

# Arthroscopic Subscapularis Repair Using a Subacromial View



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**Abstract:** As a result of the continued improvement in arthroscopic equipment and techniques, subscapularis tears are now more reliably identified and are being repaired at higher rates than previously reported. Whereas small upper-border subscapularis tears can usually be effectively managed using an intra-articular view, larger tears often cannot be fully visualized with a standard 30° arthroscope when viewed from the posterior portal. These tears may require either using a 70° arthroscope or viewing through the standard 30° arthroscope from a subacromial portal-site location to completely visualize the tear. This article illustrates and discusses the advantages of using a subacromial-space portal site to view and arthroscopically manage large subscapularis tears.

With the advancement of imaging quality and arthroscopic techniques, our ability to recognize and manage subscapularis tears has improved significantly in the past several years. Once referred to as “hidden lesions,” subscapularis tears are now being identified and repaired more reliably and at higher rates.<sup>1,2</sup> Since Burkhart and Tehrany<sup>3</sup> first published their series of arthroscopic subscapularis repairs in 2002, surgeons’ appreciation for and understanding of this pathologic condition have grown and allowed for improvements in repair techniques.

Repair of subscapularis tears can be a challenging procedure even for the very experienced treating surgeon. A successful repair requires an accurate assessment of the tear pattern and size, adequate mobilization of the tendon, and secure fixation to the lesser tuberosity. Usually, smaller Lafosse type I and type II subscapularis tears (partial and complete upper one-third tears, respectively) can be managed reliably

with intra-articular visualization through a standard posterior viewing portal.<sup>2,4</sup> However, visualization and repair become more technically difficult for larger Lafosse type III and IV tears (upper two-thirds and complete tendon tears, respectively). These larger, more complex tears are often difficult to adequately visualize while using an intra-articular viewing portal. Switching the viewing portal to a more anterior, subacromial location can allow the surgeon an improved view of such tears. This article explores the potential advantages of using a subacromial view (also referred to as an “extra-articular view” or “outside view”) to manage large subscapularis tears (Table 1).

## Surgical Technique

Once in the operating room suite, the patient undergoes induction of general and/or regional anesthesia. The operative shoulder is examined under anesthesia, and its stability and motion are compared with those of the contralateral extremity. The patient may be placed into either the beach-chair or lateral decubitus position, and the described technique can be accomplished equally as well in both positions. The arm is then sterilely prepared and draped. If the lateral decubitus position is used, approximately 10 lb of balanced suspension weight is applied.

Once the patient is carefully positioned with the prominences padded and head and neck secured, a standard posterior portal is created using a standard technique. A 30° arthroscope is advanced into the intra-articular space. An 18-gauge spinal needle is then used to localize a standard anterior portal. This spinal needle is advanced from outside in and under arthroscopic

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**Table 1.** Clinical Advantages and Disadvantages of Subacromial Approach During Subscapularis Tear Repair

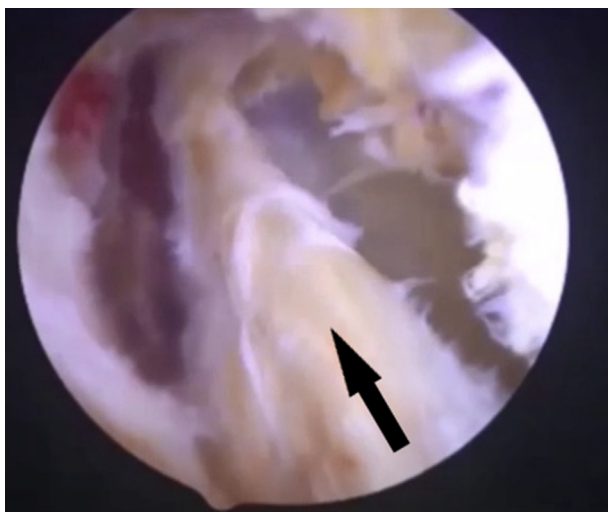
**Advantages**

- The subacromial approach provides superior visualization of subscapularis tears.
- Axillary nerve identification is improved.
- Use of a 70° arthroscope is not required.
- Lesser tuberosity visualization is generally good.

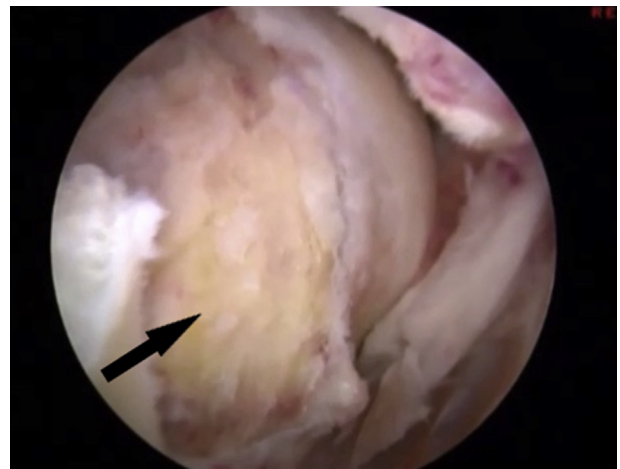
**Disadvantages**

- The technique requires creation of an additional portal.
- The view of the lesser tuberosity may be obstructed by the tendon for partial upper-border tears from an extra-articular portal.

visualization to place the needle into the center of and perpendicular to the rotator interval capsule. Once the location of the anterior portal is confirmed using the spinal needle, an 8-mm threaded cannula that follows the same path as the spinal needle is advanced into the glenohumeral joint, and a thorough diagnostic arthroscopy is performed. In addition to careful evaluation of the subscapularis tendon, it is important to always pay close attention to the biceps tendon when the presence of a subscapularis tear is either known or suspected because fraying and sometimes subtle subluxation of the biceps may be present. When the biceps is found to be significantly medially subluxated, an early tenotomy or tenodesis of the biceps (depending on the pathology and the preference of the treating surgeon) is critical because removal of the biceps from the arthroscopic field greatly improves visualization of the subscapularis tendon and lesser tuberosity. In addition, while one is viewing from the posterior portal-site location, visualization of the subscapularis tendon insertion can be greatly improved by internally rotating and posteriorly translating the humeral head.



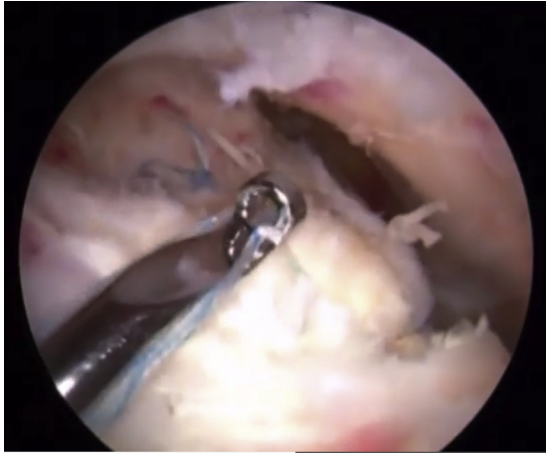
**Fig 1.** In a right shoulder being viewed from an extra-articular, subacromial portal, it is possible to visualize the subscapularis tendon looking directly in line with the tendon fibers (arrow). This allows for effective and safe mobilization of the tendon.



**Fig 2.** From the subacromial view, excellent visualization of the prepared lesser tuberosity (arrow) is obtained in a right shoulder with the patient in the beach-chair position. This allows for straightforward suture anchor placement and suture management without the necessity for humeral head manipulation.

After identification of a subscapularis tear that will require repair, it is especially helpful to create a “rotator interval window” by removing the central rotator interval tissue using an arthroscopic shaver blade (Dyonics, 4.5-mm incisor; Smith & Nephew, Memphis, TN) while care is taken to preserve the middle and superior glenohumeral ligaments. Resection of this central rotator interval capsular tissue allows the surgeon to visualize both the intra- and extra-articular surfaces of the subscapularis tendon, greatly facilitating suture passage, suture management, and ultimately, repair. Partial upper-border subscapularis tears are common, and these smaller tears can often be reliably repaired with a single suture anchor while viewing from the standard posterior intra-articular portal using a 30° arthroscope.

For larger tears, however, complete visualization of the subscapularis tendon is often quite limited using a 30° arthroscope because the tendon may be retracted medial to the glenoid articular surface. Often, these retracted tears are combined with supraspinatus tears (also called “anterosuperior tears”), further distorting the rotator cuff and rotator interval anatomy. Likewise, the lesser tuberosity insertion of the subscapularis is often difficult to clearly visualize using the 30° arthroscope from the posterior portal. For this reason, transition to a 70° arthroscope is often required if an intra-articular repair is to be attempted. Instead, we often establish an accessory anterior-superior portal near the anterolateral corner of the acromion and move the 30° arthroscope to this portal site for subacromial viewing of the subscapularis tear (Video 1). We find that viewing these large tears from this subacromial viewing portal improves visualization of both the



**Fig 3.** The repaired subscapularis is shown, as viewed from the subacromial portal, in a right shoulder with the patient in the beach-chair position, after repair with double-row fixation using 2 medial anchors and 1 lateral anchor.

retracted subscapularis tendon and the lesser tuberosity insertion.

After identifying a large, retracted subscapularis tear, the arthroscope is removed from the posterior portal, and a standard lateral subacromial portal is established. A spinal needle is then used to localize an accessory anterolateral portal location that will ultimately serve as the viewing portal when the subscapularis tendon tear is mobilized and repaired. Next, a complete bursectomy is performed throughout the subacromial space. After bursectomy, the arthroscope is moved to the anterolateral accessory portal-site location, and the subscapularis tendon can be viewed in its entirety (Fig 1). This subacromial viewing portal allows for the arthroscope to be parallel to the subscapularis tendon fibers, thus affording an excellent view of the entire tendon, even when significant medial retraction of the subscapularis has occurred. Moreover, for these large, retracted tears, it is important to identify the comma tissue, which is also generally found in a relatively medial position because such tissue typically travels medially with the subscapularis tendon. Identifying the comma tissue is important, in part, because it allows for improved recognition of the superior and lateral corner margins of the medialized subscapularis tendon. An arthroscopic grasper can be used to pull the comma tissue laterally to approximate it, along with the attached subscapularis tendon, to the lesser tuberosity.

The subacromial viewing portal provides for a more direct view that maintains a parallel orientation to the subscapularis tendon fibers and helps to improve visualization for a 270° release of the subscapularis tendon when necessary. In addition, this portal placement allows for excellent visualization of the axillary nerve, if exposure of the nerve is considered necessary depending on tendon retraction and scarring. Once

release of the subscapularis tendon is completed and adequate tendon lateralization to the lesser tuberosity is confirmed, the lesser tuberosity can also be easily visualized through this same subacromial portal-site location. This allows for debridement of the tuberosity in preparation for suture anchor placement and suture passage through the tendon (Fig 2). The subscapularis tendon can then be repaired to the lesser tuberosity, per the surgeon's preference. We prefer to use a double-row technique, when indicated, using 1 or 2 medial lesser tuberosity anchors and 1 lateral tuberosity anchor (Fig 3). If the subscapularis tear is a component of a larger anterosuperior tear involving the supraspinatus, this same viewing portal can be used to facilitate repair of the supraspinatus tendon tear (Fig 4).

## Discussion

In a cadaveric study, Wright et al.<sup>5</sup> reported that when using a standard posterior intra-articular portal and 30° arthroscope, it is possible to visualize only 26% of the area of the subscapularis tendon and only 44% of the tendon height when the tendon is intact. This restricted amount of visualization potentially limits the ability of the surgeon to adequately view subscapularis pathology. Such a constrained view is likely adequate to repair many upper-border, nonretracted partial-thickness subscapularis tendon tears but creates significant challenges when the tendon is retracted medial to the glenoid articular surface.

Koo and Burkhart<sup>6</sup> reported that with appropriate manipulation of the arm through abduction and/or internal rotation, as well as use of a posterior lever push (posterior force on the proximal humerus), most



**Fig 4.** In a right shoulder with the patient in the beach-chair position, viewing from the subacromial portal, a massive anterosuperior tear involving the supraspinatus and subscapularis tendons is shown. Using the subacromial view, one can manage both tears without moving from an intra-articular viewing portal to a subacromial portal.

of the subscapularis tendon footprint can be visualized. However, for complete evaluation of the tear, they recommended routinely using a 70° arthroscope. Although this is certainly a viable option, we instead usually visualize retracted subscapularis tears from the aforementioned subacromial portal location because it allows for assessment of the entire subscapularis tendon and lesser tuberosity and is accomplished without the need for a 70° arthroscope. The 30° arthroscope is certainly more familiar to the orthopaedic surgeon, and using it alone reduces the burden on the operating room personnel. Moreover, because the subacromial views of the tendon and tuberosity are improved through this subacromial location, the necessity to manipulate the humerus to compensate for reduced access when using an intra-articular view is decreased.

This subacromial view also allows for an excellent view of the lesser tuberosity in preparation for suture anchor placement. Often, these subscapularis tears are part of larger anterosuperior tears, requiring work within the subacromial space for management of the supraspinatus pathology. This extra-articular view offers the advantage of addressing both tendon tears equally well. In addition, excellent visualization of the subscapularis and lesser tuberosity helps to ensure that accurate reduction and secure reapproximation of the subscapularis are accomplished. This anatomic reduction of the subscapularis, in turn, facilitates supraspinatus tendon repair, which further enhances the strength and security of the entire repair construct.

Arthroscopic subscapularis repair can be a challenging procedure to perform. Visualization of the subscapularis tendon and lesser tuberosity is limited especially in large, retracted tears. Thorough assessment and repair of such tears require either use of a 70° arthroscope

combined with humeral internal rotation and posterior translation or use of an accessory subacromial portal with a standard 30° arthroscope. Viewing the tear from the subacromial space gives an improved view of the subscapularis tear as well as the lesser tuberosity. This allows for reliable, safe mobilization of the subscapularis tendon and a direct view of the lesser tuberosity, making lesser tuberosity preparation more straightforward. Furthermore, we find that suture anchor placement into the prepared lesser tuberosity as well as suture management is often less burdensome using the subacromial view. We believe that this extra-articular approach can be an equally effective alternative for management of large subscapularis tears and may provide potential advantages.

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