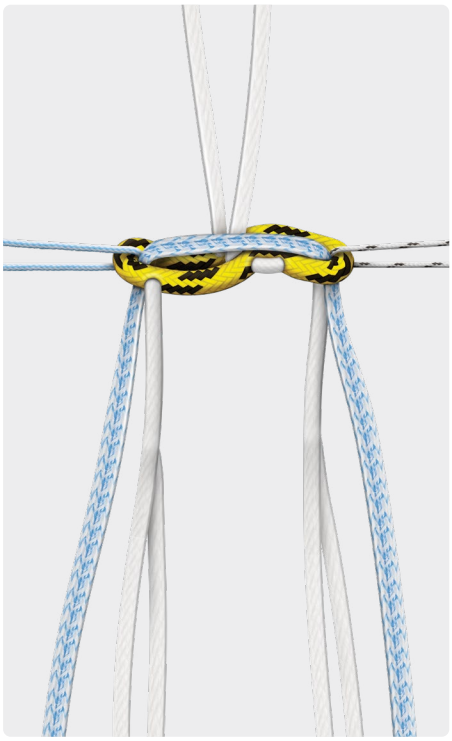
ACL Preservation With the ACL Repair TightRope® SB Implant

Surgical Technique

Arthrex®

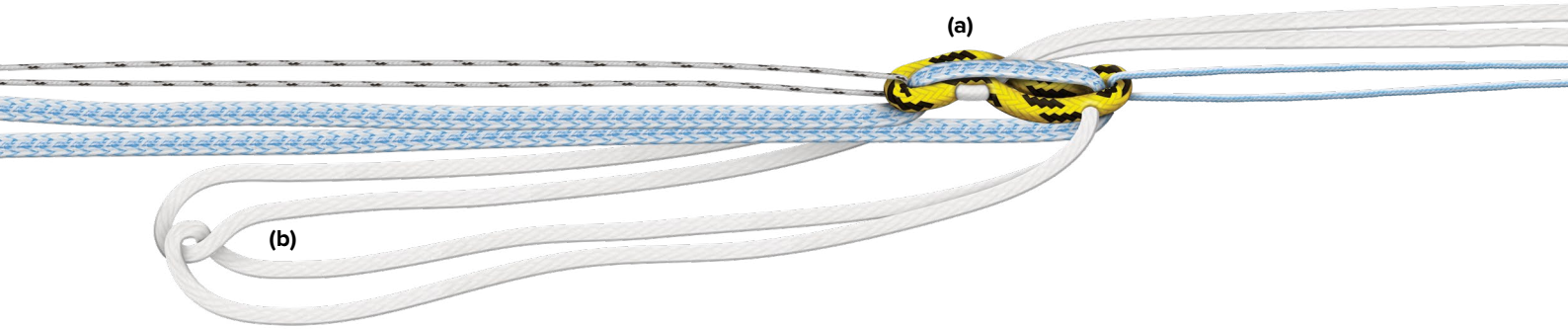
TightRope® SB Implant Introduction

The TightRope SB implant is the future of adjustable cortical suspensory-fixation technology. Using a radiopaque, suture-based 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

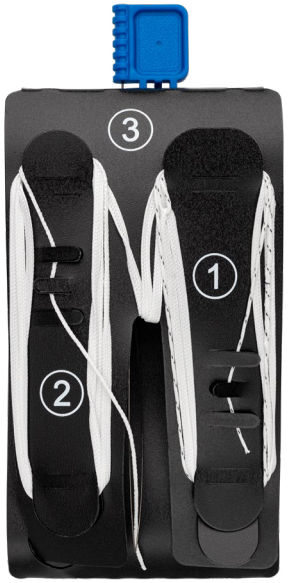
- **Suture-based button design:** Revolutionary all-suture, soft-button technology to eliminate metal from ACL reconstruction and repair **(a)**
- **Flat-tape TightRope implant:** Offers better handling characteristics and is more resistant to graft abrasion than traditional round sutures[1] **(b)**
- **Comprehensive options:** Available in RT, BTB, FiberTag® suture, and repair-implant configurations



ACL Repair TightRope® SB Implant

The first all-suture, knotless, tensionable system designed for ACL primary repair, the ACL Repair TightRope SB implant comes preassembled with a FiberTape® suture for the *Internal*Brace™ technique **(a)**. Stitch torn ligament tissue using FiberRing™ sutures **(b)**, then connect the sutures to the ACL repair TightRope SB implant for precise, incremental tensioning and titratable retensioning of the ligament after cycling the leg. FiberRing sutures are available in multiple sizes to accommodate various stitching techniques.

(a)



(b)

Patient Selection

When selecting a patient who may benefit from primary ACL repair, it is critical to appropriately evaluate two variables: injury acuteness and tear pattern. A higher percentage of successful outcomes with primary ACL repair has historically been seen in patients with acute injuries that were addressed within 4 weeks of injury and in those with proximal tear patterns (Figures 1 and 2).[3,4] Other variables, such as age, activity level, tissue quality, and injury mechanism also need to be considered when deciding between primary ACL repair and ACL reconstruction. Based on several early outcome studies in younger patients, it appears that ACL repair should be used cautiously in this cohort.[4,5]

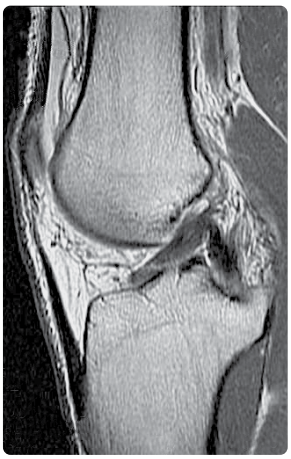
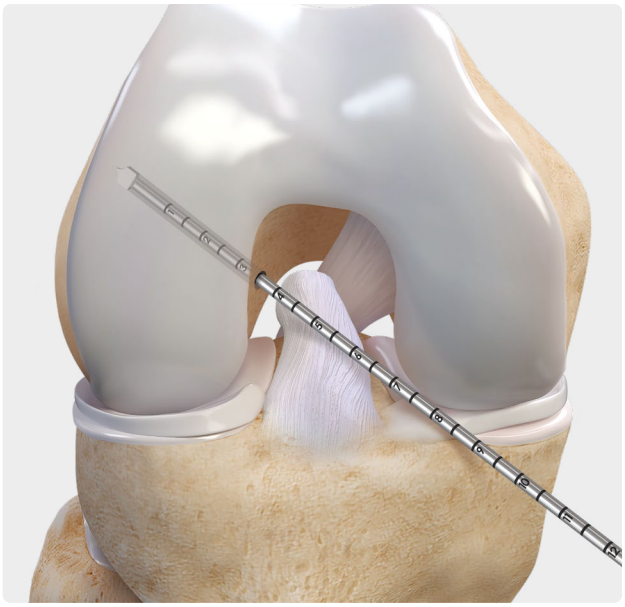


Figure 1: Sagittal T1 MRI showing proximal ACL tear

Figure 2: Coronal PD MRI showing proximal ACL tear; note that the fibers do not contact the femoral wall

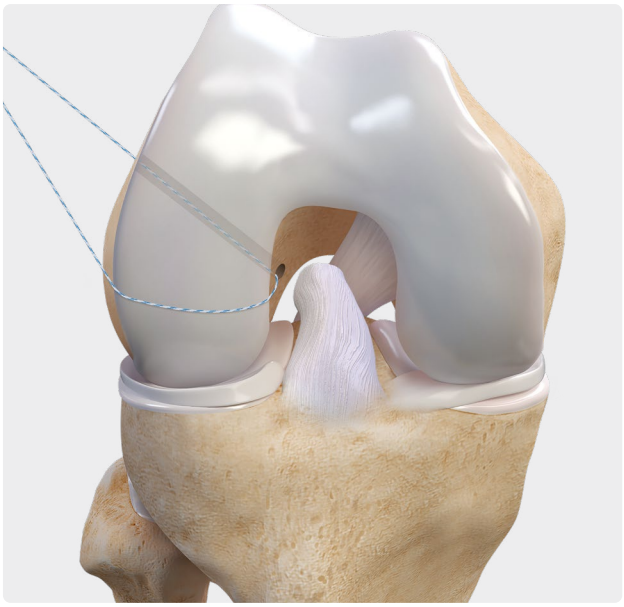
The *Internal*Brace surgical technique is intended only to augment the primary repair/reconstruction by expanding the area of tissue approximation during the healing period and is not intended as a replacement for the native ligament. The *Internal*Brace technique is for use during soft tissue-to-bone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

Surgical Technique



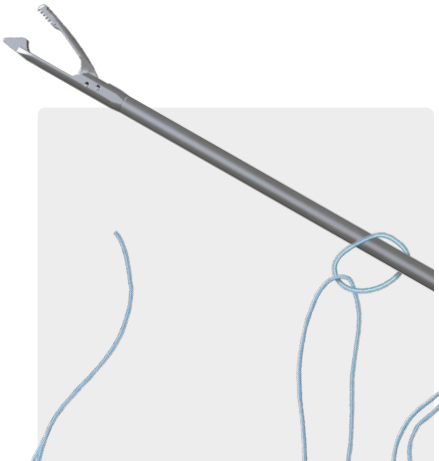
1

Use the spade-tip drill pin for the ACL TightRope® implant to drill a tunnel through the femur. Place the tunnel anatomically in the center of the femoral ACL footprint.



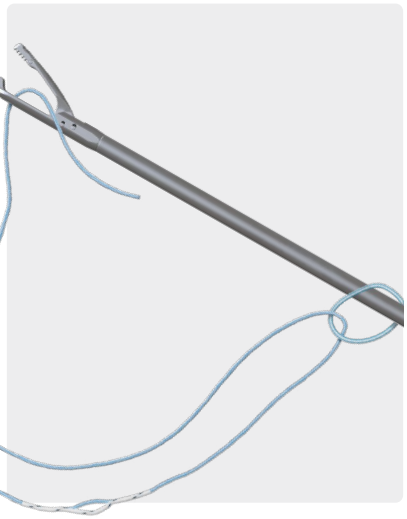
2

Using the eyelet on the ACL TightRope drill pin, pass a SutureTape FiberLink™ suture through the femur and snap for later use.



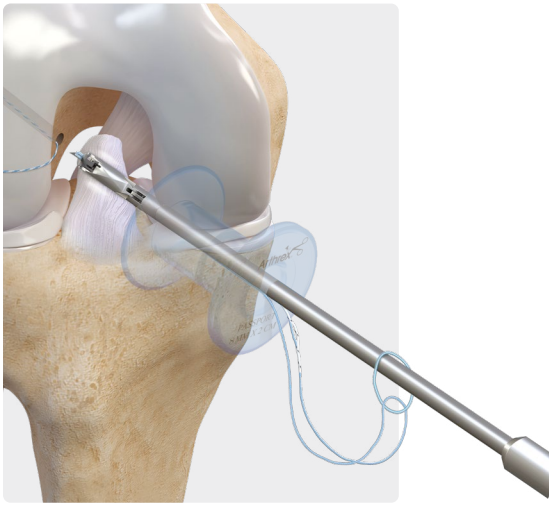
3a

Select a FiberRing™ suture of appropriate size and pass the small ring portion of the suture over the tip of a FastPass Scorpion™ suture passer.



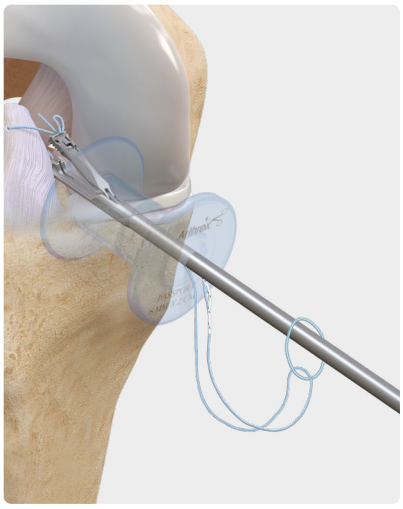
3b

Load the single end of the FiberRing shuttling suture into the bottom jaw of the FastPass Scorpion suture passer.



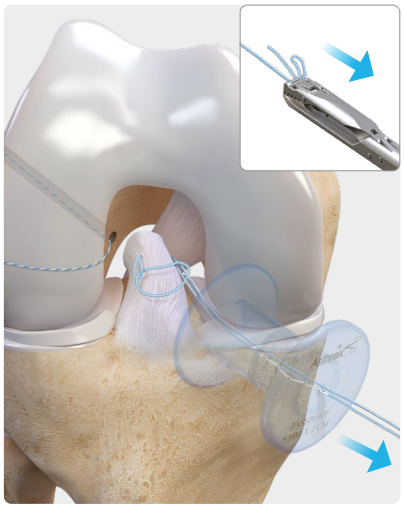
4

Using the FastPass Scorpion suture passer, advance the FiberRing suture through the intact portion of the ACL remnant. Use the PassPort Button™ cannula for suture management in the working portal to optimize visibility and maneuverability inside and outside the joint.



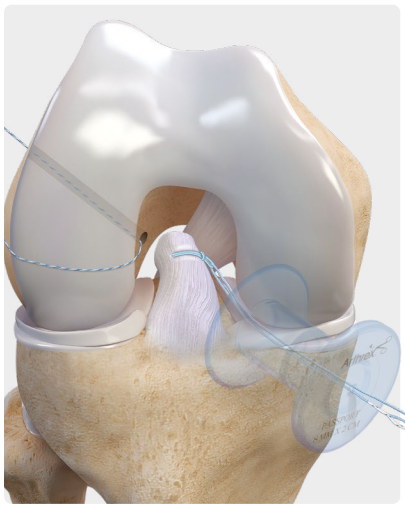
5

Visually confirm the FiberRing™ suture has been captured in the top jaw of the FastPass Scorpion™ suture passer and gently remove the instrument.



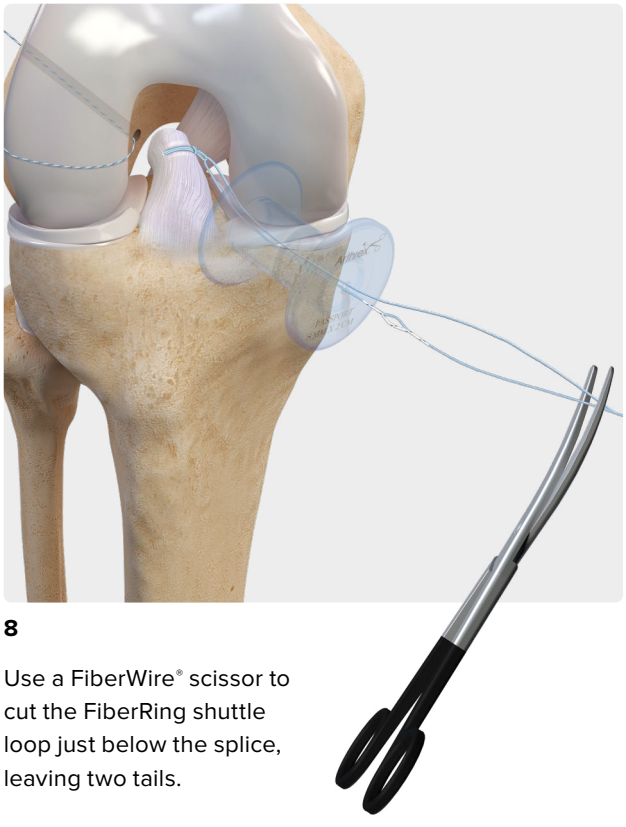
6

As the FastPass Scorpion suture passer is removed from the knee, the FiberRing luggage tag will begin to reduce down into the joint and onto the ligament.



7

Remove the FiberRing suture from the FastPass Scorpion suture passer and gently pull the end of the FiberRing shuttle loop to fully cinch down the FiberRing suture at the ACL to form the luggage tag stitch.



8

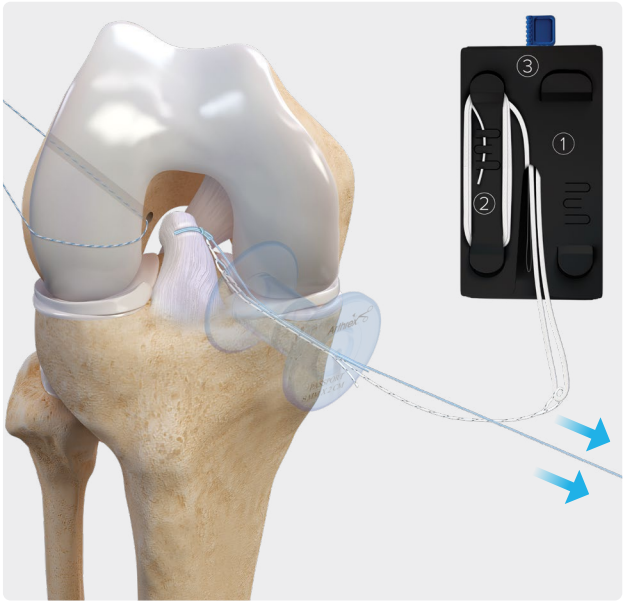
Use a FiberWire® scissor to cut the FiberRing shuttle loop just below the splice, leaving two tails.

9

Identify and unravel the black-and-white TigerWire® leader suture located at the **(1)** on the ACL Repair TightRope® SB assembly card.

10

Load approximately 2 cm of the black-and-white leader suture from the (1) section of the card into the suture eyelet of the FiberRing™ shuttle loop.



11

Pull the free blue tail of the FiberRing shuttle loop to shuttle the black-and-white TightRope® leader suture through the FiberRing luggage tag suture and back out of the Passport Button™ cannula. Once the leader suture is passed, the blue FiberRing shuttle loop may be discarded.

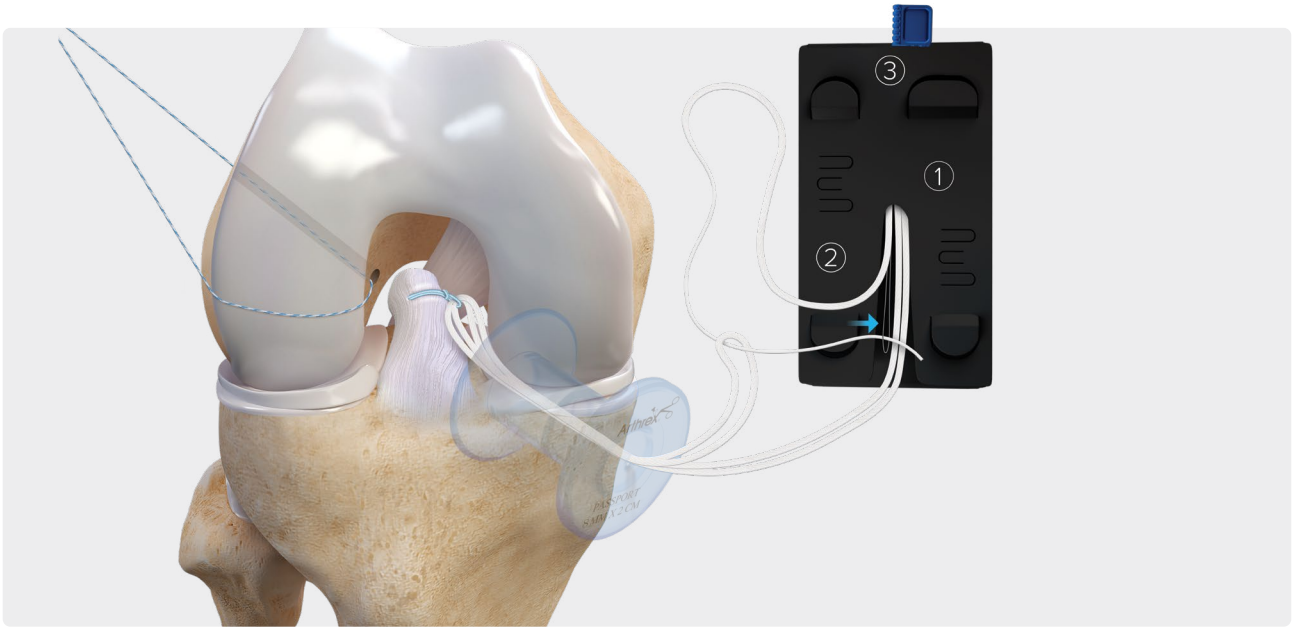
> **Note:** Repeat this passing step to load the ACL Repair TightRope SB suture onto subsequent FiberRing sutures if more than one luggage tag stitch is performed.

12

The black-and-white leader suture can now be removed using FiberWire® scissors and discarded.

13

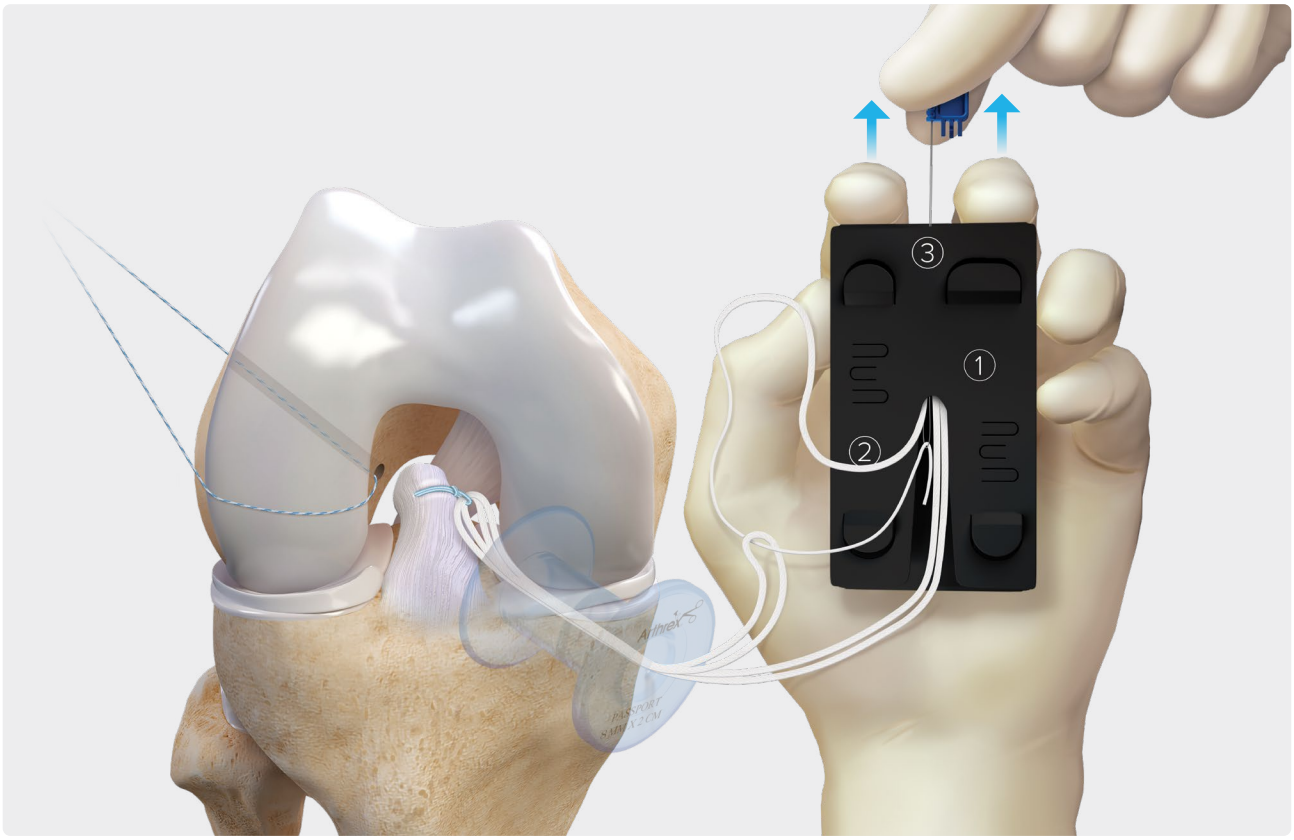
Identify and unravel the open suture limb of the TightRope suture labeled **(2)** on the assembly card and pass it through the previously shuttled ACL Repair TightRope SB loop.



14

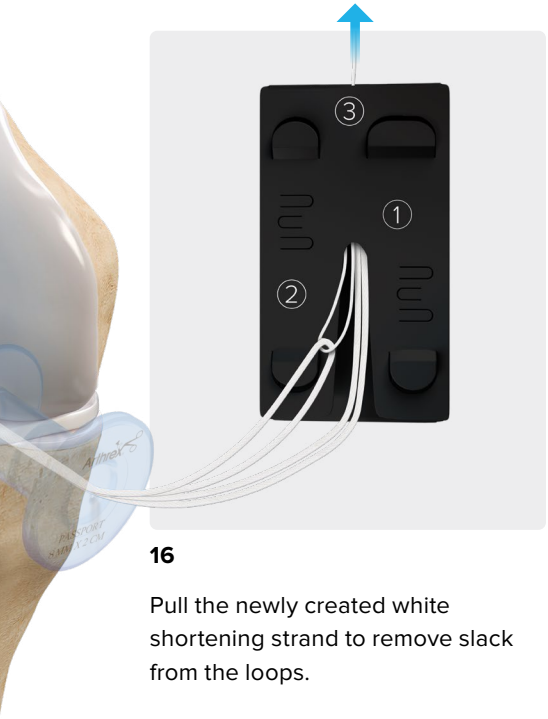
Load 1 cm of the single white suture tail labeled **(2)** through the nitinol passing loop.

Note: Fold the suture over the nitinol wire to form a crease to prevent the suture from sliding during passage.



15

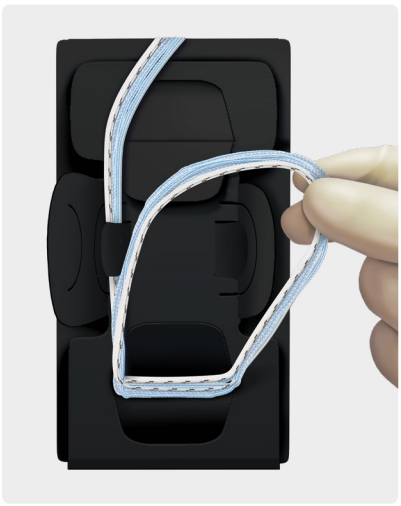
Hold two fingers over the top of the card as pictured and pull the blue threader **(3)** to complete the pass.



16

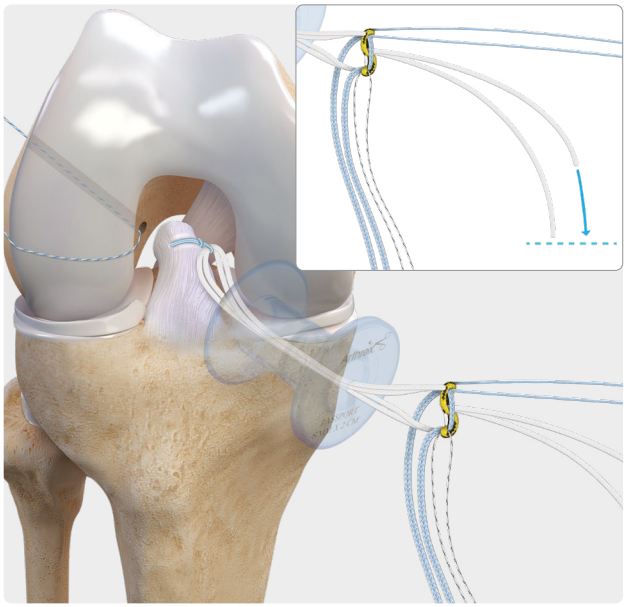
Pull the newly created white shortening strand to remove slack from the loops.

17a



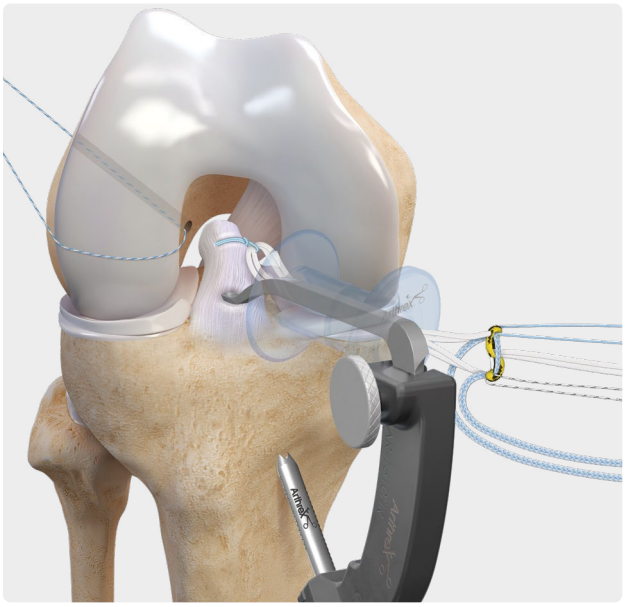
17b

Unsnap the packaging on the back of the card and pinch down the suture cleat to retrieve the sutures **(17a)**. Open the assembly card, remove the construct **(17b)**, and discard the assembly card.



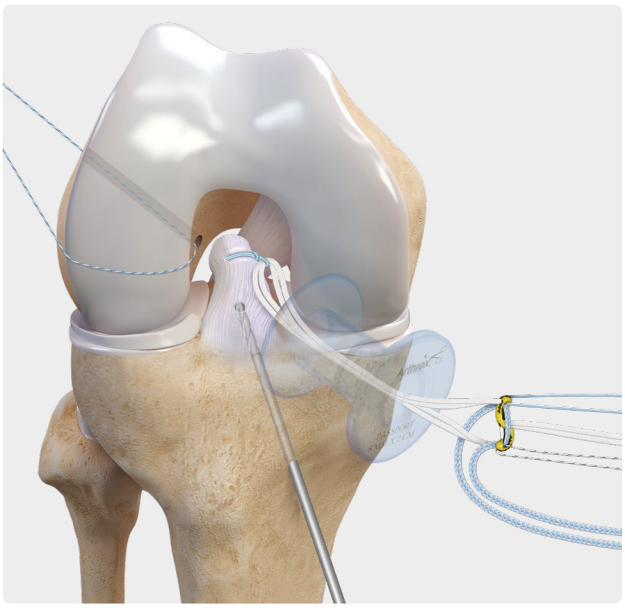
18

Identify and even out the lengths of the white TightRope® suture shortening tails.



19

Use the RetroConstruction™ tibial ACL marking hook and the 2.4 mm drill sleeve to localize centrally into the anterior third of the ACL tibial insertion.

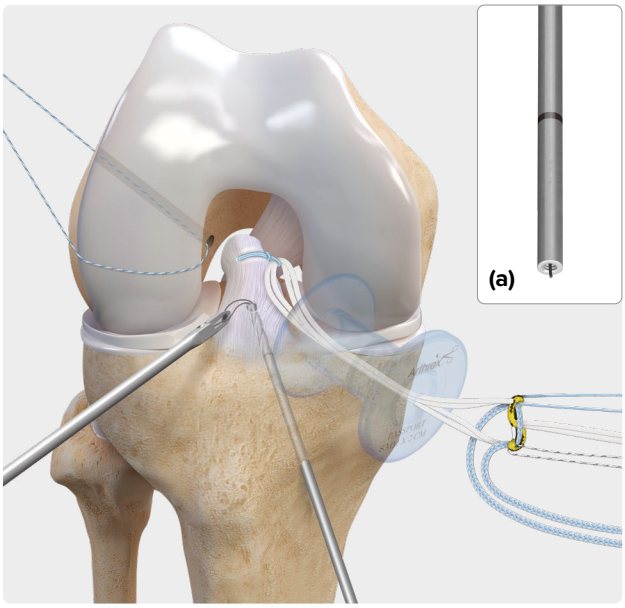


20

Drill the 2.4 mm cannulated drill into the joint. Once in position, remove the ACL drill guide, leaving the 2.4 mm cannulated drill pin in the proximal tibia.

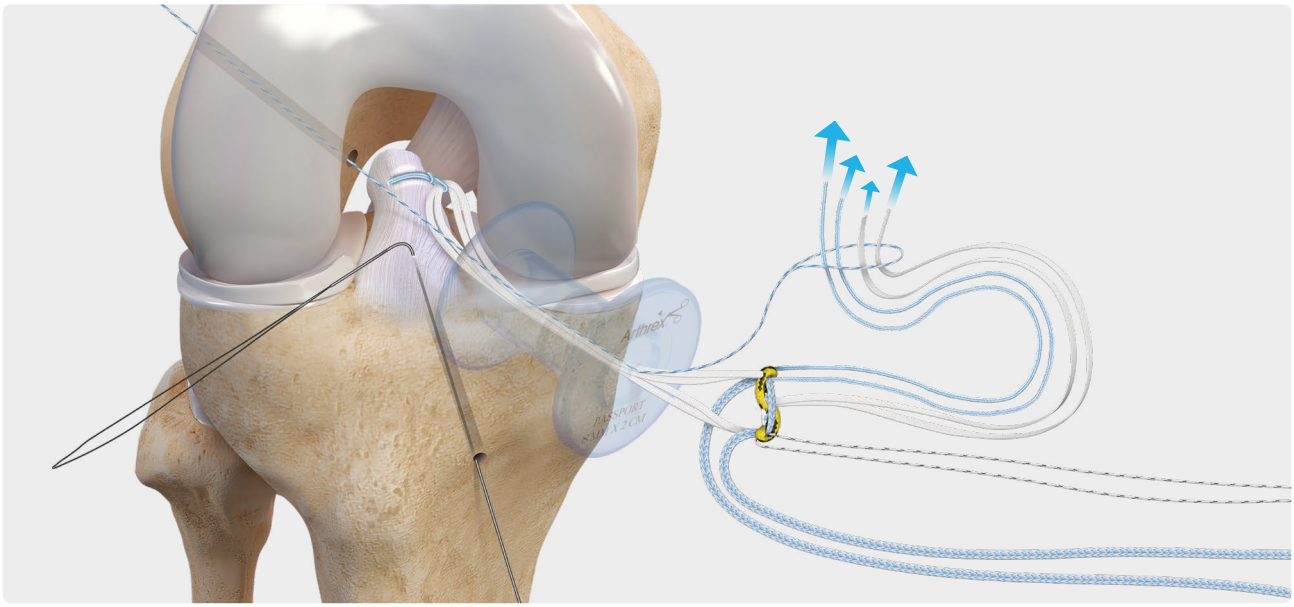
If the trocar has backed out or if bone is trapped in the cannulation of the drill, carefully reinsert the trocar and turn clockwise to thread the trocar back into the drill. Screwing in the trocar will dislodge any bony debris stuck in the cannulation.

Remove the trocar from the cannulated drill, which will allow a lasso wire to be delivered through the cannulation of the drill until it is visualized in the joint.



21

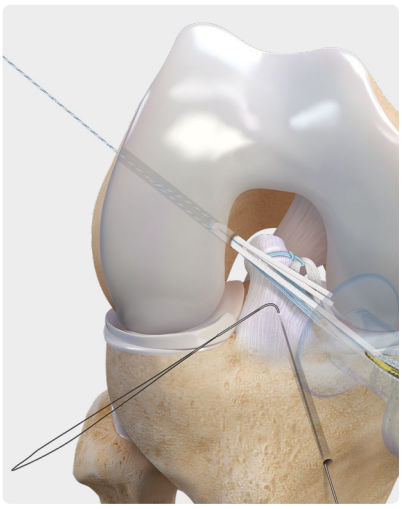
Retrieve the lasso wire with a KingFisher® grasper and advance the lasso wire until the opposite end of the wire is no longer visible at the back end of the cannulated drill **(a)**. Use a pin driver to drill and carefully remove it from the tibia. Pay attention to the lasso wire to ensure it remains visible in the distal aperture of the tibial tunnel. Snap the ends of the wire together with a hemostat for later use.



22

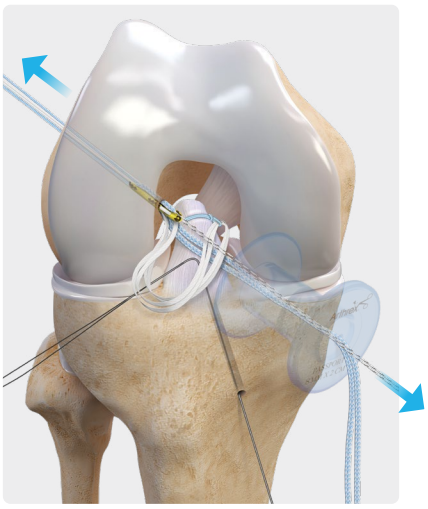
Retrieve the SutureTape FiberLink™ suture through the PassPort Button™ cannula. Identify the white TightRope® tensioning sutures and the blue passing suture. Load all 4 ends into the loop of the SutureTape FiberLink suture that was previously passed through the femur.

Note: Do not load the black-and-white TigerWire® sutures or the FiberTape® sutures in the SutureTape FiberLink suture loop.



23

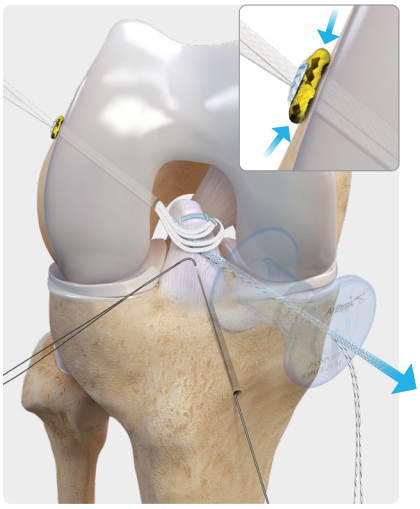
Using the SutureTape FiberLink™ suture, shuttle the ACL Repair TightRope® SB suture tails from the medial portal through the joint and out the lateral femur.



24

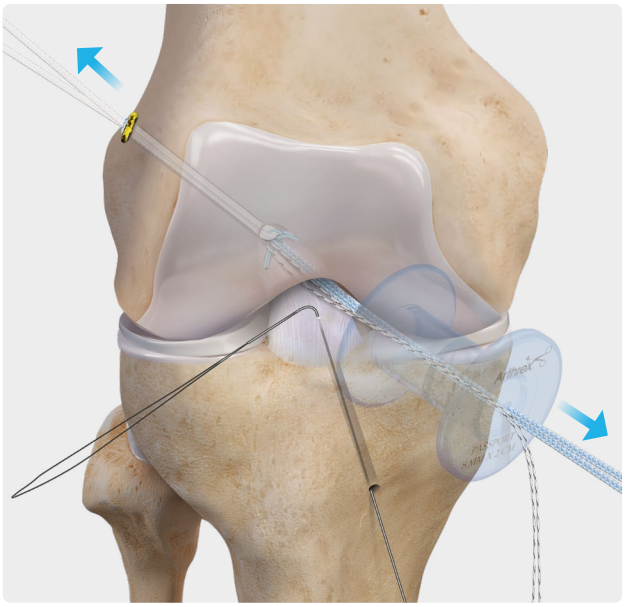
With equal tension, pull the blue passing suture and white tensioning strands together to advance the button through the femur.

> **Note:** Keep counter tension on the black-and-white TigerWire® suture to verticalize the all-suture button during shuttling.



25a

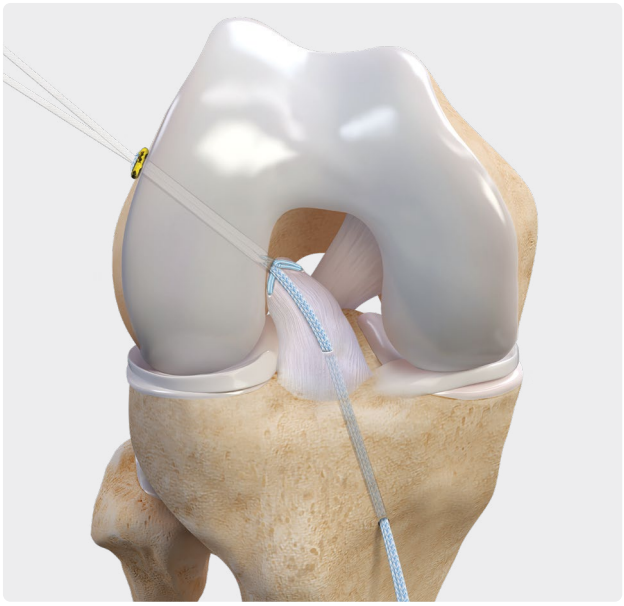
Once the button has exited the femur, remove tension on the black-and-white TigerWire suture to facilitate deployment. Pull the blue FiberTape® sutures to confirm the soft button has deployed on the femoral cortex.



25b

With countertension on the blue FiberTape sutures and the knee in full extension, gently remove the slack in the TightRope suture by alternatingly pulling the white TightRope tensioning sutures 2 cm to 3 cm at a time.

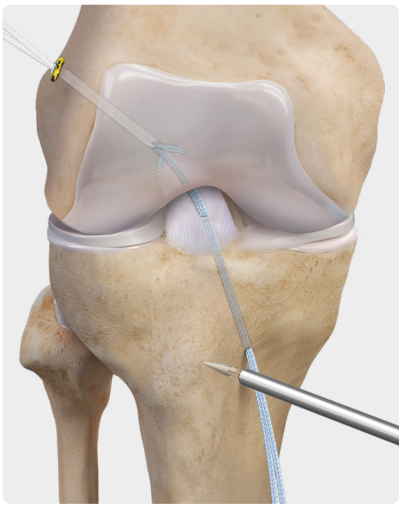
> **Note:** The black-and-white TigerWire suture can be discarded.



26

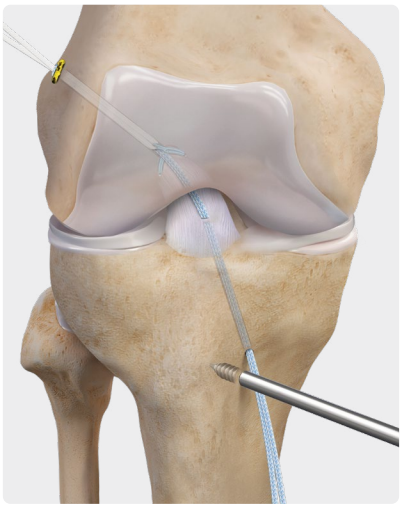
Pull distally on the lasso wire to shuttle the blue FiberTape sutures out of the tibial tunnel.

Load the round ends of the FiberTape suture limbs in the loop of the lasso passing wire and pull distally to shuttle the FiberTape sutures for the *Internal*Brace™ technique out of the tibial tunnel.



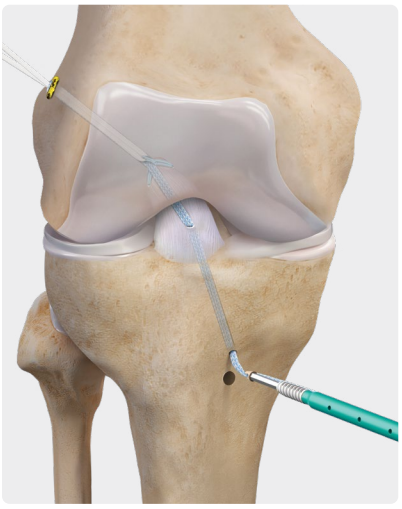
27

Use the spade-tip SwiveLock® drill from the ACL Backup Fixation Kit to drill a pilot hole 1 cm distal to the tibial bone tunnel. The drill is calibrated with a hard stop at 20 mm.



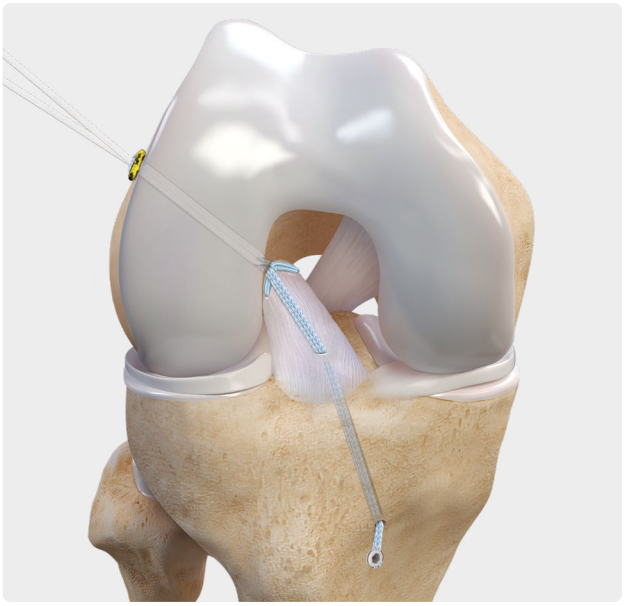
28

Use the 5.2 mm hard-bone tap included in the ACL Backup Fixation Kit to tap the pilot hole.



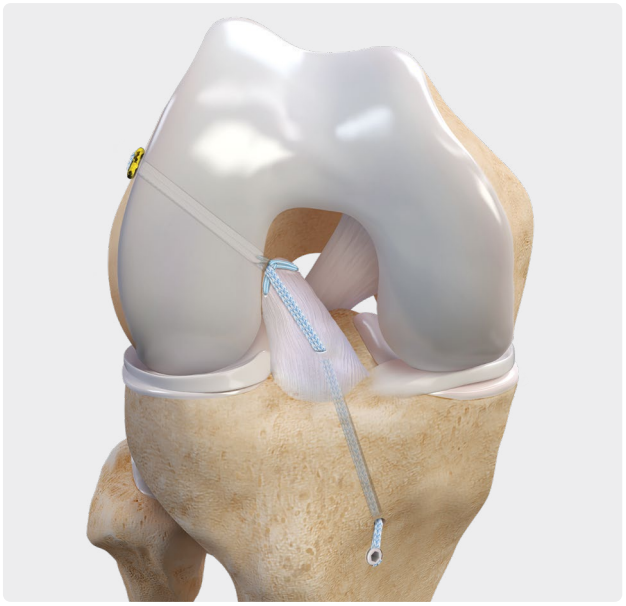
29

Place the knee in full extension and fix the FiberTape® sutures using a 4.75 mm SwiveLock anchor.



30

Cycle the knee through a complete range of motion. Then with the knee in full extension, retension the ACL Repair TightRope® SB tensioning sutures.



31

Final fixation.

Ordering Information

Primary Products	
ACL Repair TightRope® SB implant w/ FiberTape® suture for the *Internal*Brace™ technique	AR-1588SBR-RIB
FiberRing™ suture w/ shuttle loop, 25 mm	AR-7282-25
FiberRing suture w/ shuttle loop, 35 mm	AR-7282-35
FiberRing suture w/ shuttle loop, 45 mm	AR-7282-45
FiberRing suture w/ shuttle loop, 55 mm	AR-7282-55
Implant system, secondary fixation w/ BioComposite SwiveLock® anchor, 4.75 mm × 19.1 mm	AR-1593-BC
Implant system, secondary fixation w/ PEEK SwiveLock anchor, 4.75 mm × 19.1 mm	AR-1593-P

Additional Products	
PassPort Button™ cannula, 8 mm × 2 cm	AR-6592-08-20
FiberLink™ 1.3 mm SutureTape, looped w/ closed loop (white/blue)	AR-7535
ACL TightRope drill pin, closed eyelet, 4 mm	AR-1595TC
ACL ToolBox instrument set	AR-1900S
RetroConstruction™ drill guide system instrument set	AR-1510S
Ratcheting drill sleeve, 2.4 mm	AR-1510FD-24
2.4 mm cannulated drill and passing wire	AR-1594D-24
FlipCutter® III drill	AR-1204FF

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.

References

1. Arthrex, Inc. Data on file (APT-06135). Naples, FL; 2022.
2. Arthrex, Inc. LA1-00038-EN_B. Naples, FL; 2017.
3. van der List JP, DiFelice GS. Preoperative magnetic resonance imaging predicts eligibility for arthroscopic primary anterior cruciate ligament repair. *Knee Surg Sports Traumatol Arthrosc.* 2018;26(2):660-671. doi:10.1007/s00167-017-4646-z
4. van der List JP, Jonkergouw A, van Noort A, Kerkhoffs GMMJ, DiFelice GS. Identifying candidates for arthroscopic primary repair of the anterior cruciate ligament: a case-control study. *Knee.* 2019;26(3):619-627. doi:10.1016/j.knee.2019.02.004
5. Vermeijden HD, Jonkergouw A, van der List JP, DiFelice GS. The multiple ligament-injured knee: When is primary repair an option? *Knee.* 2020;27(1):173-182. doi:10.1016/j.knee.2019.11.013

Arthrex manufacturer, authorized representative, and importer information (Arthrex eIFUs)

US patent information

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