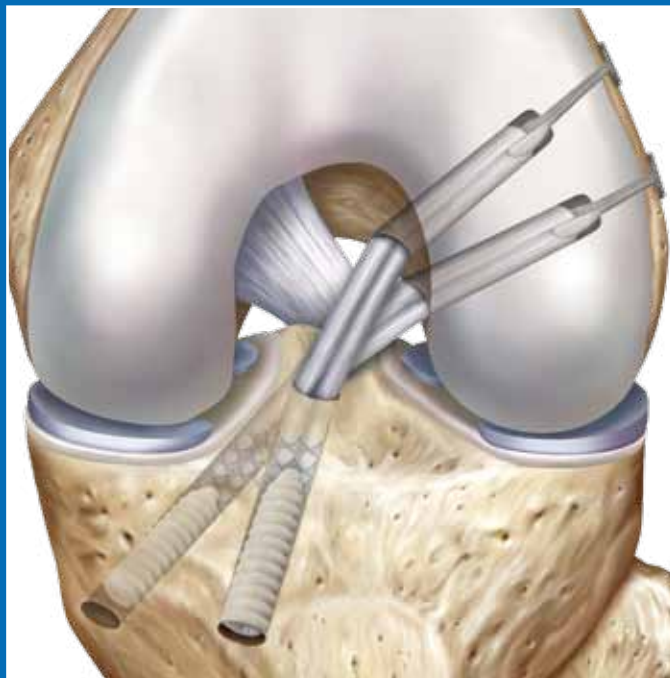




Double Bundle ACL Reconstruction

Surgical Technique



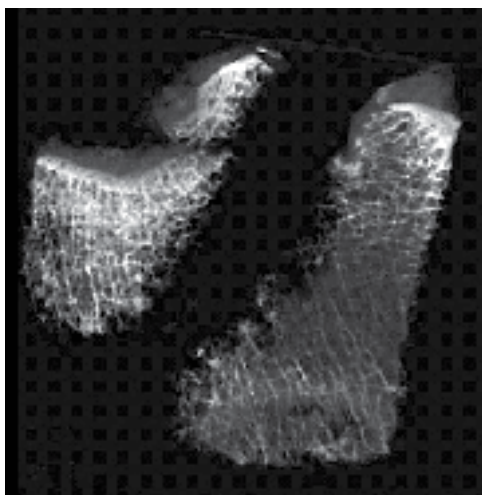
# Double Bundle ACL Reconstruction

Double bundle ACL reconstruction allows more accurate recreation of native anatomy by replicating both the anteromedial (AM) and posterolateral (PL) bundles of the ACL. Recent biomechanical studies have suggested that double bundle ACLR can more effectively restore rotational stability of the knee theoretically improving short and long term outcomes. Arthrex DB ACL instrumentation allows precise placement of femoral and tibial sockets and helps avoid common technical errors such as tunnel convergence and drilling inaccuracy.

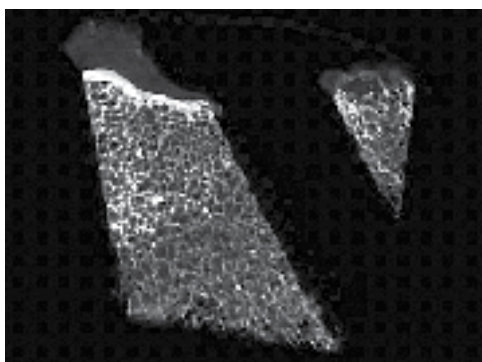
The **Transportal ACL Guides (TPGs)** facilitate femoral socket creation through the anteromedial portal, thus allowing more freedom in socket placement than transtibial techniques. Multiple sizes allow custom wall thickness depending on socket diameter and the angled tip ensures 30° of divergence between sockets.

**Low Profile Reamers** facilitate femoral socket drilling from AM portal.

The **RetroDrill®** allows surgeons to visualize full tunnel diameter before drilling tibial tunnels and has been proven to better preserve tibial plateau cortical bone than standard antegrade drilling. Inside/out drilling on the tibia also ensures separation and divergence of tibial tunnels.



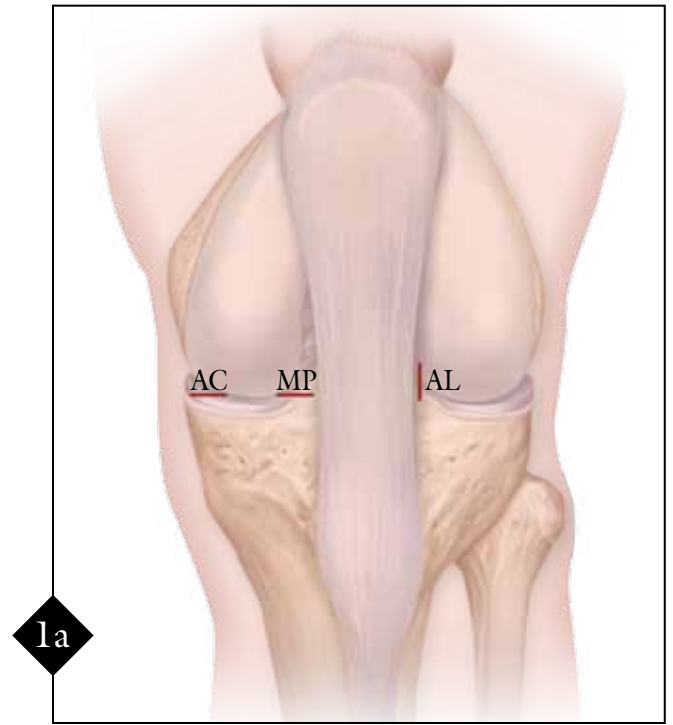
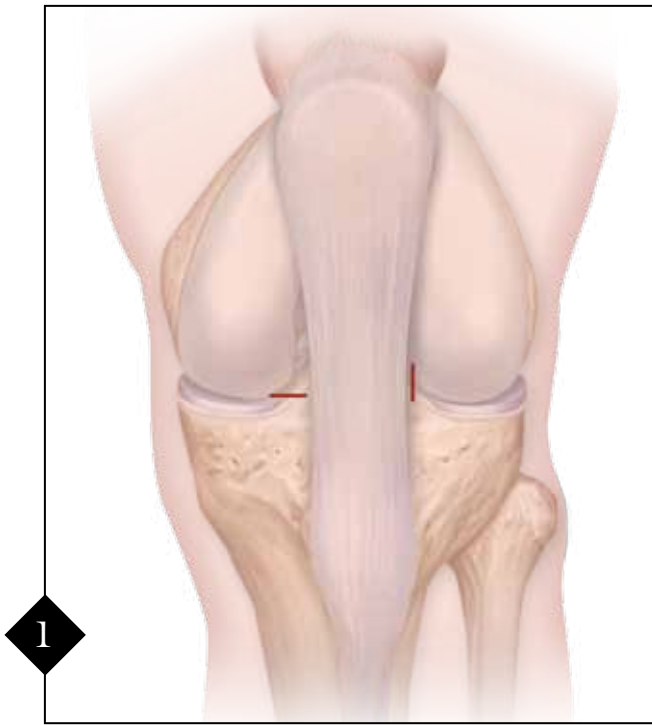
Three-dimensional and sagittal computed tomography of tibial tunnel specimen, from antegrade group, demonstrates fracture of subchondral bone\*



Three-dimensional and sagittal computed tomography of tibial tunnel, after retrograde drilling, shows no subchondral fracture or microtrauma\*

\*McAdams TR, et al, *Tibial Aperture Bone Disruption after Retrograde vs. Antegrade Tibial Tunnel Drilling: a Cadaveric Study*. Knee Surg., Sports Trauma., Arthro., 2008.

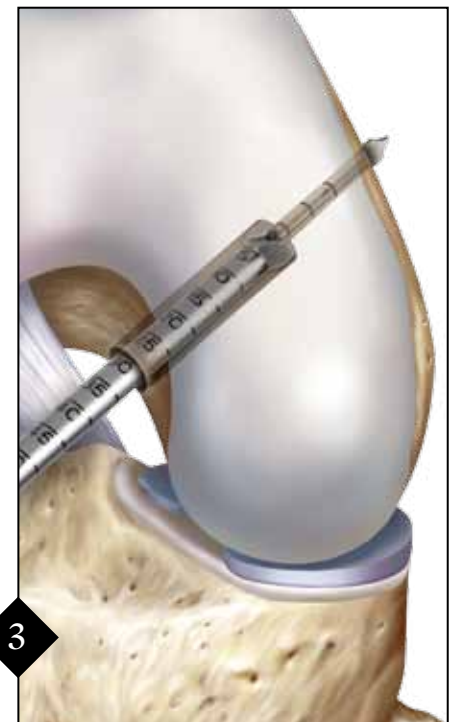
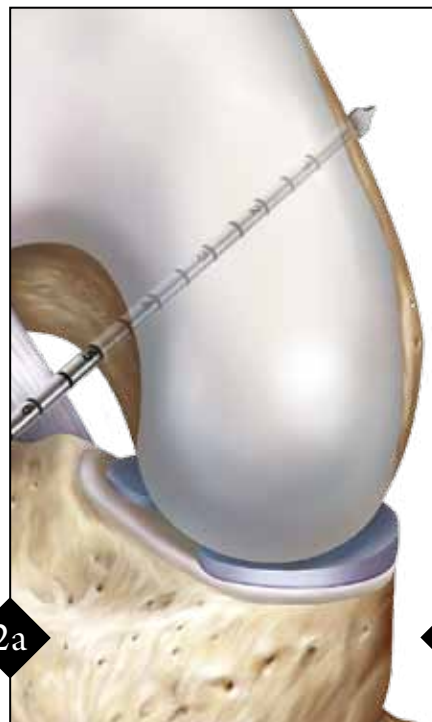
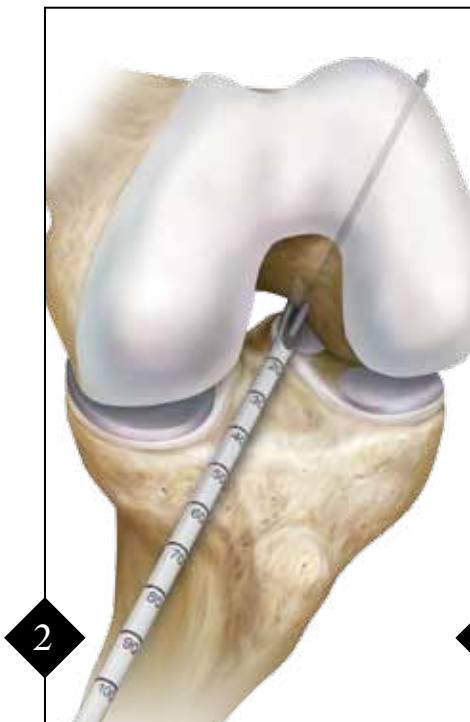
## PORTAL PLACEMENT



Two to three arthroscopic portals are routinely used. A lateral viewing portal (AL), a medial parapatellar viewing portal (MP) and occasionally an accessory medial working portal (AC). After making the AL and MP portals a spinal needle is inserted approximately 1.5 cm medial and .5 cm inferior to the MP. Arthroscopically visualize the needle entering above the medial meniscus and confirm that the femoral footprint can be reached with the tip of the needle before making the AC portal.

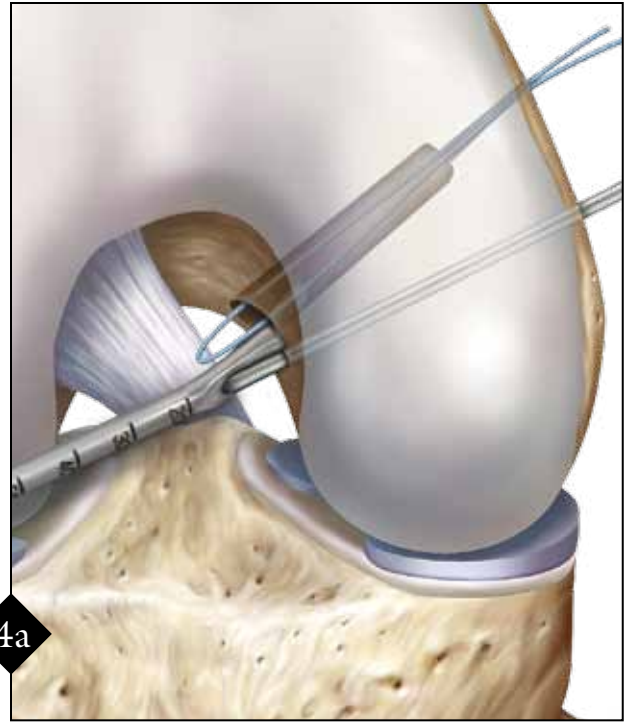
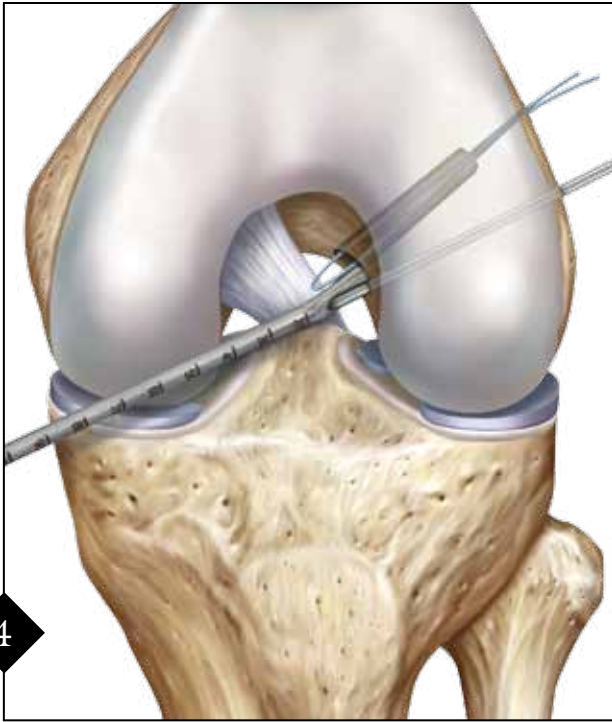
## FEMORAL SOCKET PREPARATION

Anteromedial (AM) socket preparation may be carried out by viewing through the AL portal while drilling through the MP or AC portal. Alternatively, the surgeon may view from the MP and drill through the AC.



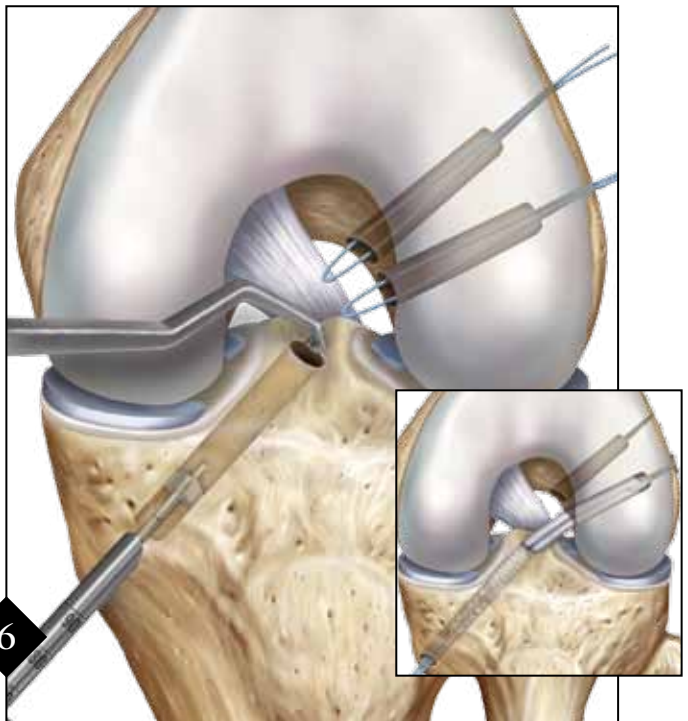
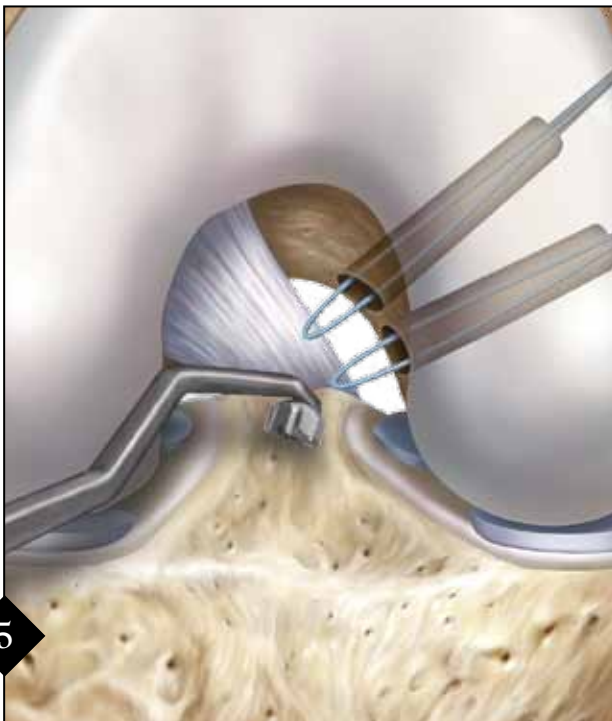
Load the Transportal Femoral Guide (TPG) of appropriate offset (radius of socket plus 1 or 2 mm) with the RetroButton® Pin II. Flex the knee to approximately 110°. Place the TPG through the MP or AC and position against the posterior cortex. Drill the RetroButton Pin II through the center of the AM bundle footprint. After the pin exits the lateral femoral cortex, remove the drill and TPG. Pull back on the RetroButton Pin II until the spade tip catches on the lateral femoral cortex. Read the intraosseous distance off the pin shaft intraarticularly. Using a Low Profile Reamer, drill the femoral socket 10 mm deeper than desired graft depth in the socket. Choose RetroButton loop length for AM socket. Leave a passing suture in the AM socket for graft passing.



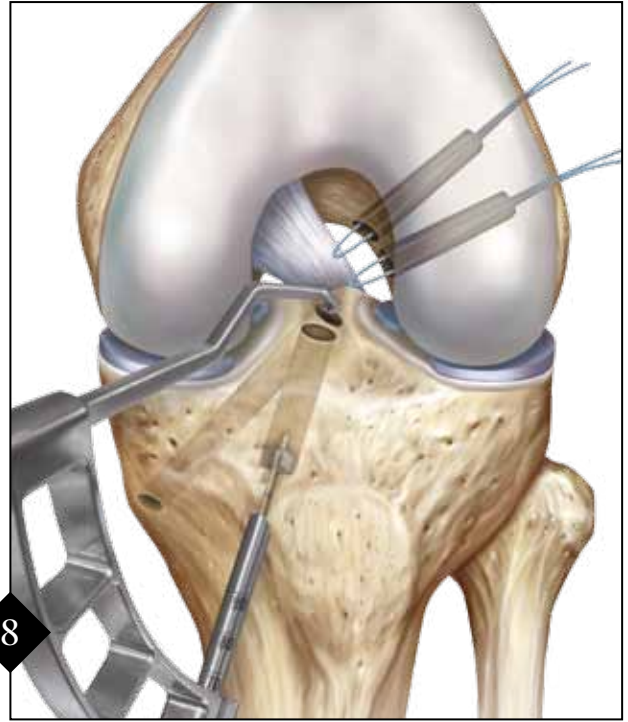
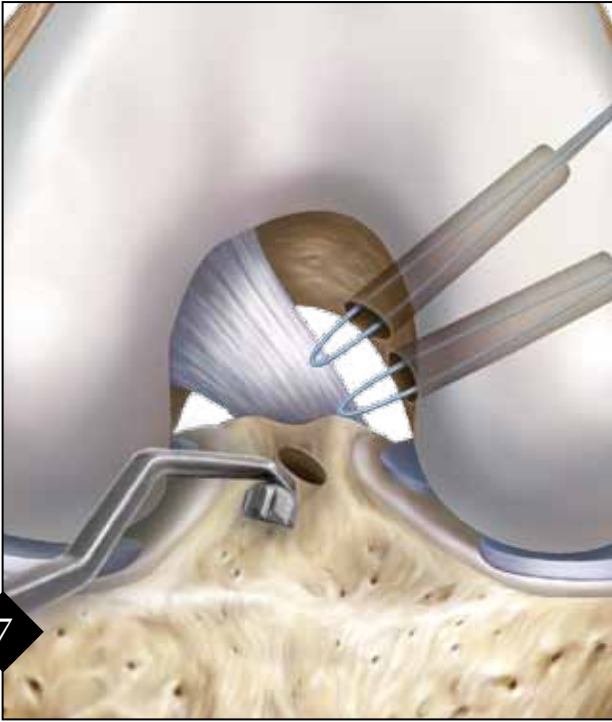


Posterolateral (PL) socket creation can also be carried out through the MP, but most commonly is performed through the AC. Load TPG of appropriate offset (radius of PL socket plus 2-3 mm) with RetroButton Pin II. Place TPG offset against the anterior/distal lip of the AM socket. In this position, the TPG will give 30° of divergence between sockets and preserve the appropriate 2-3 mm bone bridge between AM and PL sockets. Drill RetroButton Pin II through the center of the PL footprint and note the intraosseous length. Drill socket to appropriate depth and choose RetroButton length and leave a passing suture in the PL socket for graft passing.

## TIBIAL TUNNEL PREPARATION

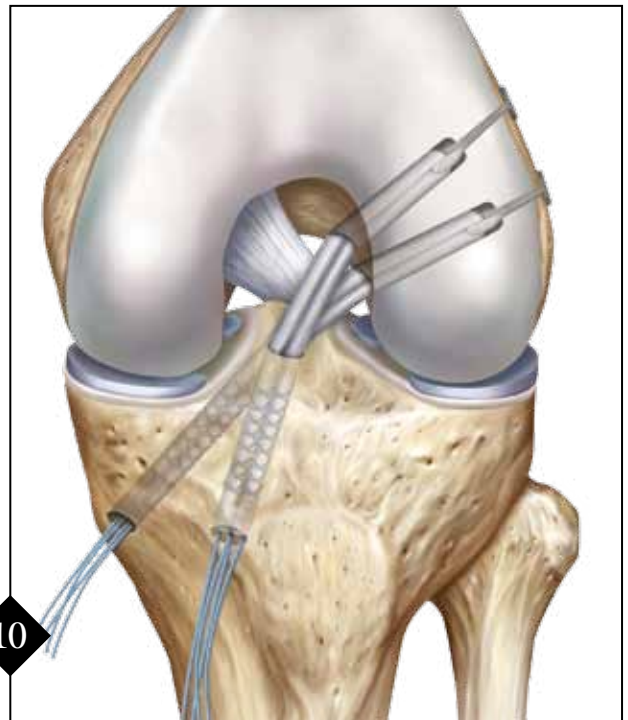
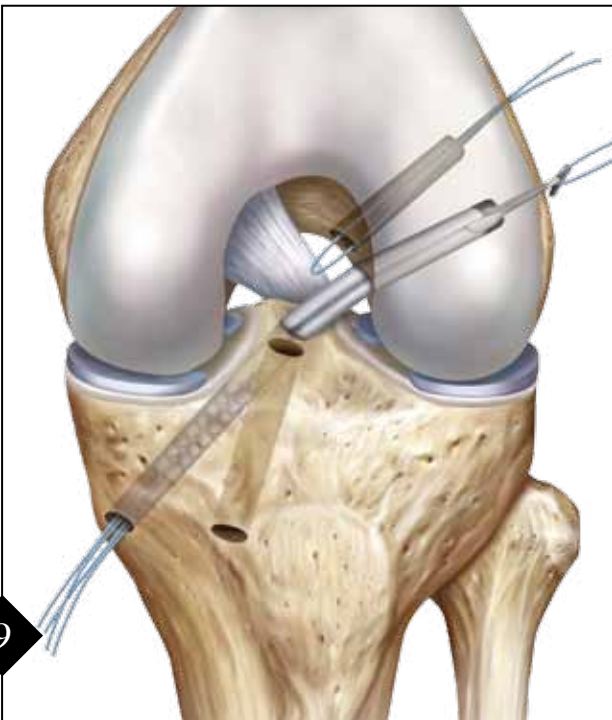


Choose appropriate sized RetroCutter for the PL tunnel and attach to the RetroDrill guide. Place RetroCutter over the PL footprint. RetroCutter allows visualization of tunnel circumference before drilling and should be centered anterior to the PCL, medial to the posterior root of the lateral meniscus and posterior to the AM footprint. The drill sleeve should be approximated to the tibial cortex just anterior to the MCL, giving the PL tunnel an oblique angle of approximately 60° to the tibial plateau. The RetroDrill Pin is then drilled into the tibia until engaging the RetroCutter. Once attached, distal traction and forward drilling will create tibial tunnel. If a RetroScrew is being used for tibial fixation of the PL graft it should be done at this time.



The AM tunnel is then created by placing the appropriate sized RetroCutter over the AM footprint just anterior and medial to the tibial tunnel, at the level of the anterior root of the lateral meniscus. Approximately 3 mm of bone should remain between tunnels at the tibial plateau. This can be visualized arthroscopically with the RetroCutter in place. The AM tunnel should be oriented in a more vertical direction than the PL to make sure tunnels diverge externally.

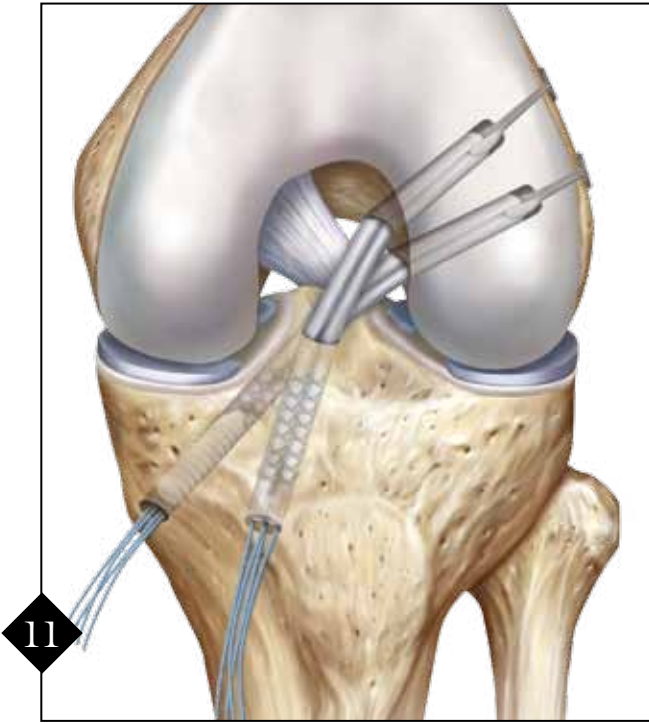
## PASSING OF GRAFTS AND FEMORAL FIXATION



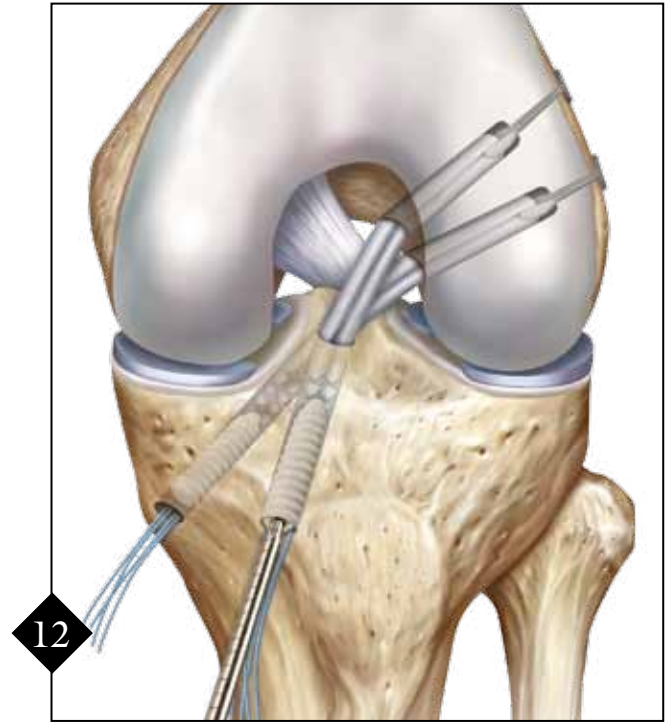
Pass the PL graft first by retrieving the femoral passing suture through the tibial tunnel. Use the passing suture to pull the PL RetroButton/graft construct through the tibia and into the femur. Repeat these steps for the AM bundle. Tension each graft while cycling the knee. *Optional: If aperture fixation is desired, an interference screw may be placed into the femoral sockets immediately after passing each graft.*



## TIBIAL FIXATION OF GRAFTS

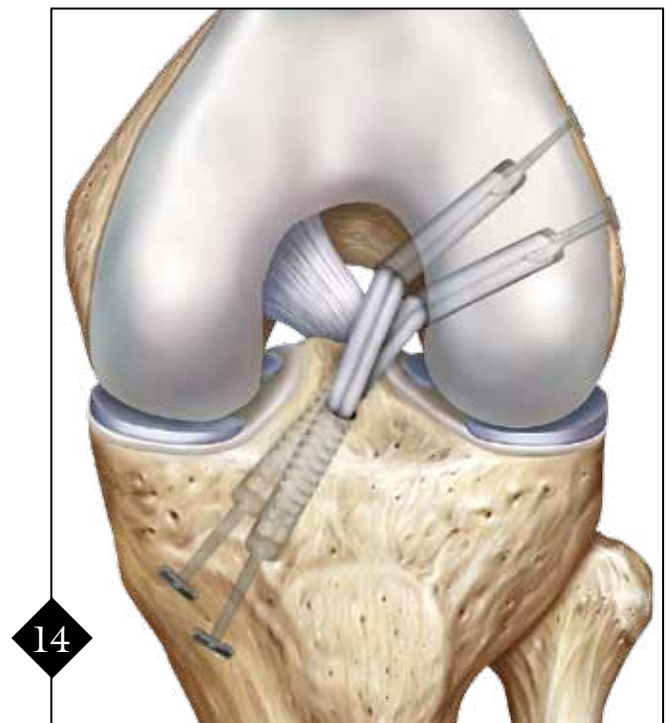
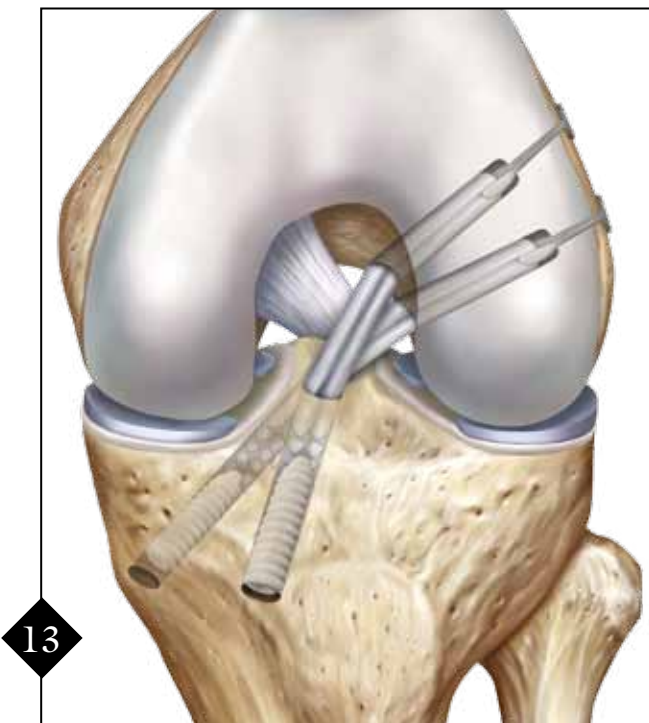


With the knee in full extension, the PL graft is fixed on the tibial side with a full thread Bio-Interference Screw, if not already completed with a RetroScrew.



With the knee in 30° of flexion, the AM bundle is fixed with a RetroScrew or a full thread Bio-Interference Screw.

## ALL-INSIDE OPTION



Using the same socket preparation tools and RetroButton/RetroScrew implants, an all-inside version of the double bundle technique decreases patient morbidity and bone removal from this four-tunnel procedure.

## ORDERING INFORMATION

### Disposables:

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RetroButton Drill Pin II	AR-1595
RetroDrill Guide Pin, 3 mm, cannulated	AR-1250RP
RetroCutters, 5 mm - 12 mm, in .5 increments	AR-1204R-05S - 12S
Low Profile Reamers, 5 mm - 11 mm	AR-1405LP - 1411LP

### Instruments:

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RetroScrew Driver, thin	AR-1586T
Constant Tibial Guide for RetroDrill, 52.5°	AR-1775R
Drill Sleeve for Constant Tibial Guide for RetroDrill	AR-1776R
Transportal ACL Guide (TPG), 4 mm - 8 mm	AR-1800-04 - 08
BioComposite Interference Screw Instrumentation Set	AR-1996S

### Suture:

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#2 FiberWire, 38" (1 blue, 1 white/black)	AR-7201
#2 FiberLoop w/Straight Needle	AR-7234
#2 TigerLoop w/Straight Needle	AR-7234T

### Interference Screws:

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RetroScrew, 7 mm x 20 mm	AR-1586RB-07
RetroScrew, 8 mm x 20 mm	AR-1586RB-08
RetroScrew, 9 mm x 20 mm	AR-1586RB-09
RetroScrew, 10 mm x 20 mm	AR-1586RB-10
RetroScrew Reverse Thread, 8 mm x 20 mm	AR-1586LB-08
RetroScrew Reverse Thread, 9 mm x 20 mm	AR-1586LB-09
RetroScrew Reverse Thread, 10 mm x 20 mm	AR-1586LB-10
BioComposite RetroScrew, 7 mm x 20 mm	AR-1586RC-07
BioComposite RetroScrew, 8 mm x 20 mm	AR-1586RC-08
BioComposite RetroScrew, 9 mm x 20 mm	AR-1586RC-09
BioComposite RetroScrew, 10 mm x 20 mm	AR-1586RC-10
BioComposite Interference Screw, 6 mm x 23 mm	AR-1360C
BioComposite Interference Screw, 7 mm x 23 mm	AR-1370C
BioComposite Interference Screw, 8 mm x 23 mm	AR-1380C
BioComposite Interference Screw, 9 mm x 23 mm	AR-1390C
BioComposite Interference Screw, 10 mm x 23 mm	AR-1400C
BioComposite Interference Screw, Full Thread, 7 mm x 28 mm	AR-1370TC
BioComposite Interference Screw, Full Thread, 8 mm x 28 mm	AR-1380TC
BioComposite Interference Screw, Full Thread, 9 mm x 28 mm	AR-1390TC
BioComposite Interference Screw, Full Thread, 10 mm x 28 mm	AR-1400TC
BioComposite Interference Screw, Full Thread, 11 mm x 28 mm	AR-1403TC
BioComposite Interference Screw, Full Thread, 12 mm x 28 mm	AR-1404TC

### 12 mm titanium RetroButtons:

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RetroButton, 15 mm loop	AR-1588-15
RetroButton, 20 mm loop	AR-1588-20
RetroButton, 25 mm loop	AR-1588-25
RetroButton, 30 mm loop	AR-1588-30
RetroButton, 35 mm loop	AR-1588-35
RetroButton, 40 mm loop	AR-1588-40
RetroButton, 45 mm loop	AR-1588-45
RetroButton, 50 mm loop	AR-1588-50
RetroButton, 55 mm loop	AR-1588-55
RetroButton, 60 mm loop	AR-1588-60

### 15 mm titanium RetroButtons:

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RetroButton, long, 15 mm loop	AR-1589-15
RetroButton, long, 20 mm loop	AR-1589-20
RetroButton, long, 25 mm loop	AR-1589-25
RetroButton, long, 30 mm loop	AR-1589-30
RetroButton, long, 35 mm loop	AR-1589-35
RetroButton, long, 40 mm loop	AR-1589-40
RetroButton, long, 45 mm loop	AR-1589-45
RetroButton, long, 50 mm loop	AR-1589-50
RetroButton, long, 55 mm loop	AR-1589-55
RetroButton, long, 60 mm loop	AR-1589-60

*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.*



U.S. PATENT NOS. 5,320,626; 5,350,383; 6,716,234; 7,063,717; 7,238,189 and PATENTS PENDING

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