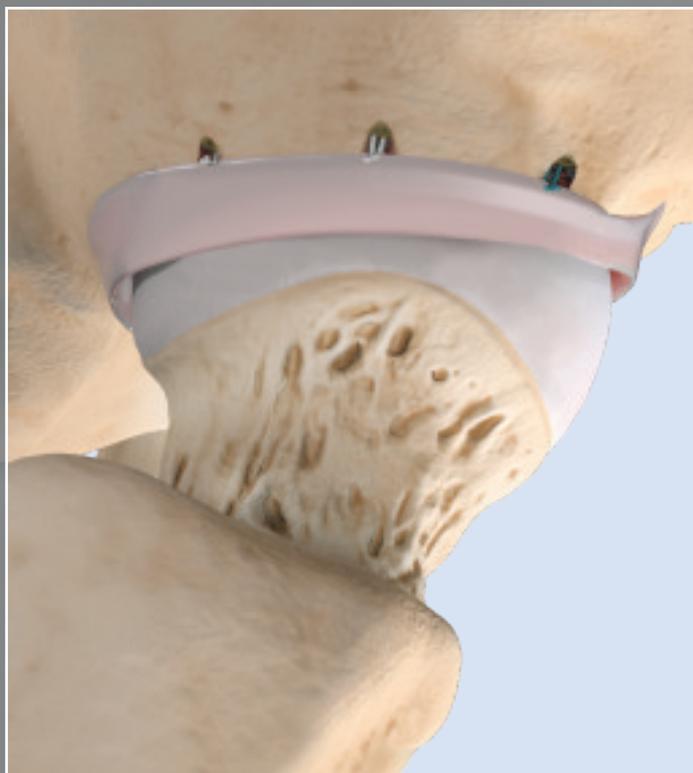




Acetabular Labral Reconstruction using
the Knotless PushLock™ Anchor System

Surgical Technique



Acetabular Labral Reconstruction

INTRODUCTION

The physiologic importance of the acetabular labrum has been described by Ferguson and others.¹ The labrum enhances joint stability and congruity by deepening the socket and creating a suction-seal mechanism. The suction-seal resists joint fluid extrusion on compression, thus protecting the articular cartilage from supraphysiologic loads. A deficient labrum compromises this mechanism and results in increased joint compressive forces that may cause early degenerative changes.

Labral reconstruction is indicated when the native labrum is insufficient and unable to recreate a suction-seal with the femoral head. This labral insufficiency occurs as advanced degenerative changes where calcification or fraying of the labrum are present, and also in the revision setting following previous labral debridement. Labral reconstruction has been shown to be successful in recent literature.^{2,3} With this technique manual, Arthrex, in conjunction with Dr. Carl Wierks and Dr. Benjamin Domb, presents a straightforward and reproducible technique for arthroscopic labral reconstruction using a low profile knotless fixation construct.

DIAGNOSIS

Labral insufficiency is suspected in the instance of previous labral debridement. Symptoms of hip instability are particularly telling. Positive physical exam findings include painful impingement tests, limited range-of-motion secondary to capsular inflammation, and discomfort with axial distraction of the hip. Magnetic resonance arthrography (MRA) can show labral degeneration and insufficiency. In addition, a diagnostic injection has been shown to be useful in atypical presentations.

PATIENT POSITIONING AND TRACTION

Arthroscopic labral reconstruction can be performed in either a supine or lateral position, according to surgeon preference. The set-up is identical to that of a standard hip arthroscopy with added attention to guarantee access to the selected autograft site (ie. iliotibial band (ITB) or hamstring).

Appropriate positioning, padding and traction are critical to a successful procedure. The Arthrex Hip Distraction System is attached to the table with a Clark Rail Adapter. Use a large, well-padded perineal post and padded foam boots to securely protect the feet and ankles to limit skin traction injury. The nonoperative leg is placed in 45° of abduction and neutral rotation. The operative leg is placed in 20° of flexion, internal rotation and abduction. Gross traction is applied and the operative hip is then brought into neutral adduction to create lateral distraction against the perineal post. Fine traction is titrated under fluoroscopic guidance to create approximately 1 cm of working space in the hip joint. A 14-gauge needle may be used to vent the joint and enhance distraction.



PORTAL PLACEMENT

Acetabular labral reconstruction is performed through the standard anterolateral and either an anterior, mid-anterior or a distal lateral working portal. The anterolateral portal is 1 cm proximal and 1 cm anterior to the tip of the greater trochanter. If started too proximal, the trajectory will be horizontal and risk penetration of the acetabular cartilage during anchor placement. Establish the anterolateral portal first for the arthroscope using a percutaneous approach under fluoroscopic guidance. Once a spinal needle is in the joint using a “loss of resistance” method to vent the capsule, advance a long Nitinol wire through the spinal needle and remove the needle. Advance a cannulated obturator, used in conjunction with the arthroscope sheath, over the Nitinol wire and into the joint. Once the Nitinol wire and cannulated obturator are removed, place the scope through the sheath and into the joint.

The second portal can be either a standard anterior portal, mid-anterior portal, or a distal lateral working portal. The mid-anterior portal is located at a 45° angle distally from the anterolateral portal at the depression between the Tensor fascia latae muscle and the Sartorius muscle. The trajectory of the mid-anterior portal is more inline with the acetabular rim contour than the anterior portal and may facilitate more anatomic suture anchor placement. This portal can be made under direct visualization in an outside/in fashion using a spinal needle to pierce the capsule. These portals can be atraumatically enlarged to accommodate varying cannula sizes by using the Portal Dilation System. Additionally, in cases of tough capsule resistant to dilation, a Retractable Cannulated Knife (AR-6527-01) can be used over a Nitinol wire to facilitate an interportal capsulotomy to accommodate cannulas and instruments.

LABRAL ASSESSMENT

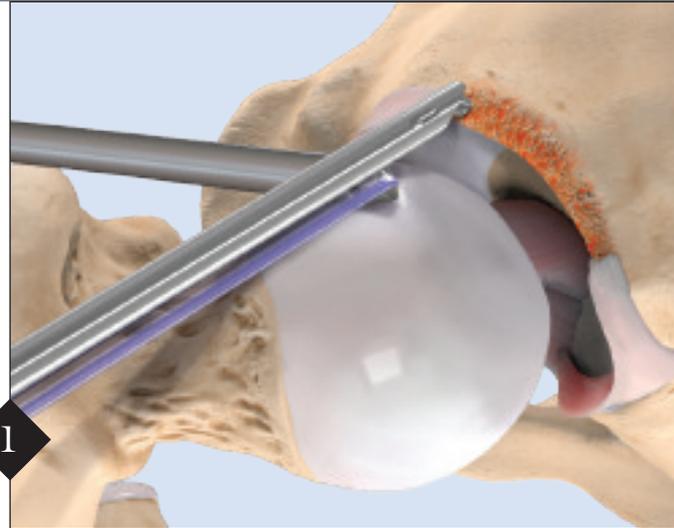
A standard diagnostic evaluation of the joint is performed paying particular attention to chondral and labral dysfunction. Preoperative planning to address coexisting bony abnormalities such as acetabular over-coverage or convexity at the femoral head/neck junction is crucial to a successful outcome and must be corrected surgically. The integrity of the labral tissue is visualized and tested dynamically. Direct visualization of the labral/femoral head congruity as the hip is taken through a full range-of-motion is integral in assessing labral sufficiency. The labrum should contact the femoral head, but not be deflected by it as the hip is flexed. A gap between the two structures within a physiologic range-of-motion indicates labral insufficiency. In the revision setting, capsular scar tissue may simulate labral tissue by adhering to the peripheral acetabulum. This should not be confused with true labral tissue.

GRAFT HARVEST/PREPARATION

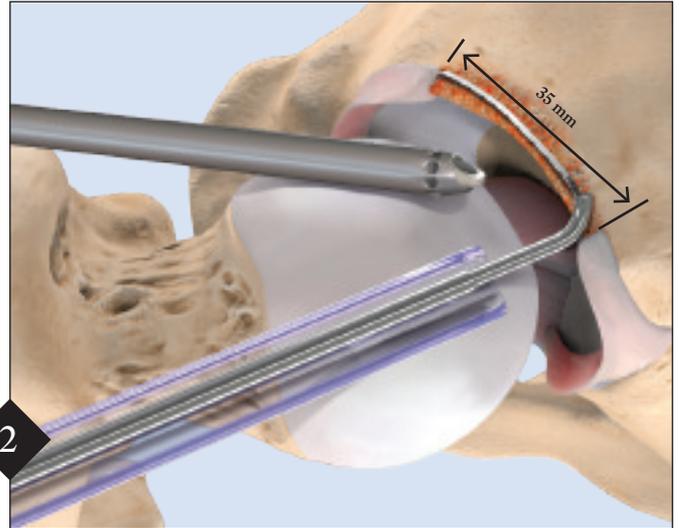
Harvest autograft tissue from either the central/posterior third of the ITB through a separate longitudinal incision 1 cm distal and posterior to the anterolateral portal or from the semitendinosis using a standard harvest technique. If using ITB, the length of the graft is increased by approximately 20% compared to the measured length of the defect to allow for tissue contraction. The edges of the ITB harvest site may be reapproximated or left open in the setting of preoperative peri-trochanteric pain. Alternatively, allograft tissue may be selected.

ARTHROSCOPIC SURGICAL TECHNIQUE

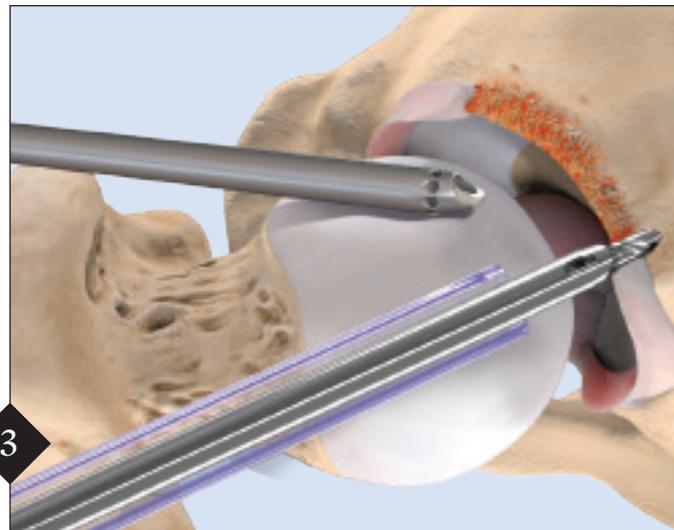
BONE PREPARATION



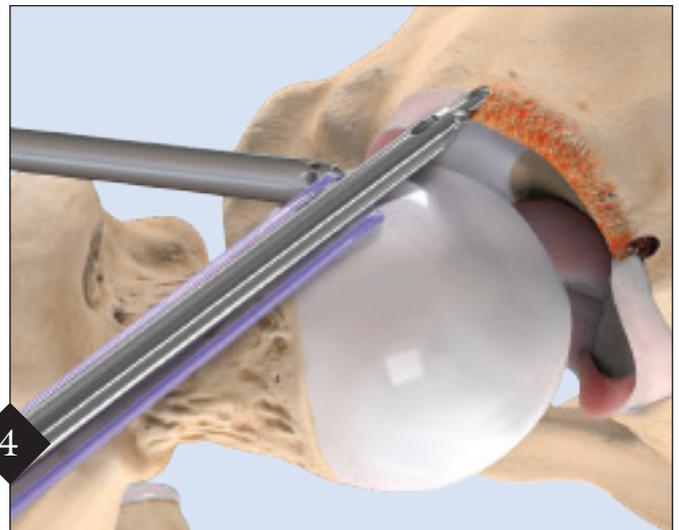
If labral insufficiency is present, debride the remnant labral tissue down to the acetabular rim using a mechanized shaver. Using an arthroscopic burr, perform an acetabuloplasty throughout the length of the labral deficiency leaving a cancellous bony bed behind the acetabular rim.



Measure the length of the segmental labral defect using the Arthroscopic Measurement Probe (AR-4070-01) from the Hip Labral Reconstruction Kit.



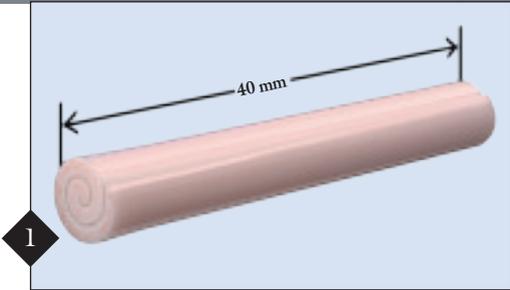
Through the mid-anterior portal, place the appropriate Spear on the medial aspect of the acetabulum where the previous acetabuloplasty was performed. The bone socket locations should be as close to the acetabular articular surface as possible, without penetrating the articular cartilage. Advance a drill on power through the Spear until its collar contacts the Spear's handle. Remove the drill and Spear making note of the bone socket location.



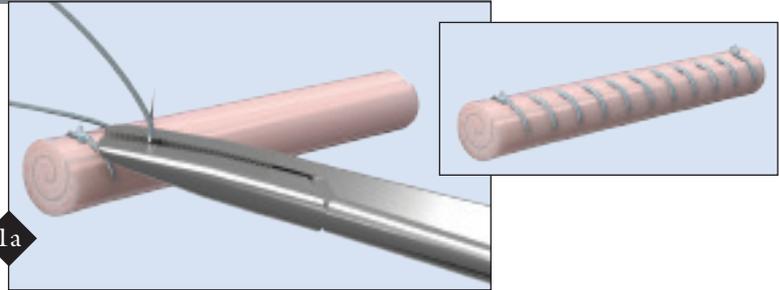
Repeat the same process as step 3 on the lateral aspect of the acetabulum for the second anchor placement. The central anchor pilot hole will be drilled after the graft is secured both medially and laterally.*

**Note: It may be necessary to use the anterolateral portal to place anchors in the posterolateral aspect of the acetabulum, keeping in mind that each bone socket must be drilled through the same portal the anchor will be implanted through.*

GRAFT PREPARATION FOR ANCHOR PLACEMENT

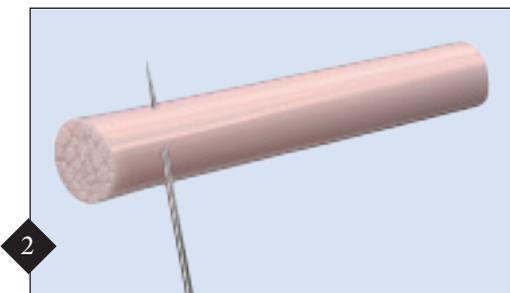


1 If using an iliotibial band (ITB) graft, size it to the appropriate length and roll it into a cylindrical shape.*

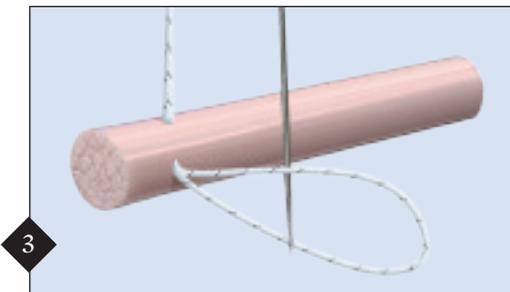
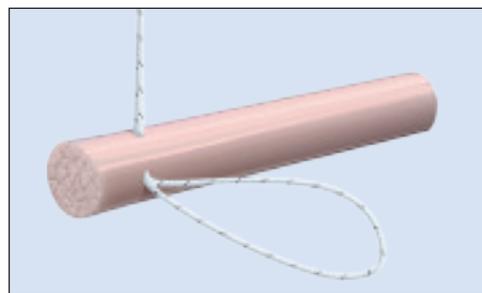


1a Secure the free edge using a running 2-0 FiberWire® whipstitch along the length of the graft. The whipstitched surface will lay against the acetabulum to avoid contact with the femoral head articular cartilage.

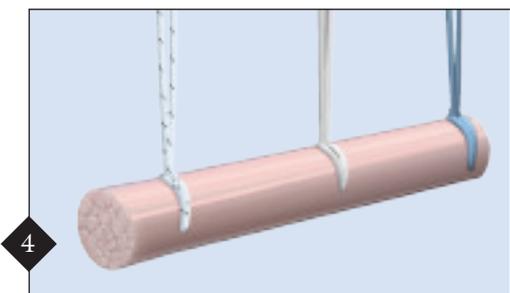
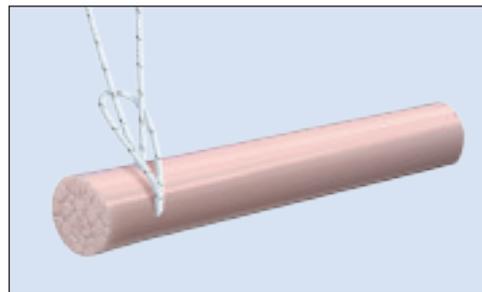
**If using gracilis or semitendinosus tendon autograft or other soft tissue allograft, size the graft to the appropriate length and trim off any unnecessary tissue.*



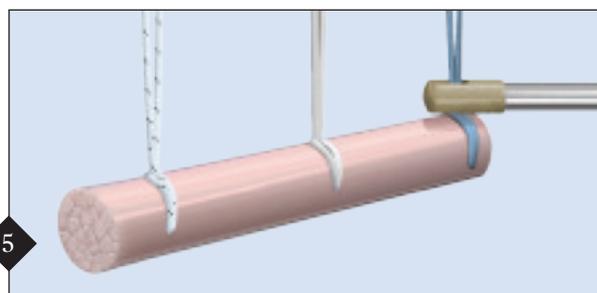
2 Place a #2 TigerLoop® suture needle through one end of the graft ensuring the needle enters and exits in the posterior aspect of the graft (near the 2-0 whipstitch if using ITB). Pull the needle until the loop of suture is approximately 2 cm long.



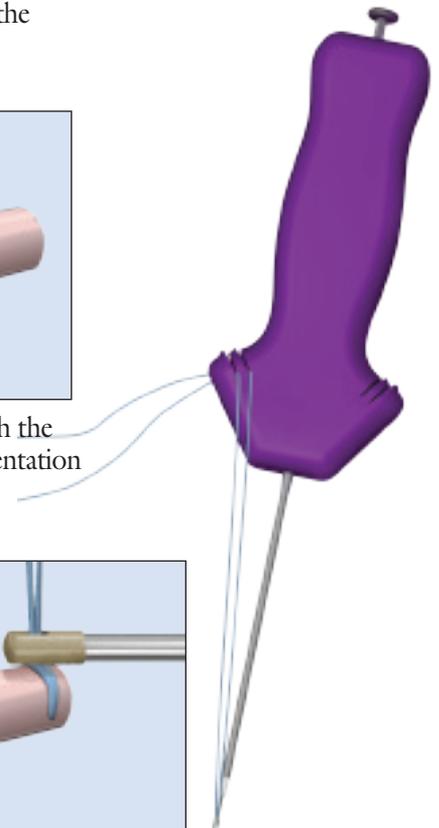
3 Place the needle through the 2 cm loop and pull tight to secure the cinch stitch through the tissue. This ensures the suture will be on the posterior aspect of the graft for proper orientation when implanted.



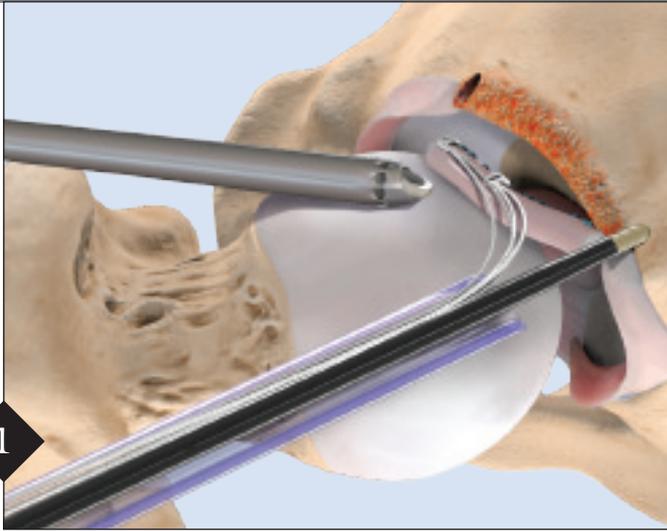
4 Place a blue #2 FiberLoop® suture through the opposite end of the graft and a white #2 FiberLoop suture through the middle of the graft at the midpoint between the two previous #2 FiberLoops in a similar cinch stitch fashion. Alternatively, this suture can be passed arthroscopically after graft fixation to ensure the suture location is ideal.



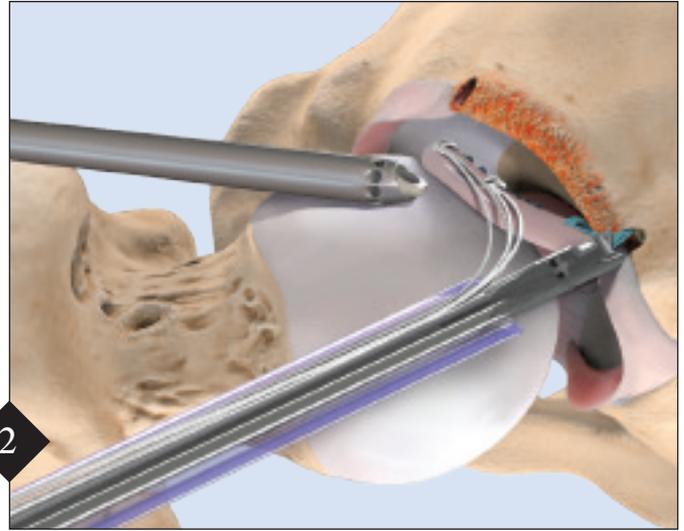
5 Remove all the suture needles and load the blue #2 FiberLoop through the eyelet of the 2.9 mm PushLock anchor and slide the PushLock anchor eyelet flush to the graft. Secure the suture limbs through the cleats on the handle of the PushLock. This portion of the graft will be placed on the medial aspect of the acetabulum during graft insertion.



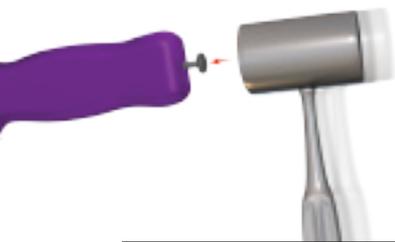
GRAFT PLACEMENT



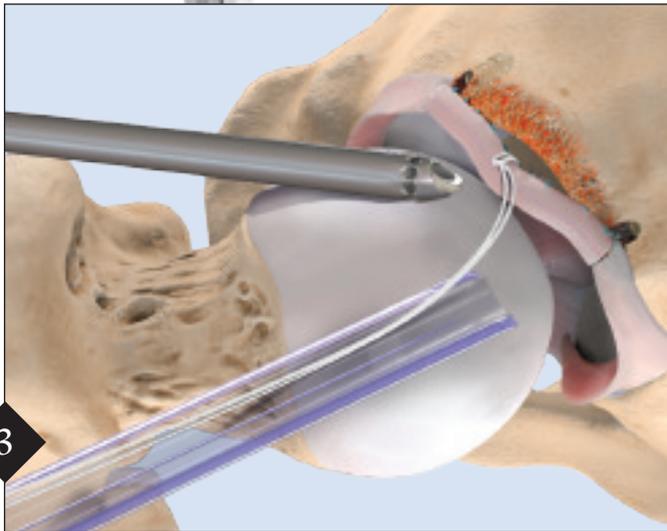
Slide the PushLock anchor into the joint through the Clear Open Cannula (AR-6507-02), while maintaining gentle tension on the FiberWire tails. Advance the anchor eyelet into the prepared bone socket until the main body of the barbed anchor reaches the socket.



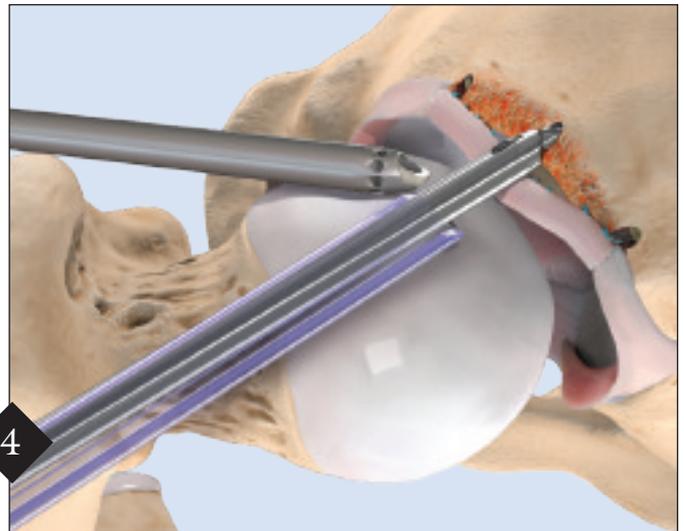
Advance the PushLock anchor body into the bone socket.* After insertion, unscrew the handle from the anchor by turning the handle six complete counterclockwise revolutions before pulling back on the handle. Insert an open ended FiberWire Suture Cutter into the joint and cut the two suture limbs.



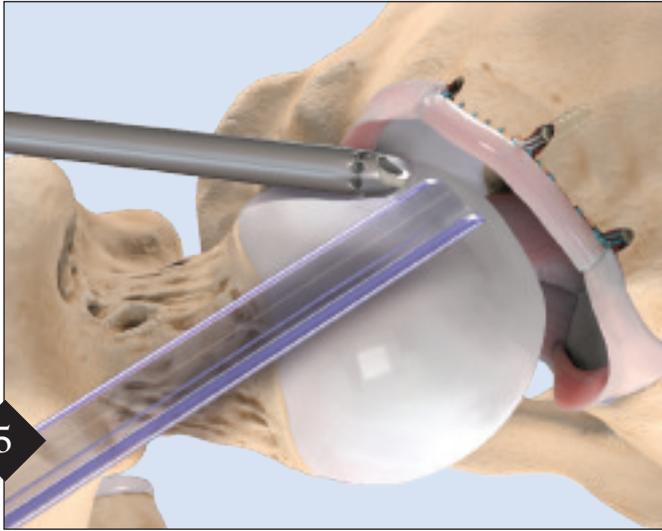
**Note: Full tissue tension should be achieved at this time. If additional tension is desired, pull on the FiberWire tails, while keeping a firm grasp on the driver. If less tension is desired, back the PushLock out of the bone socket and correct the tissue tension by adjusting the slack in the FiberWire prior to reinsertion. Avoid over-tensioning of the labrum as it will lead to labral eversion off the acetabular rim and disrupt the suction seal when in contact with the femoral head.*



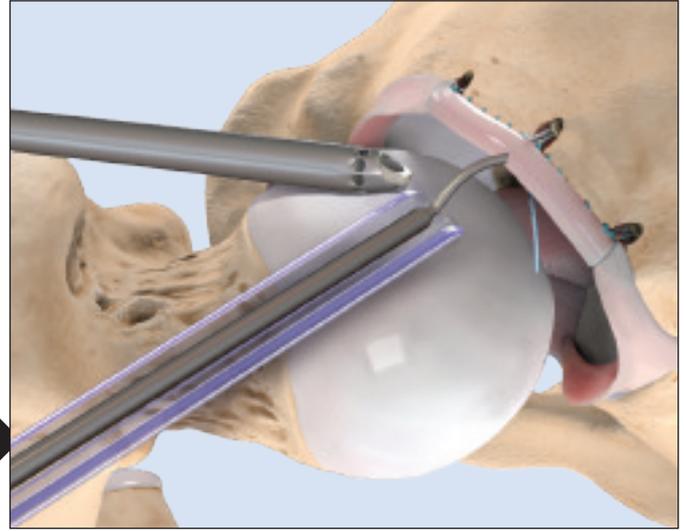
Load the #2 TigerLoop through a 2.9 mm PushLock anchor and repeat steps 1 and 2 to secure the lateral aspect of the graft.



Now that the graft is secured medially and laterally, drill the third bone socket at the location of the white #2 FiberLoop suture in the middle of the graft by repeating step 3 in the “bone preparation” section of this technique guide.



Implant the third PushLock anchor by repeating steps 1 and 2 of this section.



If additional points of fixation are required, additional #2 FiberSticks and small diameter SutureLassos™ are provided in the Hip Labral Reconstruction Kit to allow for standard knotless anchor placement techniques. Additionally, a side-to-side anastomosis stitch may be placed to approximate the graft to the adjacent native labral tissue.

POSTOPERATIVE CARE

Postoperative care is similar to that following an arthroscopic labral repair to include a period of protected weight-bearing, early range-of-motion exercises and isometric strengthening.

References:

1. Ferguson SJ, Bryant JT, Ganz R, Ito K, *An in vitro investigation of the acetabular labral seal in hip joint mechanics*, J Biomech, 2003 Feb;36(2):171-8.
2. Philippon MJ, Briggs KK, Hay CJ, Kuppersmith DA, Dewing CB, Huang MJ, *Arthroscopic labral reconstruction in the hip using iliotibial band autograft: technique and early outcomes*, Arthroscopy, 2010 Jun;26(6):750-6.
3. Domb BG, El Bitar YF, Stake CE, Trenga AP, Jackson TJ, Lindner D, *Arthroscopic labral reconstruction is superior to segmental resection for irreparable labral tears in the hip: a matched-pair controlled study with minimum 2-year follow-up*, Am J Sports Med. 2014 Jan;42(1):122-30. doi: 10.1177/0363546513508256. Epub 2013 Nov 1.

ORDERING INFORMATION

Hip Labral Reconstruction Kit (AR-6955) includes:

PEEK Hip PushLock, 2.9 mm x 15.5 mm, qty. 3	AR-1923PHS
2-0 FiberWire w/Tapered Needle, qty. 3	AR-7220
#2 FiberLoop (blue)	AR-7234
#2 TigerLoop	AR-7234T
#2 FiberLoop (white)	AR-7234-01
#2 FiberStick	AR-7209
#2 TigerStick	AR-7209T
Hip Length Crescent SutureLasso	AR-4068CH
Hip Length 90° SutureLasso	AR-4068-90H
Hip Length PushLock Drill Guide System, 2.9 mm	AR-1923DHS
Arthroscopic Measurement Probe	AR-4070-01
Clear Open Cannula, tapered	AR-6507-01

Additional Instrumentation

Hip Distraction System	AR-6529S
HDS Disposables Kit	AR-6529-11
Hip Arthroscopy Set	AR-6575S
Hip Arthroscopy Master Instrument Set	AR-6517S
Retractable Cannulated Knife, straight	AR-6527-01



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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