initial presentation was shoulder pain; 7 patients complained of pain particularly with overhead activity. Other presenting symptoms included clicking (9 patients), locking (2 patients), and weakness (2 patients). Thirty patients were tested with an Active Compression Test on initial examination; all 30 had a positive sign.

On follow-up examination, the average L'Insalata score was 87.0 points (SD, 14.1); the average ASES score was 87.2 points (SD, 16.7). The average pain score was 1.5 (range, 0-5); 4 of the 31 patients complained of moderate pain with activity. Eight patients (26%) had a positive impingement sign postoperatively. All 31 patients had full strength and full range of motion of the operated shoulder. Of the 30 patients found to have a positive Active Compression Test preoperatively, 26 of these patients now had a negative sign.

Sixteen of the 31 patients (44%) returned to their preinjury level of sports; 11 patients returned to limited activity and 2 patients were inactive at the time of follow-up. Overall satisfaction with the procedure averaged 3.79 points (range, 0-5 points): 23 patients (74%) rated overall satisfaction as good or excellent, 6 patients reported a fair outcome, and only 2 patients were unsatisfied with the results of the surgery. One patient who was unsatisfied with the procedure had reinjured his superior labrum and required a second operation (3% reoperation rate). There was no evidence of rotator cuff pathology on the 8 postoperative MRIs.

DISCUSSION

The main concern with the use of the trans-rotator cuff portal is the potential for rotator cuff injury. As mentioned previously, this can be minimized by not using a large cannula. Theoretically, the trans-rotator cuff portal represents a relatively small split in the musculotendinous junction, which should not adversely affect cuff function. Our series of 31 patients treated for type 2 SLAP lesions with greater than 2-year follow-up demonstrates good clinical results using the L'Insalata Questionnaire and the ASES scoring system for physical examination. There was no evidence of rotator cuff weakness or decreased range of motion in our patients at follow-up. Postoperative MRI demonstrated a normal appearing rotator cuff in 8 patients.

Only 74% of the 31 patients rated their surgical result as good or excellent; this is relatively low for patients undergoing repair of a type 2 SLAP lesion, as reviewed by Samani et al.[18] Possible reasons for this low subjective score include a low frequency of return to athletics at preinjury level (44%) and a high incidence of postoperative impingement. Eight of the 31 patients (26%) had a positive impingement sign on follow-up examination. A number of these patients may have had unrecognized impingement preoperatively because the 2 pathologies, superior labral lesions and impingement, can occur concomitantly and

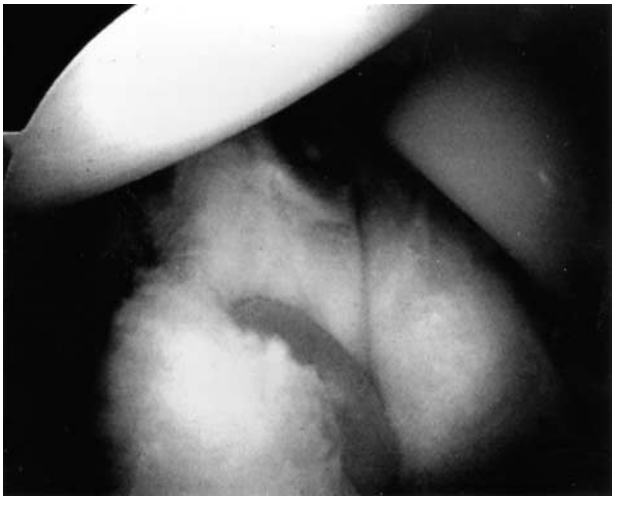

FIGURE 9. Two or more posterior Suretacs can be used for more extensive labral lesions.

share some clinical symptoms. We are currently reviewing the reasons for long-term failure following arthroscopic repair of the superior labrum.

In our experience, the trans-rotator cuff approach using a needle localization technique allows excellent portal placement to address the posterior aspect of superior labral detachments. To date, the trans-rotator cuff portal, in combination with the beach-chair position, has been used in over 400 cases without an intraoperative complication. The issue of subacromial impingement following arthroscopic SLAP repair needs to be examined more carefully.

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