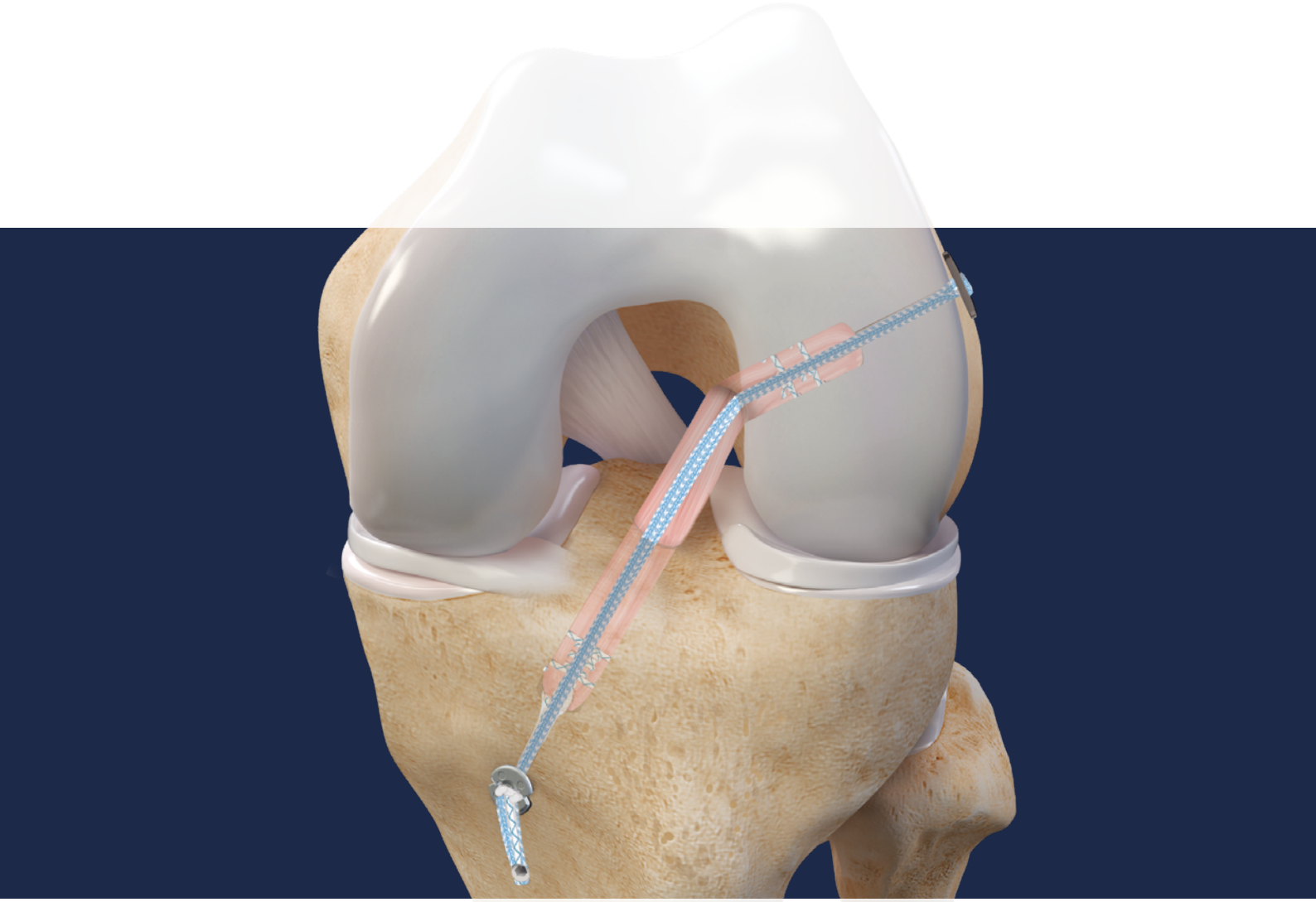
GraftLink® ACL Reconstruction With ACL TightRope® II Implant for *Internal*Brace™ Technique

Surgical Technique



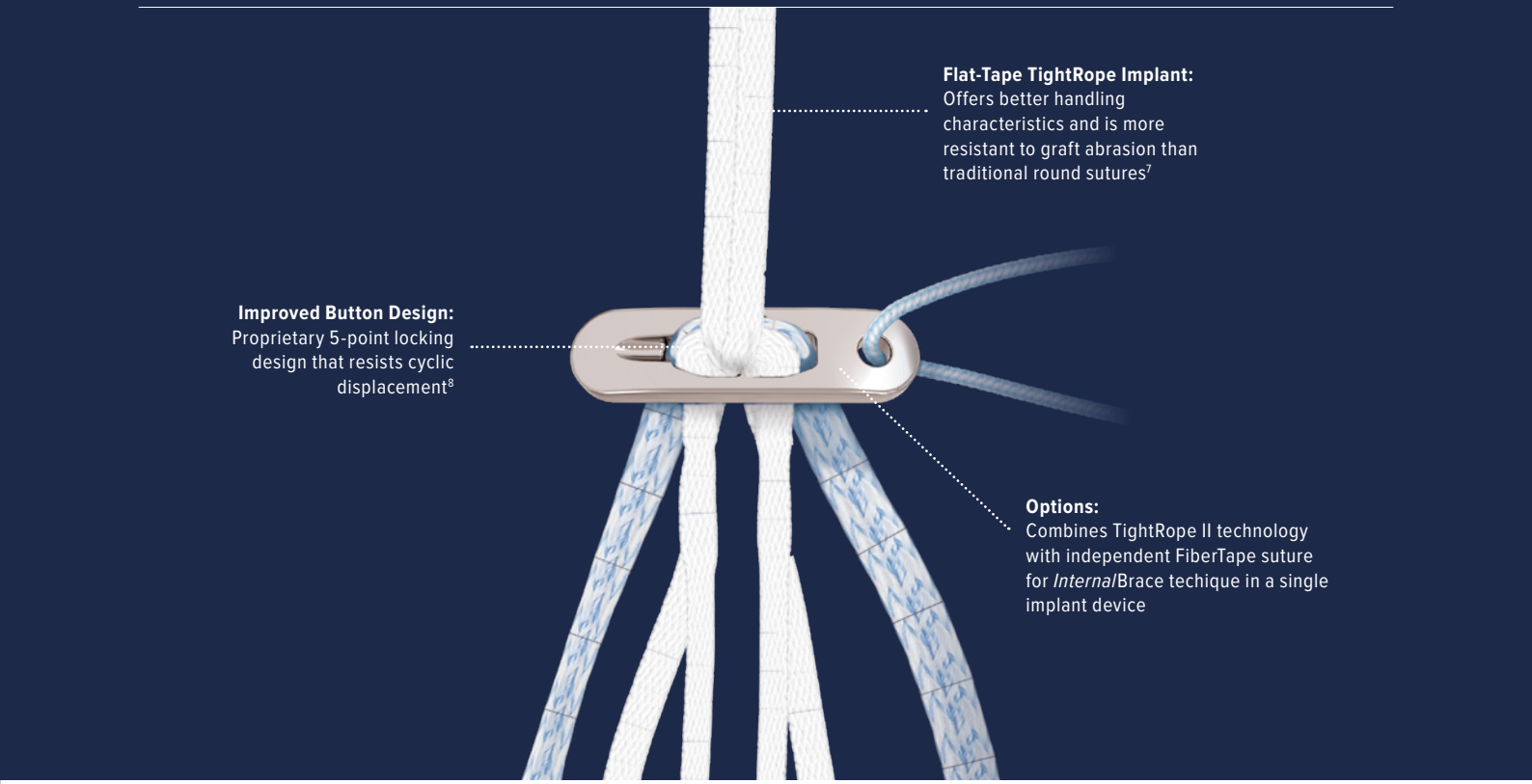
Arthrex®

Introduction

Achieve a new standard for minimally invasive ACL reconstruction by combining the long clinical history of the ACL GraftLink® technique with the ACL TightRope® II implant with FiberTape® suture for *Internal*Brace™ technique, which enhances, or augments, the graft during the healing process. Several biomechanical and clinical studies have shown that the GraftLink technique offers larger graft diameters, higher fixation strength, and excellent clinical outcomes when compared to traditional ACL constructs.[1-4] The ACL TightRope II implant with FiberTape suture for *Internal*Brace technique helps prevent excess range of motion and may reduce the chance of secondary injuries during the healing phase.[5,6]

ACL TightRope® II RT Implant With Preloaded FiberTape® Suture for *Interna*lBrace™ Technique

Flat-Out Better Adjustable-Loop Technology



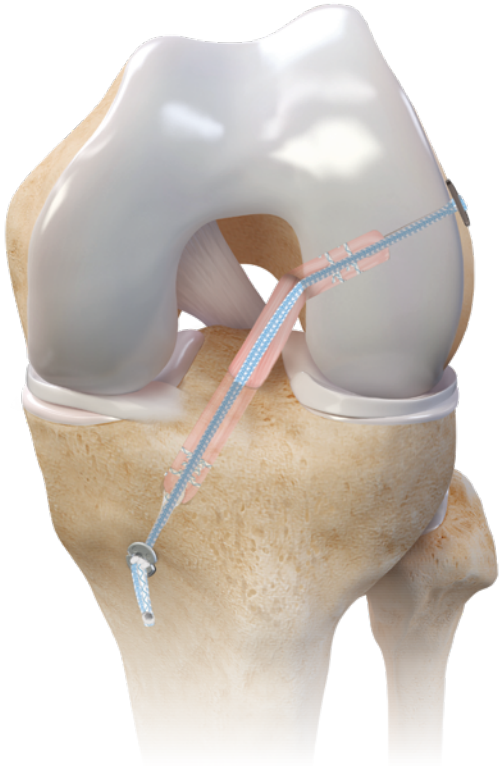
The ACL TightRope II implant with FiberTape suture for *Interna*lBrace technique is the next evolution in adjustable cortical suspensory fixation. The new flat-tape TightRope loop offers improved graft interface and handling characteristics during graft tensioning and greater resistance to graft abrasion.[7] The new proprietary 5-point locking design of the TightRope II button resists cyclic displacement[8] and offers ultimate load strength.[9] The TightRope II implant was engineered to enable precise graft tensioning and allow incremental retension of the construct after cortical button fixation.

The TightRope II implant with preloaded FiberTape suture for *Interna*lBrace technique is available for both ACL and PCL reconstruction. It is available in RT and BTB options for various technique and graft preferences.

- TightRope II RT implant
- TightRope II RT implant with FiberTape suture for *Interna*lBrace technique
- TightRope II BTB implant
- TightRope II BTB implant with FiberTape suture for *Interna*lBrace technique
- TightRope II ABS implant
- TightRope II open ABS
- Concave ABS buttons

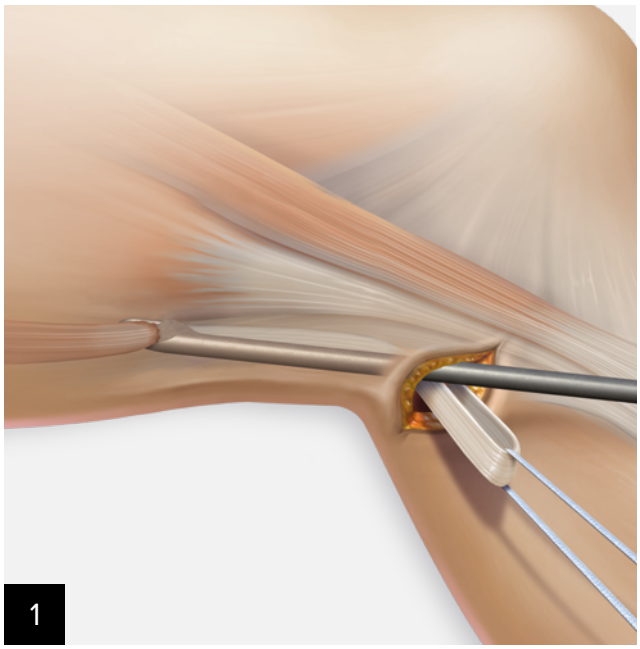
GraftLink® ACL Reconstruction With *Interna*lBrace™ Technique

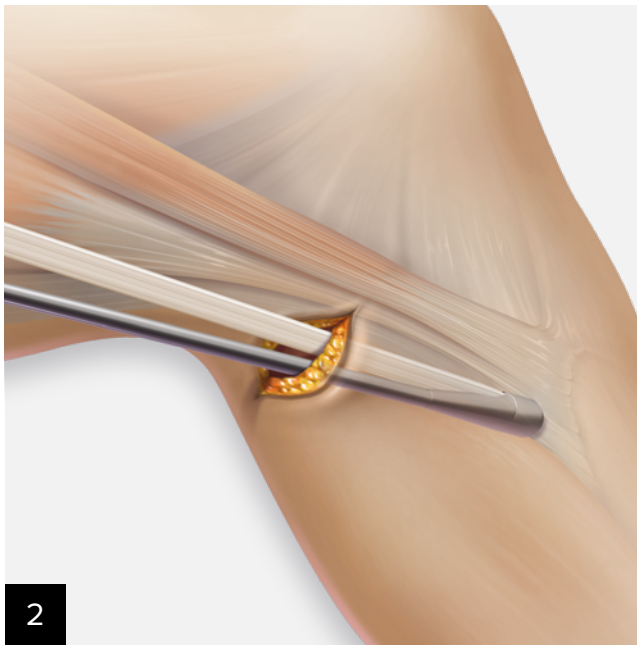
The ACL GraftLink technique with FiberTape® suture for *Interna*lBrace technique provides the ultimate in anatomic, minimally invasive, and reproducible ACL reconstruction.



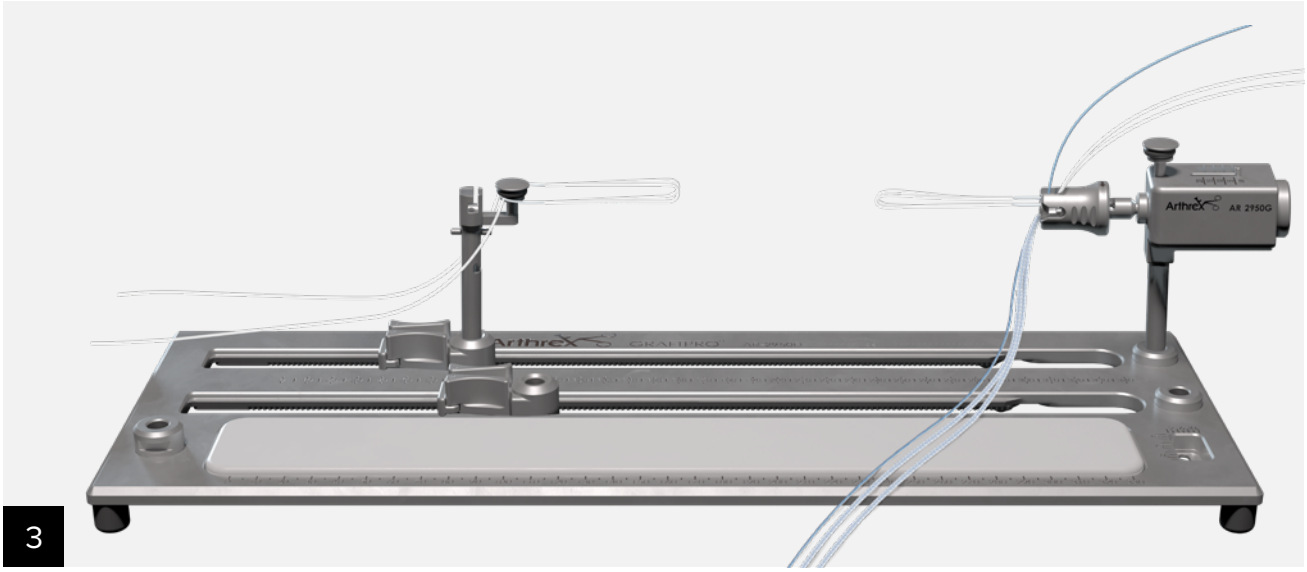
- **Anatomic**: Independent tibial and femoral socket preparation with the FlipCutter® III drill or low-profile reamers facilitate unconstrained placement of the ACL graft
- **Minimally Invasive**: Single-hamstring harvest decreases morbidity and loss of strength[10]; socket preparation with the FlipCutter 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 II implant with FiberTape suture for *Interna*lBrace 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 opportunities and can reduce tibial tunnel widening compared to screw fixations[3-6]

GraftLink ACL Reconstruction With *Interna*lBrace Technique





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).



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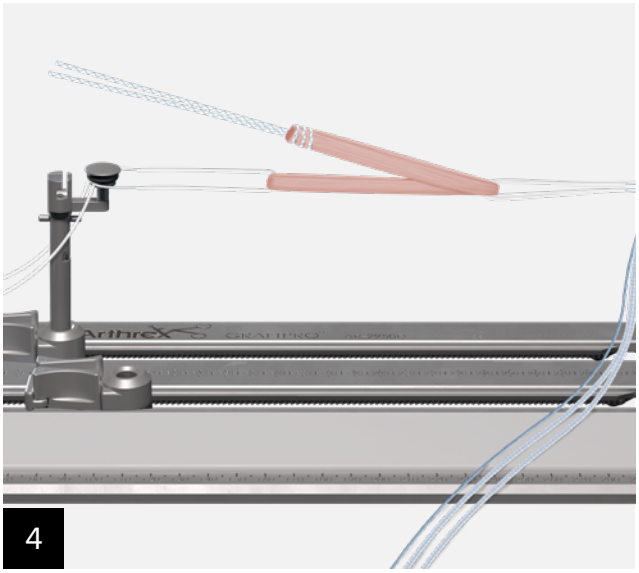
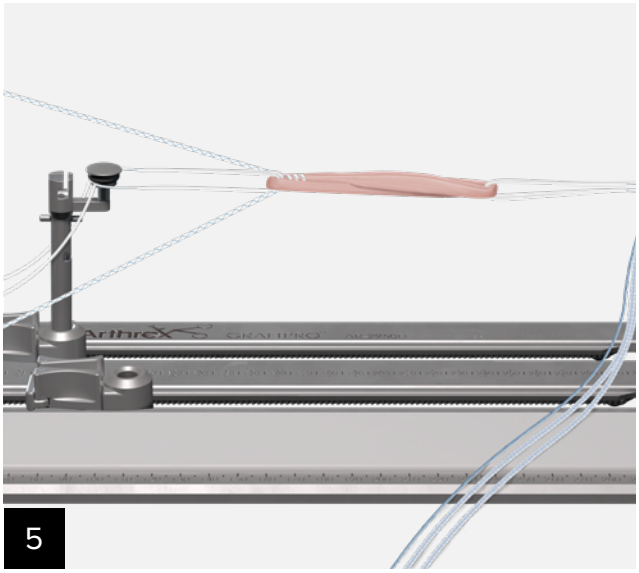
Place the GraftPro® graft prep attachments on the GraftPro base and load the ACL TightRope® II implant into the attachments. Measure the distance between the TightRope II loop ends. This distance should equal 10 mm less than the desired final graft length.
Note: A TightRope II RT implant is used for femoral fixation and a TightRope II ABS implant is used for tibial fixation.



4

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 ACL TightRope II implant.



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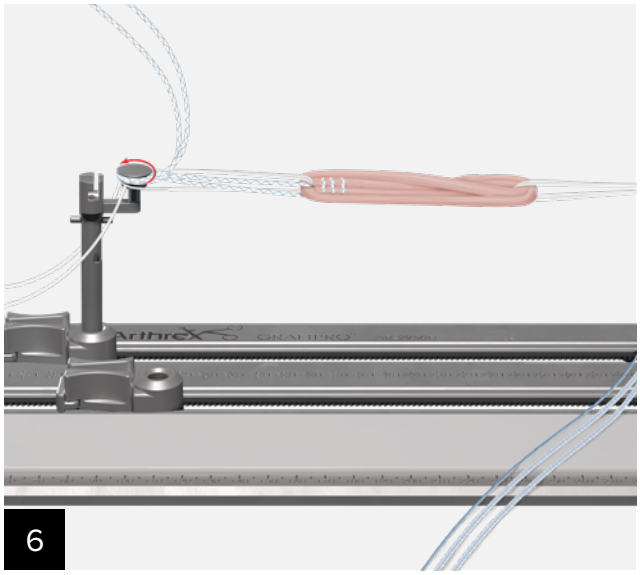
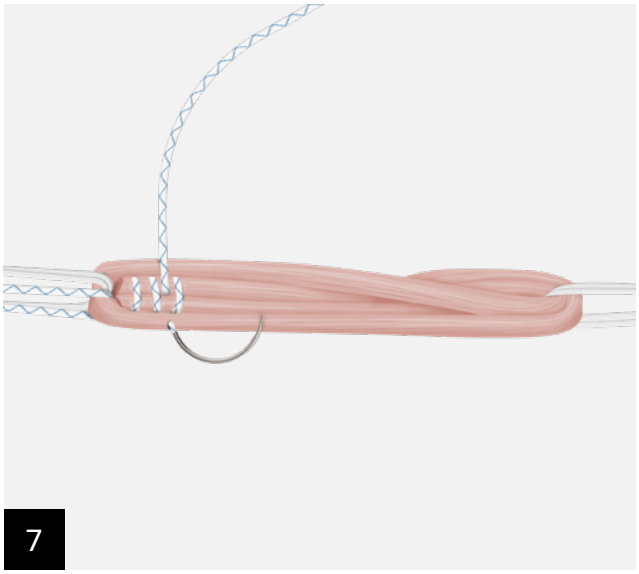
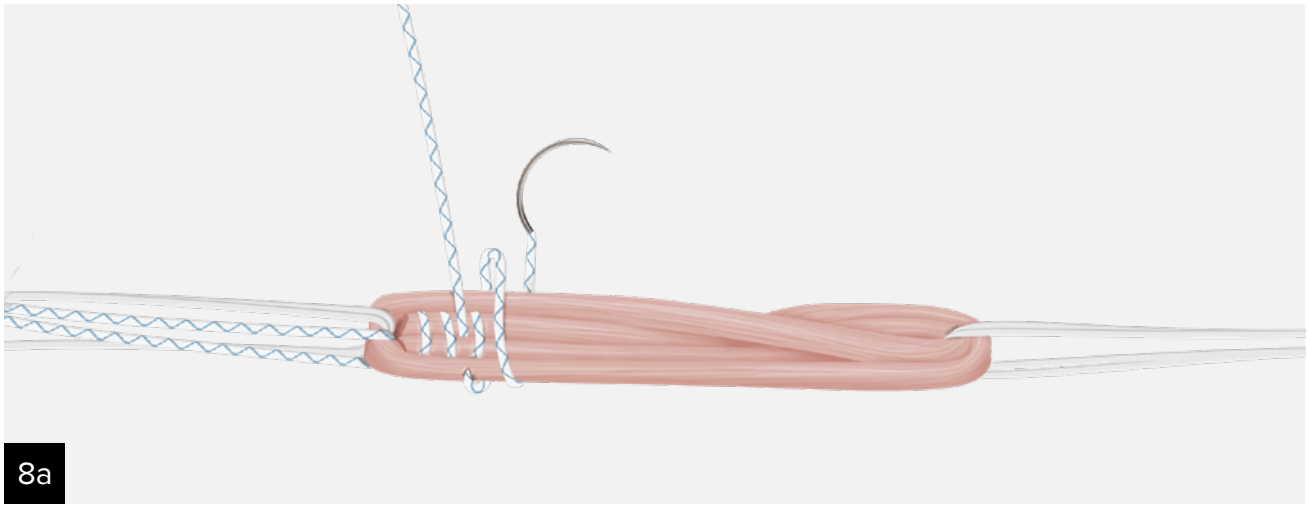
For each whipstitch, pass one tail over the graft loop and the other under the graft loop. This will ensure that the tails of the graft are tucked inside the loop during tensioning, which will facilitate tapering of ends and uniform thickness of the graft.



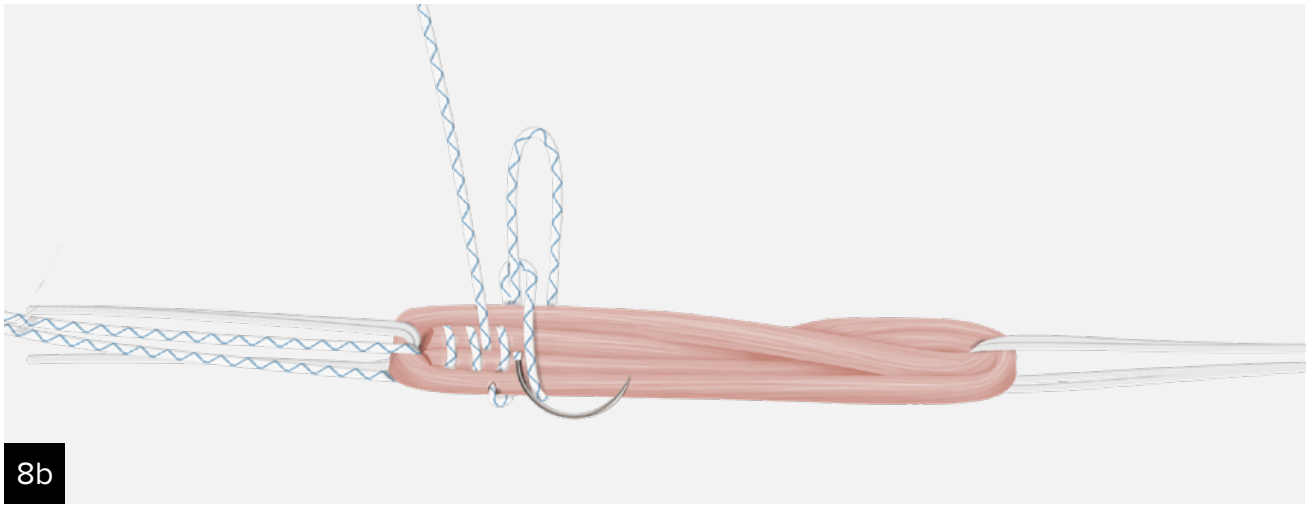
Once the graft is folded appropriately and the desired length is obtained, wrap the whipstitch sutures around the post to hold the construct in place.

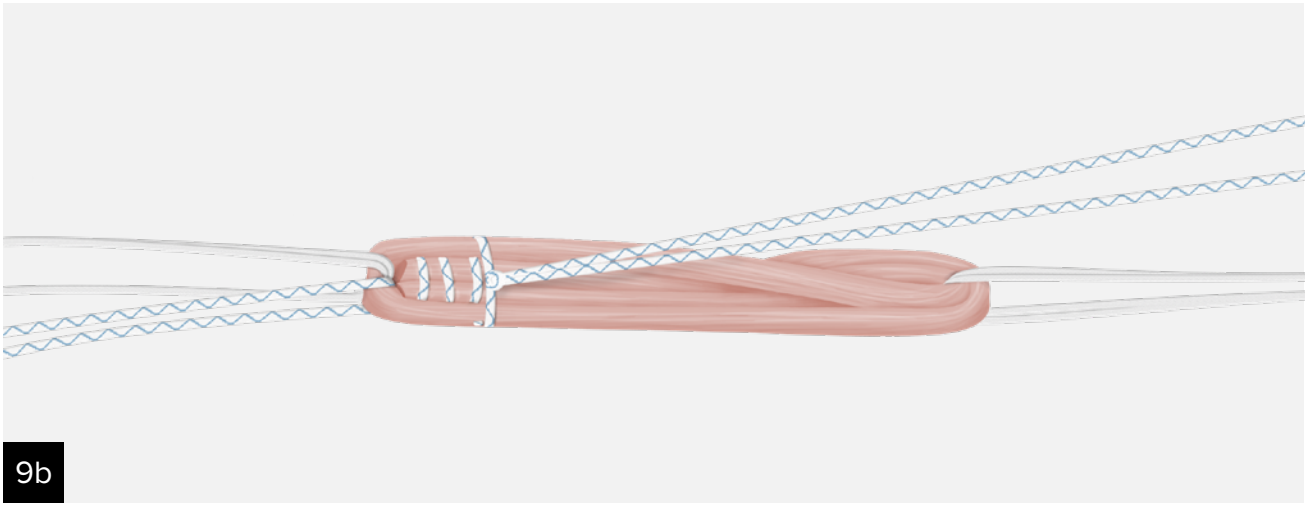


The first stitch may now be placed. Using a “buried-knot” technique, start from the inside of the graft and place the needle through the first two graft limbs.



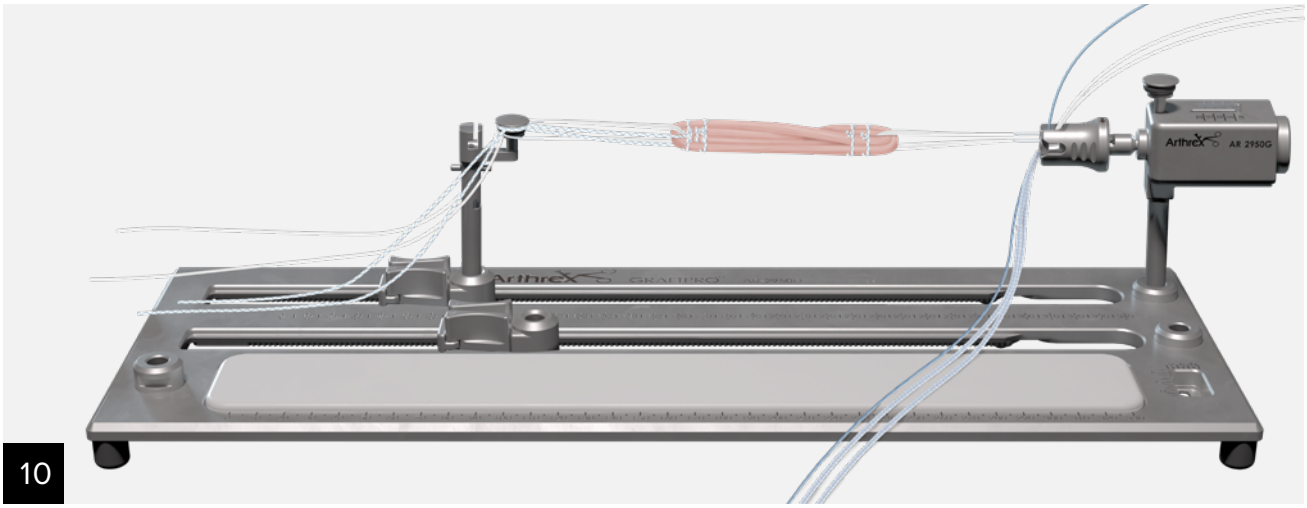
Wrap the SutureTape around the graft then place the needle through the second set of graft limbs from outside-in.





9b

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



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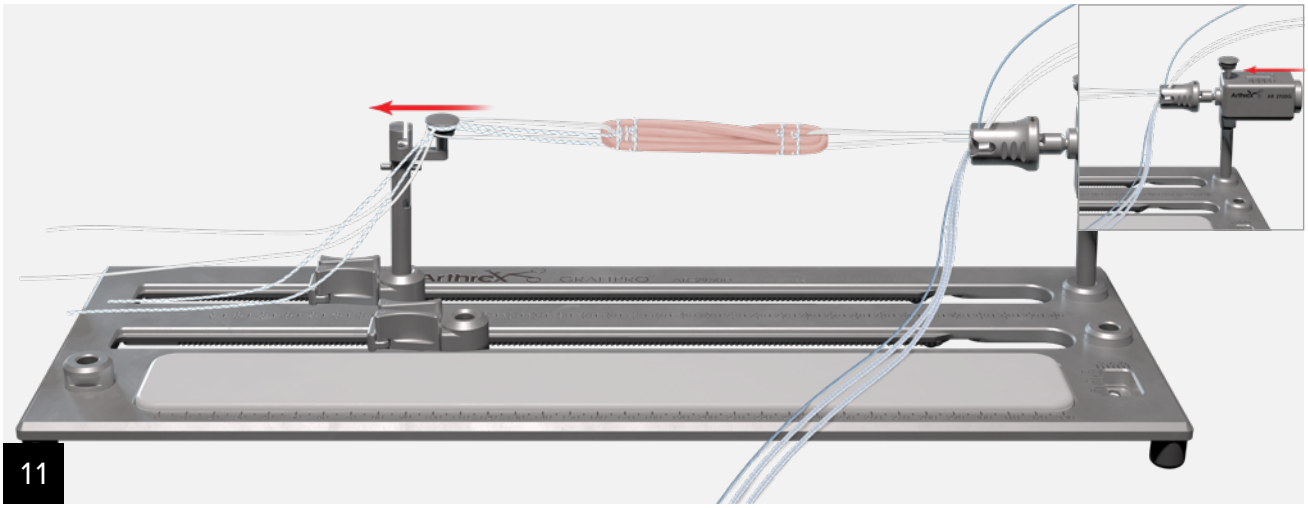
This may be repeated on either end of the graft for a total of two stitches on each end.



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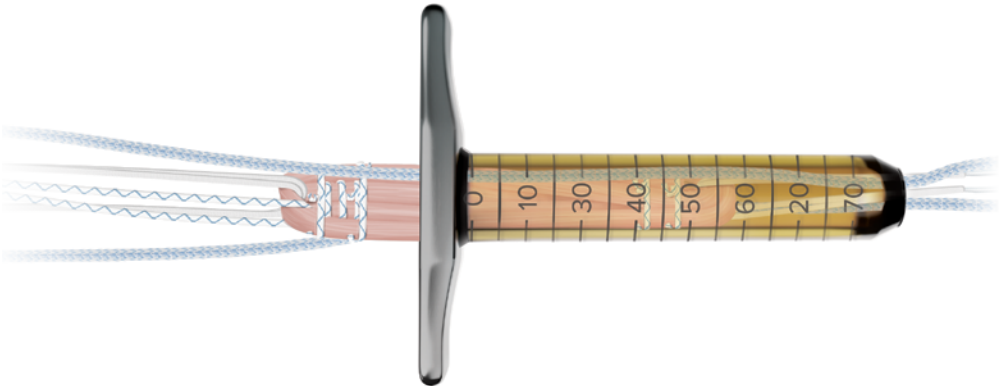
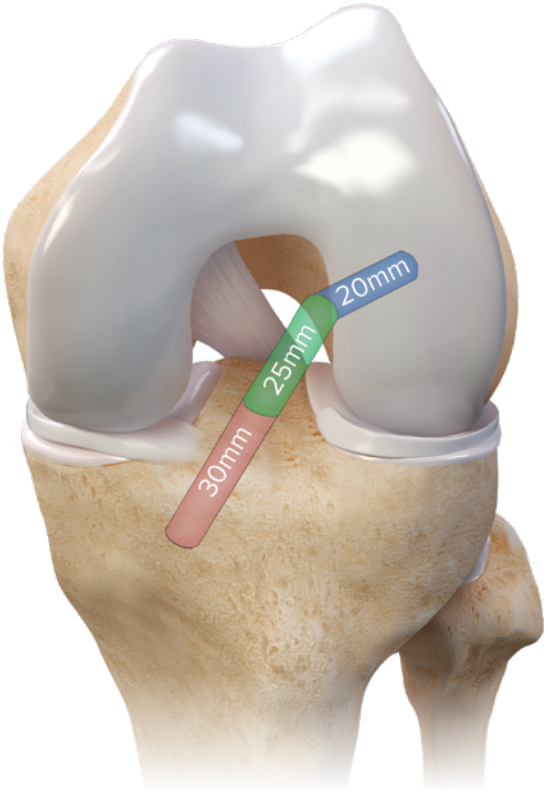
The GraftPro® graft prep attachments may now be used for tensioning by simply pulling on the sliding attachment until the desired tension is obtained as read on the tensiometer. The whipstitched FiberLoop® SutureTape may be retained and used as supplemental fixation.



The graft tube set is ideal for approximate sizing and compressing the GraftLink® construct. These full-length, translucent tubes facilitate graft compression, approximate sizing, and preparation. The unique transparent tube, with an etched ruler, allows 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.[11] Small holes in the graft tube allow hydration of the graft or injection of biologics along the entire length.

Socket Creation

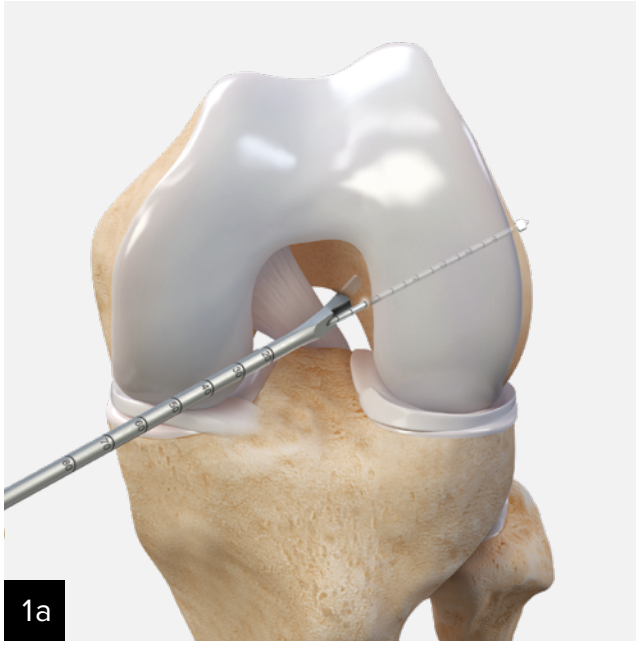


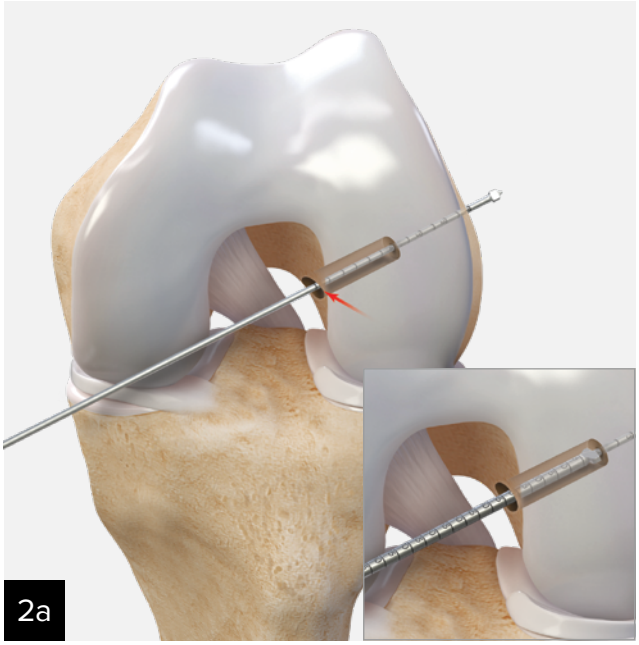
The length from the end of the femoral socket to the end of the tibial socket should be at least 10 mm longer than the graft to ensure that the graft can be tensioned fully.

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

Graft Tubes (AR-**1886-S**)

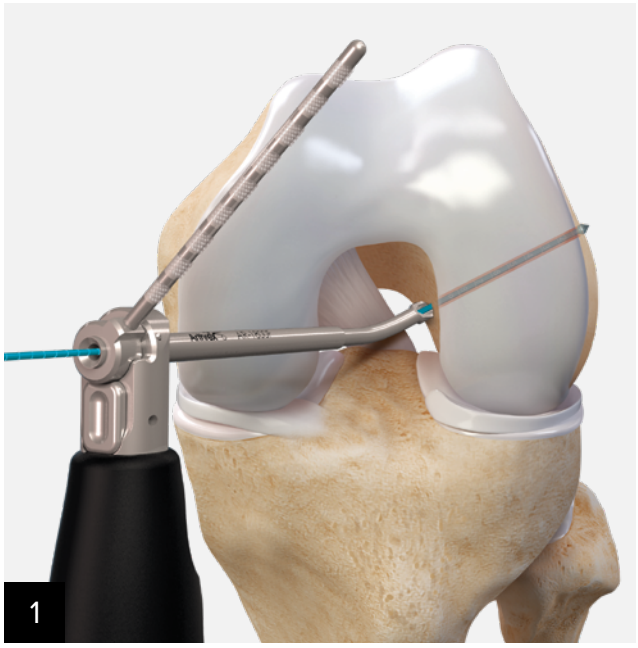
Femoral Socket Preparation

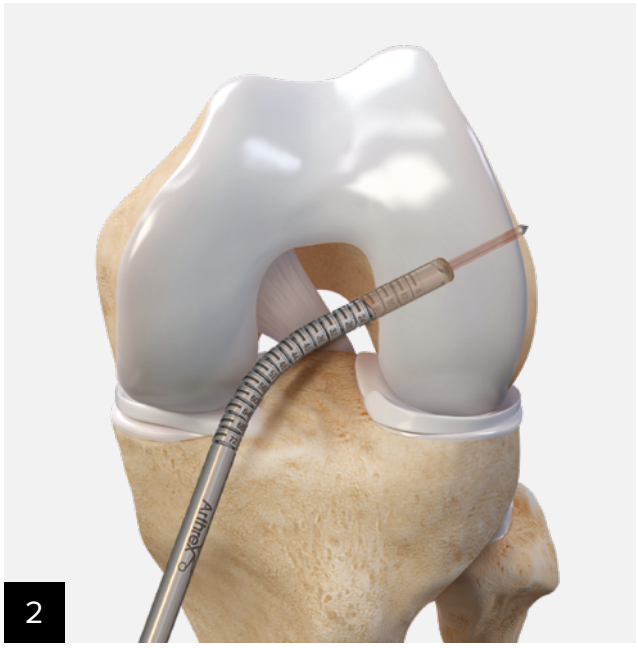




For medial portal drilling, use the TightRope® II drill pin, transportal ACL guides, and low-profile drills. Note the intraosseous length from the TightRope II drill pin. After socket drilling, pass a suture with the TightRope II drill pin for later graft passing.

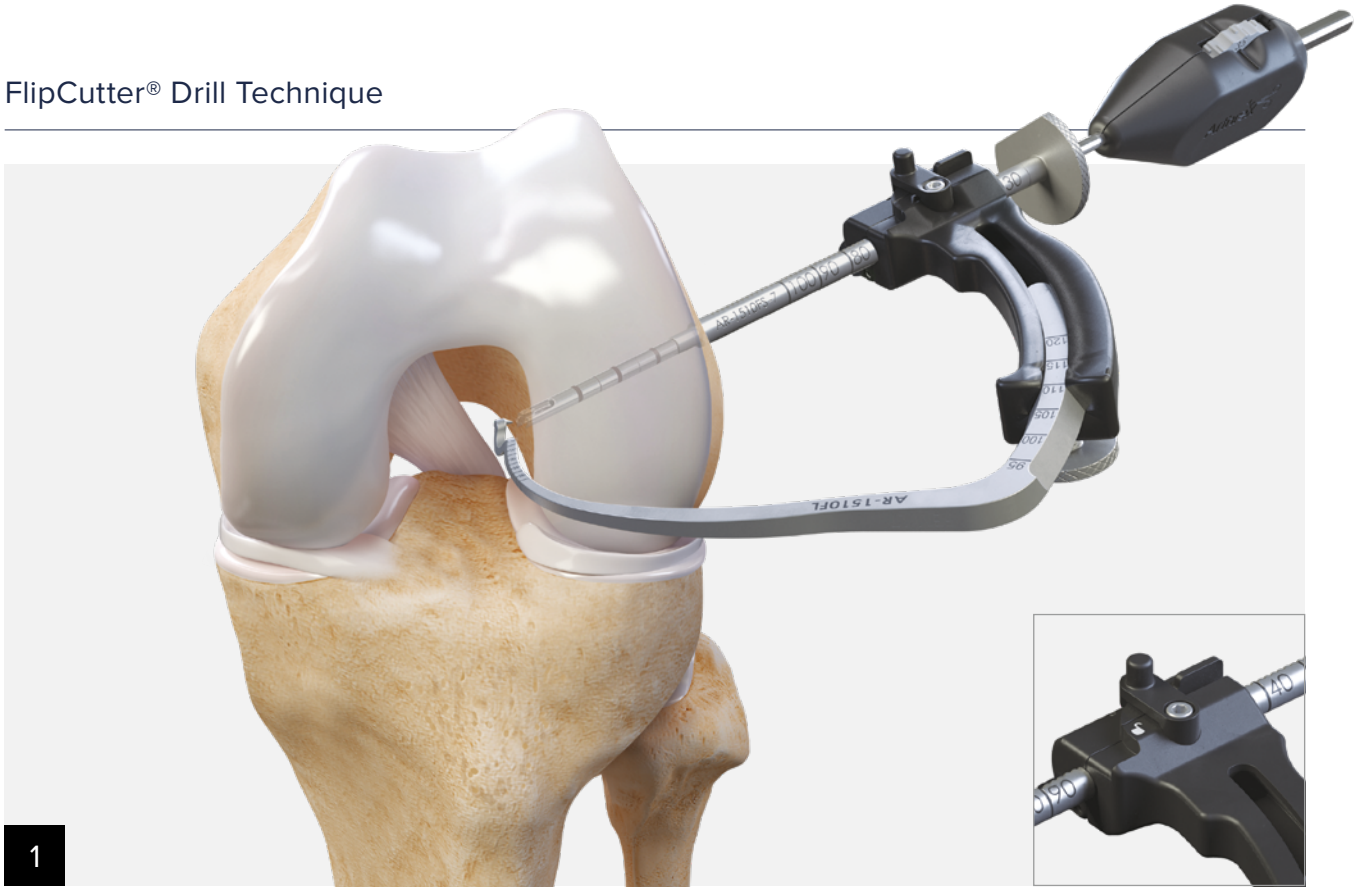
Flexible Reamer Technique



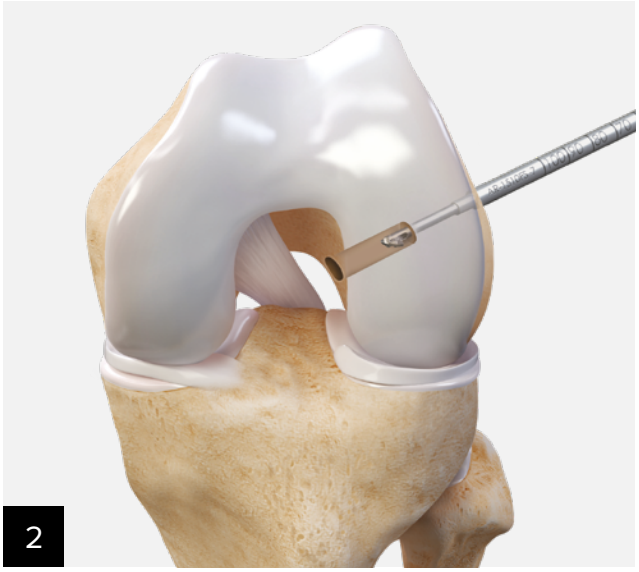


The flexible reamer system may be used for medial portal drilling. Use the flexible TightRope® drill pin, flexible reamer guide, and flexible low-profile drills. Note the intraosseous length from the flexible TightRope drill pin. After socket drilling, pass a suture with the TightRope drill pin.

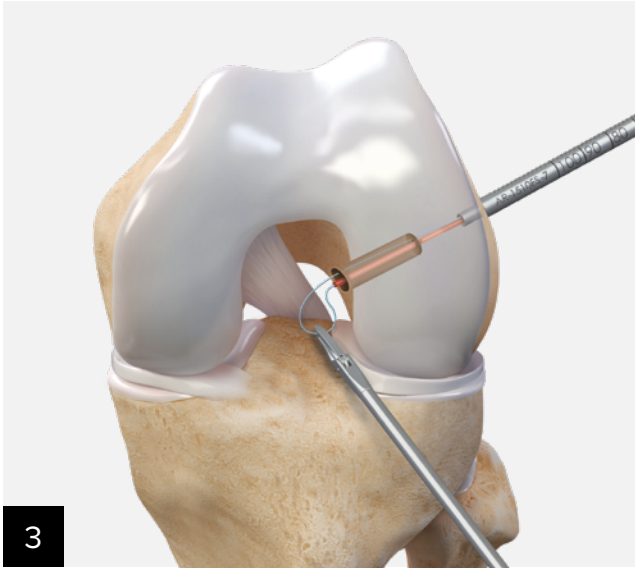
FlipCutter® Drill Technique



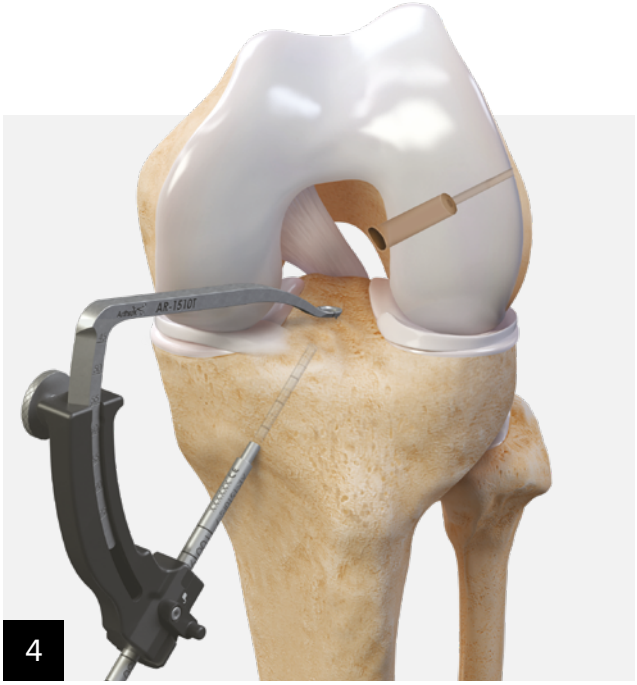
The FlipCutter III drill may also be used to create the femoral socket. Place the guide into the joint and push the drill sleeve down to bone. Note the femoral measurement where the drill sleeve meets the guide. Drill the FlipCutter drill into the joint, remove the guide, and tap the stepped drill sleeve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



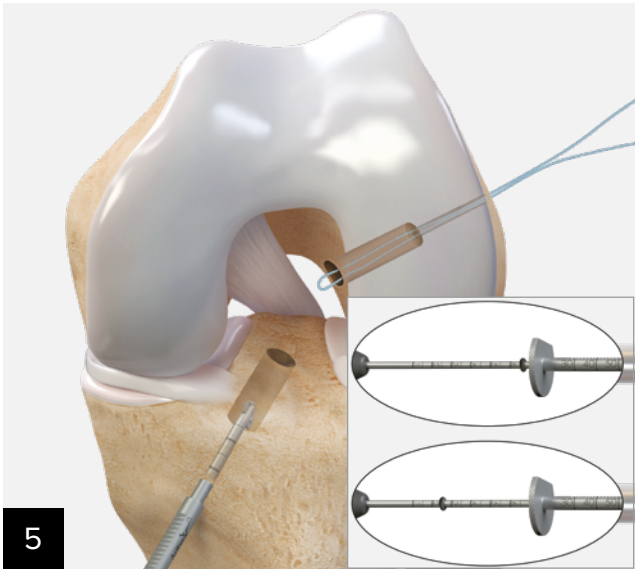
Flip the blade on the FlipCutter® III drill and ream until the desired socket depth is reached as measured on the FlipCutter drill markings.



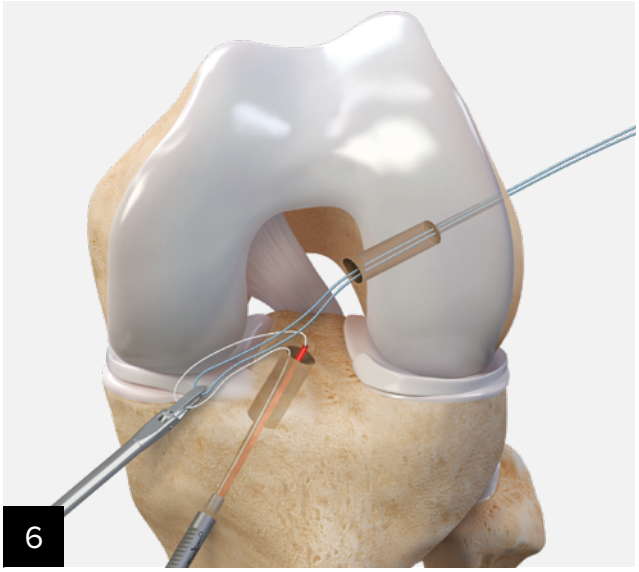
After “flipcutting,” flip the blade straight and remove it from the joint while keeping the drill sleeve in place. Pass a FiberStick™ suture passer through the stepped drill sleeve and dock for later graft passing.



Drill the FlipCutter III drill into the joint. Remove the marking hook and tap the stepped drill sleeve into the bone.

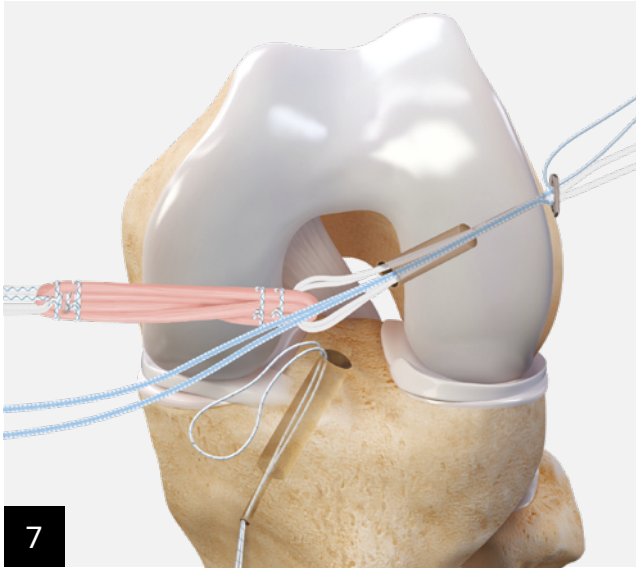


Flip the blade to the appropriate diameter for the tibial socket. Note the measurement where the drill sleeve meets the guide. Drill on forward, with traction, to cut the socket. Use the rubber grommet and 5 mm markings on the drill to measure the approximate socket depth.



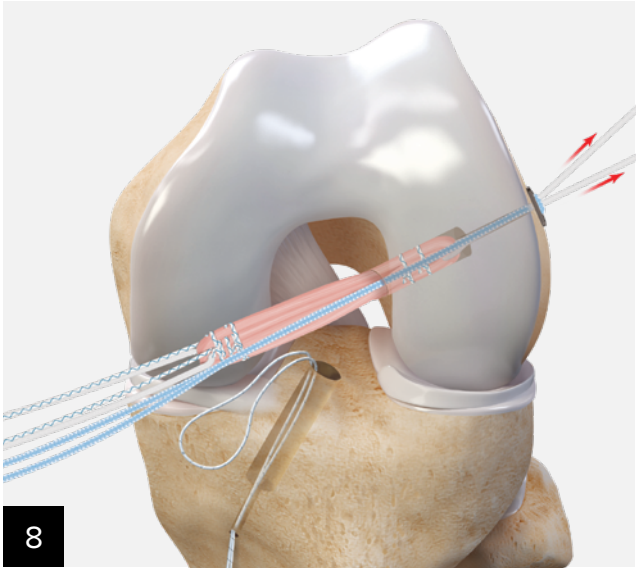
Straighten the FlipCutter® blade and remove it from the joint. Pass a TigerStick® suture passer into the joint and retrieve the tibial TigerStick and femoral FiberStick™ sutures together from the medial portal with a suture retriever. Retrieving both sutures at the same time will help avoid a tissue bridge that can complicate graft passing.

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



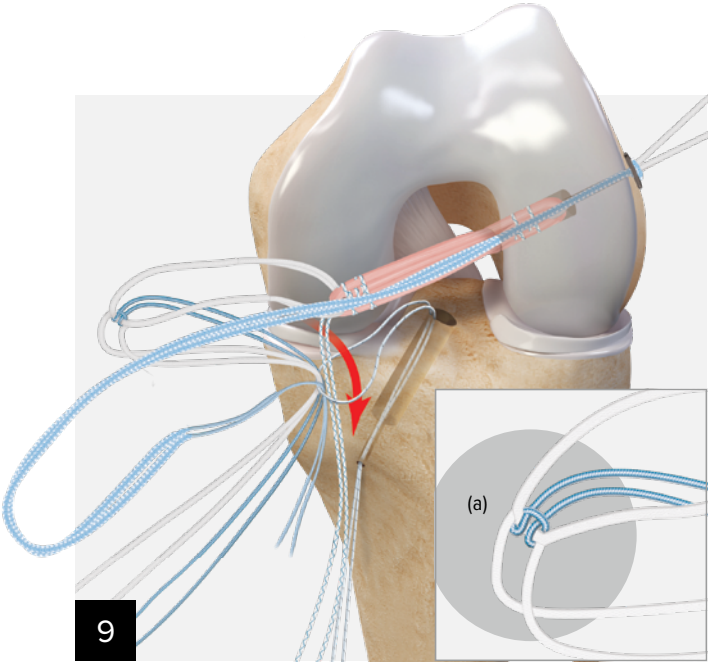
Pass the blue FiberWire® passing suture and the TightRope® II loop shortening strands through the femur. Remove slack from the sutures and ensure equal tension. Clamp or hold both blue and white sutures and pull them together to advance the button out of the femur. Pull back on the graft to confirm the button is seated.

Note: The femoral length may be marked on the TightRope II loop to signal when the button has exited the femur.



While maintaining slight tension on the graft, pull the shortening strands proximally one at a time to advance the graft. Pull on each strand in 2 cm increments.

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.



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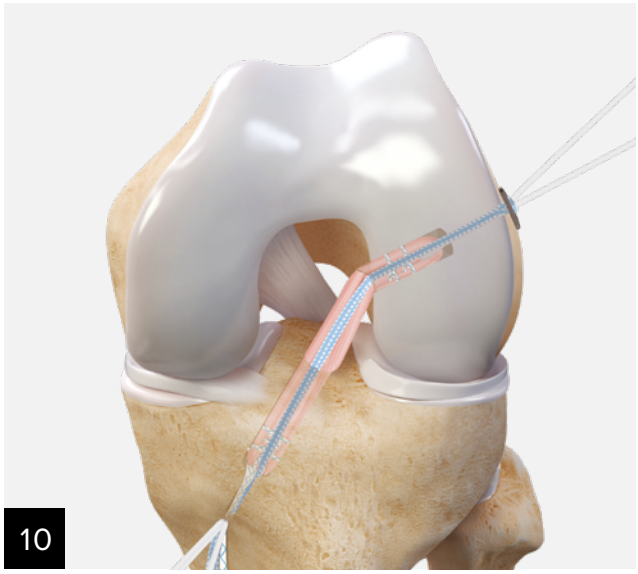
Load the cinch suture, the preassembled ABS implant passing suture, and the FiberTape® sutures from the graft into the tibial passing suture. Pull distally on the tibial passing suture to advance both the TightRope® II implant loop and FiberTape® sutures out of the tibia distally.



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Advance the graft into the tibia by pulling on the inside of the ABS loop and whipstitch sutures.

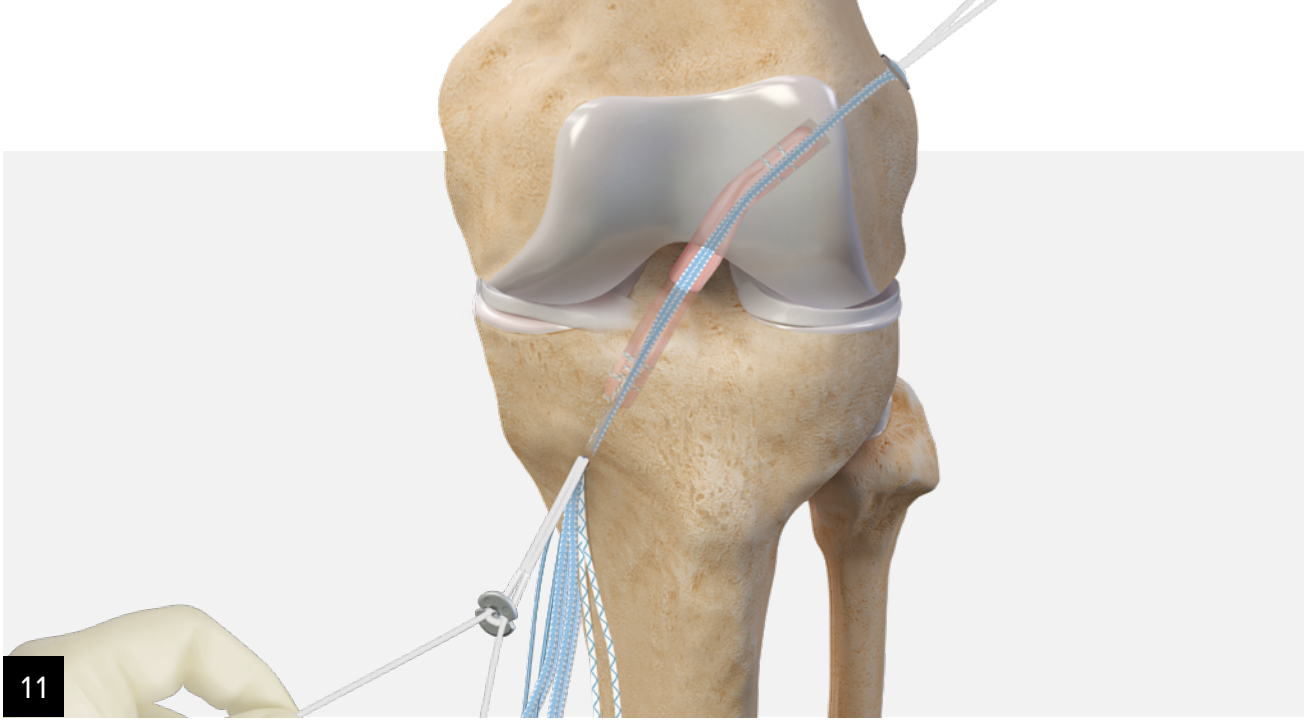
Concave ABS Buttons

- 11 mm with 4 mm collar AR-1588TB-3
- Use with 4 mm to 7 mm tunnels
- Compatible with FlipCutter® reamer

- 14 mm with 7 mm collar AR-1588TB-4
- Use with 7 mm to 9 mm tunnels

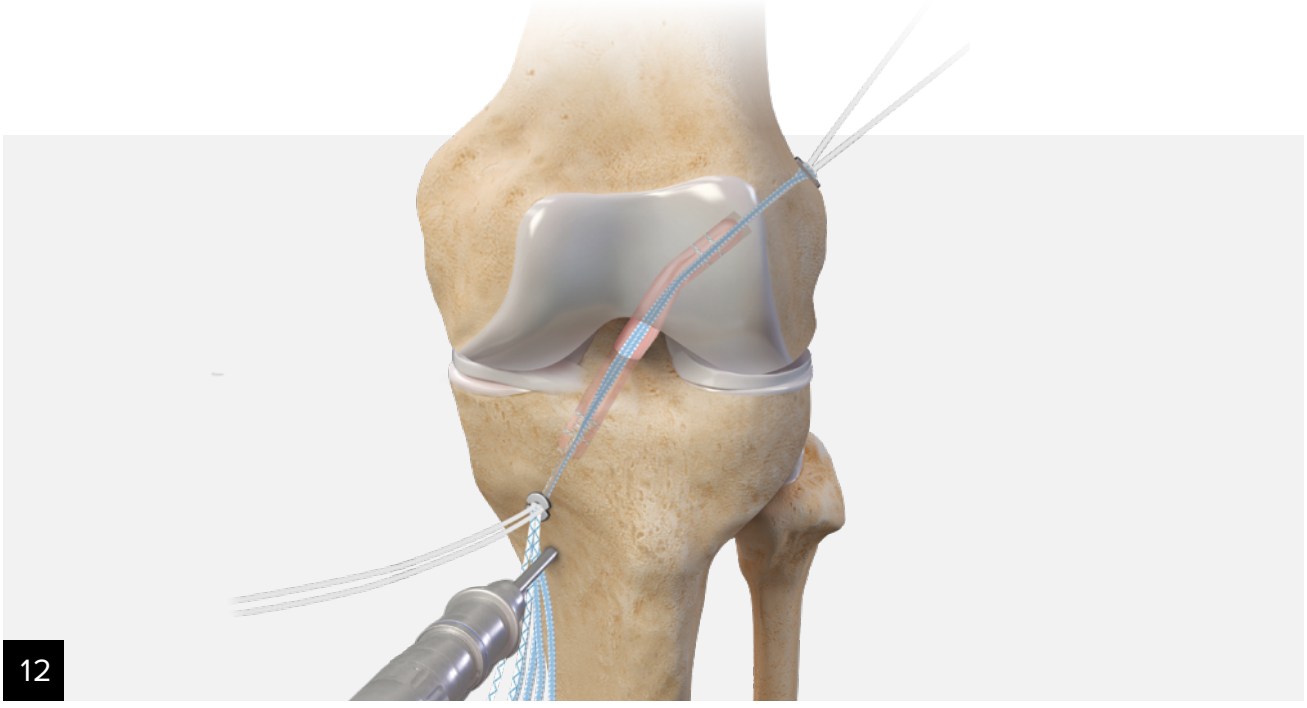
- 20 mm with 9 mm collar AR-1588TB-5
- Use with 9 mm to 13 mm tunnels

Concave ABS buttons are an ideal option for sockets or full tunnels. The centering feature maintains button position over the tunnel and provides a better seal at the cortex than standard flat buttons. The concave surface countersinks sutures and knots. All concave ABS implants have slots to load the TightRope® II ABS loop, while the 14 mm and 20 mm buttons have additional holes for extra suture.

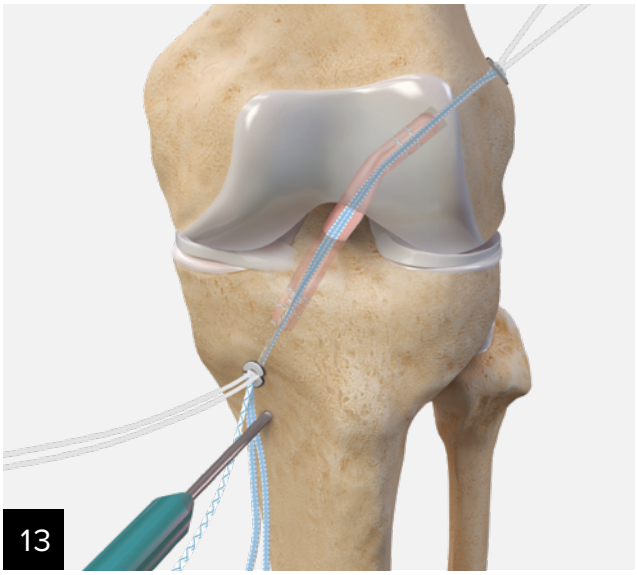


Load the ABS button onto the TightRope® loop. Additionally and similar to the TightRope loop, the FiberTape® sutures may be loaded onto the ABS button. Pull on the white shortening strands to advance the button to bone and tension the graft with the knee in extension.

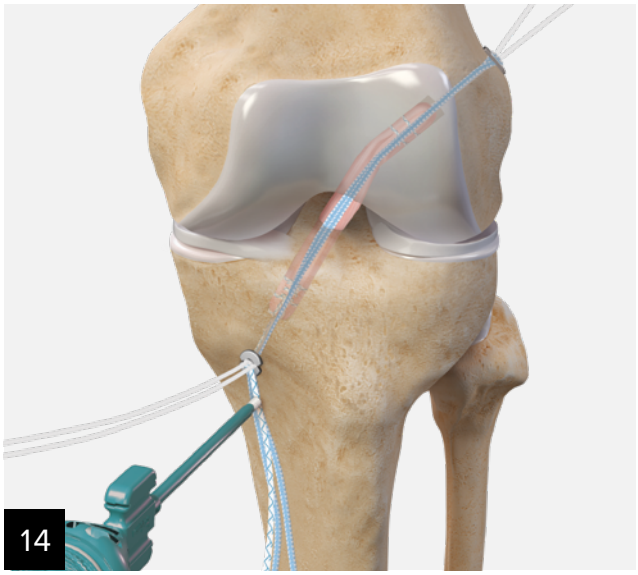
Note: Ensure the button has a clear path to bone so as to not entrap soft tissue under the button.



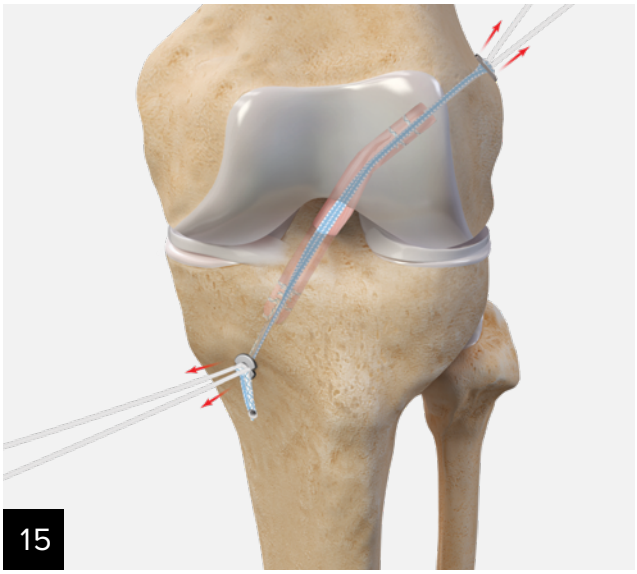
Using the spade-tip drill from the ACL backup kit, drill into the tibia to the depth of the drill collar. This represents an approximate 20 mm depth.



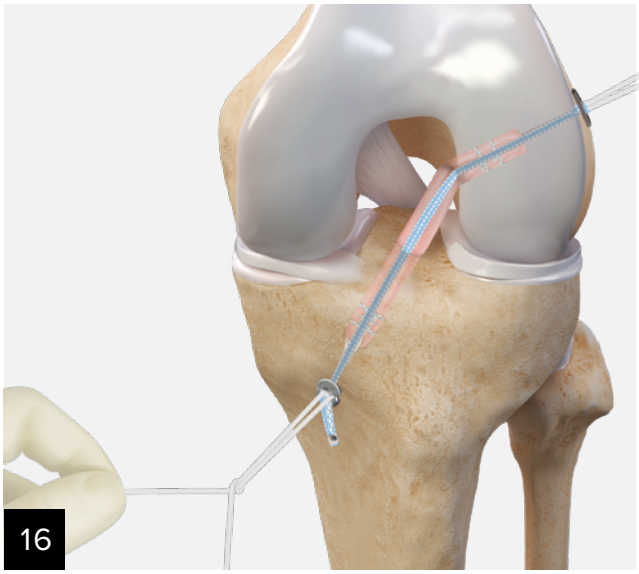
Use the 5.2 mm tap in the drilled hole and tap the socket.



In full extension, pass the FiberTape® suture and graft 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, keep the knee in extension and remove the retention suture from the anchor.



The TightRope® II RT implant can be fully tensioned. After the knee is cycled several times, both of the TightRope II implants can be tensioned again with the knee in extension.



The tensioning sutures of the tibial TightRope II implant are tied over the button to close the TightRope loop.

Ordering Information

Implants

Product Description	Item Number
ACL TightRope® II RT Implant w/ FiberTape® Suture for *Internal*Brace™ Technique	AR-**1588RT-IB**
TightRope II ABS Implant	AR-**1588TN-20**
TightRope II ABS Implant, open	AR-**1588TN-21**
ABS Button, concave, 11 mm	AR-**1588TB-3**
ABS Button, concave, 14 mm	AR-**1588TB-4**
ABS Button, concave, 20 mm	AR-**1588TB-5**
ACL Backup Kits	
ACL Backup Kit, BioComposite	AR-**1593-BC**
ACL Backup Kit, PEEK	AR-**1593-P**

Instruments (FlipCutter® III Drill Technique)

Product Description	Item Number
FlipCutter III Drill, 6 mm - 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**
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)

Product Description	Item Number
TightRope® Drill Pin, open	AR-**1595T**
TightRope Drill Pin, closed	AR-**1595TC**

GraftPro® Graft Preparation System (AR-2950D)

Product Description	Item Number
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

Product Description	Item Number
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

Product Description	Item Number
FiberStick™ Suture, #2 FiberWire® suture, blue, 1 end stiffened, 1270 mm	AR-**7209**
TigerStick® Suture, #2 TigerWire® suture, white / black, 1 end stiffened, 1270 mm	AR-**7209T**
SutureTape Loop, white / blue, 1.3 mm, 508 mm loop, with 76 mm straight needle, 12 per box	AR-**7534**
SutureTape Loop, white / black, 1.3 mm, 508 mm loop, with 76 mm straight needle, 12 per box	AR-**7534T**
SutureTape, white / blue, 1.3 mm suture, with needle	AR-**7500**
#2 TigerLoop™ Suture, white / green, 508 mm, with straight needle, 76 mm needle with 7 mm loop, with TigerWire suture	AR-**7234T**
#0 FiberWire Suture, blue, 965 mm, 22.2 mm ½ circle, with tapered needle	AR-**7250**
#2 FiberWire Suture, with straight needle	AR-**7246**
#2 FiberWire Suture, with 2 straight needles	AR-**7246-02**

Products may not be available in all markets because product availability is subject to the regulatory approvals and medical practices in individual markets. Please contact your Arthrex representative if you have questions about the availability of products in your area.

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*Internal*Brace™ surgical technique is intended only to support the primary ligament reconstruction and is not intended as a replacement for the standard of care using biologic augmentation in a primary reconstruction. *Internal*Brace surgical technique is intended only for soft-tissue-to-bone fixation and is not cleared for bone-to-bone fixation.

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