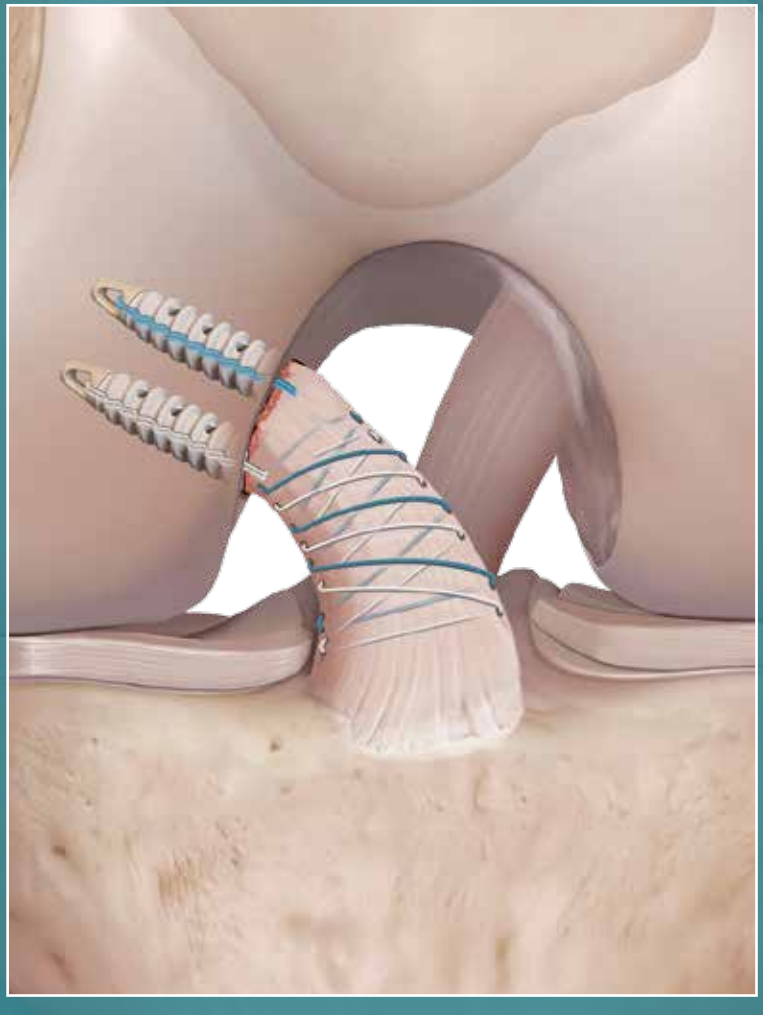
Arthrex®

ACL Primary Repair

Surgical Technique



ACL Primary Repair

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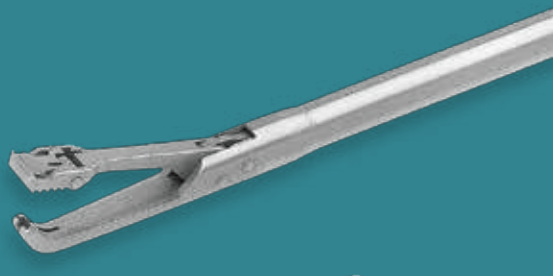
BioComposite™ SwiveLock® and Labral Scorpion™ Suture Passing Technology

There has been a recent resurgence of interest in the possibility of primary repair as the treatment for certain patterns of ACL rupture. Historically, the technique of primary ACL repair was largely abandoned by the mid 1990's due to marginal clinical outcomes. However, careful analysis of the older data reveals that certain subgroups, especially proximal tears with good tissue quality, had better clinical outcomes than the group as a whole.

In light of the advances in diagnostic imaging, arthroscopic surgical technology and rehabilitation approaches that have come to fore over the past several decades, primary ACL repair is a concept that is ripe for reevaluation. The BioComposite SwiveLock and Labral Scorpion Suture Passer allow the avulsed ACL to be arthroscopically sutured with FiberWire® and secured to the lateral wall with far superior fixation strength than in years past. Using modern MRI imaging, we clearly have the ability to preoperatively identify those tears that might be amenable to repair. With this technique manual, Arthrex, in collaboration with Dr. Gregory DiFelice, presents a technically straightforward and reproducible way of performing arthroscopic primary ACL repair.

BioComposite SwiveLock, 4.75 mm

PassPort Button Cannulas



Labral Scorpion Suture Passer

About the Surgical Technique

The technique is rather straightforward, and utilizes many of the tools that are familiar to arthroscopic shoulder surgeons. In fact, the technique, is quite analogous technically to an arthroscopic rotator cuff repair performed in the knee. The proximally torn ACL (Figure 1) is captured with a series of locking FiberWires using the Scorpion FastPass suture passing technology (Figure 2). The footprint is then debrided to provide a bleeding surface for healing. Finally, the sutures and ligament, are apposed to the footprint using a series of vented BioComposite SwiveLock anchors (Figures 3 & 4).

Figure 1: Arthroscopic view of proximally torn ACL that is amenable to arthroscopic primary repair.

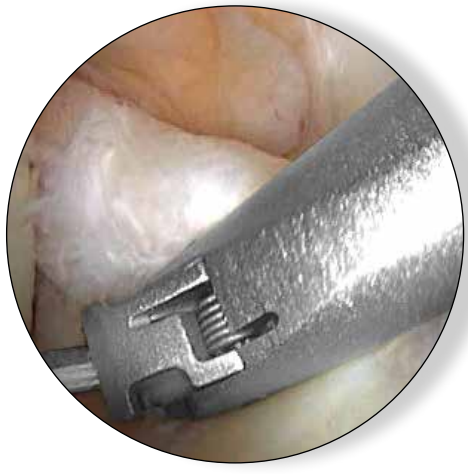


Figure 2: Arthroscopic view of suture passage through the ACL remnant using the Scorpion FastPass.

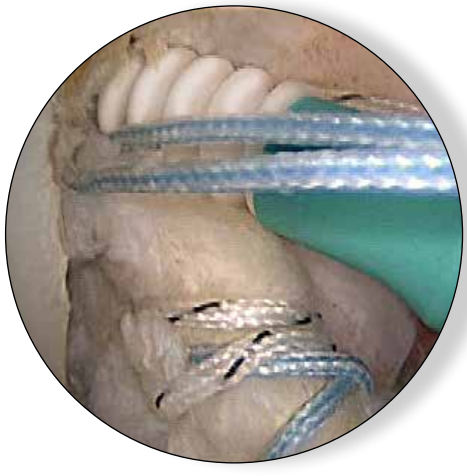


Figure 3: Arthroscopic view of 4.75 mm vented BioComposite SwiveLock being deployed to primarily repair the ACL remnant back to the femoral footprint.

Figure 4: Arthroscopic view of the final repair utilizing two locking stitches of #2 FiberWire, fixed with two 4.75 mm vented BioComposite SwiveLocks.

Patient Selection

When selecting a patient who may benefit from primary ACL repair, it is critical to appropriately evaluate two variables: the acuteness of the injury, and the tear pattern. A higher percentage of successful outcomes with primary ACL repair have historically been seen in patients with acute injuries that were addressed in the first 2-3 weeks post-injury, and in those with proximal tear patterns (Figures 5 & 6). Other variables, such as age, activity level, and injury mechanism also need to be considered in the surgical decision-making process when choosing between primary ACL repair and the more conventional ACL reconstruction.

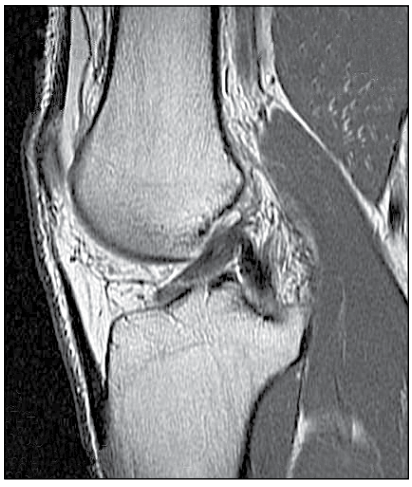


Figure 5: Sagittal T1 MRI showing proximal ACL tear.

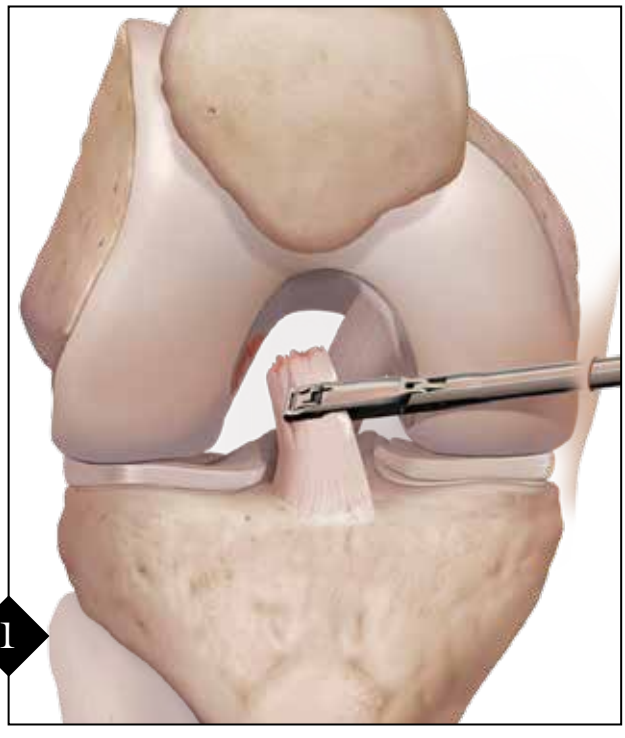
Figure 6: Coronal PD MRI showing proximal ACL tear. Note that fibers do not enter the wall of the femur.

SURGICAL TECHNIQUE

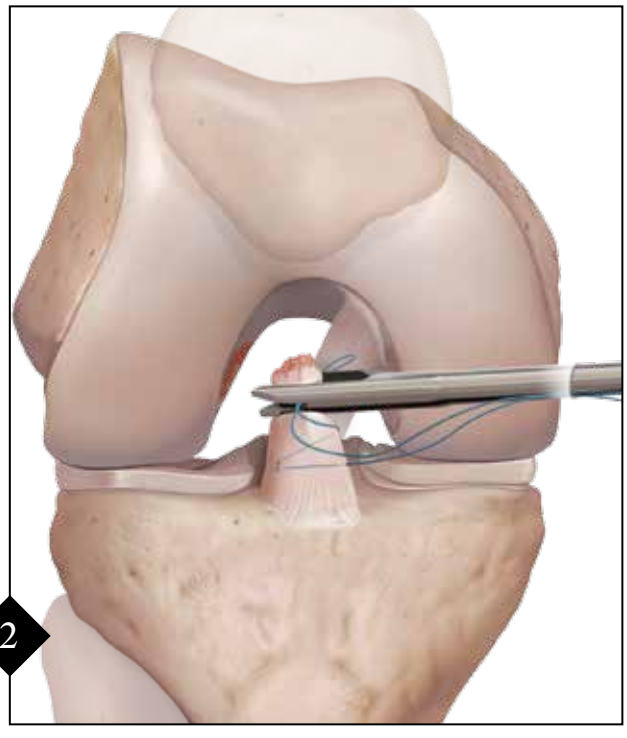
Evaluation

Intraoperatively, identify the ACL injury pattern in the notch as predicted by the MRI. Evaluate the likelihood of reparability by assessing the tissue quality, length and mobility. If the remaining ACL tissue is too short, immobile, or severely damaged, the probability for a successful reattachment will be low and traditional ACL reconstruction should be considered. Since this technique is a suture repair, rather analogous to a rotator cuff repair, cannulas are very helpful with suture management. The Passport Button Cannula, inserted into the medial portal, is perfectly suited for this application.

Suture Passage

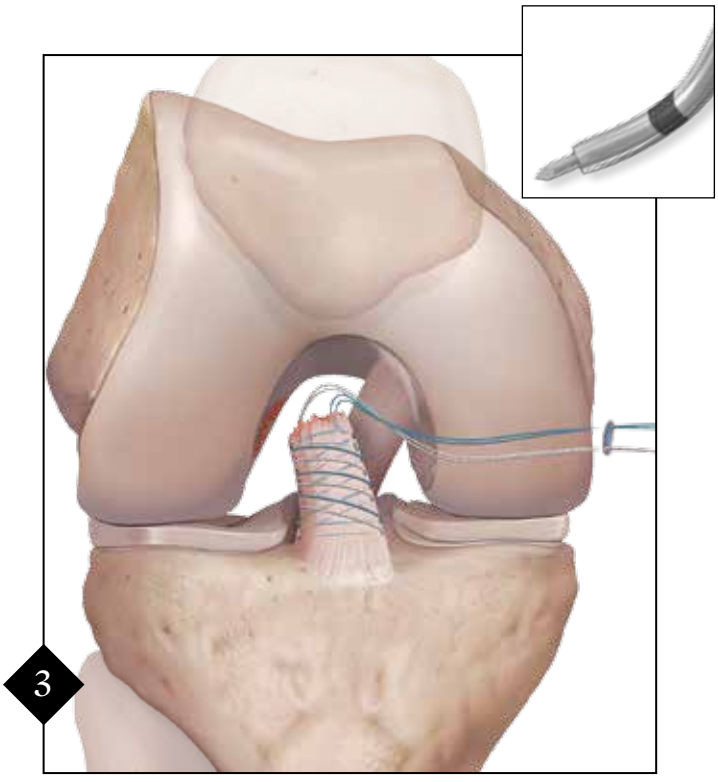


Suture passage through the ACL tissue begins at the intact portion of the ligament and progresses towards the avulsed end. Begin by passing a #2 FiberWire using the Labral Scorpion Suture Passer. After the first pass, alternate passes with opposite ends, thus creating a Bunnell-type stitch pattern. In a normal length ACL, a total of 2-3 passes can be performed with each limb of the FiberWire. The final bite should exit the avulsed end of the ligament to ensure that the tissue sits down flush to the repair site.

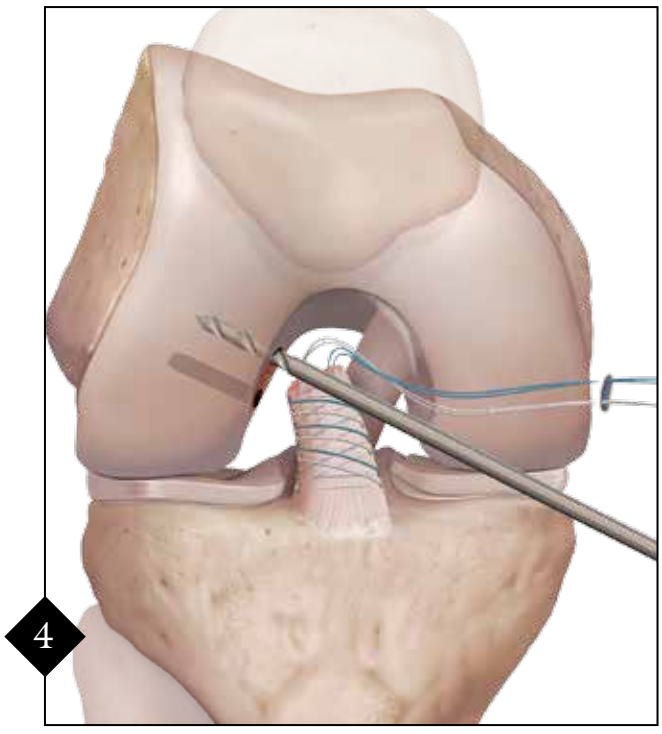


The same technique is performed using a #2 TigerWire®. As more passes are performed, the risk of transecting already placed sutures increases. Once the Scorpion is placed for a suture pass, the surgeon should get tactile feedback of increased resistance attempting to pass the suture if he or she is intersecting a previously placed stitch. If this occurs, the Scorpion should be redirected and suture passage reattempted. Again, the final bite should exit the avulsed end of the ligament to ensure that the tissue sits down flush to the repair site.

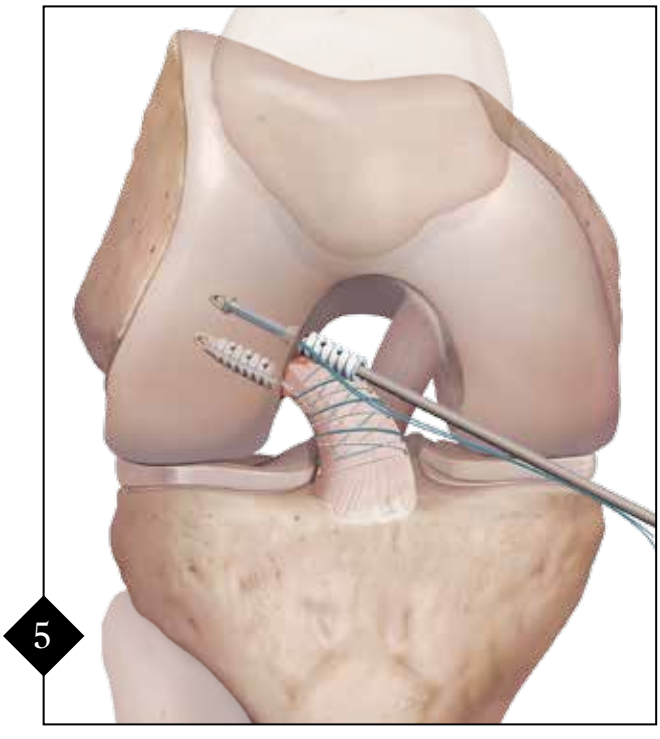
SwiveLock Femoral Fixation



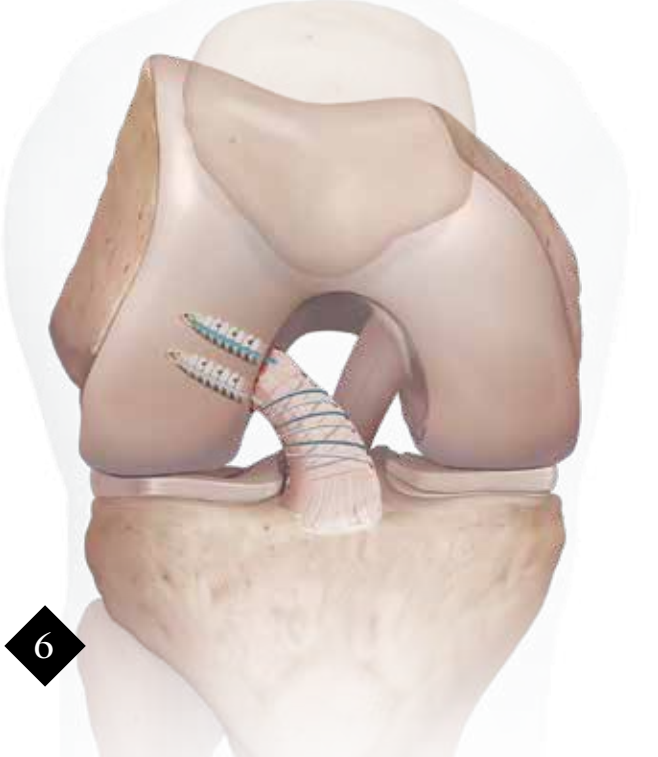
Once the sutures are passed, and control of the stump has been achieved, the sutures are parked out an accessory stab incision to retract the ligament away from the reattachment site. This allows both the ligament tissue and the sutures to stay out of harm's way while the reattachment site can be prepared with a shaver, a burr or a PowerPick (inset).



Create an accessory inferomedial portal that will allow placement of the suture anchors directly into the femoral footprint. Through this portal, with the knee in flexion, 4.5 mm x 20 mm drill holes can be made to place the anchors. Anchor pattern should be optimized depending on the pattern of tear, much like a rotator cuff repair. This will be an intraoperative decision. ***Note: Some surgeons prefer to visualize the ACL femoral footprint via the medial portal to optimize visualization and placement of the drill holes and anchors.***



Load the sutures into the eyelet of the 4.75 mm SwiveLock. Introduce the SwiveLock through the medial portal, insert into the ACL footprint and tension the SwiveLock sutures. Advance the driver into the bone socket until the anchor body contacts bone. Advance the screw by holding the thumb pad as the inserter handle is turned clockwise.



When the SwiveLock is fully implanted, the eyelet of the SwiveLock is fully seated in the socket by the body of the screw portion of the anchor and the sutures are fixated by the pressure of the screw.

Unwind the tip retention suture from the cleat at the back of the driver handle. Remove the driver. Pull one limb of the retention suture to fully remove it from the implant.

Cut the free suture ends with an open ended Suture Cutter so that they are flush with the edge of the bone socket.

Rehabilitation

The repair is strong enough to allow early ROM (unpublished data), although protected weight-bearing and postoperative brace use are recommended to be safe. Weight-bearing is progressed and the brace discontinued after 4-6 weeks. Strengthening is advanced as tolerated. In light of the minimally invasive, arthroscopic nature of the procedure and the early ROM work, patients usually progress rather quickly through rehabilitation milestones.

Surgical Pearls

1. The procedure should only be attempted on carefully indicated patients that have the maximal likelihood of benefitting from the procedure.

2. Early intervention, within the first 2-3 weeks post-injury is optimal.

3. PassPort Button Cannulas greatly facilitate suture management.

4. Begin suture passage as low (distal) as possible on the ACL remnant to maximize the grab on the tissue.

5. Take care not to saw the initial suture passes through the tissue so as to maintain tissue quality.

6. Alter the angle of the Scorpion to maximize the purchase on the ACL remnant tissue.

7. Great care should be taken to avoid cutting previously passed sutures with each subsequent pass. If resistance is felt, reorient the Scorpion to get a clean pass.

8. Typically three locking passes can be made in the ACL remnant with each FiberWire.

9. Utilize FiberWire *and* TigerWire to aid in suture management.

10. Once the sutures are passed, apply tension to retract the ACL remnant so the wall can be safely roughened with a shaver or burr. This will protect both the remnant and the sutures.

11. Make an accessory inferomedial portal, and utilize with the knee in greater than 90° of flexion to optimize the approach angle on the footprint.

12. Drill, then deploy the SwiveLocks in standard fashion, from the inferomedial portal with knee in >90° of flexion, thus tensioning the ACL remnant back to the femoral footprint. Consider tapping prior to anchor placement, if there is hard bone.

Ordering Information

Implants:

BioComposite SwiveLock, 4.75 mm	AR-2324BCC
#2 TigerWire	AR-7203
#2 FiberWire	AR-7233

Instruments:

Labral Scorpion Suture Passer	AR-13998
Drill, 4.5 mm, cannulated	AR-1204.5L

Accessories:

Suture Retriever	AR-12540
Suture Cutter	AR-12250
PassPort Button Cannula, 6 mm I.D. x 2 cm	AR-6592-06-20
PassPort Button Cannula, 6 mm I.D. x 3 cm	AR-6592-06-30
PassPort Button Cannula, 8 mm I.D. x 2 cm	AR-6592-08-20
PassPort Button Cannula, 8 mm I.D. x 3 cm	AR-6592-08-30
PassPort Button Cannula, 10 mm I.D. x 2 cm	AR-6592-10-20
PassPort Button Cannula, 10 mm I.D. x 3 cm	AR-6592-10-30

This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience and should conduct a thorough review of pertinent medical literature and the product's Directions For Use.

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