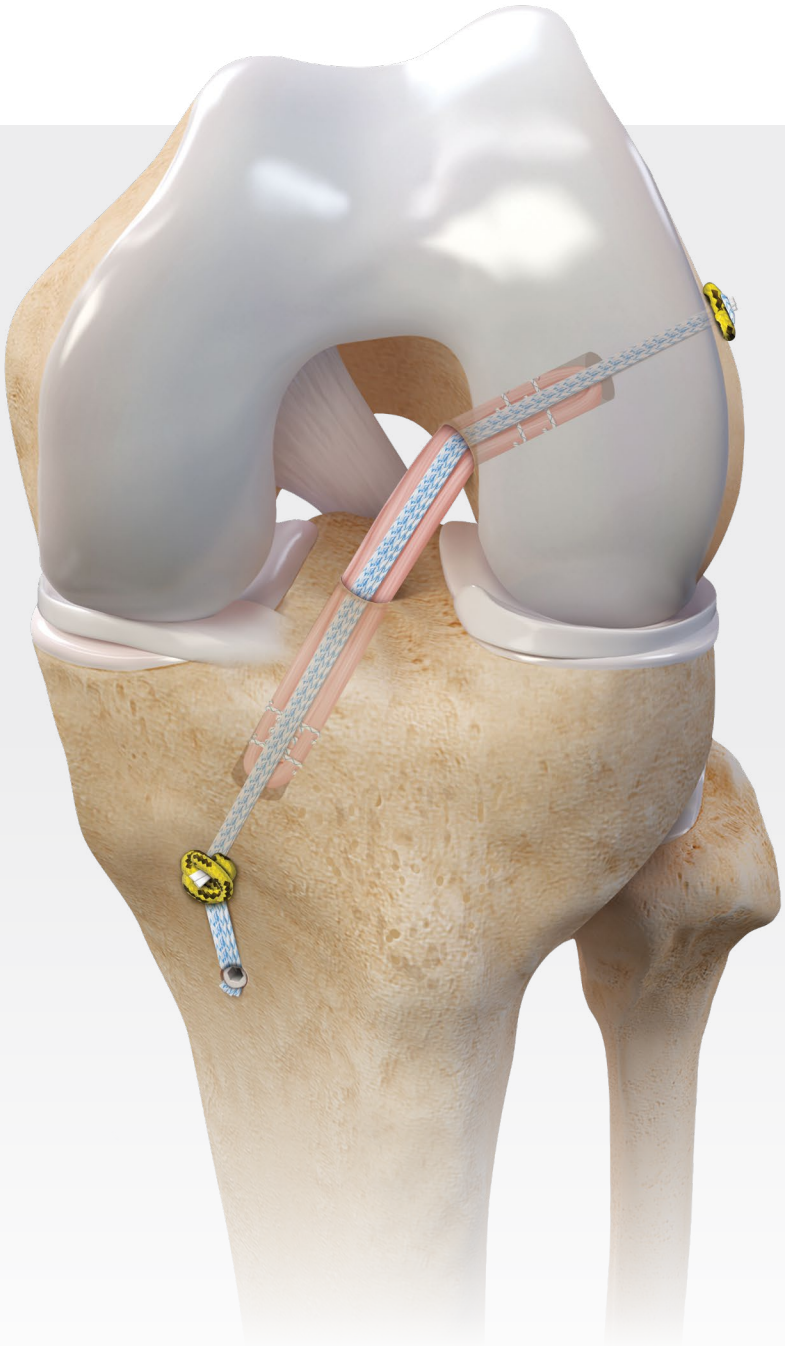
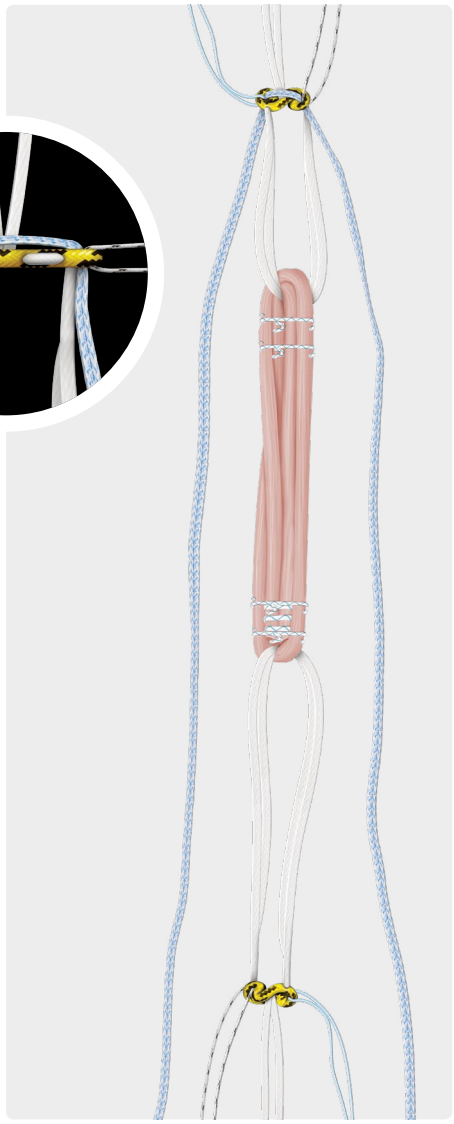
GraftLink® *Internal*Brace™ Technique With RT TightRope® SB Implants

Surgical Technique

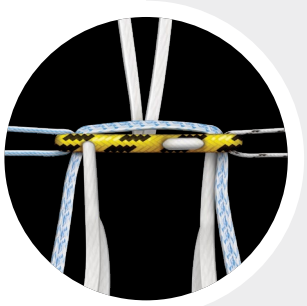


Arthrex®

RT TightRope® SB Implant Introduction

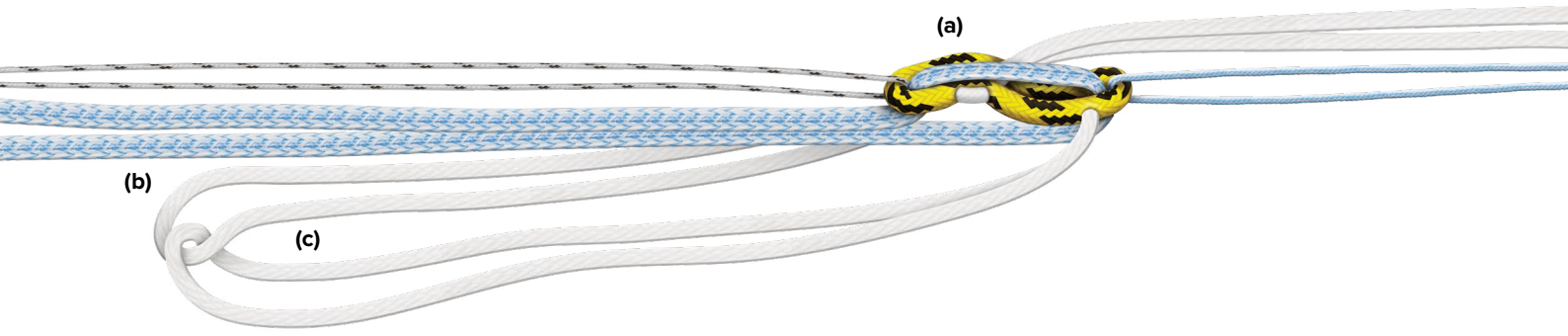


The TightRope SB implant is the ultimate innovation in adjustable cortical suspensory fixation technology. Using a radiopaque, all-suture cortical button, this implant is stronger[1] with a minimally invasive, low-profile design compatible with existing RetroConstruction™ and TightRope drill pin socket creation techniques. The flat-tape TightRope loop improves graft interface and handling characteristics during graft tensioning and provides greater resistance to graft abrasion.[2] Additionally, the TightRope SB implant features a shorter minimum loop length to maximize the amount of graft in the socket.



FEATURES AND BENEFITS

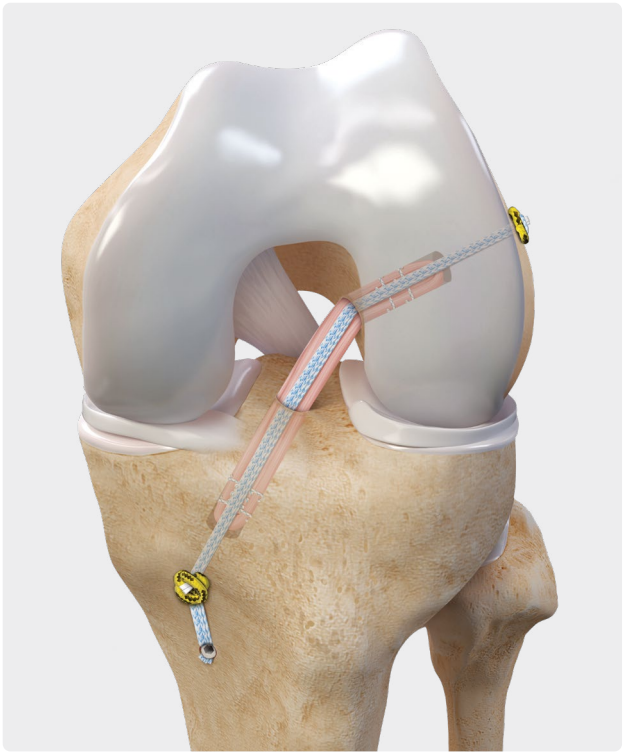
- **All-suture button design:** Revolutionary all-suture, soft-button technology to eliminate metal from ACL reconstruction **(a)**
- **Ability to reflip:** Implant can be reflipped as needed; radiopaque design allows for button-deployment confirmation
- **InternalBrace™ technique:** Available with preloaded radiolucent or radiopaque FiberTape® suture for the *Internal*Brace technique **(b)**, proven in peer-reviewed published studies to be associated with lower ACL retear rates at 2 and 5 years,[3-6] less pain, improved patient-reported outcomes, and a faster and higher rate of return to preinjury level of activity[7]
- **Flat-tape TightRope implant:** Offers better handling characteristics and is more resistant to graft abrasion than traditional round sutures[1] **(c)**
- **Comprehensive options:** Available in RT, BTB, FiberTag®, and repair implant configurations



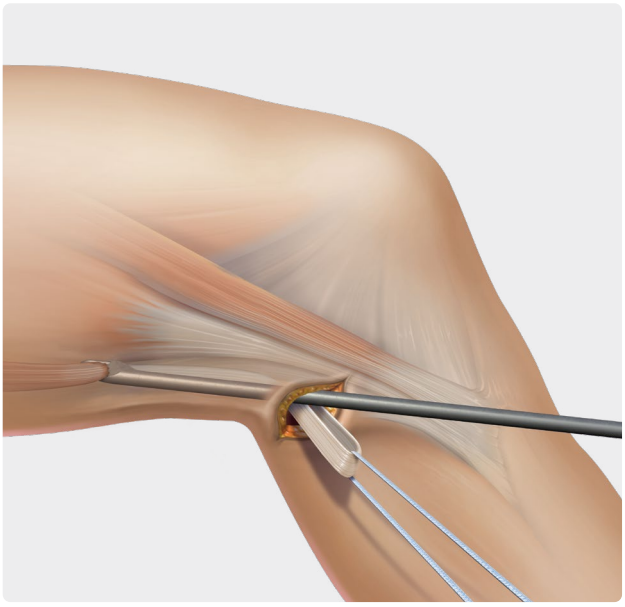
The *Internal*Brace surgical technique is intended only to augment the primary repair/reconstruction by expanding the area of tissue approximation during the healing period and is not intended as a replacement for the native ligament. The *Internal*Brace technique is for use during soft tissue-to-bone fixation procedures and is not cleared for bone-to-bone fixation.

GraftLink® ACL Reconstruction With the *Internal*Brace™ Technique

The ACL GraftLink technique with FiberTape® suture for the *Internal*Brace technique provides the ultimate in anatomic, minimally invasive, and reproducible ACL reconstruction.



- **Anatomic:** Independent tibial and femoral socket preparation with the FlipCutter® III drill or low-profile reamers facilitates unconstrained placement of the ACL graft.
- **Minimally invasive:** Single-hamstring harvest decreases morbidity and loss of strength[8]; socket preparation with the FlipCutter III drill limits soft-tissue dissection and helps preserve bone and periosteum.
- **Reproducible:** The GraftPro® graft prep system simplifies graft preparation; the tapered graft and adjustable femoral and tibial ACL TightRope SB implant with FiberTape suture for *Internal*Brace technique facilitate graft passing, precise control on the amount of graft in each socket, and graft tensioning from the femoral and tibial sides.
- **Safe:** GraftLink ACL reconstruction offers the largest pull-to-failure forces compared to other reconstruction techniques and similar elongation to fixed-loop devices; it is the only device and technique that allows for precise and effective retensioning and can reduce tibial tunnel widening compared to screw fixations.[9-12]



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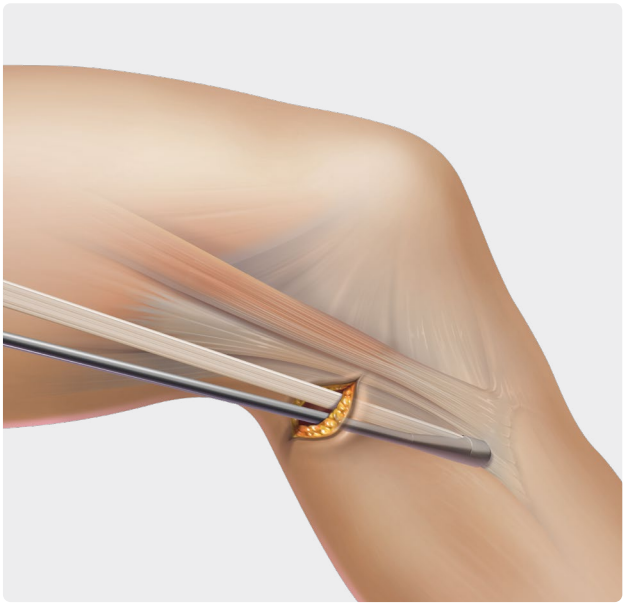
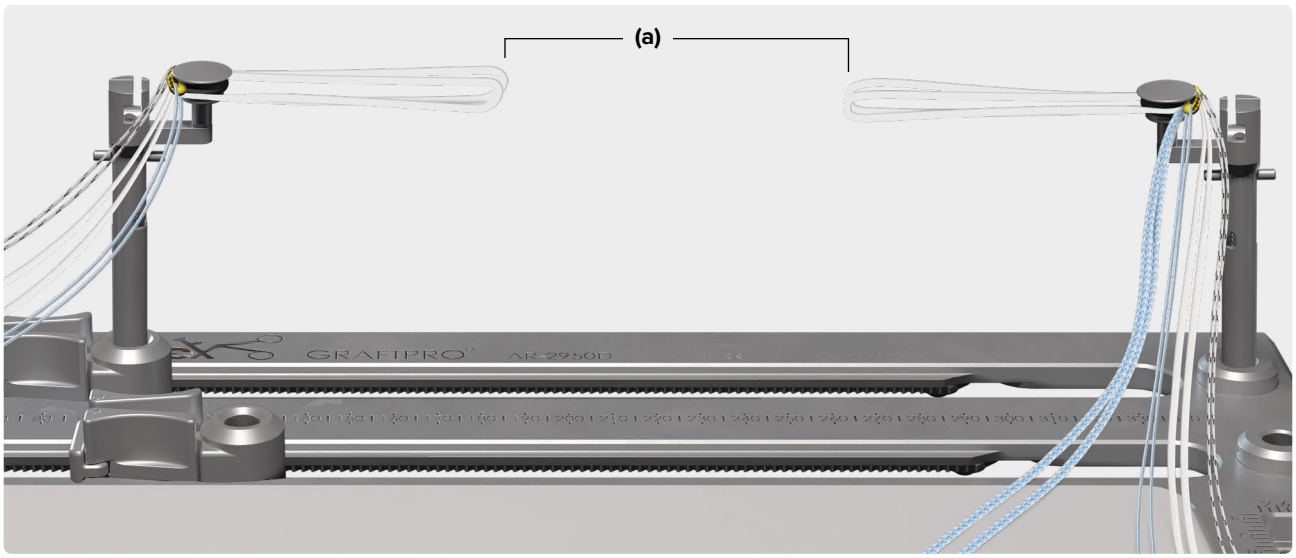


02

In most cases, only the semitendinosus is needed to create the GraftLink construct.

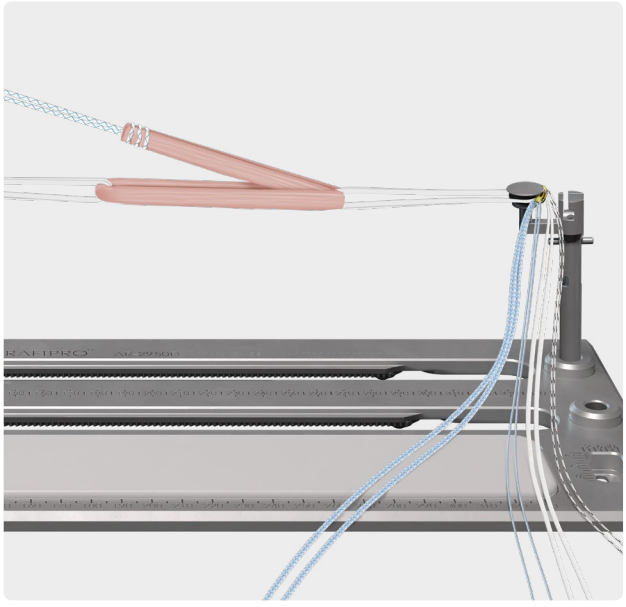
> **Note:** For a less invasive option, harvest the tendon using the atraumatic hamstring harvest technique and instruments described in the Atraumatic Hamstring Harvester Technique Guide (LS1-00075-EN).



03

Place the GraftPro® graft prep attachments on the GraftPro base and load the TightRope® SB implants into the attachments. Measure the distance between the two TightRope SB loop ends **(a)**. This distance should equal 10 mm less than the desired final graft length to accommodate for graft stretch.

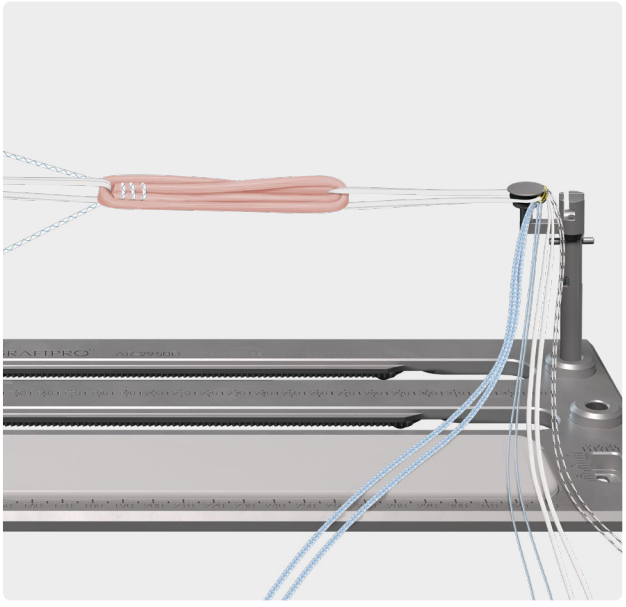
Note: Use an RT TightRope SB implant with FiberTape® suture for *Internal*Brace™ technique for femoral fixation and an RT TightRope SB implant for tibial fixation.



04

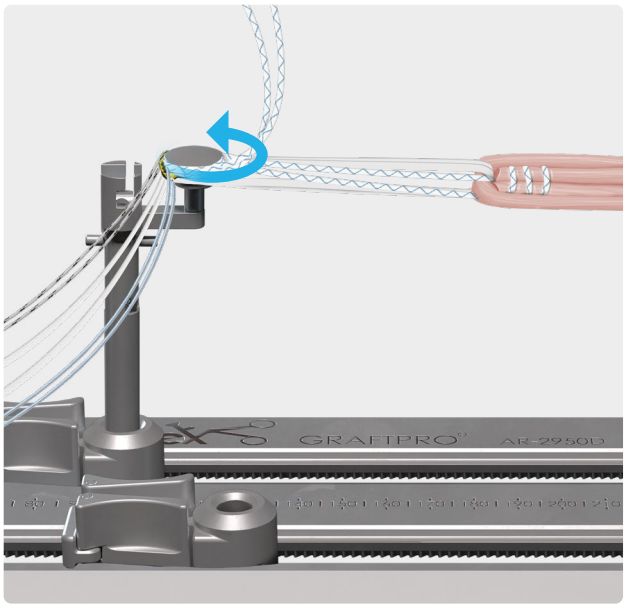
Measure the overall graft length.

Note: A length of 26 cm will yield a 4-stranded GraftLink® construct of at least 6.5 cm, which will provide approximately 2 cm of graft in the femoral and tibial sockets. Load the graft through the implants by folding it symmetrically over the loops. Stitch both graft ends together with a single 1.3 mm FiberLoop® SutureTape after passing the graft through the TightRope SB implant.



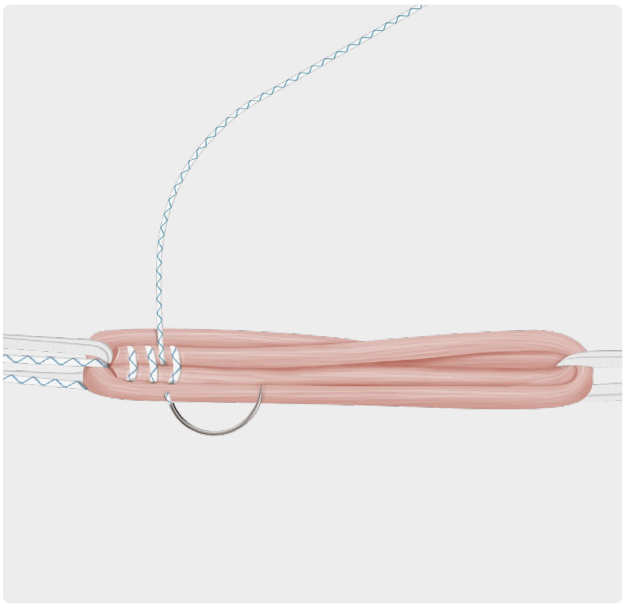
05

For each whipstitch, pass one tail over the graft loop and the other under the graft loop. This will ensure that the tails of the graft are tucked inside the loop during tensioning, which will facilitate tapering of ends and uniform thickness of the graft.



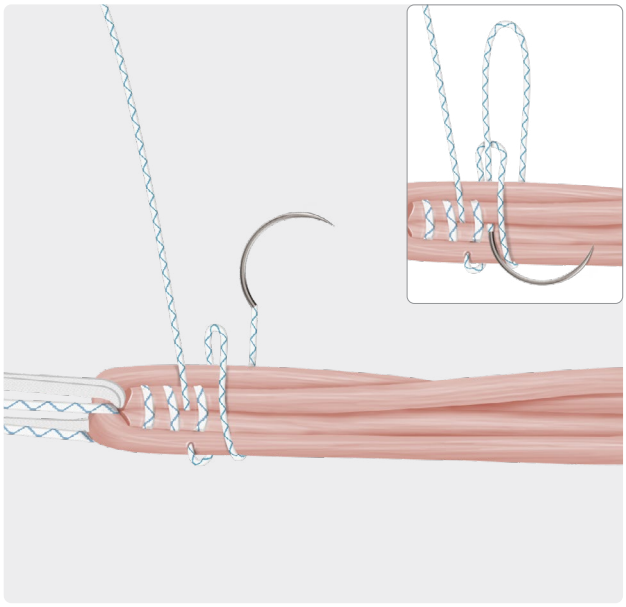
06

Once the graft is folded appropriately and the desired length is obtained, wrap the whipstitch sutures around the post to hold the construct in place.



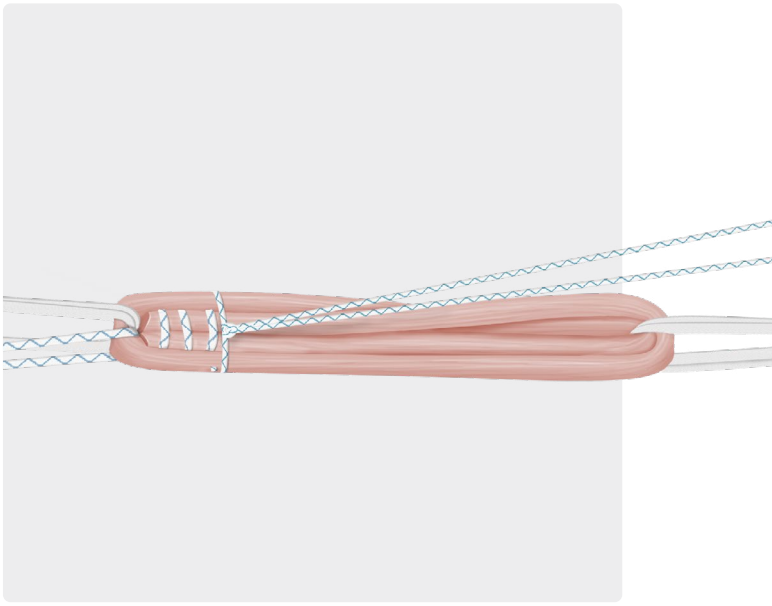
07

The first stitch may now be placed. Using a “buried-knot” technique, start from the inside of the graft and place the needle through the first two graft limbs.



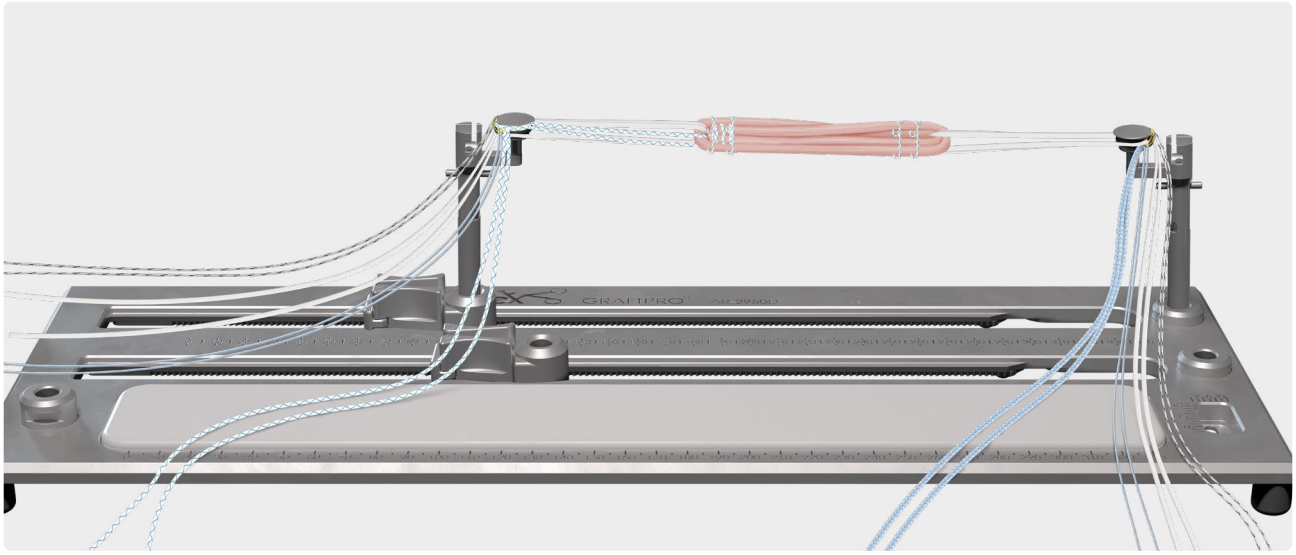
08

Wrap the SutureTape around the graft then place the needle through the second set of graft limbs from the outside in.



09

Tension the suture and tie a knot to secure the stitch.



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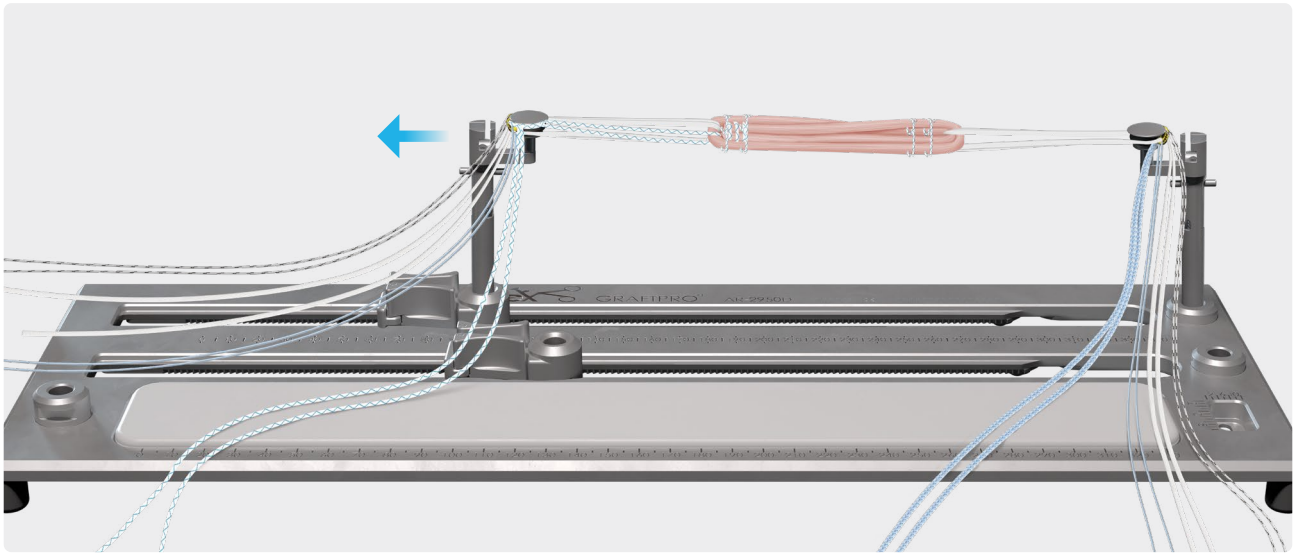
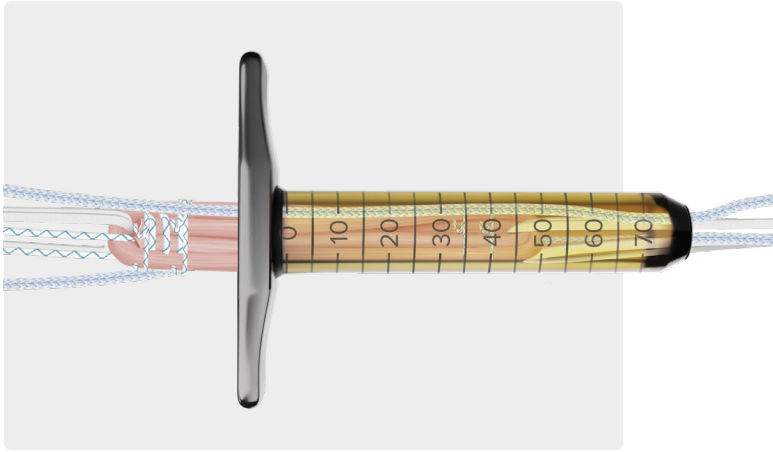
This may be repeated on either end of the graft for a total of two stitches on each end.



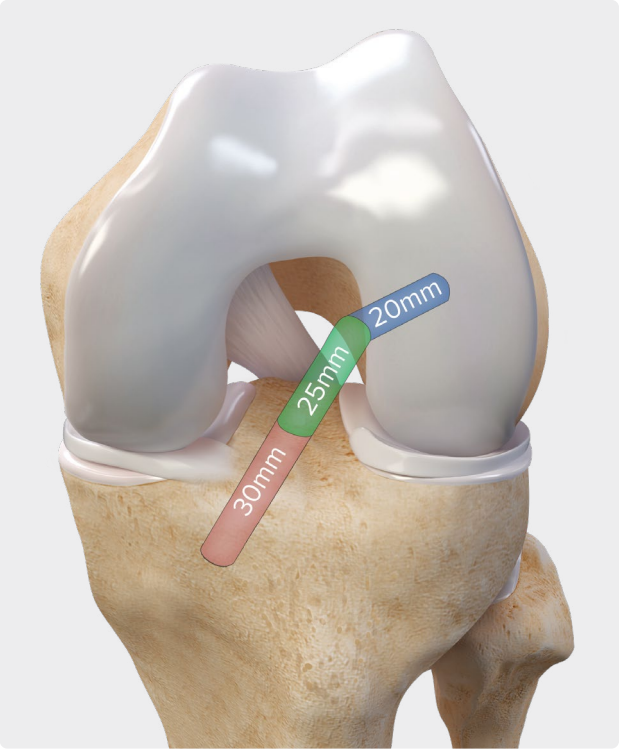
11

The GraftPro® graft prep attachments can now be used for tensioning by simply pulling on the sliding attachment until the desired tension is obtained. The whipstitched FiberLoop® SutureTape may be retained and used as supplemental fixation.

The graft tube set is ideal for approximate sizing and compressing the GraftLink® construct. The full-length, transparent graft tube set is ideal for approximating sizing, compression, and preparation of the GraftLink® construct. The transparency and etched ruler allow for visualization of the graft while approximately sizing the diameter and length. A funneled entrance and attachable handle ease the entry of grafts into the sizer, allowing compression of up to 2 mm and reduction of bone loss.[13] Small holes in the graft tube allow for hydration of the graft or injection of biologics along the entire length.



Socket Creation

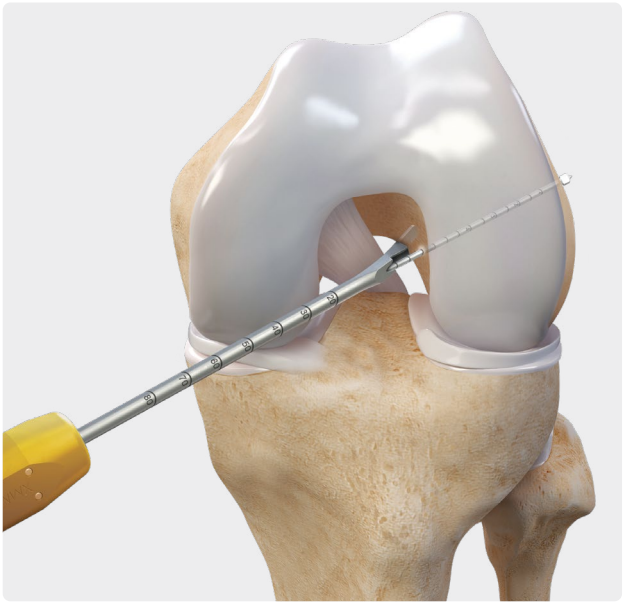


The length from the end of the femoral socket to the end of the tibial socket should be at least 10 mm longer than the graft to ensure that the graft can be tensioned fully.

Assuming an intra-articular length of 25 mm, there will be approximately 20 mm of graft in the femoral and tibial sockets. Drill the femur 20 mm deep and the tibia approximately 30 mm deep to allow an extra 10 mm for tensioning.

Graft tube set (AR-1886-S)

Femoral Socket Preparation



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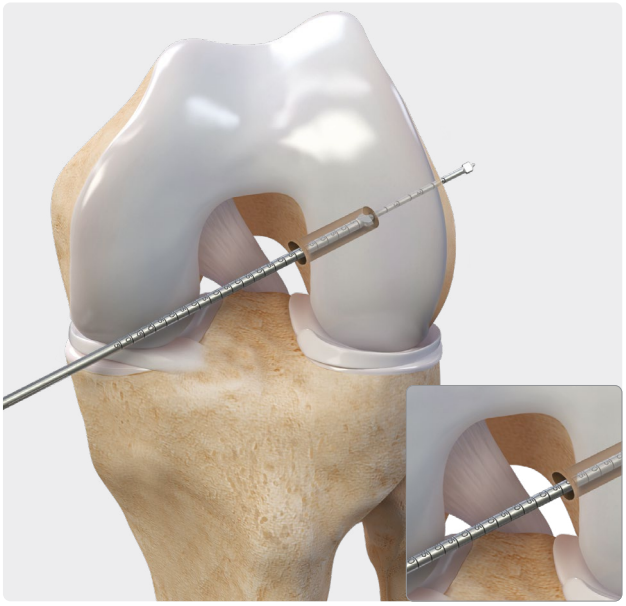
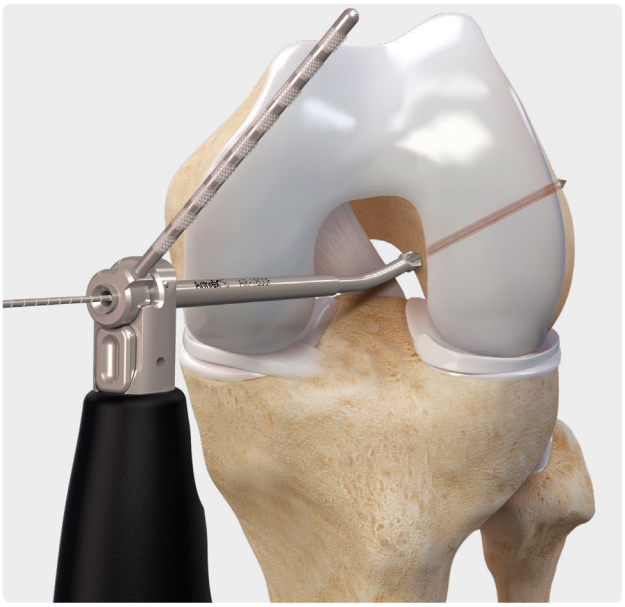


02

For medial portal drilling, use the TightRope® II drill pin, transportal ACL guides, and low-profile drills. Note the intraosseous length from the TightRope II drill pin. After socket drilling, pass a suture with the TightRope II drill pin for later graft passing.

Flexible Reamer Technique



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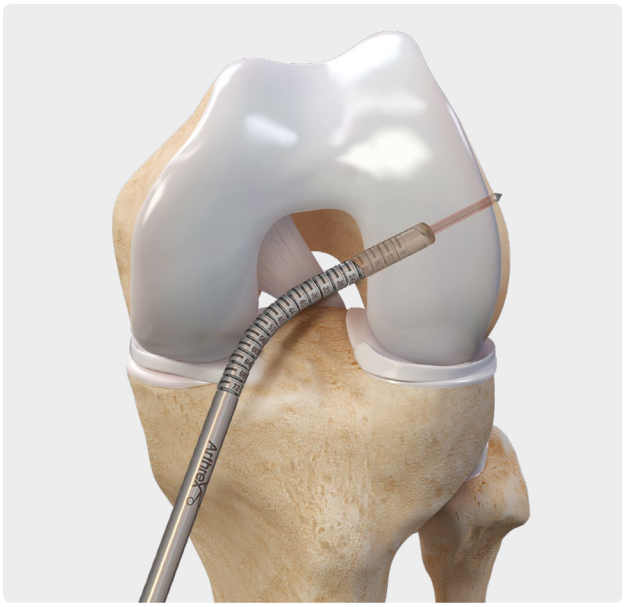
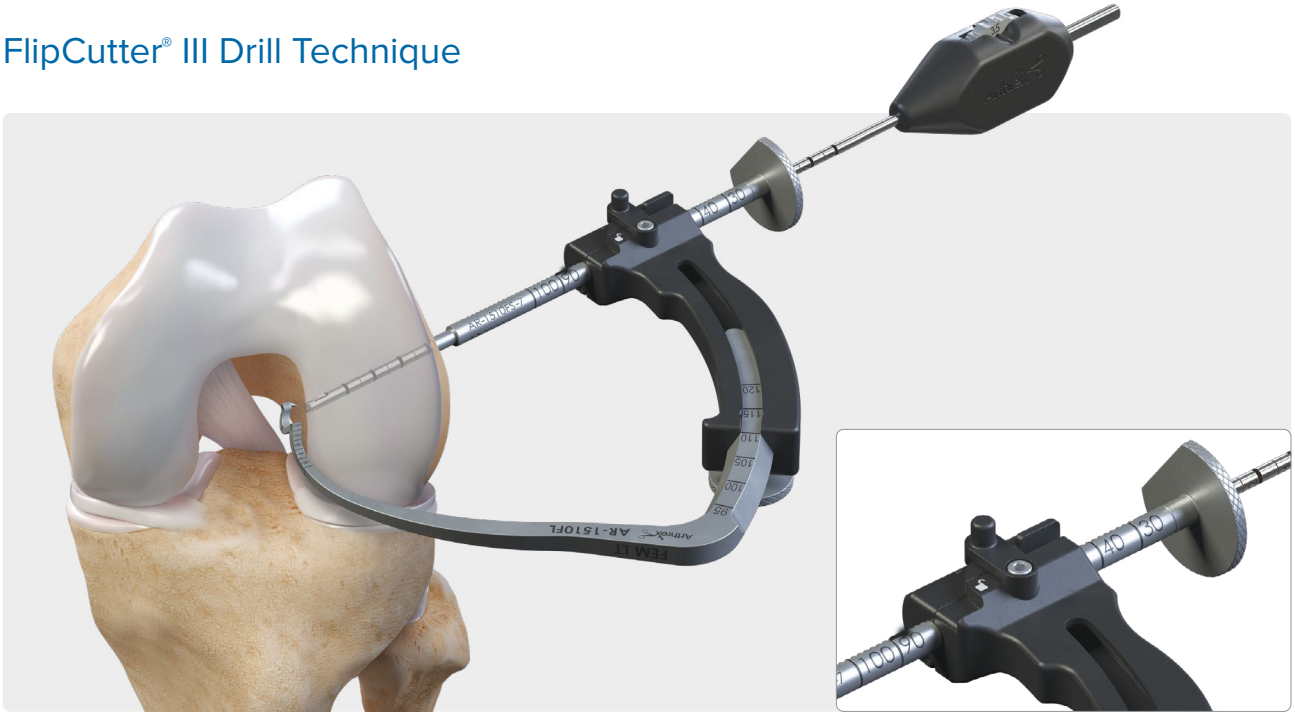


02

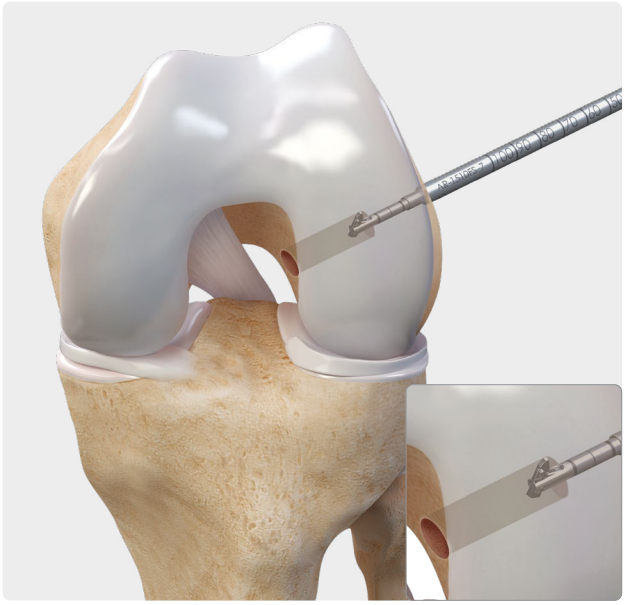
The flexible reamer system may be used for medial portal drilling. Use the flexible TightRope® drill pin, flexible reamer guide, and flexible low-profile drills. Note the intraosseous length from the flexible TightRope drill pin. After socket drilling, pass a suture with the TightRope drill pin.

FlipCutter® III Drill Technique



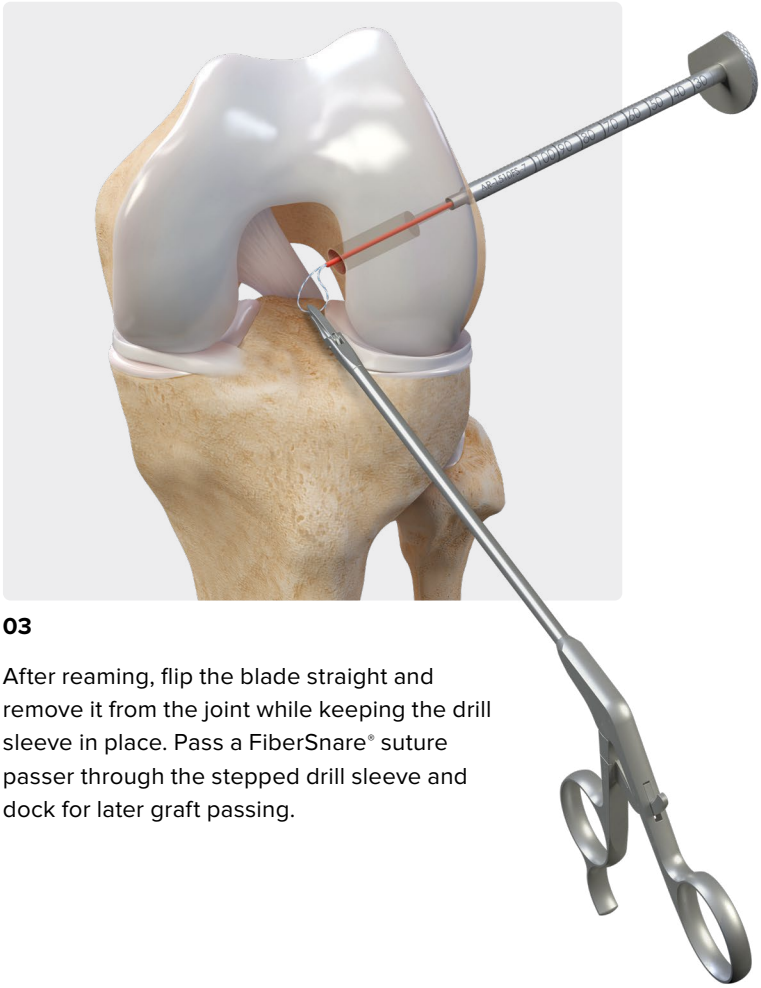
01

The FlipCutter III drill may also be used to create the femoral socket. Place the guide into the joint and push the drill sleeve down to bone. Note the femoral intraosseous length where the drill sleeve meets the back of the guide. Drill the FlipCutter drill into the joint, remove the guide, and tap the stepped drill sleeve into bone.



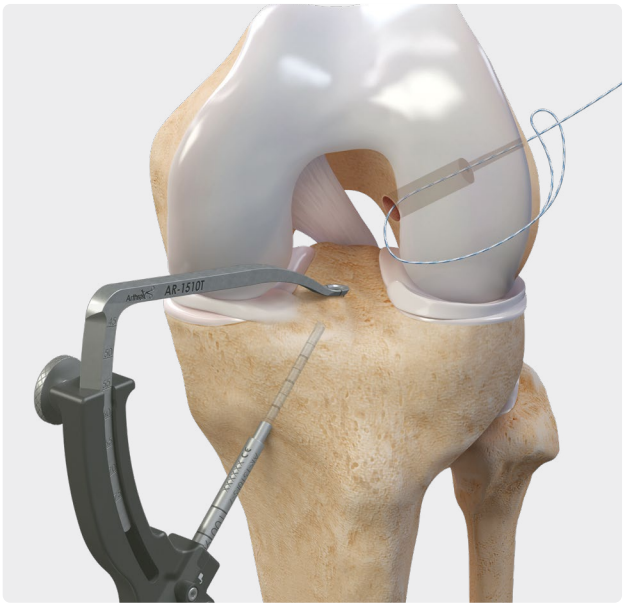
02

Flip the blade on the FlipCutter® III drill and ream until the desired socket depth is reached as measured on the FlipCutter drill markings in relation to the rubber grommet.



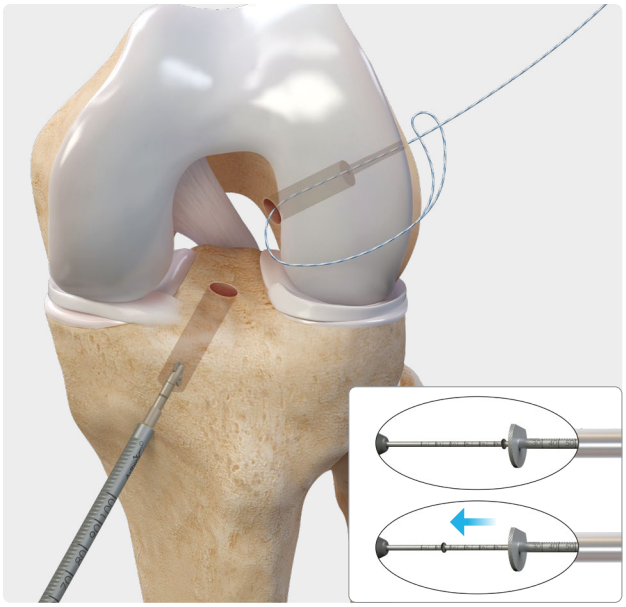
03

After reaming, flip the blade straight and remove it from the joint while keeping the drill sleeve in place. Pass a FiberSnare® suture passer through the stepped drill sleeve and dock for later graft passing.



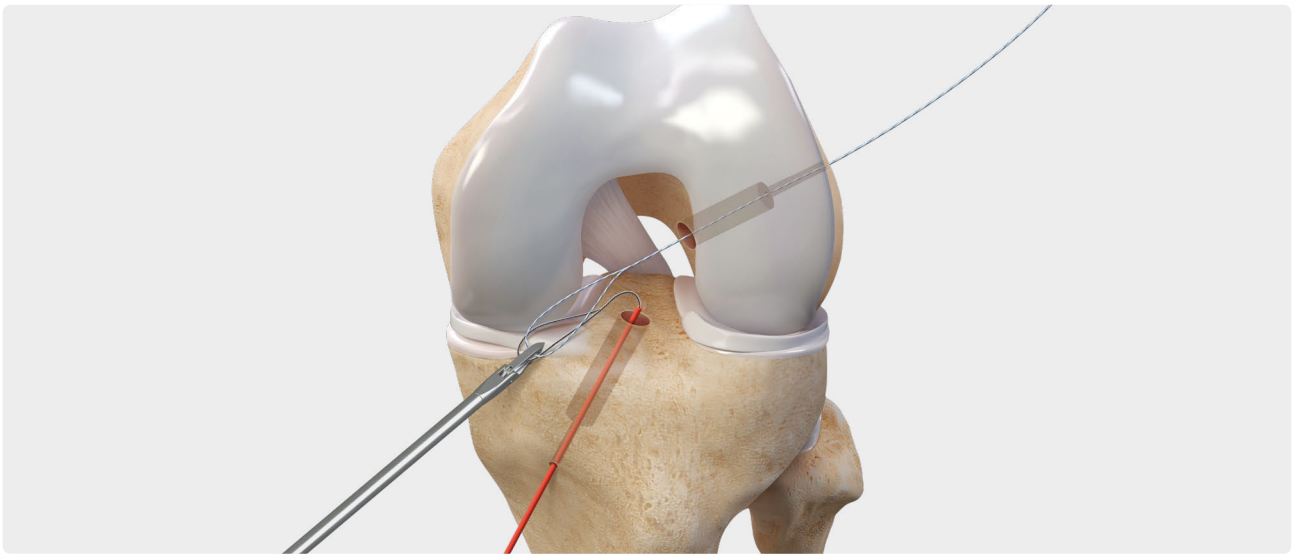
04

For tibial socket drilling, drill the FlipCutter III drill into the joint. Note the tibial intraosseous length where the drill sleeve meets the back of the guide. Remove the marking hook and tap the stepped drill sleeve into bone.



05

Flip the blade to the appropriate diameter for the tibial socket. Ream on forward with traction to cut the socket. Use the rubber grommet and 5 mm markings on the drill to measure the approximate socket depth.



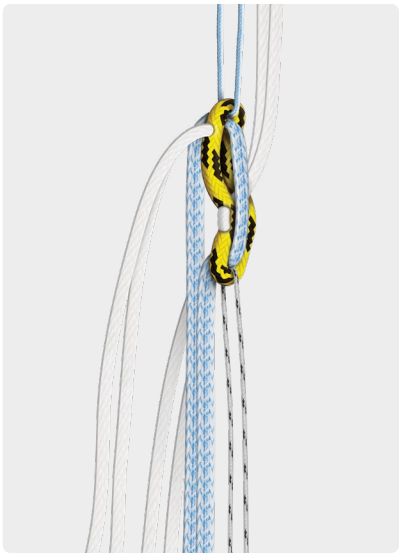
06

Straighten the FlipCutter® III blade, remove it from the joint, and pass a different color of FiberSnare® suture passer into the joint. Retrieve the tibial and femoral FiberSnare sutures together from the medial portal with a suture retriever.

Technique pearl: Retrieving both sutures at the same time will help avoid a tissue bridge that can complicate graft passing.

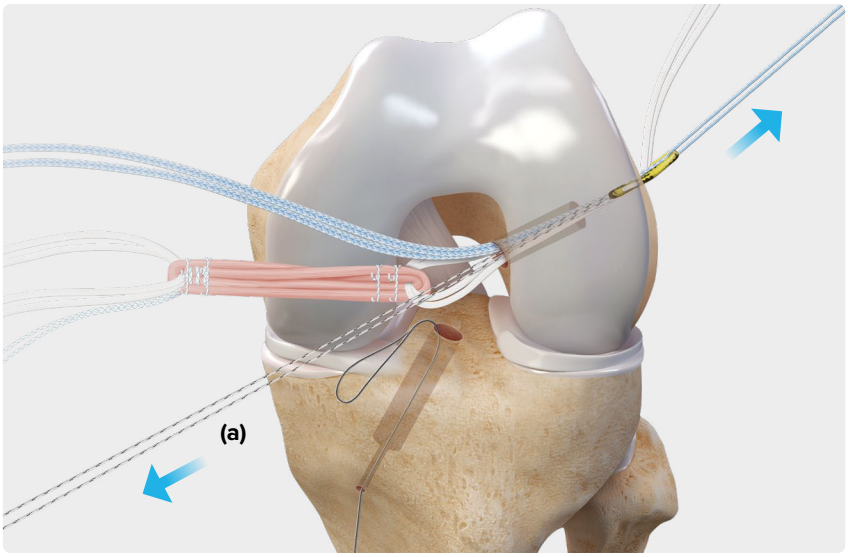
Note: A PassPort Button™ cannula can also be used in the medial portal to prevent tangling.

All-Suture Button Graft Passing Technique



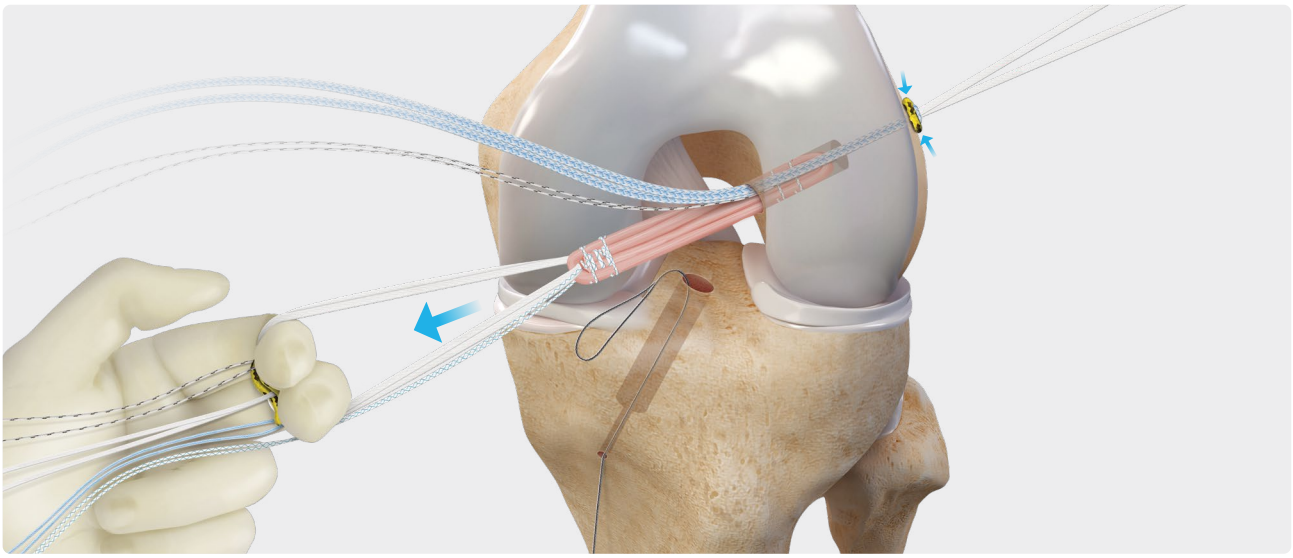
01

For proper deployment, the all-suture button should be oriented with only the blue passing suture and white tensioning strands toward the femur for shuttling, leaving behind the FiberTape® and TigerWire® sutures in line with the graft.



02

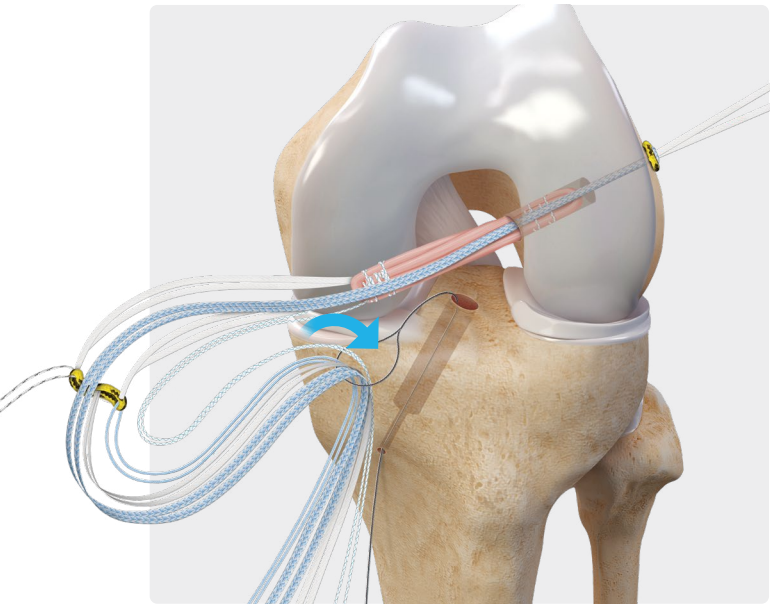
Pass the blue passing suture and white tensioning strands together through the femur. Keep the white-and-black TigerWire suture under tension to elongate the all-suture button **(a)**. With equal tension, pull the blue passing suture and white tensioning strands together to advance the button through the femur. The FiberTape suture can be pulled back to confirm deployment. Marking the intraosseous length on the implant may be helpful to signal that the button has exited the femur. The button can also be viewed through the medial portal as it exits the femoral cortex.



03

The FiberWire® and TigerWire® sutures can be discarded from the all-suture button following its deployment on the femur. To advance the graft, pull on the tensioning strands one at time, alternating approximately 2 cm on each side. Slight tension should be maintained during graft advancement by pulling on the inside of the tibial-sided TightRope® suture loop.

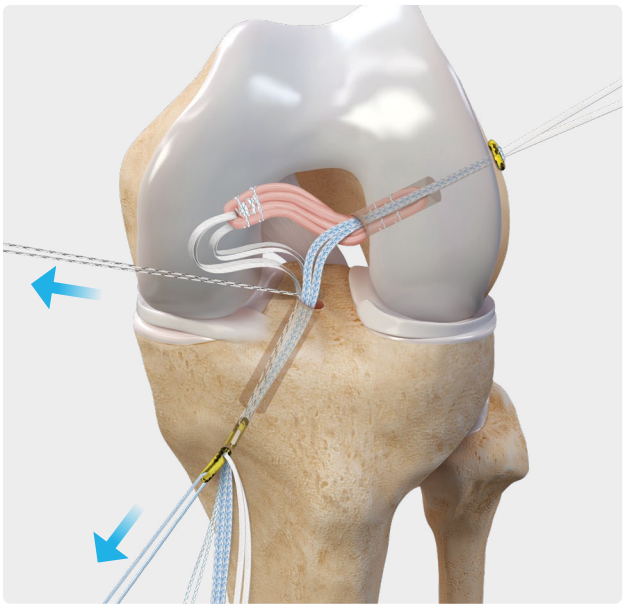
Note: The graft can be fully seated into the femur or left partially inserted until tibial passing is complete. The latter option allows fine-tuning of graft depth in each socket.



04

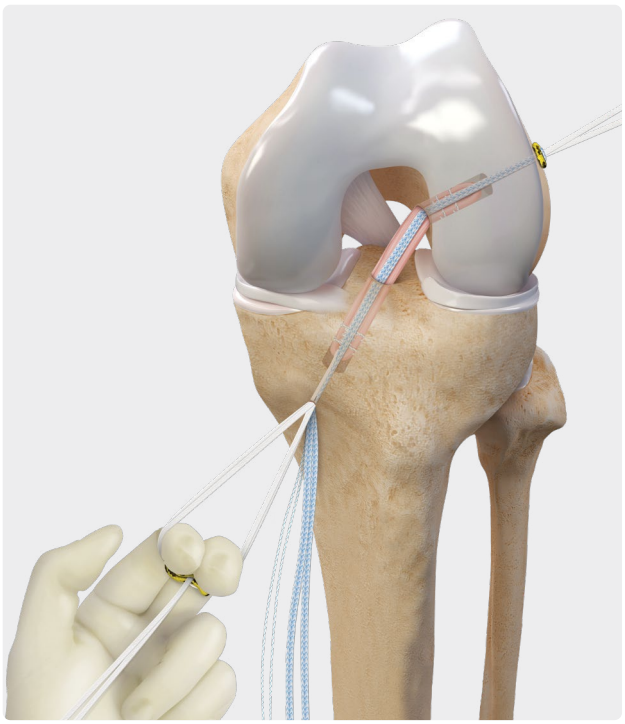
Load the white tensioning strands, blue passing suture, and FiberTape® sutures into the tibial FiberSnare® suture.

Note: The white-and-black TigerWire suture should be left behind to facilitate verticalization of the all-suture button.



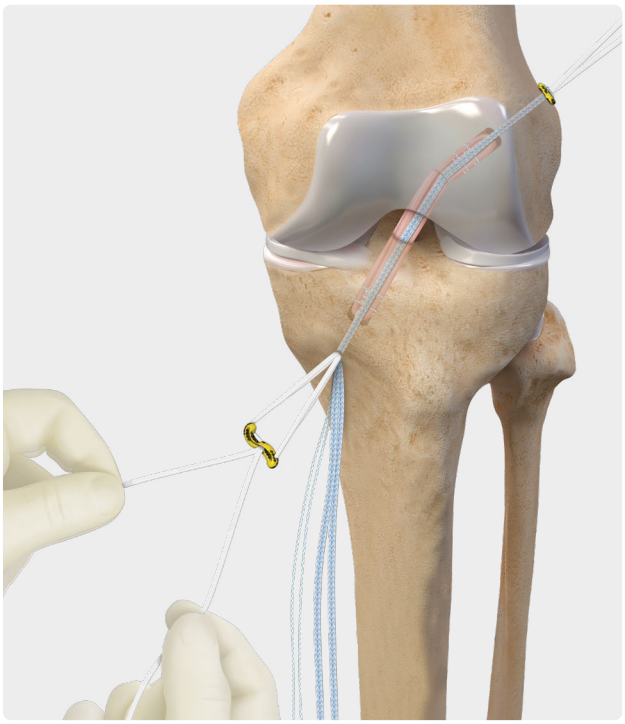
05

While maintaining tension on the TigerWire suture, pull distally on the tibial FiberSnare suture to advance both the TightRope® SB implant and FiberTape sutures out of the tibia distally.



06

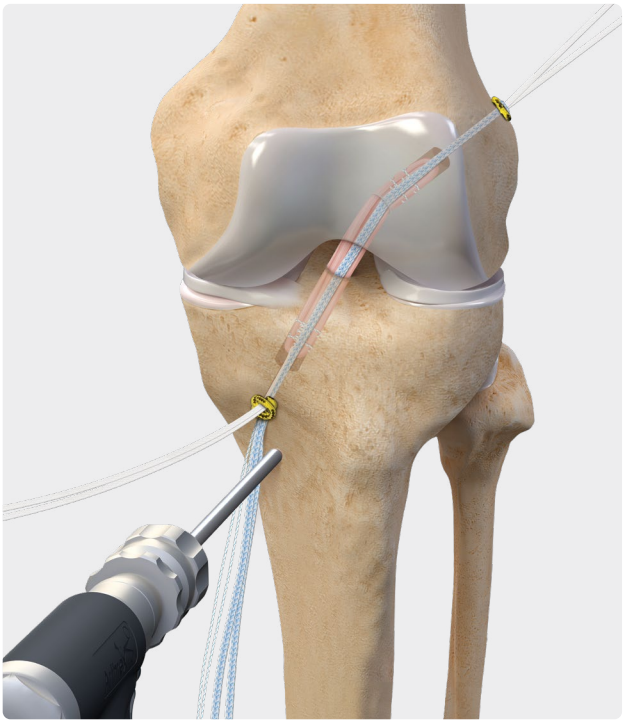
Advance the graft into the tibia by pulling on the inside of the TightRope® SB loop. The TigerWire® and FiberWire® sutures can be discarded.



07

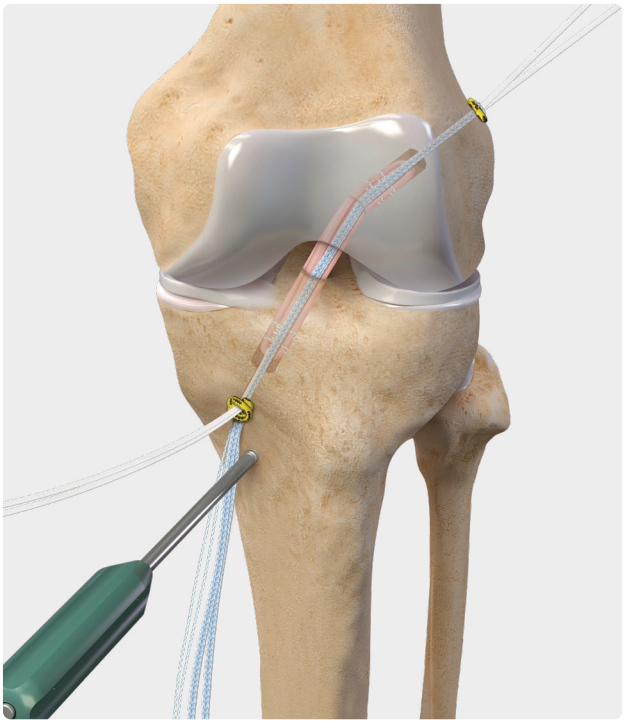
Pull on the white shortening strands to advance the all-suture button to bone and tension the graft in full extension.

> **Note:** Ensure the all-suture button has a clear path to bone so as to not entrap soft tissue beneath it.



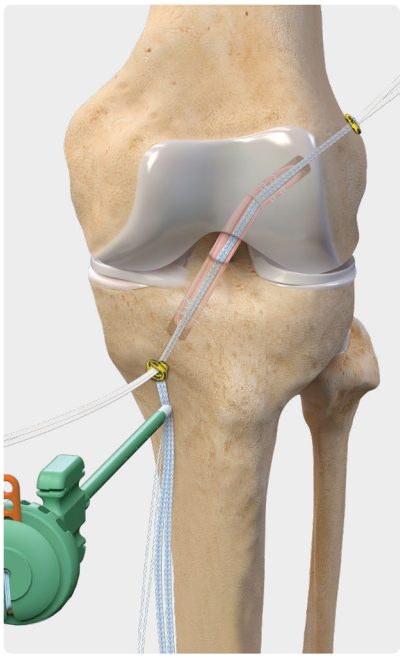
08

Use the spade-tip drill from the ACL Backup Kit to drill into the tibia to the depth of the drill collar. This represents a depth of approximately 20 mm.



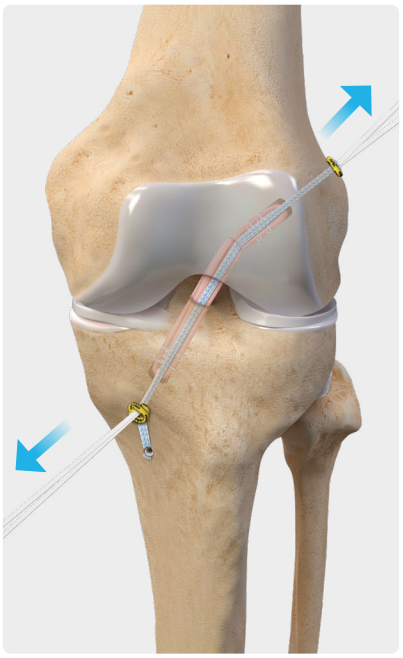
09

Use the disposable 5.2 mm tap to prepare the drill hole.



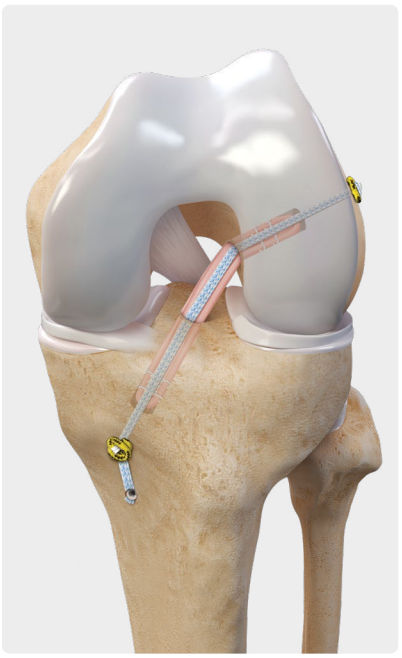
10

With the leg in full extension, pass the FiberTape® suture and whipstitch sutures through the eyelet of the 4.75 mm BioComposite SwiveLock® anchor. Push the anchor into the drill hole until the eyelet is fully seated. Maintain tension on the suture limbs and screw the biocomposite anchor into the tibia. After removing the driver, remove the retention suture from the anchor.



11

The TightRope® soft-button implant can be fully tensioned in the femur. After the knee is cycled several times, both TightRope implants can be tensioned again with the knee in extension.



12

Final fixation: After final tensioning is complete, cut flush the TightRope® implant shortening strands.

Ordering Information

Implants	
RT TightRope® SB implant w/ FiberTape® suture for the *Internal*Brace™ technique	AR-1588SBR-RT-IB
RT TightRope SB implant w/ radiopaque FiberTape suture for the *Internal*Brace technique	AR-1588SBR-RT-IBR
RT TightRope SB implant	AR-1588SBR-RT
ACL Backup Kits	
ACL Backup Kit, biocomposite	AR-1593-BC
ACL Backup Kit, PEEK	AR-1593-P

Instruments (FlipCutter® III Drill Technique)	
FlipCutter III drill, 6-12 mm	AR-1204FF
RetroConstruction™ drill guide set	AR-1510S
RetroConstruction handle, side release	AR-1510HR
Drill guide sleeve, stepped, 7 mm	AR-1510FS-7
Drill guide sleeve, stepped, 10 mm	AR-1204FDS-10
Guide pin, drill tip, 3.5 mm (predrill for FlipCutter drill)	AR-1250F
Footprint femoral ACL guide, left	AR-1510FL
Footprint femoral ACL guide, right	AR-1510FR
Femoral ACL, tip to tip	AR-1510F-01
Femoral ACL marking hook, AM portal, 7 mm offset	AR-1510F-02
Footprint femoral ACL guide, small angle, left	AR-1510FLS
Footprint femoral ACL guide, small angle, right	AR-1510FRS
Tibial ACL marking hook, for RetroConstruction drill guide	AR-1510T
Tibial ACL drill guide, pin tip	AR-1510GT
Tibial marking hook ACL guide, pin tip, small angle	AR-1510GTS

Instruments (Medial Portal Technique)	
TightRope drill pin, open	AR-1595T
TightRope drill pin, closed	AR-1595TC

GraftPro® Graft Preparation System (AR-2950D)	
GraftPro board	AR-2950D
GraftPro posts	AR-2950AP
GraftPro case	AR-2950DC
GraftPro GraftLink® implant tensioner	AR-2950GT
GraftPro GraftLink holder	AR-2950GH
GraftPro button holder	AR-2950BH
GraftPro soft-tissue clamp	AR-2950SC
Optional	
Cutting board clamp	AR-2950CBC

Accessories	
Suture retriever	AR-12540
Graft sizing block	AR-1886
Suture cutter for ACL TightRope II implant	AR-4520
Graft tube set	AR-1886-S
Atraumatic hamstring harvester	AR-10300
Hamstring harvester, minimally invasive	AR-1297L

Suture Options	
#2 FiberSnare® suture, 26 in length w/ 2 in closed loop (white/blue)	AR-7209SNL
#2 FiberSnare suture, 26 in length w/ 2 in closed loop (black/white)	AR-7209SNT
SutureTape loop, white/blue, 1.3 mm, 508 mm loop w/ 76 mm straight needle, 12 per box	AR-7534
SutureTape loop, white/black, 1.3 mm, 508 mm loop w/ 76 mm straight needle, 12 per box	AR-7534T
SutureTape, white/blue, 1.3 mm suture w/ needle	AR-7500
SutureTape, 0.9 mm w/ two 36.6 mm half-curved tapered needles, (white/blue)	AR-7571-02
SutureTape, 0.9 mm w/ one straight tapered needle, (white/black)	AR-7547T
SutureTape, 1.3 mm w/ two straight needles, (white/blue)	AR-7546-02
SutureTape, 1.3 mm w/ two straight needles, (black/white)	AR-7546TT-02

Products advertised in this brochure / surgical technique guide may not be available in all countries. For information on availability, please contact Arthrex Customer Service or your local Arthrex representative.

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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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