

Technical Note

Arthroscopic Surgery for Partial Rotator Cuff Tears

Richard C. Lehman, M.D., and Clayton R. Perry, M.D.

Abstract: Rotator cuff pathology is one of the most common disorders of the shoulder. However, partial rotator cuff tears, treatment, and natural history are still in a state of flux. We believe that partial rotator cuff tears should be treated surgically when the rotator cuff is torn more than 50% of the thickness or when substantial thinning of the rotator cuff is identified arthroscopically. We believe that the technique described here addresses the need for increased blood supply in the rotator cuff and diminishes the chance for extension to a complete rotator cuff tear. The technique and postoperative rehabilitative regimen is described. **Key Words:** Rotator cuff—Repair—Arthroscopic—Anchor—Replacement.

Rotator cuff pathology is one of the most common disorders of the shoulder. Rotator cuff pathology is a true spectrum that starts with minor bursal irritation, progresses to bursal fibrosis, and then to tendon fibrosis with lack of normal tendon tissue. Subsequently, partial rotator cuff tears occur and ultimately full-thickness rotator cuff tears occur. Complete loss of the rotator cuff,¹ such as rotator cuff arthropathy, can be seen. The exact etiology of rotator cuff pathology has not been clearly defined, with mechanical impingement and intrinsic breakdown of the tendon caused by lack of blood supply as the 2 most common major factors. Rotator cuff pathology can occur in all ages, but is most commonly seen in the 45 and over age range. Mechanical factors leading to rotator cuff pathology include impingement syndrome,² acromial morphology,^{2,3} spur formation in the anterior inferior aspect of the acromion, and degenerative changes of the rotator cuff itself. Repetitive stress to the rotator cuff, as in

the overhand-throwing athlete, is also a factor in rotator cuff breakdown. With the advent of magnetic resonance imaging (MRI) and arthroscopic procedures,³⁻⁵ it is clear that a substantial spectrum of pathology exists. Rotator cuff tears have historically been treated using open surgery; however, as technology has progressed, the trend has been to less invasive surgery.^{4,6} The trend toward the mini-open technique⁷ has led the way for arthroscopic cuff repairs of full-thickness tears. Treatment of partial rotator cuff tears continues to evolve, with some authors⁵ recommending arthroscopic anterior acromioplasty and debridement of partial-thickness rotator cuff repairs. Weber⁵ described treatment of partial-thickness rotator cuff tears with arthroscopic acromioplasty and mini-open rotator cuff repair after debridement. Arthroscopic debridement only yielded 15 good results with 8 fair results and 9 poor results. Montgomery et al.⁶ compared arthroscopic debridement with open tendon repair in 88 patients with chronic full-thickness tears. Open surgical repair yielded far better results than did arthroscopic debridement and subacromial decompression. We believe partial rotator cuff tears should be surgically repaired. Standard open repair for partial-thickness tears has been advocated. This paper will describe our surgical technique to arthroscopically repair partial-thickness rotator cuff tears.

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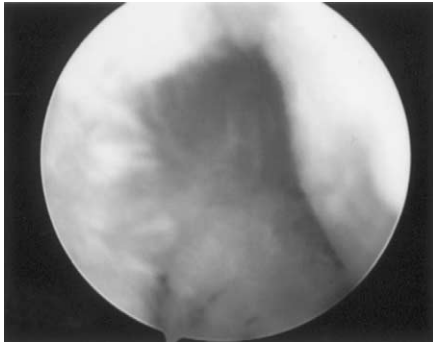


FIGURE 1. A substantial partial-thickness tear of the supraspinatus is shown. The articular portion of the rotator cuff is substantially thinned.

SURGICAL TECHNIQUE

The patient is prepped and draped in the usual manner in the lateral decubitus position. Standard arthroscopic portals are completed using a 3-portal technique. The arthroscope is placed through the posterior portal, and intra-articular structures are identified. After standard arthroscopic evaluation, attention is turned to the rotator cuff (Fig 1). When a substantial partial-thickness rotator cuff tear is encountered, the anatomic status of the rotator cuff in correlation with the greater tuberosity footprint is identified. If the rotator cuff is torn partially on the articular side, the rotator cuff is debrided with a full-radius resector back to normal nonfragmented tissue (Fig 2). An arthroscopic burr is then placed in the shoulder and the footprint is debrided, making sure not to remove any rotator cuff tissue from its insertion site into the greater tuberosity.

The footprint is debrided, taking down the soft tissue and excoriating the cortical bone (Fig 3). When

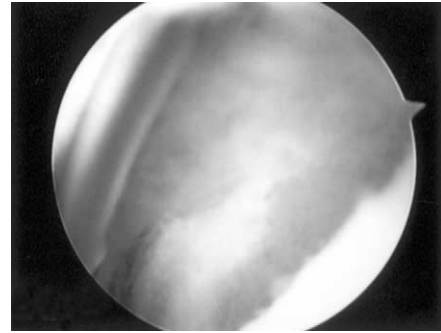


FIGURE 3. Abrasions of the greater tuberosity footprint (bleeding bed of bone).

this is completed, the arthroscope is removed from the intra-articular portion of the joint and placed in the subacromial bursa. A substantial subacromial bursectomy is completed, and the rotator cuff is re-evaluated. If the rotator cuff tear is thought to be 50% or greater, the bursal tissue is aggressively debrided and the rotator cuff is palpated. If the rotator cuff is intact but 50% or more of the rotator cuff is torn, a spinal needle is placed into the thin portion of the rotator cuff. A corkscrew anchor (with 2 nonabsorbable sutures) is placed through the rotator cuff from the bursal side to the articular side (Fig 4). The arthroscope is then placed into the glenohumeral joint and, under direct vision, the anchor is implanted into the recently debrided greater tuberosity footprint (Fig 5). Subsequently, a suture grasper is used to place the 4 strands of suture loosely in the joint. The arthroscope is then placed in the subacromial bursa. In a box pattern, the sutures are retrieved from the intra-articular area using a suture retriever with the suture retriever starting on the bursal side, placed through the rotator cuff, grasping the sutures in the glenohumeral joint, and bringing

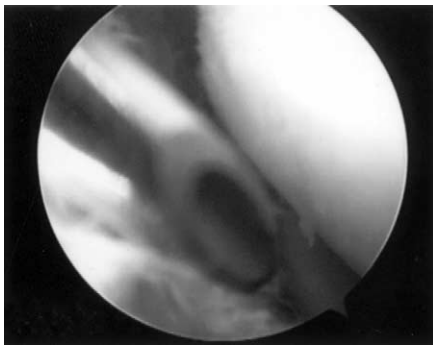


FIGURE 2. Debridement of the rotator cuff using the full synovial resector allows the cuff to be debrided back to healthy tissue.

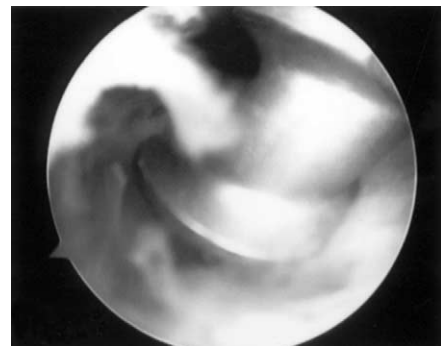


FIGURE 4. The suture anchor is placed through the rotator cuff from the bursal side into the greater tuberosity footprint.

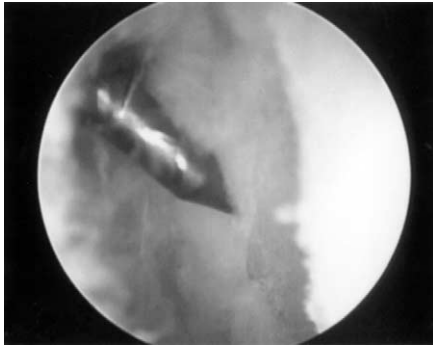


FIGURE 5. The suture anchor is placed after being passed from the bursal side to the articular side.

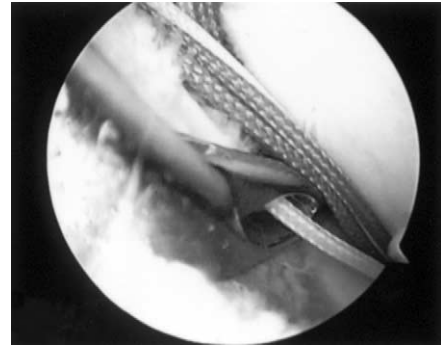


FIGURE 7. The suture retriever allows passage of the sutures to ensure coaptation of the rotator cuff to the bone.

them to the bursal side again. The arthroscope must be placed from the bursal side to the articular side to follow retrieval of the sutures (Figs 6 and 7).

After this is completed, the 4 sutures are brought through the rotator cuff from the glenohumeral side to the bursal side. When the box pattern has been completed and the 4 sutures are on the bursal side, they are tied arthroscopically using a knot pusher. The sutures are tied down to tent the insertion of the rotator cuff (Fig 8). This is evaluated arthroscopically from the glenohumeral side to make sure that the rotator cuff has been drawn next to the footprint in the greater tuberosity (Fig 9). The rotator cuff will juxtapose the decorticated footprint and close the gap of the bone tendon interface. The sutures are then cut arthroscopically, and any subsequent bursal surgery is completed. The patient's wounds are thoroughly irrigated and then closed.

The patient is placed in a shoulder immobilizer. Pendulum exercises are started on day 3 and passive-only exercises are used for the first 3 weeks. No active

weightlifting is allowed for the first 8 weeks, but the patient is allowed to actively lift the shoulder at week 4. Aggressive strengthening then occurs, and patients are limited in any type of overhead activities for 14 weeks.

DISCUSSION

Treatment of partial rotator cuff tears in overhand-throwing athletes, older patients with chronic overuse of the shoulder, and for acute partial rotator cuff tears is an evolving process that has not been clearly defined. We believe that partial rotator cuff tears that are greater than 50% in thickness should be repaired and that this repair can be performed using an all-arthroscopic technique. One approach might be to debride the partial rotator cuff tear into a complete rotator cuff tear and then repair the rotator cuff in a conventional manner. However, we believe that rotator cuff tissue that is attached to the greater tuberosity and is healthy should not be damaged.

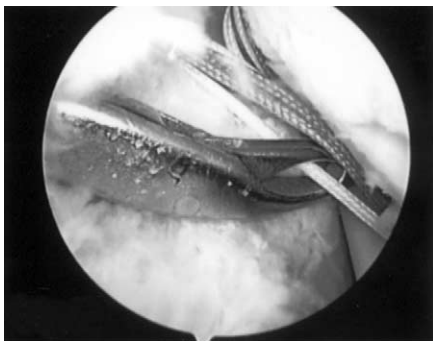


FIGURE 6. The sutures are retrieved from the bursal side to the articular side with the suture retriever, pulling the sutures through the rotator cuff in a box pattern.

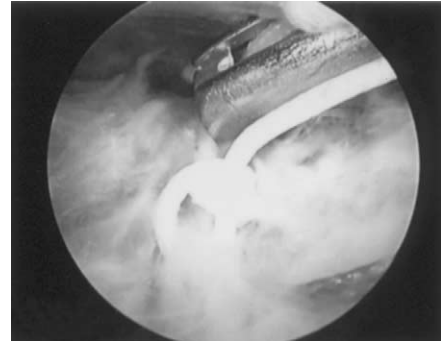


FIGURE 8. The sutures are arthroscopically tied on the bursal side and the knots are squarely completed, pulling the rotator cuff taut against the footprint.

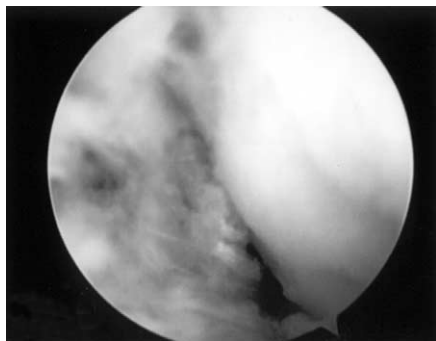


FIGURE 9. Repairing the rotator cuff arthroscopically shows it pulled tightly to the bleeding bed of bone at the level of the footprint to provide excellent contact between the rotator cuff and the intra-articular greater tuberosity footprint.

We recommend an all-arthroscopic procedure to help protect and limit further breakdown with the hope of healing and promoting blood supply into partial rotator cuff tears. We believe that this allows the rotator cuff to heal and limits further damage. We believe this to be a reasonable alternative and an excellent addition to the procedures that have histor-

ically been used to repair partial-thickness rotator cuff tears. Increase in blood supply and promotion of healing has been shown in 2 second-look arthroscopies.

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