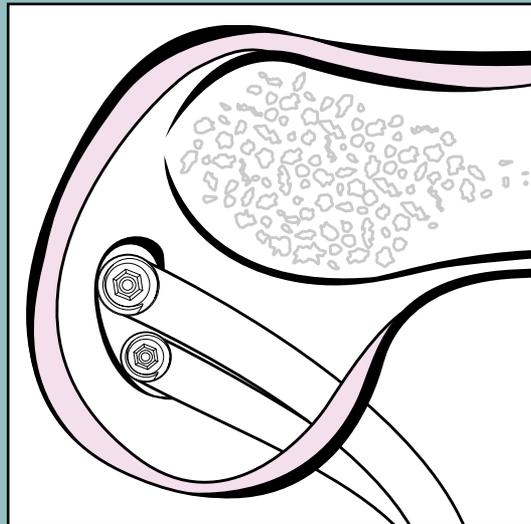




Double Bundle PCL Reconstruction

Surgical Technique



Double Bundle PCL Reconstruction

With recent interest in double tunnel endoscopic PCL reconstruction, Arthrex has created a series of Femoral PCL Drill Guides. Developed in conjunction with Robert Burks, M.D., of Salt Lake City, UT, the guides were specifically designed to arthroscopically create the anterolateral and posteromedial femoral tunnels.

Using a far lateral portal, the anterolateral tunnel is created by placing the appropriate sized femoral guide near the edge of the articular cartilage of the medial femoral condyle. Drilling from inside out, a guide pin is placed through the guide and drilled until it exits the medial aspect of the femur.

The anterolateral socket is then created using the appropriate size drill corresponding to the graft diameter of the anterolateral bundle. The tunnel is then referenced to position the second guide which is used to create the posteromedial bundle in a similar fashion. An approximate 2 mm bone bridge is left between both bundles which best replicates the two-bundle configuration of the PCL.

The Double Bundle PCL Guides give versatility in creating appropriate socket placement using anatomical constants or directly visualizing the intended socket diameter with the guides.

Graft Selection and Preparation

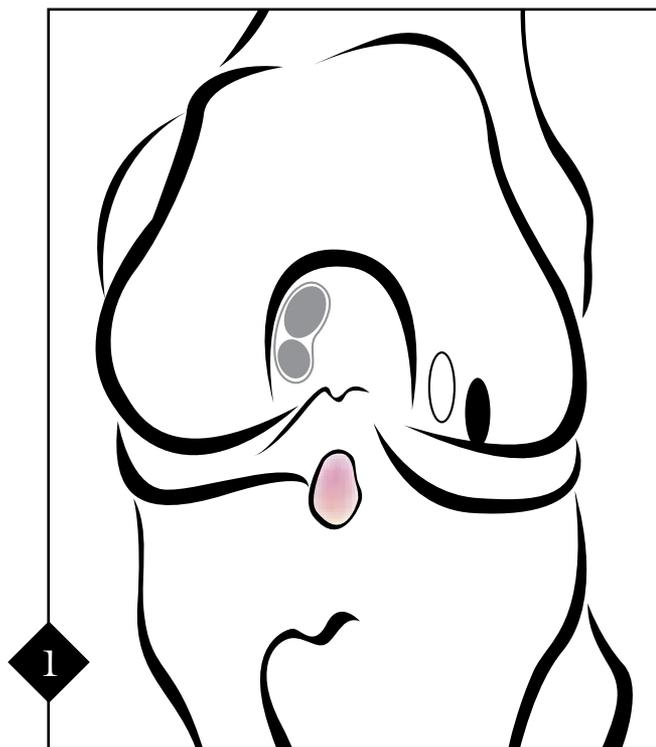
Graft selection is the surgeon's preference utilizing the double femoral tunnel endoscopic technique.

A graft well suited for the endoscopic double bundle PCL reconstruction is a soft tissue graft of 220 mm in length. The graft is first doubled over a #5 FiberWire® suture and secured to the workstation. The Tensioning Device is set to 10 lbs. and a #2 FiberWire suture is placed in the looped end of the graft using a baseball stitch and run a distance of 30 mm. Each throw is tensioned for a more consistent graft end, enabling easier graft passage through the tunnels.

The diameter of the graft is sized. The two free ends of the graft are then split and sutured separately in similar fashion and the diameter is measured again. Ensure enough free suture to allow passage and tensioning during fixation. If the two free ends are different sizes, the larger is preferred for the anterolateral bundle of the PCL.

The double bundle technique may also be utilized in the "in-lay" technique or when a bone-tendon-bone graft is utilized in the tibia. The approximate intra-articular length of 30-38 mm for the PCL is added to the portion of the graft ends to be fixed into the femoral tunnels (plus 30 mm) to avoid slack fixation of the graft. Femoral tunnels drilled endoscopically are then over drilled by 7-10 mm.

Note: Proper technique must be followed to ensure adequate tunnel/socket and aperture preparation. Deviating from the technique may cause excessive torque on the screw during implantation and lead to damage to the graft or damage to the implant. It is also recommended to monitor the implantation depth of the screw to ensure that the tip of the screw inserted into the tibial tunnel is not protruding into joint.



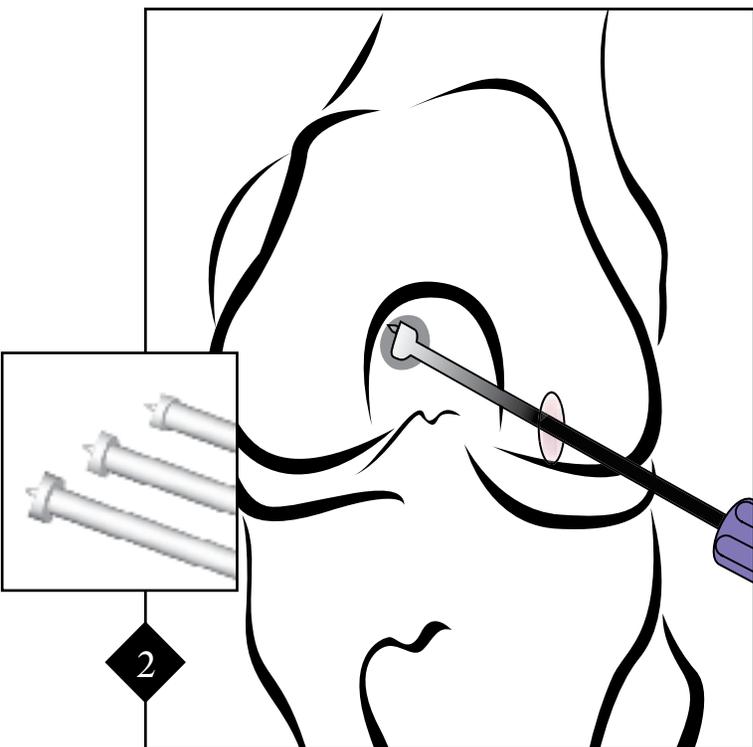
A far lateral portal is made at the onset of the procedure to gain access to the PCL origin during the double socket technique. Utilizing a motorized shaver and resection hand instruments, the damaged PCL is removed leaving behind its footprint on the femur.

Tunnel preparation is carried out with the origin of the PCL visualized with a 30° arthroscope placed through the anteromedial portal.



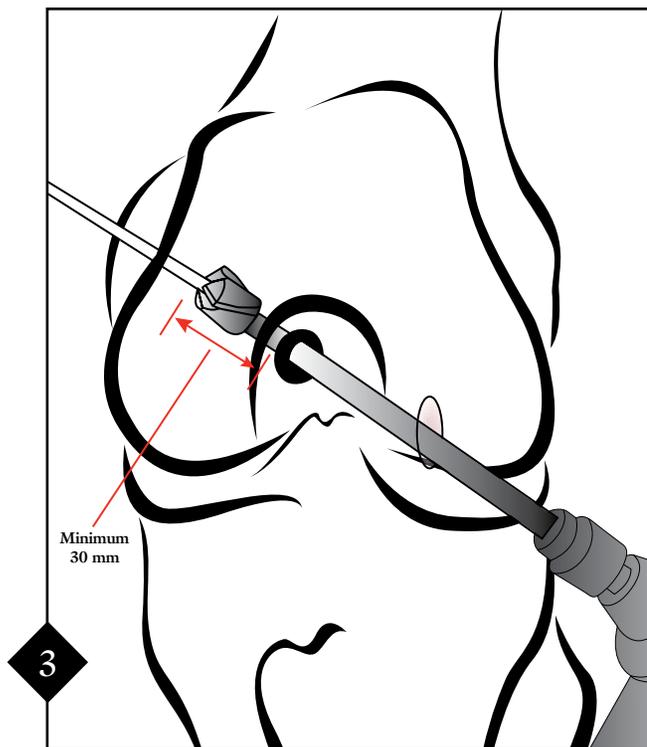
Note: The tibial tunnel is created as described in the Transtibial PCL Reconstruction surgical technique (LT0104).

Please contact your local Arthrex representative for more information on the endoscopic Double Bundle PCL Reconstruction technique and surgical technique video performed by David Caborn, M.D., of Louisville, KY.



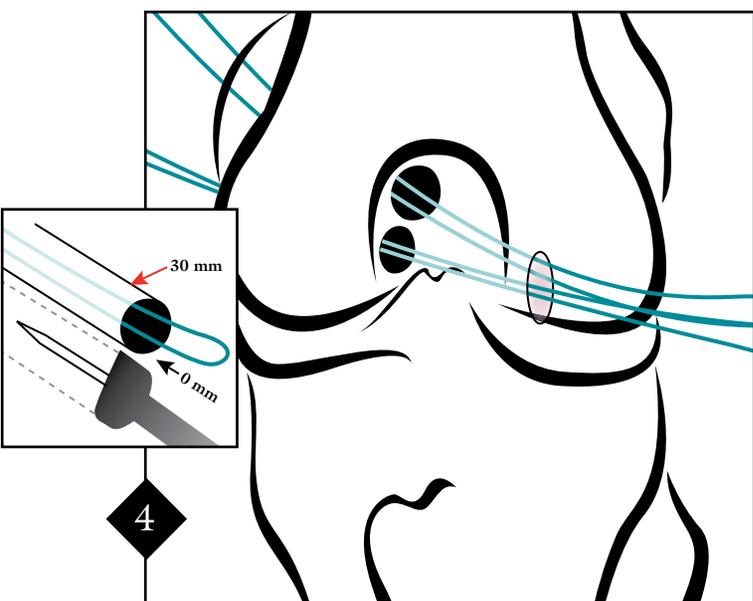
Using the far lateral portal, the anterolateral socket is initially created by placing the appropriate size Double Bundle PCL Guide next to the articular cartilage against the superior inner wall of the medial femoral condyle. The graft diameter of the anterolateral bundle plus 4 mm determines appropriate selection of the initial guide. A Beath pin is placed through the guide and drilled until it exits the medial aspect of the knee.

Alternatively, the guide may be used as a visual reference to create the femoral tunnel by selecting the appropriate size guide to match the graft bundle's diameter.



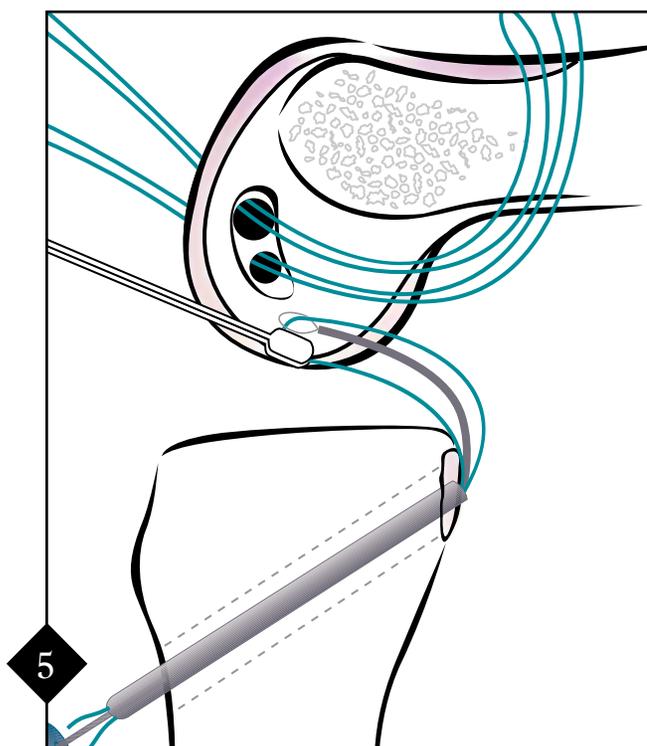
The femoral Cannulated Headed Reamer matching the graft bundle diameter is placed over the Beath pin and drilled to a desirable depth (minimum of 30 mm is recommended). The edge of the anterolateral socket is positioned 2 mm from the articular surface.

Prior to removing the Beath pin, a suture loop is passed through the anterolateral socket. The suture loops will be later used to assist in passing the graft.

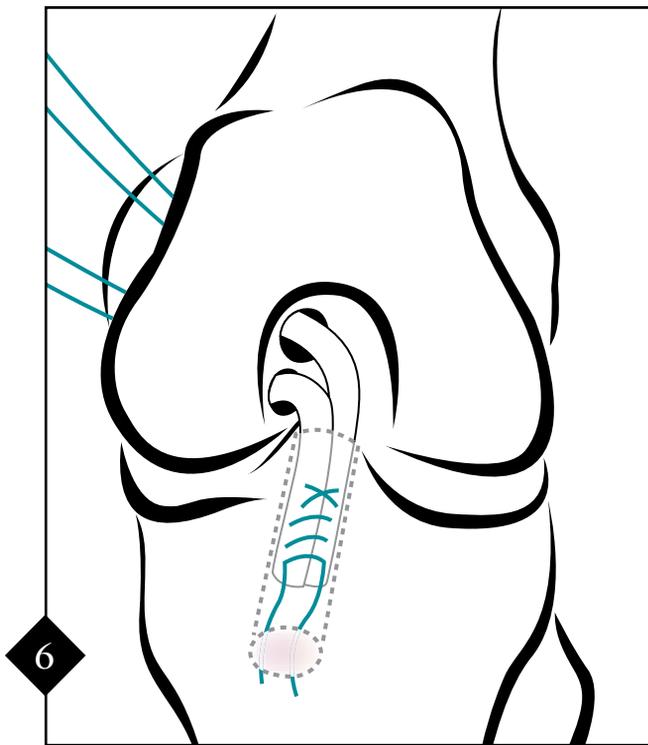


Inset: The graft diameter of the posteromedial bundle plus 4 mm determines the appropriate guide selection to create the posterior medial bundle. The guide inserted through the far lateral portal is rested on the posterior inferior edge of the anterolateral socket (7:00 right knee, 5:00 left knee). The posterior medial tunnel is created in similar fashion.

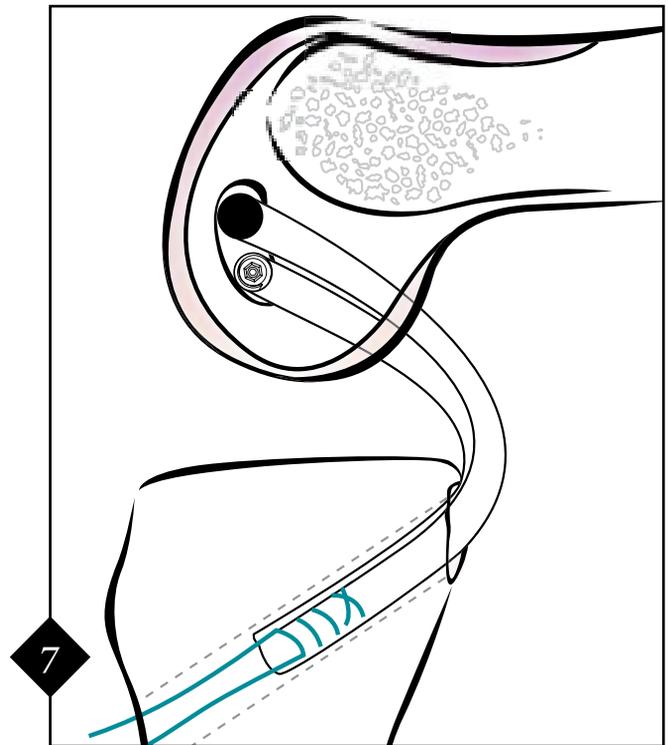
The posteromedial tunnel may also be created by directly visualizing its placement with the guide matching the diameter of posteromedial graft bundle.



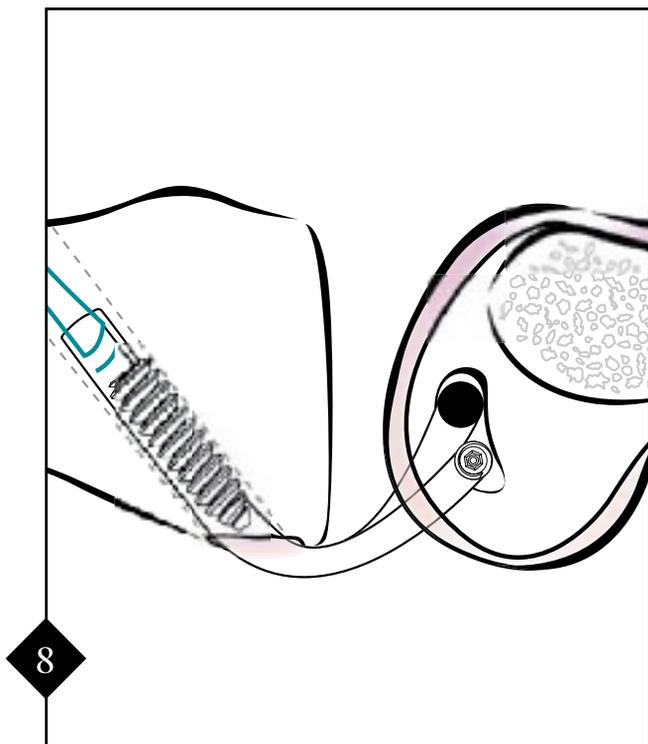
Using the "Worm" Curving Suture Passer, with attached suture loop, graft passage is accomplished by initially passing the tibia side of the graft from the lateral portal into the tibial tunnel. It is important that the tibial portion of the graft is passed below the femoral side graft passing sutures.



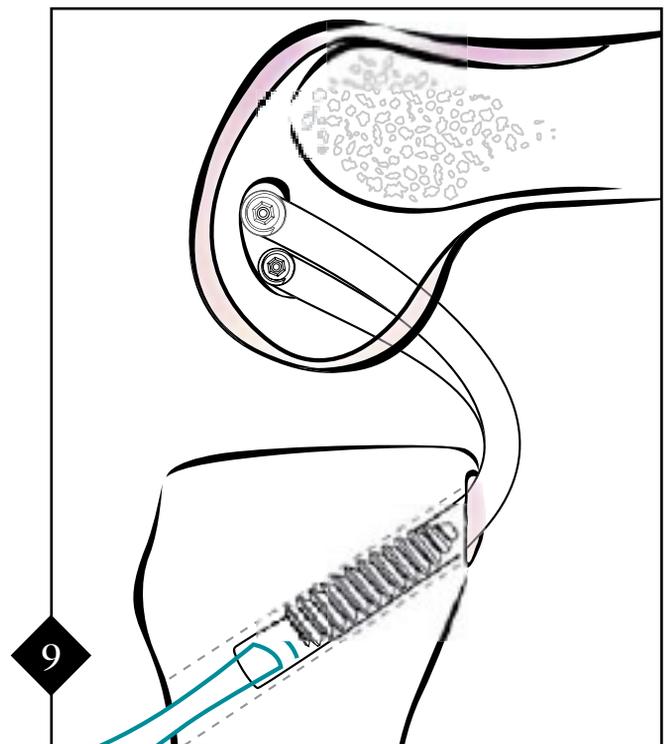
6 Using the suture loops passed through the double bundle femoral sockets, the graft sutures are delivered out the respective femoral sockets and the posteromedial bundle pulled into position prior to seating the anterolateral bundle. The tibial portion of the graft is held securely within the tibial tunnel.



7 With the knee held in 90° of flexion, graft fixation of the double bundle configuration is carried out by first placing a 23 mm cannulated round head BioComposite Interference Screw through the far lateral portal to secure the femoral side of the posteromedial bundle while maintaining tension of the tibial portion of the graft.



8 The knee is then brought into extension while tension is placed on the anterolateral bundle on the femur. The tibial side of the graft is secured with a 35 mm Delta Tapered BioComposite Interference Screw.



9 The knee is then brought into 90° of flexion again and, with an anterior drawer stress applied to the knee, the anterolateral bundle is secured with another 23 mm BioComposite Interference Screw. Fixation of the double bundle PCL graft is confirmed prior to conclusion of the procedure.

Varied fixation methods respective to graft type (individual grafts strands) and tibia preparation ("in-lay" technique) may also be considered.

Double Bundle PCL Guide Set (AR-5015S):

Double Bundle PCL Guide, 6 mm	AR-5015-06
Double Bundle PCL Guide, 7 mm	AR-5015-07
Double Bundle PCL Guide, 8 mm	AR-5015-08
Double Bundle PCL Guide, 9 mm	AR-5015-09
Double Bundle PCL Guide, 10 mm	AR-5015-10
Double Bundle PCL Guide, 11 mm	AR-5015-11
Double Bundle PCL Guide, 12 mm	AR-5015-12
Double Bundle PCL Guide Instrument Case	AR-5015C

Screws:

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, Delta Tapered, 9 mm x 35 mm	AR-5035TC-09
BioComposite Interference Screw, Delta Tapered, 10 mm x 35 mm	AR-5035TC-10
BioComposite Interference Screw, Delta Tapered, 11 mm x 35 mm	AR-5035TC-11
BioComposite Interference Screw, Delta Tapered, 12 mm x 35 mm	AR-5035TC-12

PCL Cruciate Reconstruction ToolBox Set (AR-1269S) includes:

Cannulated Drills, 6, 7, 8 and 9 mm	AR-1206L - AR-1209L
PCL Suture Pusher	AR-1263
PCL Rasp	AR-1264
PCL Popliteal Protector Cap	AR-1267
“Worm” Curving Suture Passer	AR-1268
Cannulated Headed Reamers, 7, 7.5, 8, 8.5, 9, 9.5, 10, 10.5 and 11 mm	AR-1407 - AR-1411
Jacob’s Chuck Handle	AR-1415
Quick Connect T-Handle	AR-1416T
PCL Femoral Target Marking Hook, right	AR-1846
PCL Femoral Target Marking Hook, left	AR-1847
Tunnel Dilator, 7 mm	AR-1854-07.0
Tunnel Dilator, 7.5 mm	AR-1854-07.5
Tunnel Dilator, 8 mm	AR-1854-08.0
Tunnel Dilator, 8.5 mm	AR-1854-08.5
Tunnel Dilator, 9 mm	AR-1854-09.0
Tunnel Dilator, 9.5 mm	AR-1854-09.5
Tunnel Dilator, 10 mm	AR-1854-10.0
Tunnel Dilator, 10.5 mm	AR-1854-10.5
Tunnel Dilator, 11 mm	AR-1854-11.0
Adapteur Drill Guide C-Ring	AR-1875
Graduated Guide Pin Sleeve for 2.4 mm Pins	AR-1876
Drill Stop for Adapteur Drill Guide	AR-1877
PCL Tibial Adapteur Guide Marking Hook, curved	AR-1880
PCL Tibial Adapteur Guide Marking Hook, angled	AR-1880-01
Easy-In and Easy-Out	AR-1993 and AR-1994
Cannulated Bio-Interference Screwdriver Shaft	AR-1997
Cannulated Screwdriver Shaft for Delta Bio-Interference Screw	AR-1997D
Cannulated Screwdriver Shaft, 3.5 mm Hex	AR-1998
Ratcheting Screwdriver Handle	AR-1999
Double Bundle PCL Guide, 6 mm	AR-5015-06
Double Bundle PCL Guide, 7 mm	AR-5015-07
Double Bundle PCL Guide, 8 mm	AR-5015-08
Double Bundle PCL Guide, 9 mm	AR-5015-09
Double Bundle PCL Guide, 10 mm	AR-5015-10
Double Bundle PCL Guide, 11 mm	AR-5015-11
Suture Retriever	AR-4030
PCL Curved Curette, closed end	AR-5013
PCL Straight Curette, closed end	AR-5014
Chuck Key	AR-8241
PCL Cruciate ToolBox Instrumentation Case	AR-1269C

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. 5,211,647; 5,425,733; 5,350,383; 6,629,977; 6,716,234 and 6,875,216

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