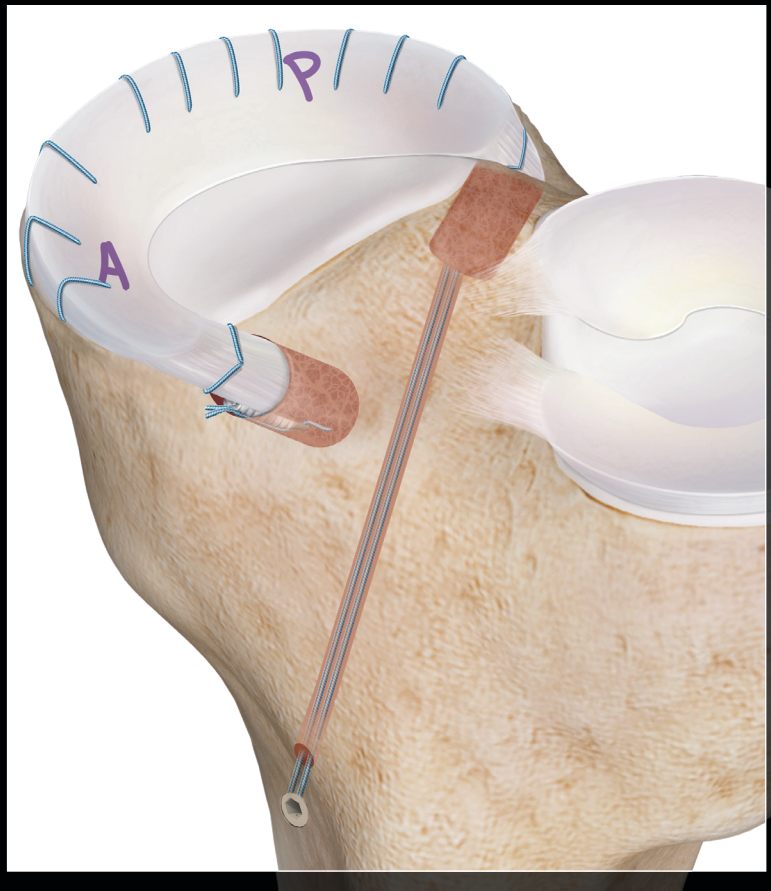
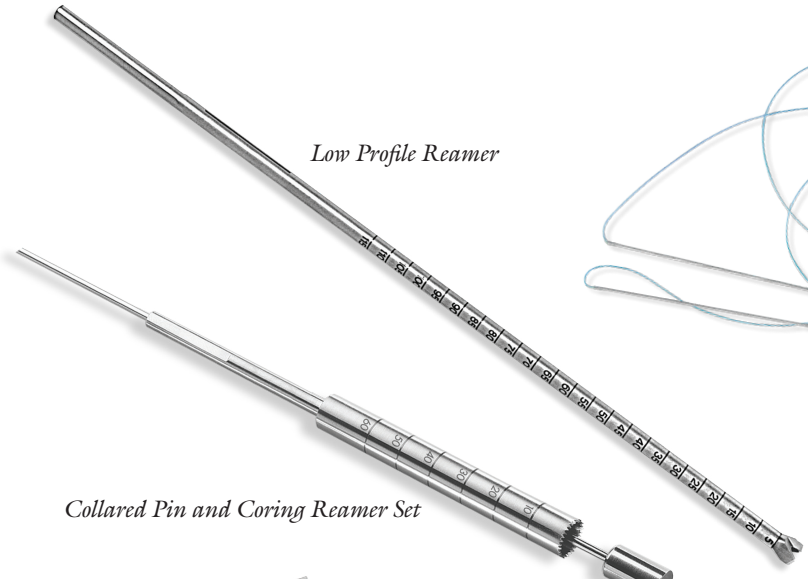
Arthrex®

Double Bone Plug Meniscus Reconstruction

Surgical Technique

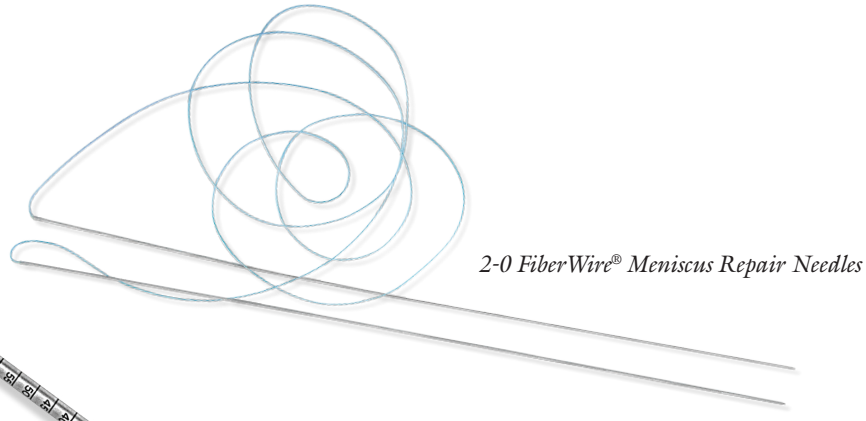


Double Bone Plug Meniscus



Low Profile Reamer

Collared Pin and Coring Reamer Set



2-0 FiberWire® Meniscus Repair Needles

RetroConstruction Drill Guide Set

FlipCutter® II Reamer

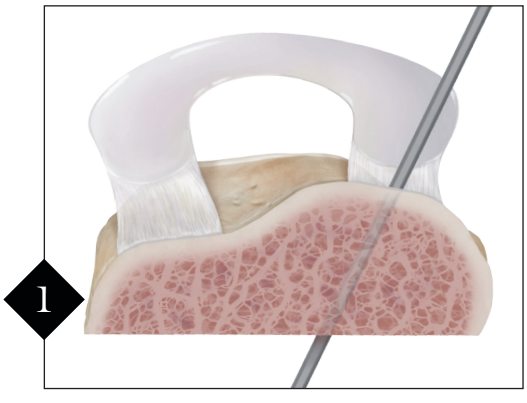
The double bone plug technique for meniscal allograft reconstruction provides a method for implanting the meniscal allograft with rigid fixation at the horn attachments. It has been demonstrated that bony fixation at the attachment site allows for the maintenance of functional hoop stress by the meniscal allograft.[1]

Graft Preparation

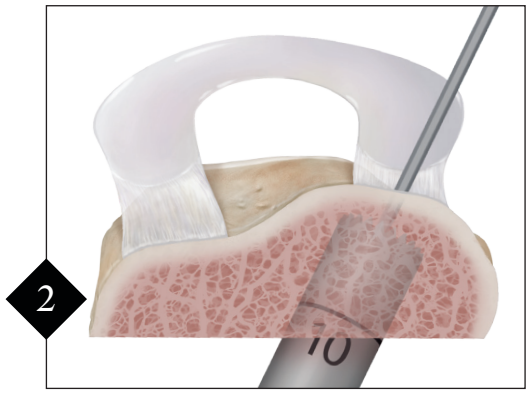
Allow 25 minutes to thaw and dilute the graft. Proper handling instructions are included with the graft.

Option 1 – *Coring Reamer Technique*

Using a Collared Pin and corresponding size Coring Reamer



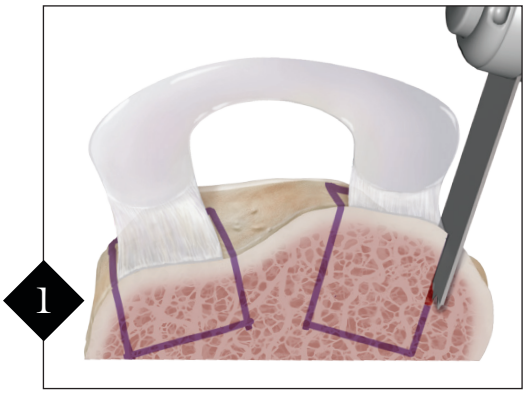
A 2.4 mm guide pin is drilled through the attachments of the allograft at angles that approximate the tunnel to be drilled in the tibia. The pin hole should be extended through the middle of the bone bridge.



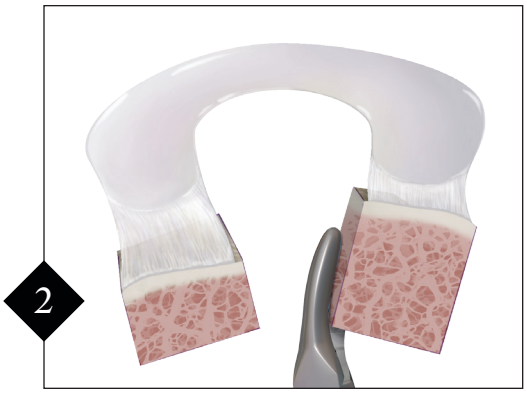
A Collared Pin is inserted into the bottom of the bone bridge, so that a Coring Reamer can be used to cut a dowel.

Option 2 – *Freehand Technique*

Using a microsagittal saw and ronguers



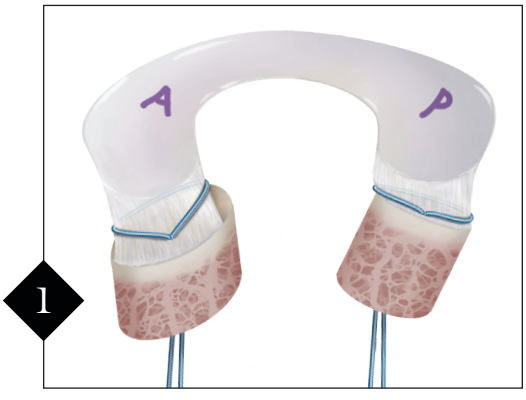
Using a 1 mm microsagittal saw, make 4 box cuts around each of the meniscal horns. Start with the posterior cut, then the anterior cut. Create the medial and lateral cuts. Make these cuts in the same trajectory as the retrograde drilled socket that will be prepared later. Move to the medial side to make sagittal cuts, about 10 mm posterior from the meniscus. To release the bone plug from the donor, cut the meniscus bone block to 10 mm in depth.



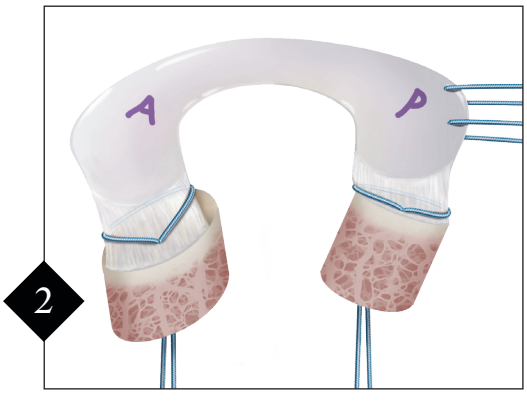
Use a freehand technique to tubularize the bone plugs using ronguers and/or a small saw. Prepare the plugs to have a 7 mm to 8 mm posterior diameter (8 mm long) and a 9 mm anterior diameter (10 mm long).

Suture Passing

Complete these 2 steps for either technique

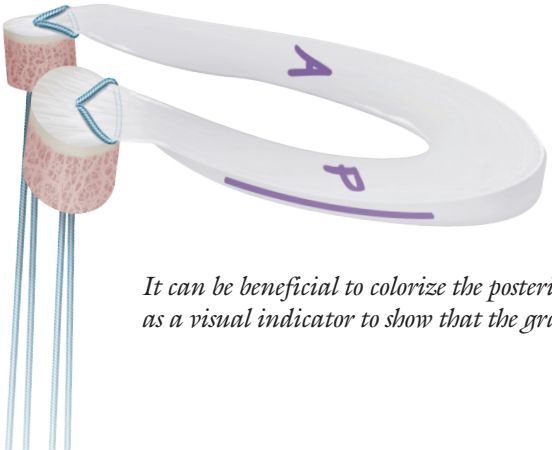


Pass size #2 FiberLoop® suture through the posterior plug. A modified Kessler or horizontal mattress suture incorporating meniscal tissue, is placed through the posterior attachment. Pull the suture back down through the posterior plug. The anterior plug is prepared similarly with #2 FiberWire® suture.



Two vertical #2 FiberWire sutures are placed in the meniscus. The first is the posterior horn vertical suture, 5 mm from posterior bone plug. The second is the midbody vertical suture, 15 mm from the posterior horn suture, toward the body of the meniscus. These provide 2 permanent sutures that will be tied over the capsule posteriorly upon implantation of the construct.

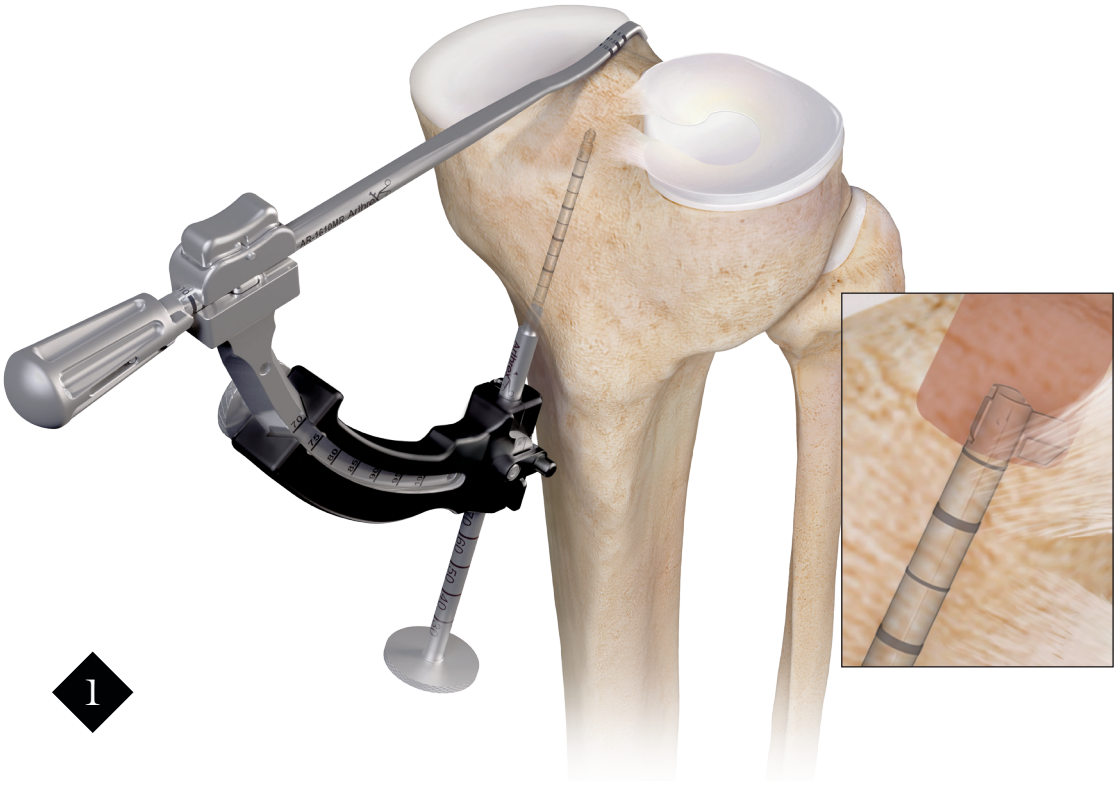
Mark the anterior of the graft with an "A." Not only will this denote the anterior portion, but also show where the last (most anterior) stitch should be placed on the graft. Mark the posterior of the graft with a "P."



It can be beneficial to colorize the posterior rim so when the graft is passed, the color acts as a visual indicator to show that the graft has not rotated or twisted across the joint.

Posterior Tunnel Preparation

Anatomic position: The posterior horn socket will be drilled in a retrograde manner through the anterior-most portion of the residual nub of the meniscus attachment point. It should be appropriately and anatomically juxtaposed to the PCL. This socket should be just off the shoulder of the cartilaginous portion of the plateau and just behind the eminence medially.

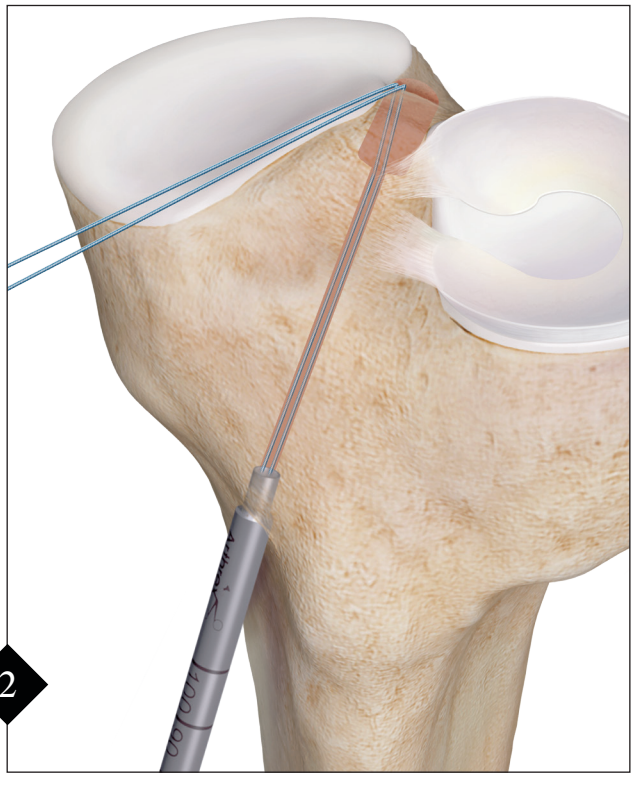


The FlipCutter® reamer is flipped into its cutting position and drilled backward to a depth of 10 mm. The rubber grommet on the FlipCutter reamer is used to measure this 10 mm distance. The posterior tunnel should be drilled 1 mm larger than the posterior plug diameter.

1

The RetroConstruction guide with multi use hook is positioned on the middle of the posterior remnant attachment at an angle that is as perpendicular to the tibial plateau as possible. Choose a FlipCutter reamer size that is 1 mm larger than the diameter of the bone plugs on the donor meniscus.

The FlipCutter reamer is drilled into the middle of the posterior remnant. The guide is removed and the cannula is tapped into bone. After the posterior tunnel is drilled, use a curved rasp or shaver to remove any extraneous pieces of tissue from around the tunnel's superior rim. Any piece of soft tissue or cartilage will present difficulties in reducing the posterior plug. Pass a FiberStick™ suture through the drilled tunnel and retrieve through the portal.



Standard inside/out suturing technique is followed by a 4 cm incision made on the posteriomedial aspect of the knee. Dissect down to the medial head of the gastrocnemius. Make a small vertical incision and dissect further to the posteromedial capsule.

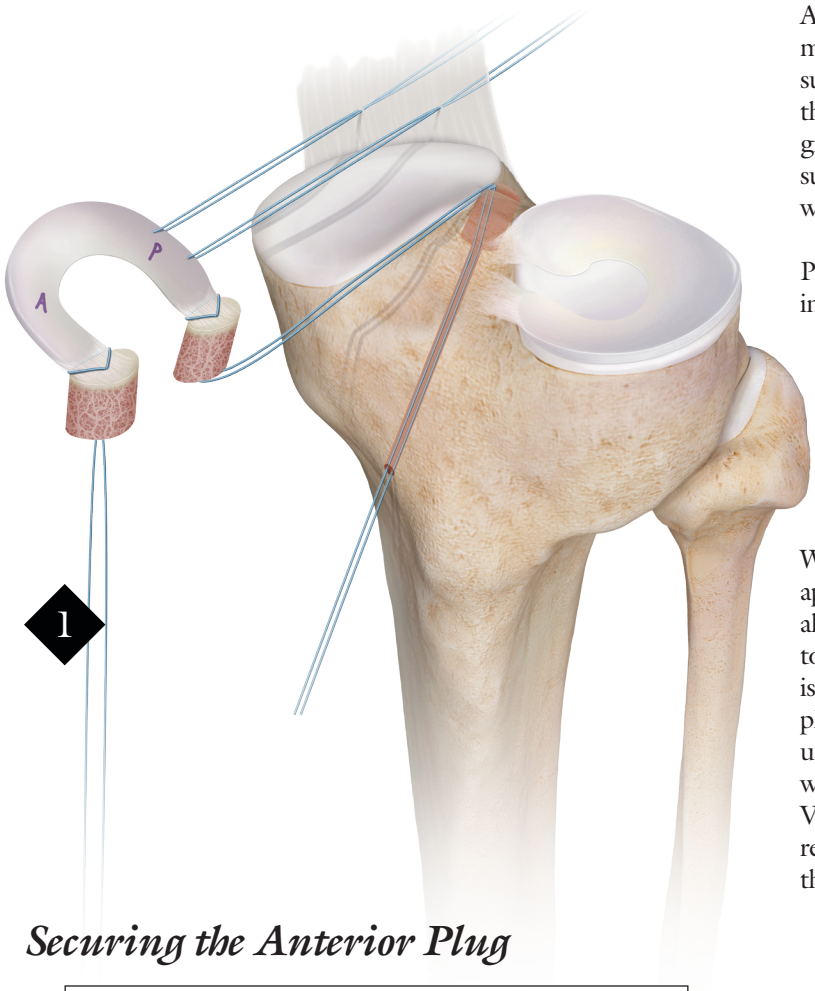
2

Pass a FiberStick suture through the FlipCutter drill sleeve and retrieve the passing sutures through the medial portal.

Passing the Allograft

With direct visualization, pass a Micro SutureLasso™ suture passer through the notch in the dilated portion that was created for the passage of the posterior horn. Use the suture passer to move the passing suture out of the posterior capsule. The passing suture will then be used to deliver the posterior horn vertical suture that was placed on the meniscal transplant construct.

With the knee in valgus position, this same technique will be used to place a second passing suture at the midbody of the capsule. This passing suture will be used to deliver the midbody vertical suture that was placed on the meniscal transplant construct.



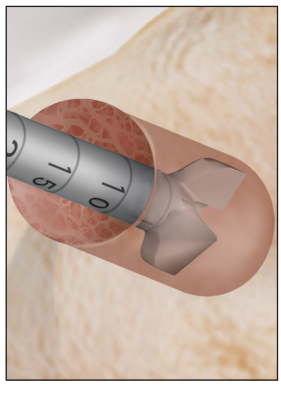
A PassPort Button™ cannula can aid in suture management and avoid a soft-tissue bridge between passing sutures. It should be used in at least 1 anterior portal that is ipsilateral to the transplant. This is critical so the graft does not twist on itself during implantation. Be sure to remove the cannula before passing the allograft, while maintaining suture segregation.

Pass the 3 posterior passing sutures on the allograft in the following order:

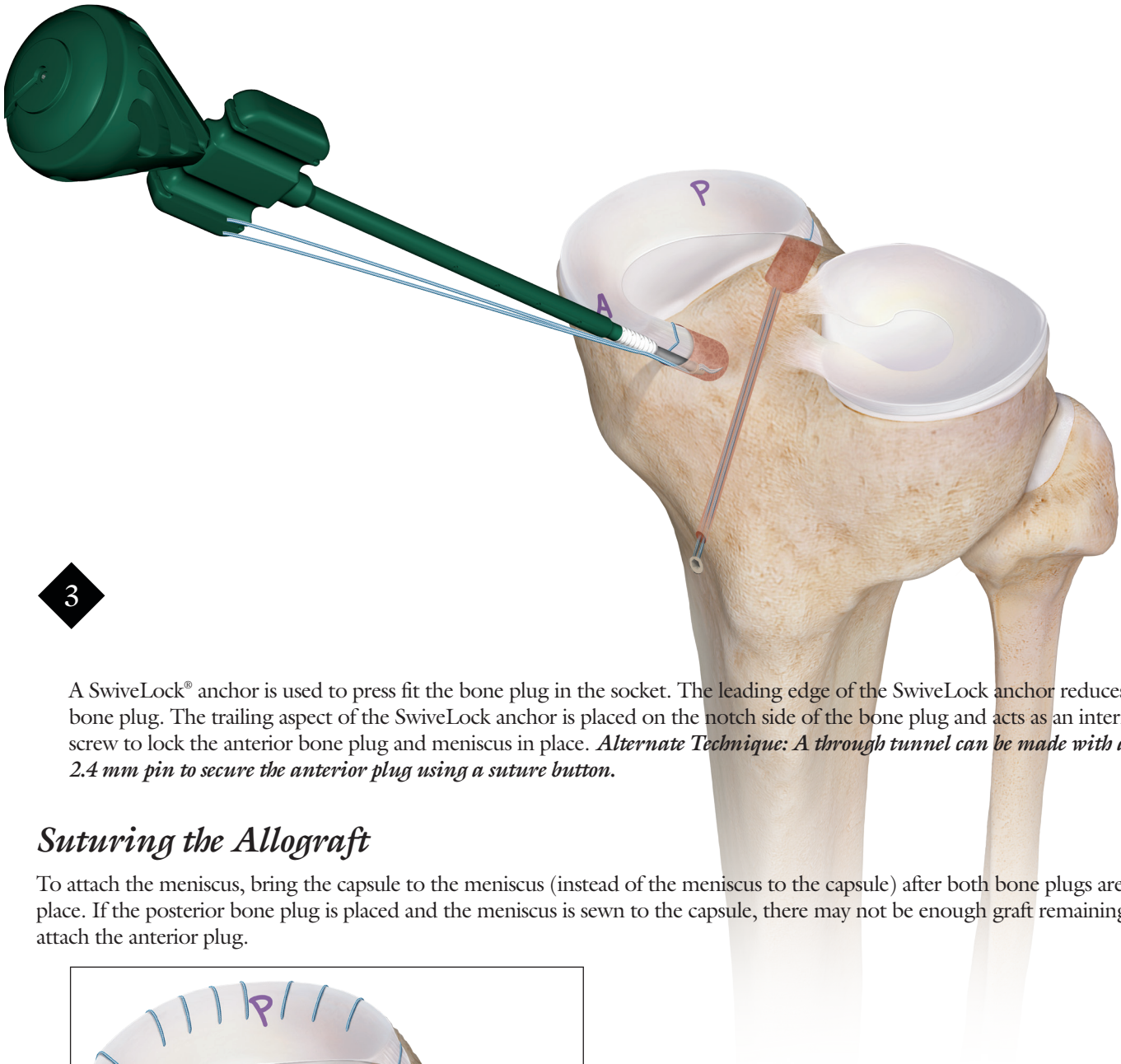
1. Tie the suture on the posterior horn bone plug to the passing suture that was previously placed through the posterior socket.
   Note: Do not pass the meniscus at this time.
2. Pass the posterior horn passing sutures.
3. Pass the midbody passing sutures.

With adequate space, pass the graft around the gutter applying valgus stress on the knee. Begin inserting the allograft by first passing the posterior horn. Continue to take up any slack in the other sutures as the allograft is inserted. Use a probe to help guide the posterior bone plug into place. A meniscal probe or blunt instrument is used to maneuver the posterior plug around the gutter, while applying gentle traction on the posterior suture. Visualize to ensure that the plug and the meniscus have reduced properly. Pass the posterior horn suture through the capsule and midbody sutures and tie.

Securing the Anterior Plug



Use the 2.4 mm drill sleeve to help protect the patella and soft tissues to deliver a 2.4 mm pin in the correct anatomic position of the anterior meniscus attachment. Use a Low Profile Reamer to drill a 10 mm deep socket. Ensure that the anterior horn sutures are safely out of the way before drilling.

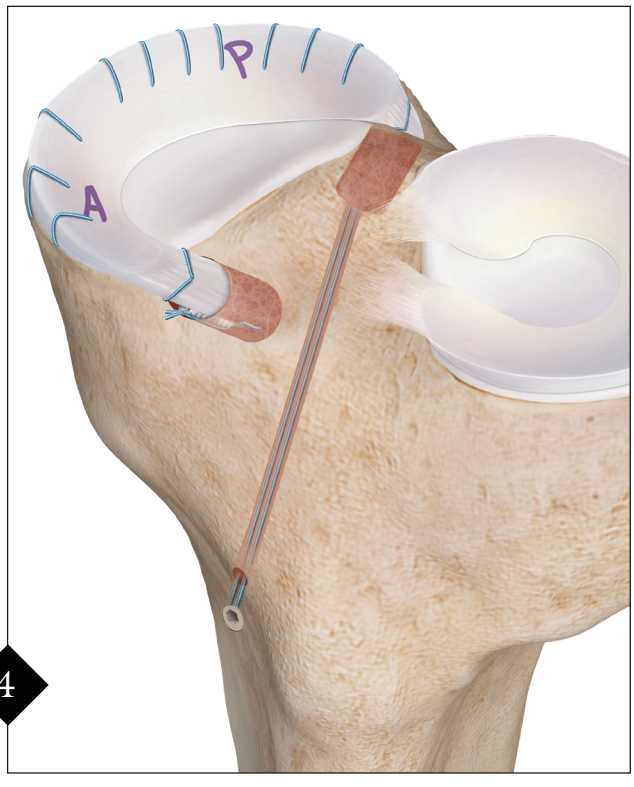


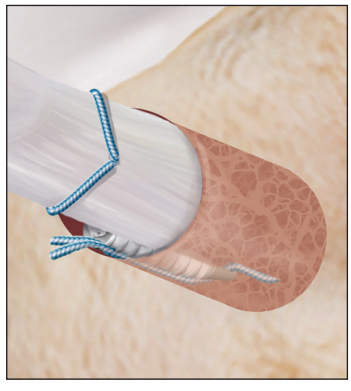
3

A SwiveLock® anchor is used to press fit the bone plug in the socket. The leading edge of the SwiveLock anchor reduces the bone plug. The trailing aspect of the SwiveLock anchor is placed on the notch side of the bone plug and acts as an interference screw to lock the anterior bone plug and meniscus in place. ***Alternate Technique: A through tunnel can be made with a 2.4 mm pin to secure the anterior plug using a suture button.***

Suturing the Allograft

To attach the meniscus, bring the capsule to the meniscus (instead of the meniscus to the capsule) after both bone plugs are in place. If the posterior bone plug is placed and the meniscus is sewn to the capsule, there may not be enough graft remaining to attach the anterior plug.





4

The anterior sutures of the meniscocapsular interface may be placed under direct visualization. Size 2-0 absorbable suture is frequently used for this application. The arthrotomy should be closed so that the remaining sutures can be placed using routine arthroscopic meniscal repair techniques with 2-0 FiberWire® meniscus repair needles. Remove the posteromedial guide suture, as it is unlikely to be in the proper anatomic position to serve as a fixation suture.

Add vertical sutures for additional strength. Routinely, 6-8 sutures are used to secure the peripheral interface.

ORDERING INFORMATION

RetroConstruction Drill Guide Set	AR-4555S
Side-Release RetroConstruction Handle	AR-1510HR
Meniscal Root Marking Hook	AR-1610MR
Locking Guide for Meniscal Root Marking Hook	AR-1610LG
Coring Reamer and Collared Pin Set, 9 mm	AR-1223S
Coring Reamer and Collared Pin Set, 10 mm	AR-1224S
Low Profile Reamer, 10 mm	AR-1410LP
Suture Retriever	AR-12540
Suture Cutter	AR-12250
Knee Scorpion™ Suture Passer	AR-12990

Disposables

Knee Scorpion Needle	AR-12990N
#2 FiberLoop® Suture, w/straight needle	AR-7234
FiberStick™ Suture, #2 FiberWire® Suture, 50”	AR-7209
TigerStick® Suture, #2 TigerWire® Suture, 50”	AR-7209T
#2 FiberWire Suture, 38” w/Tapered Needle	AR-7200
Micro SutureLasso™ suture passer, minor bend	AR-8701
FlipCutter® II Reamers, 6 mm – 13 mm	AR-1204AF-60 – 130
Suture Button, 3.5 mm	AR-8920
Suture Button, 12 mm round	AR-8922
2-0 FiberWire Meniscus Repair Needles	AR-7223
Protector™ Meniscus Suturing Set	AR-4060S
Meniscal Repair Joystick System	AR-4007JS
BioComposite SwiveLock® Anchor, 3.5 mm	AR-2325BCC
Drill for 3.5 mm BioComposite SwiveLock Anchor	AR-2325D
PassPort Button™ Cannulas, 6 mm x 2 cm – 5 cm	AR-6592-06-20 – 50
PassPort Button Cannulas, 8 mm x 2 cm – 5 cm	AR-6592-08-20 – 50
PassPort Button Cannulas, 10 mm x 2 cm – 5 cm	AR-6592-10-20 – 50

Reference

1. Chen MI, Branch TP, Hutton WC. Is it important to secure the horns during lateral meniscal transplantation? A cadaveric study. *Arthroscopy.* 1996;12(2):174-181.

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. Postoperative management is patient specific and dependent on the treating professional's assessment. Individual results will vary and not all patients will experience the same postoperative activity level or outcomes.

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