Arthroscopic Rotator Cuff Repair with the ELITE SHOULDER SYSTEM°
As Described by:

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Rotator cuff tears are a significant cause of shoulder pain. These tears should be repaired if the patient has pain and weakness that interferes with their lifestyle. A smoothing of the subacromial arch (subacromial decompression) is done at the same time as the repair, unless there is tenuous repair of a massive tear. An MRI will provide the surgeon and patient with an approximation of the tear size.

Visualization of the surgical site is enhanced through the use of the Smith & Nephew DYONICS® 25 Fluid Management System, by safely lowering the systolic blood pressure to 95 mmHg, and by cauterizing any bleeding vessels. The surgeon must be aware of movements of the arthroscope and must be proficient in the use of the ELITE® Shoulder Instruments, suture management, and arthroscopic knot tying.

This guide illustrates creation of a tension-free repair using a combination of side-to-side margin convergence and tendon to bleeding bone using suture anchors. The exact steps depend upon an awareness of the tear size and shape.
Introduction

The ELITE SHOULDER SYSTEM™ has been specifically designed to offer a complete approach to arthroscopic rotator cuff repair. In describing this technique Dr. James Esch utilizes specific components of the comprehensive ELITE™ System to illustrate the details of repairing an “L”-shaped tendon tear.

The procedure illustrated in this guide utilizes the following components:

**Anchor**

TWINFIX® TI 5.0 mm, preloaded with two #2 ULTRABRAID® Sutures

**Suture**

#2 braided ULTRABRAID sutures, (preloaded, two per anchor)

**Instrumentation**

ELITE® Calibrated Probe

ELITE CUFF STITCH® Suture Relay, 70° Right Bend

ELITE CUFF STITCH Suture Relay, Straight

ARTHRO-PIERCE® Instrument

ELITE Suture Loop Grasper

ELITE Combination Tissue/Suture Grasper

ELITE Knot Manipulator, Full Loop

ELITE Double Hook Suture Scissors
Procedure

Operative Site Access

Use three portals during this procedure – the posterior, anterior and lateral working portals. Also, create an accessory anterior incision for anchor insertion.

Insert an arthroscope into the posterior portal (Figure 1).

An “L”-shaped tear is used to demonstrate this technique. Figure 2 shows an “L”-shaped tear in the anterior part of the supraspinatus tendon.

Reducing the Tear

Place the ELITE™ Calibrated Probe through the anterior portal to reduce the tear (Figure 3).

Note: A tissue grasper can also be used for reduction of the tear.
**Side-to-Side Suturing**

Reposition the arthroscope into the lateral portal. Pass a suture across the tear using a straight ELITE CUFF STITCH™ Suture Relay from the posterior portal. Grasp the suture with an ELITE™ Combination Tissue/Suture Grasper inserted through the anterior portal (Figure 4).

Remove the straight cuff stitch suture relay. Insert an ELITE Suture Loop Grasper through the posterior portal to retrieve the suture from the anterior portal (Figure 5).

Remove the suture loop grasper. Tie an arthroscopic sliding knot with the sutures exiting the posterior cannula. Advance the knot to the repair site with the ELITE Full Loop Knot Manipulator (Figure 6a). For more detail on knot tying, refer to page 18.
Tighten the knot by advancing the knot manipulator into a past-point position (Figure 6b).

Cut the sutures using the ELITE® Double Hook Suture Scissors (Figure 6c). Alternatively, the ELITE Sliding Suture Cutter may be used.

Figure 6b. Tighten knot

Figure 6c. Cut sutures
The Second Side-to-Side Suture

An alternative method for side-to-side suturing is the suture hand-off.

Hand the suture from the straight ELITE CUFF STITCH™ Suture Relay in the posterior portal to the ARTHRO-PIERCE™ Instrument in the anterior portal (Figures 7a and 7b).

Then use the suture loop grasper to retrieve the suture through the posterior portal (Figure 7c).

Figure 7a. Handing suture from suture relay to ARTHRO-PIERCE™ Instrument

Figure 7b. Suture handed from suture relay to ARTHRO-PIERCE Instrument

Figure 7c. Grasper retrieving suture
Inserting the First Anchor

Use an accessory incision for the anchor insertion. The accessory portal is located adjacent to the lateral margin of the acromion (Figure 8).

Insert the first anchor (Figure 9a). Rotate the anchor approximately 45° so it is partially under the articular surface (Figure 9b). Insert the anchor up to the first laser etch mark on the distal end of the inserter. This ensures that the top of the anchor is below the bone surface. Use the vertical laser mark to orient the sutures as desired.
Suturing Tendon to Bone

Transfer the white sutures from the accessory portal to the posterior portal using the ELITE® Suture Loop Grasper (Figure 10a).

Pass the 70° Right ELITE CUFF STITCH® Suture Relay through the cuff with the white suture loaded. Retrieve the suture from the anterior portal using the ELITE Combination Tissue/Suture Grasper (Figure 10b).

Next, retrieve the suture from the posterior portal using the suture loop grasper (Figure 10c). Leave the white suture through the tendon with both strands out of the posterior portal.
Pass the green suture using the same steps. Use the grasper to transfer the green sutures from the accessory portal to the posterior portal (Figure 10d). Pass the 70° Right ELITE CUFF STITCH™ Suture Relay through the cuff with the green suture loaded. Retrieve the suture from the anterior portal using the ELITE® Combination Tissue/Suture Grasper (Figure 10e). Retrieve the suture from the posterior portal using the ELITE Suture Loop Grasper (Figure 10f).
Inserting the Second Anchor

Insert the second anchor, again using the accessory anterior incision (Figure 11).

Again, position the anchor approximately 45° so it is partially under the articular surface and the anchor is inserted up to the first laser etch mark on the end of the inserter.

White Suture Passage

Transfer the white sutures using the ELITE° Suture Loop Grasper (Figure 12a).

Then, using the ARTHRO-PIERCE° Instrument, retrieve one white suture from the anterior portal, passing it through the tendon (Figures 12b and 12c).
Tie the white suture using the full loop knot manipulator through the preferred portal (Figure 12d).

*Green Suture Passage*

Next, penetrate the tissue using the ARTHRO-PIERCE® Instrument, and retrieve one green suture leg through the anterior portal (Figure 13a).
Remove the instrument and insert it into the posterior portal, penetrating the tissue and retrieving the second green suture leg (Figure 13b).

Bring both sutures into the preferred portal using the ELITE™ Suture Loop Grasper. The green suture is now ready to be tied (Figure 13c).

Tie the last knot, and cut the suture (Figure 13d).

Finally, confirm the adequacy and stability of the repair.
Alternate Suture Passage Method

Prepare the ELITE® PASS Suture Shuttle by inserting a new needle through the needle cannulation opening in the back of the instrument near the thumb actuator (Figure 14).

Secure the ELITE PASS Needle in the thumb actuator by positioning the "L"-shaped end into the hole on the thumb actuator. Cycle the thumb actuator in and out once to set the needle (Figure 15).

Load the first white suture that is exiting the lateral portal into the ELITE PASS Suture Shuttle. If loaded properly, a short suture tail (approximately 1 cm in length) will exit the bottom of the suture shuttle. The long leg will exit the left side of the instrument (Figure 16). This leg leads to the cannula and passes through the anchor eyelet. For detailed instructions refer to the ELITE PASS Suture Shuttle Instructions for Use.
Pass the ELITE® PASS Instrument through the lateral cannula with the jaws in a closed position. Once the jaws exit the distal cannula opening, open the instrument jaws. Advance the instrument forward with the bottom jaw sliding under the tissue to the desired biting depth (Figure 17).

Close the instrument jaws to secure the tissue. Drive the needle forward by depressing the top of the thumb actuator. The needle carries the suture through the tissue, creating a loop.

Retrieve the needle by pushing on the bottom of the actuating lever. Grasp the loop of suture with an ELITE Combination Tissue/Suture Grasper. Open the ELITE PASS Instrument jaws and, exercising care, remove the instrument from the suture insertion site (Figure 18).

**Caution:** Move only one instrument within the joint space at a time. This reduces the potential of unloading the suture anchor or losing the suture.

Retrieve the combination grasper, with the suture attached, from the anterior cannula. Repeat the process as needed with additional sutures and/or suture anchors (Figure 19).
Rehabilitation

The goal of rehabilitation is to keep a full range of motion while protecting the repair for 6–8 weeks until the healing tissue is strong enough to begin active motion. A sling should be worn for three weeks.

Remove the arm from the sling several times daily to do passive elevation to 90° and passive external rotation to 20°. Begin active assistive motion at 6–8 weeks and active motion at 8–10 weeks. Do not perform resistive exercises until 12–16 weeks postoperatively. During this time, it is imperative to continue passive exercises to avoid shoulder stiffness.
One of the first basic sliding knots used in arthroscopic surgery is the Hangman's Knot.

1. Begin this knot by sliding the suture through the anchor eyelet so that one leg of suture has about 1/3 the length of suture and the second leg of suture is 2/3 the overall length of the suture. The shorter suture leg is the post leg. Pinch both legs of suture between the thumb and index finger. The post leg is colored blue for easy identification.

2. The non-post leg of suture is thrown over the top of the thumb and then looped around both suture legs four times. The wraps do not have to be tightly wrapped at this time.

3. Take the non-post leg of suture and thread through the loop created over the back of the thumb.

4. Use the non-post leg and begin to tighten the knot.

5. Slide the knot down to the tissue surface by pulling on the post suture leg. The knot will begin to tighten and form as it is pulled down.

Note: Objects in these step-by-step Hangman's Knot illustrations are not in actual scale to one another.
Hangman’s Knot

6. The knot is locked into place by applying alternating half hitch knots, reversing the post leg with each half hitch thrown.

7. Alternate the post leg of the knot and tie a half hitch.

8. The ELITE™ Knot Manipulator can be used to push and tighten down the knot.

9. The final alternated half hitch is created and pushed down to the knot surface.

10. The knot is finished by cutting the legs of the suture 3–5 mm from the knot surface. Be sure not to cut the suture too close to the knot surface, causing the knot to loosen.
Additional Instruction

Prior to performing this technique, consult the Instructions for Use documentation provided with individual components, including indications, contraindications, warnings, cautions, and instructions.

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Caution: U.S. Federal law restricts this device to sale by or on the order of a physician.

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