Arthroscopic Debridement of the Thrower’s Shoulder: Less Is More

Paul E. Caldwell III, M.D., Dustin C. Dyer, D.O., and Sara E. Pearson, Ph.D.

Abstract: The thrower’s shoulder has long been a topic of debate among shoulder specialists. The tremendous forces produced during the throwing motion coupled with the compilation of the pathology encountered in the thrower’s shoulder have generated a complex treatment algorithm. Simplifying management options has been challenging and recommendations continue to evolve. Treatment of injuries to the thrower’s shoulder most commonly involves addressing partial articular-sided rotator cuff tears. These can be isolated or more commonly associated with tearing of the posterior superior labrum. The understanding of the dramatic difference between the surgical treatment of shoulder injuries in overhead athletes and nonoverhead athletes is paramount to positive outcomes after surgery.

Glenohumeral internal rotation deficit, posterosuperior labral tears, and partial-thickness rotator cuff tears have all been associated with internal impingement in the thrower’s shoulder. Repetitive contact between the undersurface of the posterior aspect of the rotator cuff tendons and the posterosuperior glenoid rim during the late cocking and early acceleration phases of throwing has been implicated in this pathologic process.1 Although Millstein and Snyder2 first described partial articular supraspinatus tendon avulsions or “PASTA lesions” in the general population, advances in shoulder arthroscopy and our understanding of the thrower’s shoulder have led to controversy regarding the preferred treatment in this particular patient population. There is a paucity of literature comparing clinical outcomes of throwing athletes versus nonthrowing athletes, but advancements in the surgical management of partial articular-sided rotator cuff tears and posterior superior labral tears in throwing athletes have embraced a “less is more” approach with debridement now being favored over repair. Our case shows an arthroscopic technique for debridement of a partial articular-sided rotator cuff tear and the corresponding posterior superior labral tear in a throwing athlete.

Surgical Technique

Preoperative Setup

Our preoperative setup for the thrower’s shoulder employs the traditional lateral decubitus position with a beanbag and the Caspari shoulder traction apparatus (Arthrex, Naples, FL) allowing the patient to be tilted back 30° and the arm abducted 45° and flexed 15°. All bony prominences are well padded and 10 pounds of longitudinal traction is applied to the well-padded upper extremity. A sterile bolster placed under the arm allows for optimal visualization of the labrum (Video 1).

Portal Placement and Arthroscopic Assessment

Our portal placement focuses on 2 initial portals, with the anterior superior portal established as the primary viewing portal and the posterior portal as our working portal (Fig 1). A standard posterior portal is initially created approximately 2 to 3 cm inferior and 1 to 2 cm medial to the posterosuperior acromion. Once the posterior superior labral tear and partial undersurface tear of the infraspinatus (Figs 2 and 3) have been identified through the posterior portal, the position of the anterosuperior portal may be predicated to the extent of the pathology. An outside-in technique is used with an 18-gauge spinal needle to localize an anterior-superior portal within the superior aspect of the rotator interval. This portal is established under

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direct visualization and is approximately 1 to 2 cm inferomedial to the anterolateral acromion and just anterior to the biceps tendon.

Our arthroscopic assessment (Table 1) involves a diagnostic arthroscopy of the glenohumeral joint with special attention to the anterior aspect of the infraspinatus tendon and the posterior superior labrum. Concomitant pathology may be addressed at the same setting with additional portals as needed. A small cannula (Smith & Nephew, Andover, MA) or probe (Smith & Nephew) may be used to determine the size and stability of the posterior superior labral tear. The dynamic portion of the arthroscopic examination is carried out with the arm out of traction. An assistant rotates the arm into abduction-external rotation to simulate the throwing position to aid in further evaluation of the internal impingement (Figs 4 and 5). The arthroscope is retracted behind the biceps tendon to allow for optimal viewing during this dynamic testing and to eliminate potential for iatrogenic injury to the humeral head.

Technical Procedure

Arthroscopic debridement of the thrower’s shoulder is initiated with a 4.5-mm shaver (Smith & Nephew) to debride the labral tear to a stable base and to debride the undersurface of the rotator cuff as well (Fig 6-8). The shaver is alternated with a probe to verify the depth and stability of the posterior superior labral tear (Fig 9). The humeral head is shifted forward (reverse

**Figure 1.** Sagittal and axial views of the shoulder showing arthroscopic portal placement for arthroscopic treatment of the thrower’s shoulder as well as tearing of the undersurface of the infraspinatus and posterior superior labrum (arrows). Illustration used with permission from the illustrator, Robert Edwards, M.S., C.M.I.

**Figure 2.** Arthroscopic view of the right shoulder in the lateral decubitus position from the anterior superior portal with a 30° arthroscope visualizing a posterior superior labral tear (arrow).

**Figure 3.** Arthroscopic view of the right shoulder in the lateral decubitus position from the anterior superior portal with a 30° arthroscope visualizing a partial articular-sided infraspinatus tear (arrow).
posterior lever push) by the surgical assistant to allow optimal visualization of the undersurface of the posteri
or aspect of the supraspinatus and anterior infraspinatus tendons. Once the rotator cuff is debrided to a stable edge, a probe is used to evaluate the depth of the tear and any evidence of delamination (Fig 10).

Postoperatively the portals are closed with a single nylon stitch (Ethicon, Somerville, NJ) and a dry sterile dressing is applied. The patient is instructed to wear a sling for the first postoperative day but is encouraged to remove the sling the following day to start elbow and wrist exercises. The dressing is removed the second day after the surgery and showering is encouraged. Formal elbow and scapula exercises are started the second postoperative day and therapy is initiated after the stitches are removed at 1 week. The athlete is transitioned into a structured thrower’s rehabilitation program thereafter.

Discussion

The term “internal impingement” has long been associated with the thrower’s shoulder. The phrase describes the process of repetitive contact between the posterior aspect of the rotator cuff and the posterior superior glenoid typically observed in abduction and external rotation. Overhead athletes will often experience tears of the posterior superior labrum, along with undersurface or articular-sided tears of the posterior supraspinatus and anterior portion of the infraspinatus tendon. This pathology is also frequently associated

Table 1. Key Steps in the Arthroscopic Evaluation of the Thrower’s Shoulder

1. Standard posterior portal for a diagnostic evaluation
2. Use of the anterior superior portal for optimal visualization
3. Evaluation of the tearing and stability of the posterior superior labrum
4. Evaluation of the depth of tearing of the undersurface of the anterior infraspinatus tendon
5. Perform an abduction external rotation evaluation out of traction
6. Debridement of the posterior superior labrum to a stable edge
7. Debridement of the undersurface of the infraspinatus using the anterior lever push
8. Confirmation of the stability of the posterior superior labrum and depth of the infraspinatus tear

Fig 4. A sagittal view of a shoulder in abduction and external rotation and axial view of the shoulder showing impingement of the undersurface of the infraspinatus against the posterior superior labral tear (arrow). Illustration used with permission from the illustrator, Robert Edwards, M.S., C.M.I.
with scapular dyskinesis, tightness of the posterior capsule, and anterior pseudolaxity.\textsuperscript{1}

Although the recommended initial management for the symptomatic thrower’s shoulder is an extended nonsurgical approach, numerous descriptions of surgical treatment have reported favorable results. The published surgical techniques have included arthroscopic debridement to transtendinous arthroscopic repair\textsuperscript{3,4} versus completion of the tear with subsequent repair. The most studies evaluating the surgical treatment of partial-thickness rotator cuff tears have focused on nonthrowing athletes, and the traditional consensus has been to perform debridement on tears less than 50\% of the tendon thickness and repair those greater than 50\% thickness.\textsuperscript{2,5,6} Although seemingly simplistic, this surgical treatment algorithm may not be ideal for overhead throwing athletes, and these individuals should be evaluated and treated as a distinctive subgroup.

The presence of partial rotator cuff tears in the overhead athlete is not uncommon.\textsuperscript{7} The presence of

\textbf{Fig 5.} Arthroscopic view of the right shoulder in the lateral decubitus position from the anterior superior portal with a 30° arthroscope with the arm out of traction in abduction and external rotation visualizing the impingement of the undersurface of the infraspinatus against the posterior superior labral tear (arrow).

\textbf{Fig 6.} Sagittal and axial views of the shoulder with axial inset showing debridement of the undersurface of the infraspinatus and posterior superior labral tear with a shaver along with completed debridement (arrows). Illustration used with permission from the illustrator, Robert Edwards, M.S., C.M.I.

\textbf{Fig 7.} Arthroscopic view of the right shoulder in the lateral decubitus position from the anterior superior portal with a 30° arthroscope visualizing debridement of the posterior superior labral tear with a shaver (arrow).
partial-thickness rotator cuff tears alters throwing mechanics and consequently diminishes the velocity and control of the throwing athlete. Although the repair of partial tears in the nonthrowing population has been excellent, reports of rotator cuff repair in overhead throwing athletes have shown less than satisfactory results with up to 25% retear rates and return-to-throw rates as low as 8%. Multiple authors have shown improved outcomes with debridement of partial rotator cuff tears in throwers with success rates of 72% to 89%. More recently, Reynolds et al followed elite overhead throwing athletes who underwent arthroscopic debridement for partial rotator cuff tears and noted that 76% of players were able to return to competitive pitching at the professional level. The potential advantages of arthroscopic debridement of the thrower’s shoulder are noteworthy. The accelerated rehabilitation allows an opportunity for the athlete to return to play earlier than with repair. The limited immobilization with debridement potentially decreases the probability of postoperative stiffness, which can be career ending for a throwing athlete. The reduced operative time and implant cost also make debridement an attractive option in the overhead athlete. The major disadvantage of this technique is that it may be a temporizing measure to eliminate or lessen

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<th>Table 2. Pearls and Pitfalls in Arthroscopic Evaluation and Treatment of the Thrower’s Shoulder</th>
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<tr>
<td><strong>Pearls</strong></td>
</tr>
<tr>
<td>1. Always evaluate the pathology from both posterior and anterior portals</td>
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<td>2. Learn the technique for the dynamic arthroscopic abduction and external rotation evaluation</td>
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<td>3. Learn the technique for the “reverse lever push” for optimal visualization of the posterior rotator cuff</td>
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<td><strong>Pitfalls</strong></td>
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<tr>
<td>1. Neglecting the rotator cuff pathology due to the posterior location</td>
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<td>2. Underestimation of the stability of the posterior labrum and delamination of the rotator cuff</td>
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<td>3. Stabilization and advancement of the posterior superior labrum may restrict necessary rollback</td>
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<td>4. Completion and repair of low grade partial rotator cuff tears may restrict adaptive mobility</td>
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the symptoms that the athlete is experiencing and allow them to return to overhead sports. Unfortunately, debridement may not entirely address the complex progression of the overhead athlete’s shoulder, and rehabilitation and maintenance are paramount to prevent recurrence (Table 2).

Although additional studies in this population are essential to substantiate an encompassing treatment algorithm (Table 3), the pendulum has swung from repair to debridement. Appreciating the distinction between the evaluation and surgical decision making involved in the management of the thrower’s shoulder and the nonthrower’s shoulder is essential for all sports medicine specialists. Our surgical technique and the subsequent return to play of this throwing athlete further support the recommendation for minimal debridement and rehabilitation for the thrower’s shoulder.

Table 3. Treatment Algorithm of Evaluation of Partial Rotator Cuff Tears in Throwers vs Nonthrowers

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<th>Throwers</th>
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<tbody>
<tr>
<td>1. Special attention to preoperative internal rotation deficit and scapula dyskinesis</td>
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<td>2. Consider internal impingement as a cause of pain</td>
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<tr>
<td>3. Special attention to the posterior aspect of supraspinatus and anterior infraspinatus</td>
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<td>4. Special attention to the posterior superior labrum</td>
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<tr>
<td>5. Consider debridement of partial rotator cuff tears and posterior superior labral tears</td>
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<td>6. Postoperative accelerated thrower’s rehabilitation</td>
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<table>
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<tr>
<th>Nonthrowers</th>
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</thead>
<tbody>
<tr>
<td>1. Special attention to preoperative strength and night pain</td>
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<tr>
<td>2. Consider external impingement as a cause of pain</td>
</tr>
<tr>
<td>3. Special attention to the anterior aspect of the supraspinatus</td>
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<tr>
<td>4. Special attention to the acromial morphology or acromioclavicular joint arthritis</td>
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<tr>
<td>5. Consider completion and repair of the partial rotator cuff tear with acromioplasty and distal clavicle excision</td>
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<td>6. Postoperative immobilization and physical therapy</td>
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References


