Arthroscopic Repair of Full-Thickness Rotator Cuff Tears:

Surgical Technique and Instrumentation

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Rotator cuff tears can be effectively treated with acromioplasty and stable repair of the tendon to the tuberosity of the humerus. Rotator cuff surgery reliably decreases pain, and improves motion and function as well as the general health status of the patient.[1,2] The operative approach for rotator cuff repairs has evolved from the classic open approach to a mini-open, or deltoid-sparing, approach, then finally to an "all-arthroscopic" repair.[3,4] The surgical evolution has been stimulated by an improved understanding of rotator cuff tear patterns, as well as the availability of arthroscopic instrumentation specifically designed for soft tissue repair techniques. Furthermore, surgical concepts such as margin convergence have provided repair strategies that allow the shoulder arthroscopist to treat any rotator cuff tear, regardless of its size or retraction, with arthroscopic methods that are equal to open methods when evaluating the clinical result.[3-5] The ability to repair the rotator cuff without detachment or manipulation of the deltoid is a tremendous benefit to the patient, offering decreased pain associated with the cuff repair, avoidance of complications related to deltoid reattachment, and optimization of the rehabilitation process. With arthroscopic rotator cuff repairs, the rate-limiting step for recovery is biologic healing of the rotator cuff tendon to the humeral bone (estimated to be a minimum of 8 to 12 weeks), and the time required to strengthen the rotator cuff muscles once biologic healing is achieved. This discussion will focus on the concepts related to arthroscopic repair of rotator cuff tears involving the supraspinatus and infraspinatus tendons.

Surgical Technique

A thorough physical examination of the injured shoulder is performed prior to patient positioning. Preoperative shoulder crepitation, range of motion (ROM), and stability is recorded and compared to that of the contralateral shoulder. The preferred method of anesthesia is the combination of an interscalene block and general anesthesia.[6] A long-acting interscalene block reduces the amounts of inhalation agents and narcotics necessary for effective general anesthesia, and provides postoperative pain relief throughout the day of surgery. More than 95% of patients using this method are discharged from our surgical facility within a few hours after the completion of arthroscopic rotator cuff repair.

Figure 1.

Osseous and soft tissue landmarks outlined on the skin prior to incision.

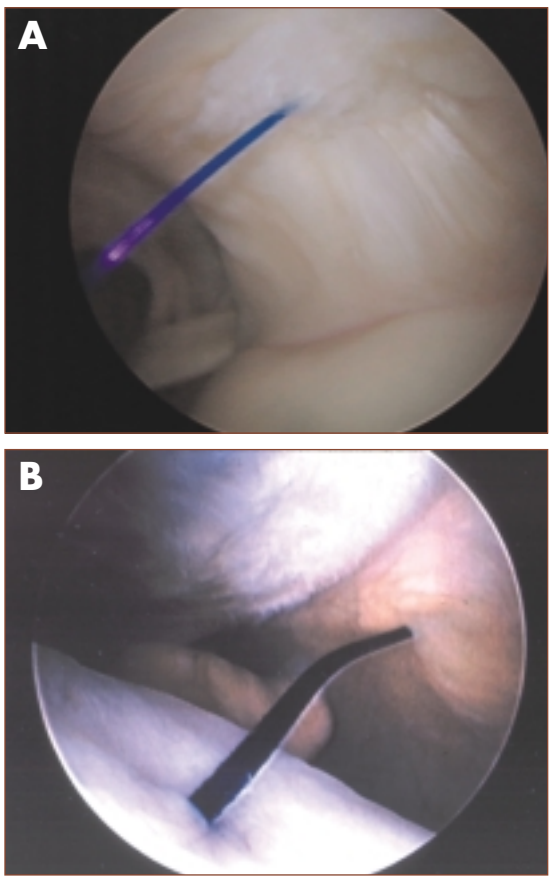

Figure 2.

(A) Using an 18-gauge spinal needle as a guide, a #0 or #1 PDS suture marker is placed through the partial-thickness articular-side tear prior to completing the glenohumeral joint arthroscopy. (B) Suture marker for the partial-thickness articular-side rotator cuff tear is identified in the subacromial space to help determine the significance of the partial-thickness tear.

Patient Positioning

We prefer the beach chair position for rotator cuff repairs for several reasons (Figure 1). This position makes it simple for ancillary staff to set up the patient; the shoulder is oriented in a way that is familiar to the surgeon and allows the surgeon to easily move the arm and the rotator cuff during the procedure, facilitating surgical repair. The lateral decubitus position with fixed traction on the arm is preferred by others.[4,7]

Portal Placement

The boney landmarks of the shoulder are outlined to identify the acromion, clavicle, acromioclavicular articulation, spine of the scapula, coracoid process, and coracoacromial ligament. In addition, the positions of the 3 standard portals are identified and infiltrated with bupivacaine and epinephrine prior to making incisions. The standard posterior portal is placed in the "soft spot" of the posterior shoulder, which is approximately 2 cm inferior and 1.5 cm medial to the posterior lateral corner of the acromion. The anterior portal is lateral to the coracoid process and below the coracoacromial ligament, at the level of the acromioclavicular joint externally and within the rotator interval internally. The lateral portal routinely used for subacromial decompression and arthroscopic cuff repairs is positioned 2 to 3 cm distal to the lateral edge of the acromion and just anterior to a line that would bisect the anterior-to-posterior distance of the acromion. In addition, an accessory anterolateral portal is created after the acromioplasty and bursectomy to facilitate anchor placement, suture passing through the tendon, suture management, and—most importantly—arthroscopic knot tying. The portal is located at the anterolateral corner of the acromion. Occasionally, posteriorly located tears are repaired through an accessory portal located at the posterolateral corner of the acromion.

The arthroscope is introduced into the glenohumeral joint via blunt trocar to avoid damage to the articular cartilage. The standard anterior portal is established using an inside-out or outside-in technique, depending on the surgeon's preference. A systematic evaluation of the glenohumeral joint is then performed. Evaluation of the articular surfaces and documentation of associated pathologies are important. Arthroscopic evidence of abnormalities related to the glenoid labrum, the biceps tendon, or the subscapularis tendon may alter the preoperative plan in 10% to 15% of patients undergoing rotator cuff repair surgery.[8] Arthroscopic treatment of intra-articular pathology may require the placement of additional portals, such as an anterosuperior portal for repair of superior labral tears.

An arthroscopic pump is used throughout the procedure to provide fluid control and hemostasis. The inflow of fluid is connected to the arthroscopic sheath, while the outflow is connected to the cannula, away from the arthroscope (most commonly, the anterior portal cannula). The pump pressure is set at 35 to 40 mm Hg during glenohumeral arthroscopy, and it is increased to 40 to 60 mm Hg during arthroscopic acromioplasty and bursectomy, and then reduced to 40 mm Hg during the rotator cuff repair.

Intra-articular Evaluation of the Rotator Cuff

A meticulous evaluation of the articular side of the rotator cuff is essential prior to removing the arthroscope from the glenohumeral joint. Examination of the insertions of the subscapularis, supraspinatus, and infraspinatus can all be performed when viewing from the posterior portal. For partial rotator cuff tears, tear thickness should be documented, and the quality of the remaining cuff tissue should be assessed. Treatment of partial thickness articular-side tears with debridement versus formal repair remains controversial, but important factors for the surgeon to consider include the depth of the partial tear, the pattern of the tear (avulsion vs degenerative), and the activity level of the patient.[1,9]

At times, the decision to repair a partial thickness articular-side tear cannot be finalized from intra-articular inspection. To further assess the area of the tear and its corresponding bursal-side appearance, the area is identified by passing a #0 or #1 polydioxanone (PDS) suture through the partial tear using an 18-gauge spinal needle (Figure 2A). The anterior cannula and the needle are removed, and the suture is clamped together to avoid inadvertent removal.

The condition of the subacromial space is another factor in determining if formal repair of a partial rotator cuff tear is indicated. For example, if there is a relative paucity of inflammation or bursitis in the subacromial space, then in a patient with significant pain, especially at night, formal arthroscopic repair of a partial-thickness tear is usually performed.

Finally, with significant partial-thickness cuff tears, the suture marker is identified in the subacromial space to evaluate the bursal integrity of the rotator

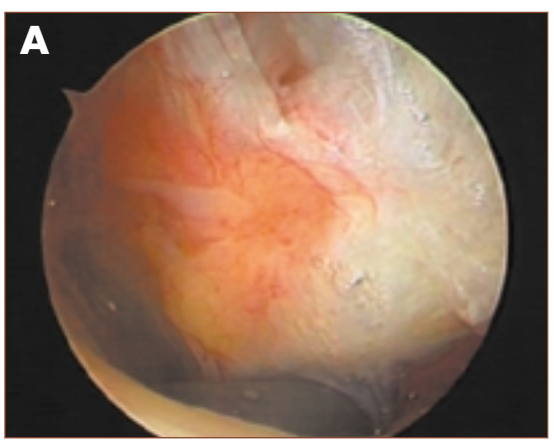

Figure 3.

As visualized from within the subacromial space, (A) "a room with a view" demonstrating panoramic view of anterior acromion and coracoacromial ligament, and (B) a full-thickness supraspinatus tear.

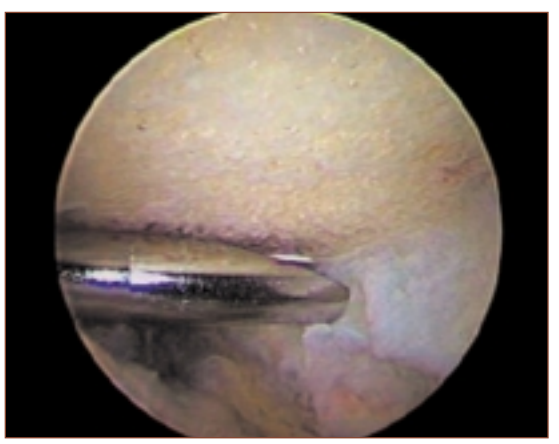

Figure 4.

After subacromial decompression is initiated from the lateral portal, the arthroscopic burr is switched to the posterior portal, allowing the surgeon to continue the acromioplasty using the "cutting-block" technique while visualizing from the lateral portal.

cuff tendon (Figure 2B). In general, a nondegenerative partial-thickness tear of 50% or more of the cuff tendon in an active patient with rotator cuff symptoms is a strong indication for surgical repair.

Before the procedure advances into the subacromial space, the arthroscope is placed through the anterior portal to re-evaluate the glenohumeral joint structures, including the posterior labrum. Evaluation of full-thickness rotator cuff tears requires documentation of the size of the tear, the number of tendons involved, and the degree of medial retraction. A final assessment of tear size and configuration is completed when the tear is viewed from the bursal surface, which provides a panoramic view of the rotator cuff tendon.

Subacromial Surgery

Direct entry from the posterior portal into the subacromial space allows for minimal bleeding and avoids causing trauma to the posterior rotator cuff tendon and muscle fibers. Improper placement of the arthroscope can lead to "wrong-plane" dissection and inadvertent rotator cuff injury. The correct placement of the arthroscope into the subacromial space begins with a redirection of the arthroscope superiorly toward the anterior portal entry site into the space, with palpation of the undersurface of the acromion with the tip of the blunt trocar while it is still within its sheath. The blunt trocar is then removed, and a smooth metal rod is passed through the cannula, below the coracoacromial ligament and outside the anterior portal incision. The anterior cannula is passed into the subacromial space over the metal rod, and the coupled cannulas are gently withdrawn and separated within the space, creating a "room with a view"[4] (Figure 3). The lateral portal is established by localizing the proper position with an 18-gauge needle while viewing the subacromial space from the posterior portal. The portal should be below the level of the lateral acromion, so that there is a direct approach to the subacromial space without interference from the acromion. In general, more superiorly positioned cannulas are favored because they allow the surgeon to "look down" at the rotator cuff tear, and because they improve the working distance between the instruments and the rotator cuff.

Establishing and maintaining visualization is paramount to successfully completing the procedure. Hemostasis is achieved by maintaining a low systolic blood pressure (≤110 mm Hg), using an arthroscopic pump system that maintains subacromial pressure, and an electrothermal device (ie, Ablation Probe; Oratec Interventions, Menlo Park, Calif) for coagulation and ablation of soft tissues. A complete bursectomy allows a comprehensive evaluation of the cuff tear size and configuration, and provides a space for an unencumbered arthroscopic repair. The initial bursectomy is performed when viewing the anterior subacromial space from the posterior portal and using a shaver or electrothermal device from the lateral portal.

In our practice, arthroscopic acromioplasty is routinely performed, principally to increase the working space and provide a smooth surface to minimize abrasion of the repaired rotator cuff. The coracoacromial ligament is released, beginning at the anterior-lateral edge of the acromion and continuing medially along the anterior-inferior margin of the acromion. Occasionally, the ligament is completely resected to allow for better visualization and subsequent repair of anterior-superior cuff tears. The soft tissue is removed from the anterior half of the inferior surface of the acromion. The acromioplasty is initiated at the anterolateral margin of the acromion, typically removing about 4 mm of bone using a barrel-shaped or flat-sided high-speed burr. After removing the anterior-inferior section of the acromion, the arthroscope is placed in the lateral portal to visualize the slope of the acromion and profile. The high-speed burr is then advanced through the posterior portal to the midpoint of the acromion. A "cutting-block" technique is used to complete the acromioplasty.[10] The burr is advanced from posterior to anterior, to flatten and smooth the undersurface of the acromion (Figure 4).

Following the acromioplasty, an extensive bursectomy is performed from the posterior portal using an arthroscopic shaver to allow full visualization of the rotator cuff. However, debridement of bursal tissue in the lateral gutter should not proceed beyond the bursal reflection (3 to 5 cm) to avoid causing injury to the axillary nerve on the undersurface of the deltoid, which lies directly inferior to the subacromial bursal reflection.

Table 1. Tear Configurations With Recommended Repair Technique

Tear Configuration	Repair Technique
Crescent	Repair of free margin of cuff tendon directly to bone with suture from suture anchors
U-shape	Side-to-side repair of medial-to-lateral extent of tear leading to tear margin convergence, then repair of the free lateral margin of the cuff tendon directly to the bone with sutures from the anchor
L-shape/reverse L-shape	Anchor placement corresponding to the elbow of the "L," followed by repair of the soft-tissue component of the elbow of the "L" to that point; then, side-to-side repair, followed by repair of the remaining lateral margin to bone with suture from suture anchors

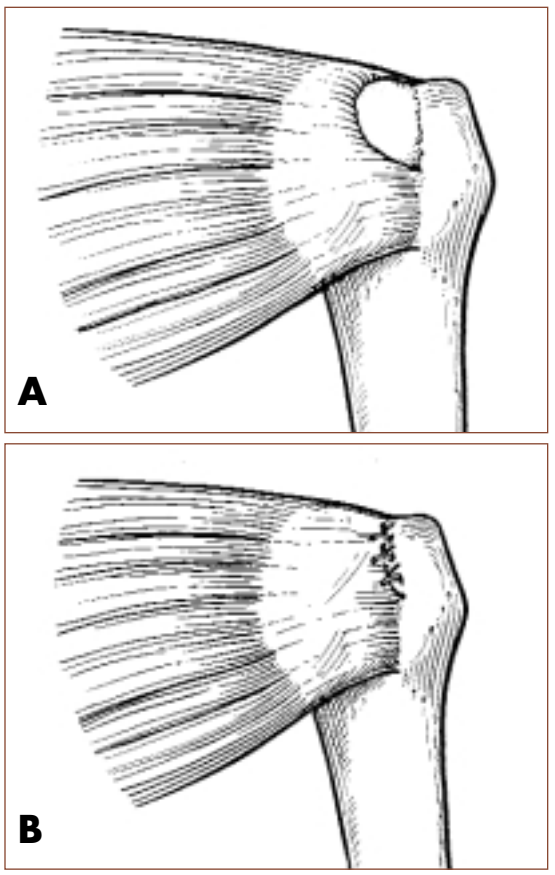

Figure 5.

(A) Schematic of a crescent tear configuration repaired by (B) securing the free lateral tendon edge to bone with simple sutures from laterally placed suture anchors.
(Courtesy of Stephen S. Burkhart, MD)

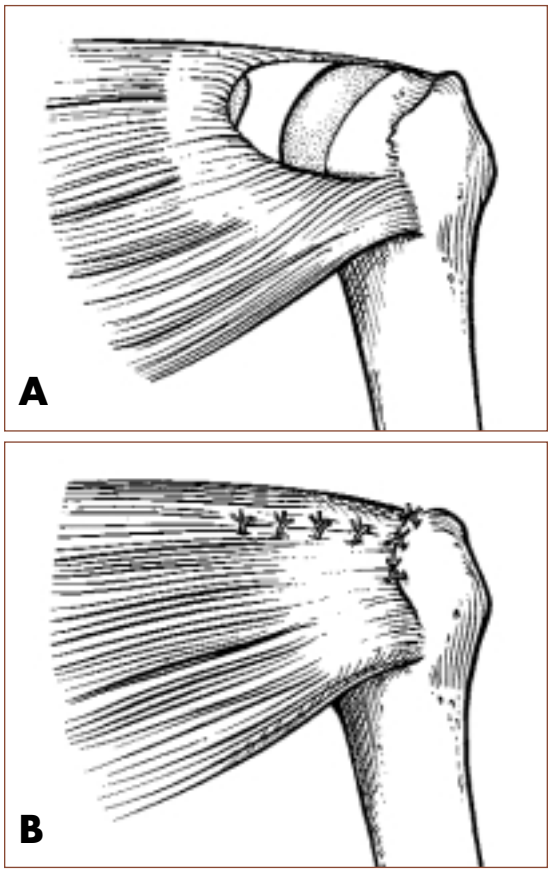

Figure 6.

(A) Schematic of a U-shaped tear repaired by (B) convergence of the posterior and anterior margins of the tear, followed by fixation of the lateral tendon edge to bone with simple sutures from laterally placed suture anchors.
(Courtesy of Stephen S. Burkhart, MD)

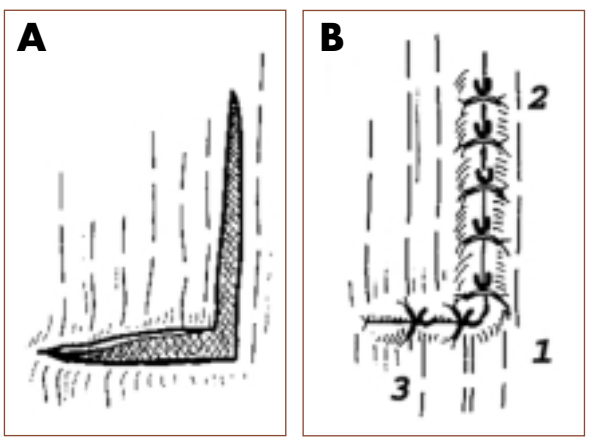

Figure 7.

(A) Schematic of an L-shaped tear repaired by (B) anchor placement corresponding to the elbow of the "L," followed by repair of the soft-tissue component of the elbow of the "L" to that point (1). Then, side-to-side repair (2), followed by repair of the remaining lateral margin to bone with suture from suture anchors (3).
(Courtesy of Stephen S. Burkhart, MD)

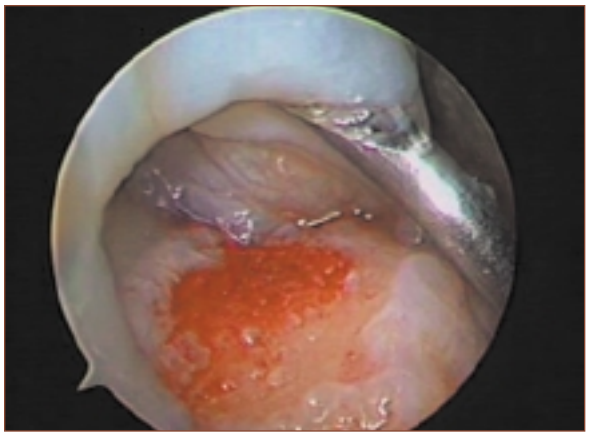

Figure 8.

Example of a crescent-shape tear with the normal footprint of the rotator cuff tendon insertion debrided in preparation for the rotator cuff repair.

Figure 9.

Arthroscopic capsular release performed adjacent to the glenoid may be indicated to mobilize chronic, retracted rotator cuff tears.

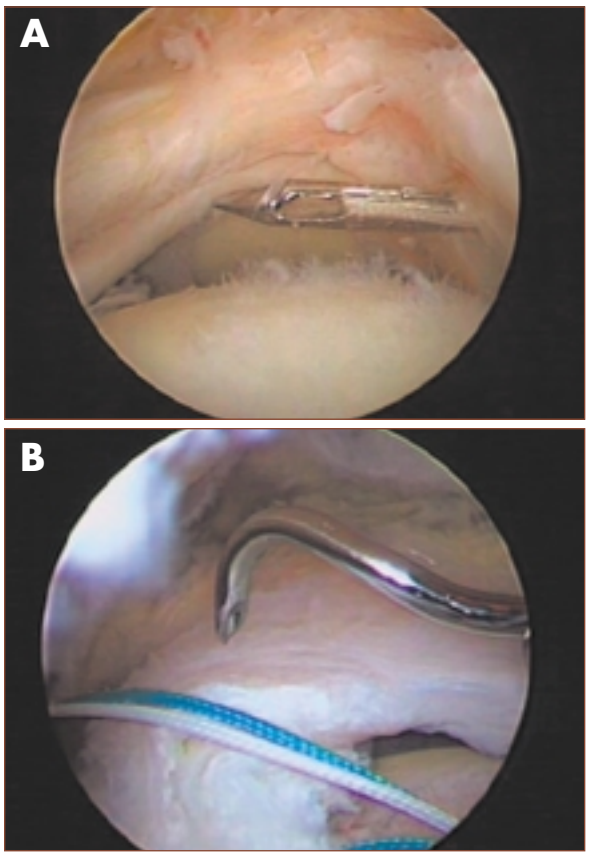

Figure 10.

(A) The Penetrator (Arthrex; Naples, Fla) facilitates the passes of suture from the posterior to the anterior rotator cuff tendon for a side-to-side repair required for margin convergence. (B) A suture hook (ie, Spectrum; Linvatec, Largo, Fla) is helpful to pass a #0 or #1 PDS suture at various angles due to the variety of left and right curve configurations. The PDS is then used to "shuttle" a prolonged-absorbable suture through the tendons.

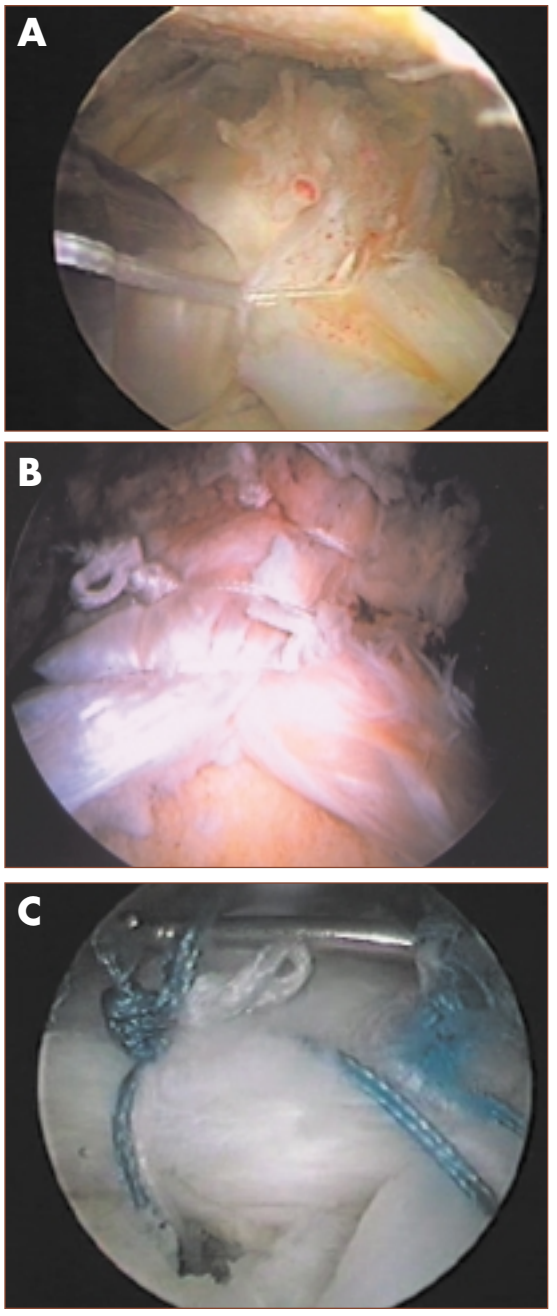

Figure 11.

(A) Side-to-side repair is initiated at the medial aspect of the tear. The sutures are tied for a gradual progression towards the lateral aspect of the tear. (B) The sutures are tied with a knot placed on the posterior rotator cuff. (C) The goal of margin convergence is to place the lateral edge of the tendon tear in close proximity to the greater tuberosity, while minimizing strain at the repair site.

Evaluation of the Rotator Cuff Tear Pattern

The evaluation of a cuff tear typically includes the size (area in cm^2) of the tear based on the length of the detachment and the amount of retraction from the greater tuberosity. Similarly, tendon mobility and quality are assessed. Proper recognition of the cuff tear configuration will help determine the most effective strategy for arthroscopic cuff repair (Table 1, page 27). Crescent-shaped tears can be repaired to the tuberosity using suture anchors and simple suture patterns (Figure 5, page 27). For U-shaped tears, the first step in the repair is to reduce or eliminate the medial-to-lateral component of the tear configuration by converging the posterior and anterior margins with a side-to-side repair (Figure 6, page 27). Margin convergence is a critical step to successful cuff repair because it facilitates anatomic repair of the tendon and reduces the strain at the tendon–bone repair site.[11] For L-shaped tears, the elbow of the "L" is secured to its anatomic site with simple sutures from a laterally placed suture anchor, and margin convergence proceeds with the passage of sutures from the posterior-to-anterior margin, followed by the securing of the lateral tendon edge to bone with simple sutures from additional suture anchors (Figure 7, page 27).

Preparation for the Rotator Cuff Tendon Repair

For most cuff repairs, the arthroscope will remain in the lateral portal, providing a panaromic view of the tear and the repair site. The mobility of the tendon is evaluated by grasping the tendon and gently pulling laterally. The arm is kept at 10 to 20 degrees of abduction. The excursion of the tendon edge determines the position of the repair site on the tuberosity. The normal soft tissue footprint of the rotator cuff is debrided to create a bleeding bony surface just lateral to the articular cartilage for a width of 7 to 10 mm (Figure 8). Avascular and frayed edges of the tendon may also be conservatively debrided at this time, but the structural fibers of the tendon are completely preserved. An accessory anterolateral portal is then established for anchor placement, suture management, and knot tying.

With chronic tears and recurrent tears after previous surgery, tendon excursion may be increased by an intra-articular capsular release and excision of the fibrous adhesions on the bursal side. The capsular release is performed 1 cm from the edge of the glenoid to avoid injury to the labrum and the rotator cuff tendon (Figure 9). Release of the coracohumeral ligament may also be necessary to mobilize a retracted anterior portion of the supraspinatus tendon.[7]

Arthroscopic Repair

Special instruments are required for arthroscopic repair of the rotator cuff. For our technique, we use a crochet hook, a single-hole knot pusher, a suture cutting device, and a suture passing-retrieval hand instrument. The tear configuration dictates the steps needed for the cuff repair. For tears requiring margin convergence, side-to-side repair is performed using a suture passing-retrieval instrument (eg, Penetrator; Arthrex, Naples, Fla) with a prolonged-absorbable braided suture (Panacryl; Ethicon, Somerville, NJ) passed through the posterior tendon, across the tear, and through the anterior tendon (Figure 10A). Occasionally, portal placement does not allow a single antegrade pass of the passing-retrieval instrument. In this case, suture passage may need to be performed in 2 steps, with passage through the posterior edge, and subsequent retrieval through the anterior edge through the anterior cannula. Alternatively, a suture hook (eg, Spectrum; Linvatec, Largo, Fla) helps to pass a #0 or #1 PDS suture, which is subsequently used as a shuttle to draw a prolonged-absorbable suture through the tendons (Figure 10B).

Following suture passage, both limbs of the suture are retrieved through the accessory cannula with a crochet hook. The side-to-side repair begins medially. The suture is tied with the knot placed on the posterior side of the cuff to avoid irritation from the knot. Knot tying is prepared with multiple alternating half-hitches, or a sliding knot followed by 3 alternating multiple half-hitches.[5,12] The goal of side-to-side repair is to converge the anterior and posterior tendon margins, enabling the lateral edge of the repair to rest close to the tuberosity, allowing the final repair to be made with minimal tension (Figure 11).

Rotator cuff repairs using suture anchors have been shown to be less prone to failure than repairs

Table 2. Suture-Passing Devices

Manufacturer	Product	Packaging
Arthrex (Naples, Fla)	Bird beak (45 degrees)	Reusable
	Penetrator (0, 15, 22 degrees)	Reusable
	Suture lasso (45, 90 degrees)	Disposable
	Knot pusher	Reusable
	6-finger knot pusher	Disposable
	Crochet hook	Reusable
	Arthroscopic knot cutter	Reusable
Linvatec (Largo, Fla)	Blitz (Straight, 45 degrees, right or left)	Disposable
	Suture hook handle	Reusable
	Shuttle relay suture passer	Disposable
	Suture hook (45 degrees, right or left, straight)	Reusable
	Crescent suture hook (small, medium, large)	Reusable
	Suture retrieval forceps	Reusable
	Caspari suture punch (4 mm, 7 mm)	Reusable
	Crochet hook	Reusable
	Loop handle knot pusher	Reusable
Mitek (Westwood, Mass)	Ideal suture grasper (15, 30, 45, 60 degrees)	Disposable
	Suture passer handle	Reusable
	Tips (30, 60, 90 degrees)	Disposable
	Knot pushers: Knot delivery instrument Knot pusher Skid rod	Reusable
	Suture cutter	Reusable
Orthopaedic Biosystems, Ltd. (OBL) (Scottsdale, Ariz)	Cuff stitch suture relay (9 angles available)	Reusable
	180-degree cuff stitch suture relay (Left and right available)	Reusable
	Arthro-Pierce piercing grasper (4 angles available)	Reusable
	Knot manipulator	Reusable
	Arthroscopic knot cutter	Reusable
	Surgical Dynamics ArthroSew	Disposable

using tendon fixation with sutures through bone tunnels.[13] There are several arthroscopic bone anchors and suture-passing devices manufactured for arthroscopic rotator cuff repairs (see *Resorbable Fixation Devices: A Product Guide** at orthopedicse.com and Table 2). The ideal repair location is at the rotator cuff tendon's anatomic insertion, approximately 5 to 10 mm lateral to the articular surface; some medialization may be required to reduce the tension on the repair. Anchors should be inserted at an angle of approximately 45 degrees, the so-called "dead man's angle," to resist the pull-out forces of the rotator cuff tendon[14] (Figure 12). Additionally, suture anchors that allow for 2 sutures per anchor are ideally suited for cuff repair and resistance against physiologic loads at the repair site.[13]

Proper anchor placement is facilitated by rotating the arm while applying gentle traction to identify the site of anchor insertion. Suture anchors can be placed through the accessory portal or through additional small incisions. The number of anchors used is based on the tear size. Separating each suture anchor by approximately 5 to 8 mm will proportionately distribute fixation over the entire insertion site and minimize excessive tension at any single fixation point.[15,16]

After placing the suture anchor, the next step is to pass the suture through the rotator cuff tendon edge. Typically, suture passage is most easily accomplished by passing the suture retriever to perforate the anterior supraspinatus or upper subscapularis (anterior portal), or posterior supraspinatus and infraspinatus (posterior portal), in an effort to retrieve the most medial limb of 1 of the 2 sutures loaded through the suture eyelet (Figure 13, page 30). The correct alignment and position of the suture is determined by visualizing the cuff, the sutures, and tuberosity through the panoramic lateral view.

Figure 12.

Suture anchors are inserted at a 45-degree angle in the lateral aspect of the area prepared on the tuberosity. This anchor may be placed through the accessory anterolateral portal, or through a separate small incision in the skin.

Passing a suture through the anterior half of the supraspinatus usually requires a sharp-angled suture retriever advanced through the anterior portal. Once a suture limb is passed through the tissue, visualization of the anchor is important to avoid inadvertent "unloading" or removal of the suture from the suture anchor. Identifying the suture limbs that pass through the anchor, and pulling only the suture that leads to withdrawal from within the cannula (rather than sliding of the suture within the anchor) will avoid this frustrating event.

After the first suture limb is passed through the cuff tissue, the 2 limbs of the same suture (1 through the tissue and 1 outside the tissue) are brought out through the same portal using a crochet hook or the suture retriever to avoid suture entanglement (Figure 14, page 30). The second suture is threaded through the cuff tissue with a similar technique, approximately 5 to 10 mm away from the first suture. Each suture should have independent soft tissue fixation points through the rotator cuff tendon. The ability to pass the suture through the ideal position in the cuff is improved by rotating the arm to deliver the anterior or posterior cuff into the appropriate alignment.

Optimal suture management is achieved by placing 1 anchor at a time, and securing the tendon to the bone with both sutures before placing the next anchor. Using the accessory portal as the dedicated knot-tying portal greatly improves suture management and the reliability of knot tying. The arm is rotated so that the suture, anchor, and cannula are in alignment before tying the knot. If tension is then placed on the soft-tissue limb while holding the other limb steady, the tendon is reduced to the tuberosity repair site. Multiple alternating half-hitches with alternating posts are used to secure the suture knot. Alternatively, a sliding knot is tied over the soft tissue suture limb. As the knot slides into place, the tissue is reduced to the tuberosity. Ideally, the knots should be placed over the tendon, and not laterally over the tuberosity (Figure 15, page 30). The basic skills required for arthroscopic cuff repair include the ability to tie both a sliding knot and a nonsliding, multiple half-hitch knot. Finally, a simple suture pattern is routinely used because this technique is adequate for maximal loading conditions of the rotator cuff tendon repair.[5]

*Barber AF. Resorbable materials for arthroscopic fixation: a product guide. *Orthopedic Special Edition*. 2000;6(2):79-87.

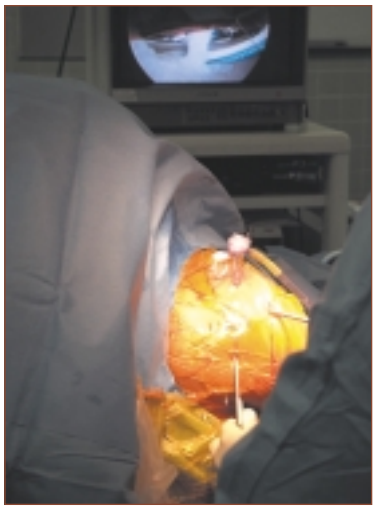

Figure 13.

The sutures are retrieved through either the anterior or posterior portal using the suture retriever after it has penetrated the rotator cuff tendon. Care is taken to avoid inadvertent unloading of the suture anchor.

Figure 14.

It is helpful to maintain the suture that is not being passed or manipulated through 1 portal (ie, the posterior portal in this figure) and tie through a different portal (ie, the lateral portal in this figure).

Figure 15.

The completed arthroscopic rotator cuff repair. Knots are tied over the rotator cuff tendon and away from the greater tuberosity to minimize suture irritation.

Table 3. Rehabilitation of Rotator Cuff Injury

Phase I (0 to 6 weeks)	Protection of repaired tendon Passive range of motion within specified limits Active–assisted or active motion for small tears with good-quality tissue
Phase II (6 to 12 weeks)	Progress to full passive motion Begin active–assisted and active motion Advance to light strengthening for small tears with good-quality tissue Advance strengthening of intact cuff Light strengthening of scapular stabilizers
Phase III (12 to 16 weeks)	Passive stretching at end ranges of motion Advance strengthening of repaired cuff Progressive strengthening of scapular stabilizers
Phase IV	Functional strengthening Proprioception re-education Sports-specific rehabilitation

All knots are tied with a single-hole knot pusher. Each throw includes pass pointing the suture limbs to maximize loop security. A minimum of 3 alternating half-hitches with alternating post limbs is included with every knot after a slip knot or after 2 serial half-hitches.[5,12] At the completion of the knot tying, sutures are cut 3 to 4 mm from the end of the knot with a suture-cutting tool. The arm is then rotated to dynamically assess the security of the repair.

At the completion of the procedure, the 4 portal incisions are closed with interrupted monofilament sutures. The portal sites and subacromial space are reinjected with bupivacaine and epinephrine. The arm is protected with a padded sling that has an attached immobilization strap.

Rehabilitation

Arthroscopic repair of a torn rotator cuff tendon does not shorten the time required for biologic healing; therefore, protection of the repair follows the same time frame as open rotator cuff tears. The decreased surgical trauma as compared to open or mini-open repair results in decreased pain and decreased narcotic usage. The rehabilitation protocol is guided by several factors, including the size of the tendon tear, the chronicity of the tear, the quality of the repair, the surgeon's assessment of repair tension, the tear location, and patient-specific factors such as chronic medical conditions.[17] Overall, the phases of the rehabilitation protocol follow the guidelines outlined in Table 3.

Results

The results of arthroscopic rotator cuff repairs performed by advanced shoulder arthroscopists are equal to the results of open rotator cuff repair.[3,4,18,19] The ability to achieve results similar to those achieved during open repairs with reduced morbidity is appealing. Although pain relief and ROM may be improved even without lasting cuff integrity, the long-term functional result is clearly related to an intact cuff repair. Our early analysis of more than 100 arthroscopic cuff repairs suggests that cuff integrity is maintained at the same rate as that seen with open surgery. Our results and other published reports and presentations[3,4,18,19] further support our position that arthroscopic cuff repairs can provide outcomes and patient satisfaction similar to or greater than those found with open rotator cuff surgery. ❖

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