

# Plantar Plate Ligament Augmentation Using the Forefoot *Internal/Brace*<sup>™</sup> System

Surgical Technique

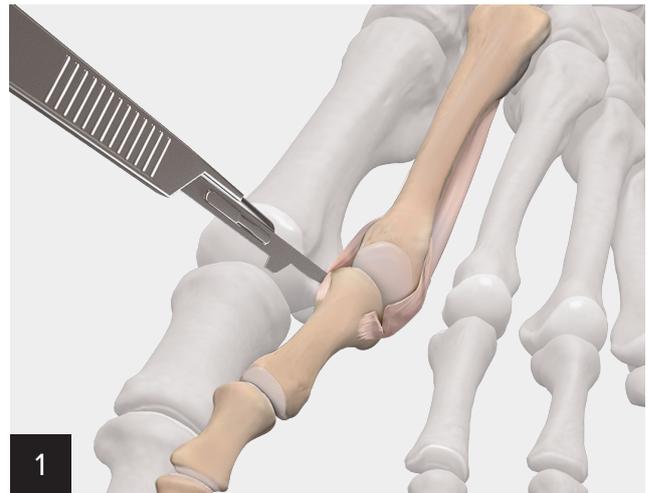


## Plantar Plate Ligament Augmentation Using the Forefoot *Internal/Brace*™ System

Arthrex is pleased to add the Plantar Plate *Internal/Brace* ligament augmentation technique to our extensive product offering for lesser metatarsophalangeal (MTP) joint instability. This technique can be performed using the Forefoot *Internal/Brace* ligament augmentation repair system and is designed to be used in instances where a direct plantar plate repair may prove difficult (ie, stage IV plantar plate tears or any other complex type of plantar plate tear). It is important to note that this technique can be performed with or without a Weil osteotomy. The plantar plate augmentation technique provides a simple time-zero construct<sup>1</sup> to treat plantar plate pathology and restores the normal alignment of the lesser MTP joints. Due to the proximal nature of the hardware at the phalanx, the Plantar Plate *Internal/Brace* ligament augmentation procedure can be easily combined with a proximal interphalangeal joint (PIP) fusion.

### Reference

1. Viens NA, Wijdicks CA, Campbell KJ, Laprade RF, Clanton TO. Anterior talofibular ligament ruptures, part 1: biomechanical comparison of augmented Broström repair techniques with the intact anterior talofibular ligament. *Am J Sports Med.* 2014;42(2):405-411. doi:10.1177/0363546513510141



With the patient in the supine position, make a dorsal longitudinal incision at the center of the MTP joint. Complete your soft-tissue dissection, ensuring the contracting forces of the extensor ligaments are addressed.



Use a McGlamry elevator to release the plantar plate from the head of the metatarsal.



If the metatarsal is long and contributing to the pathology, a Weil osteotomy can be performed to shorten the overall length of the metatarsal. The cut should be made 1 mm to 2 mm below the dorsal aspect of the articular surface and aimed such that the cut is parallel to the weight-bearing surface of the foot.

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.



**3**

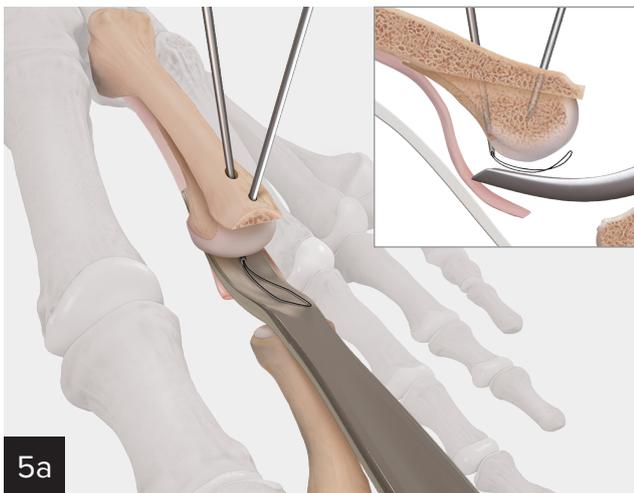
Use a 1.6 mm K-wire to temporarily fixate the Weil osteotomy in the desired final position. A second 1.6 mm K-wire can be placed 5 mm distal to the base of the proximal phalanx and used as a joystick. Resect the plantar plate from the base of the proximal phalanx and release the proper collateral ligaments. The small joint distraction may be used to gain access to the plantar plate.



**4**

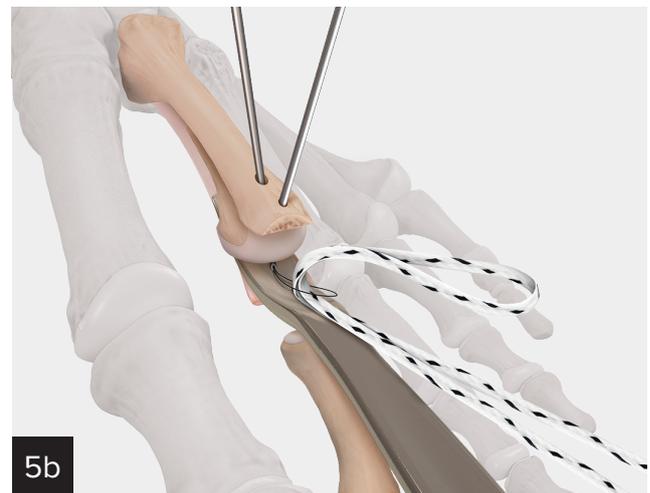
Next, insert a McGlamry elevator beneath the metatarsal head. Place a 1.1 mm K-wire proximally at the metatarsal, positioned centrally, angled toward the joint. Advance the K-wire bicortically, until it makes contact with the McGlamry elevator.

Use a 2.5 mm cannulated drill over the K-wire to finish preparing the metatarsal. Ensure the drill goes bicortical and contacts the McGlamry.



**5a**

Insert the straight Micro SutureLasso™ suture passer through the prepared bone tunnel in the metatarsal. Ensure that the arrow on the handle of the straight Micro SutureLasso suture passer is facing you. The arrow on the handle indicates the orientation of the beveled feature on the tip of the handle and will aid in passing the suture in the subsequent steps. At this point, shuttle the lasso wire and retrieve the wire through the dorsal incision.



**5b**

Load a doubled-over LabralTape™ suture into the wire loop and shuttle the suture and wire through the metatarsal tunnel.



6a

Secure the LabralTape loop with a hemostat so the loop is not pulled through the metatarsal tunnel when passing the remaining portion of the LabralTape suture deep to the plantar plate.



6b

Pass the pigtail SutureLasso suture passer through the plantar plate from the outside in. Take caution to exit the plantar plate centrally and deep beneath the metatarsal head. Shuttle the lasso wire and retrieve the tails of LabralTape suture deep to the plantar plate.



7a

Load the Mini Scorpion™ DX suture passer with SutureTape to complete your direct repair. Use a pick-up to stabilize the plantar plate as the Mini Scorpion DX suture passer is inserted into the MTP joint and grasp the plantar plate medially or laterally.



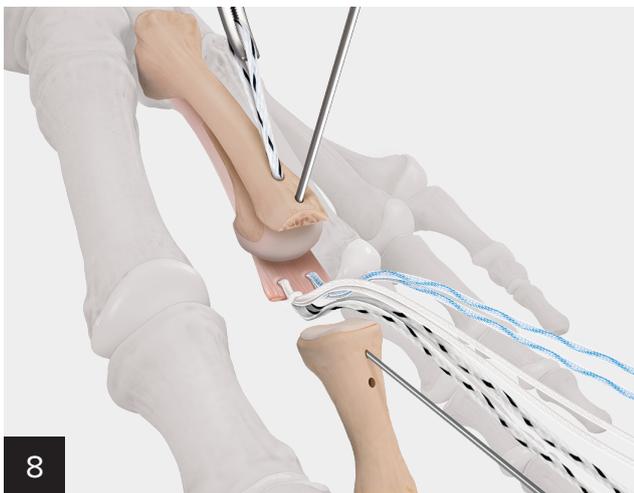
7b

Deploy the Mini Scorpion DX suture passer to advance the suture through the plantar plate. Pass the tails of the SutureTape sutures through the loop to create a luggage tag stitch.

Repeat the process on the other side of the plantar plate.



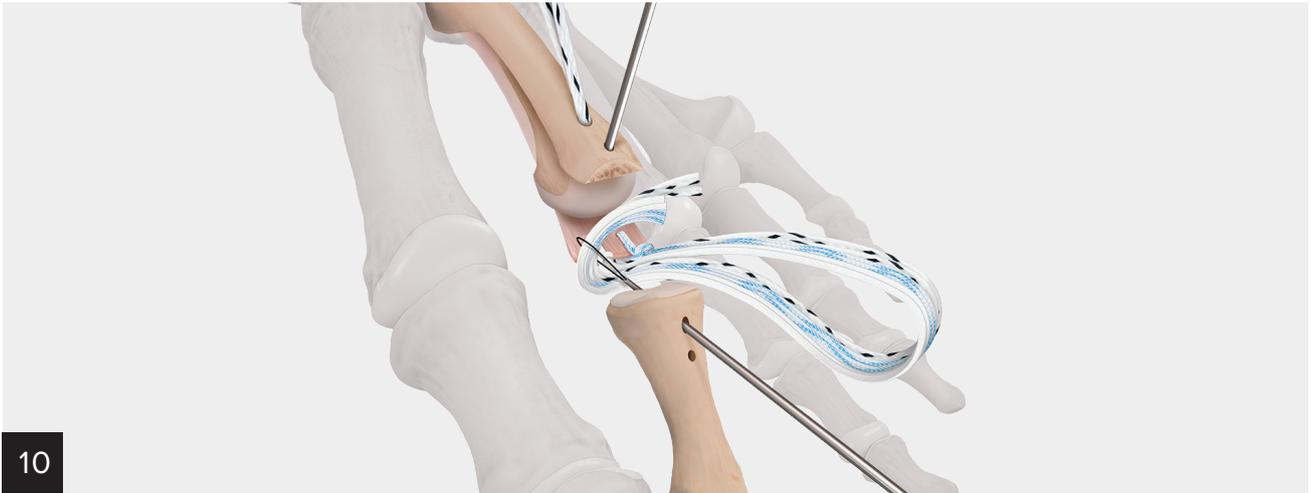
As an alternative, the CPR™ viper can be used in the same manner to pass the SutureTape through the plantar plate. This is useful when space is limited or when a Weil osteotomy will not be performed. Additional suture-passing options include using the pigtail SutureLasso™ suture passer or a free needle.



Remove the 1.6 mm joystick K-wire. Place the appropriate 1.1 mm K-wire centrally on the proximal phalanx, and aim toward the joint. The K-wire should exit just below the articular surface of the proximal phalanx base.

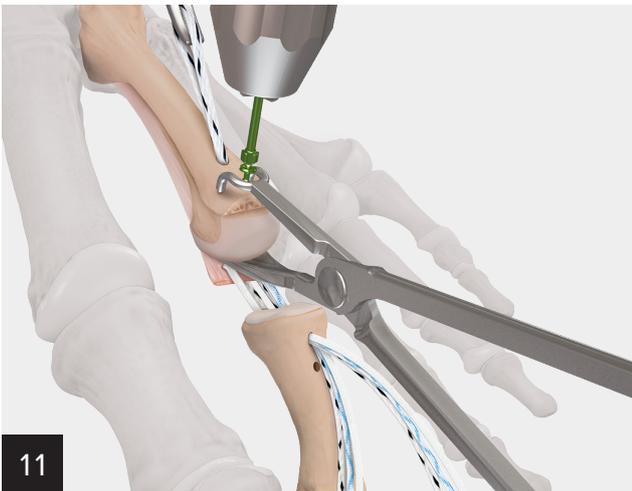


If you are unable to see the tip of the K-wire with the toe plantar flexed, it will make suture retrieval more difficult. Use the 2.5 mm cannulated drill bit to drill a bicortical tunnel in the phalanx.



Once more, use the straight Micro SutureLasso™ suture passer to shuttle a wire loop from dorsal to plantar, now through the proximal phalanx. Feed the two free limbs of LabralTape™ suture as well as the four free ends of the SutureTape sutures into the wire loop and shuttle the construct through the proximal phalanx.

**Note:** To ease the shuttling process, it may be useful to shuttle the LabralTape suture first, then pass the straight Micro SutureLasso suture passer again and shuttle the SutureTape sutures.



Fixate the Weil osteotomy with the QuickFix™ cannulated screw system using one or two 2 mm × 11 mm and 2 mm × 13 mm snap-off screws. Typically, there is only 1 mm to 2 mm of shortening at the osteotomy site. The QuickFix clamp helps prevent rotation of the capital fragment and plantar gapping of the osteotomy.



Reduce the toe and place it in 30° plantar flexion while completing the direct repair. Cycle the SutureTape sutures to remove any slack prior to final fixation.

Split the tails of the LabralTape™ and SutureTape sutures and insert the 3 mm × 8 mm PEEK tenodesis screws in to the proximal phalanx.

Seat the tenodesis screw flush to slightly proud to maximize cortical fixation.

**Note: Make sure the LabralTape loop is secured with a hemostat so the loop is not pulled through the metatarsal tunnel when securing the proximal phalanx screw.**



To tension the augmentation, place the toe in 10° to 15° dorsiflexion to set the maximum limit of dorsiflexion range of motion.

Pull back on the looped end of the LabralTape suture to remove all the slack from sutures. Once adequate tension has been achieved, split the LabralTape loop and insert the 3 mm × 8 mm PEEK tenodesis screw into the metatarsal. Again, seat the screw flush or slightly proud to maintain adequate cortical fixation.



For final fixation, you may simply cut flush to the bony surface.

## Ordering Information

### Forefoot *InternalBrace™* System

Product Description	Item Number
PEEK Tenodesis Screw, 3 mm × 8 mm, qty. 2 LabralTape™ Suture, white/black, 36 in, 1.5 mm, qty. 2 #2 FiberTape® Suture, blue #0 TigerWire® Suture w/ Needle, white/green 4-0 FiberLoop® Suture w/ Needle, blue, 12 in Micro SutureLasso™ Suture Passer, straight w/ wire Oblong Button, 2.6 mm K-Wire, 1.1 mm, qty. 2 Drill, cannulated, 2.5 mm Drill, cannulated, 3.0 mm Suture Retrieval Funnels, qty. 2 Suture Passing Wire, 8 in	<b>AR-1530P-CP</b>

If performing a Weil osteotomy, the following QuickFix™ screws can be found in the 2.4 mm/3.0 mm Comprehensive Fixation System (AR-8950S-01).

#### 2 mm Screws

Product Description	Item Number
QuickFix Screw, silver, 2 mm × 10 mm	<b>AR-8930-10</b>
QuickFix Screw, magenta, 2 mm × 11 mm	<b>AR-8930-11</b>
QuickFix Screw, blue, 2 mm × 12 mm	<b>AR-8930-12</b>
QuickFix Screw, green, 2 mm × 13 mm	<b>AR-8930-13</b>
QuickFix Screw, purple, 2 mm × 14 mm	<b>AR-8930-14</b>

#### 3 mm Screws

Product Description	Item Number
QuickFix Screw, yellow, 3 mm × 13 mm	<b>AR-8931-13</b>
QuickFix Screw, light blue, 3 mm × 15 mm	<b>AR-8931-15</b>
QuickFix Screw, aqua, 3 mm × 17 mm	<b>AR-8931-17</b>
QuickFix Screw, bronze, 3 mm × 19 mm	<b>AR-8931-19</b>

#### Optional Products

Product Description	Item Number
CPR™ Viper Implant System	<b>AR-8692DS</b>
CPR Mini Scorpion DX Needle and Micro SutureLasso Suture Passer Implant System	<b>AR-8690DS</b>

### Mini Scorpion™ DX CPR Instrument Set (AR-8690S)

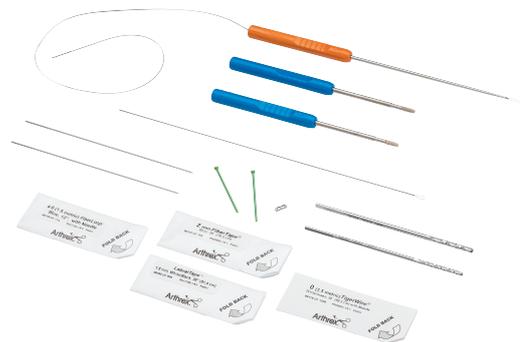
Product Description	Item Number
Mini Scorpion DX	<b>AR-8999</b>
Small Joint Distractor	<b>AR-8690SJD</b>
McGlamry Metatarsal Elevator	<b>AR-8930M</b>
QuickFix Clamp	<b>AR-8930MC</b>
Small Handle w/ AO Connection	<b>AR-2001AOT</b>
Driver Shaft for QuickFix Screw, 2 mm	<b>AR-8930D</b>
QuickFix Screw Cutter, 2 mm	<b>AR-8930R</b>
Metatarsal Head Pusher	<b>AR-8690P</b>
Mini Scorpion Instrument Case	<b>AR-8690C</b>

#### Accessories

Product Description	Item Number
Mini Scorpion DX Suture Passer	<b>AR-8999</b>
Mini Scorpion DX, curved	<b>AR-8999C</b>
Small Joint Distractor, 11 mm	<b>AR-8690SJD</b>
QuickFix Clamp	<b>AR-8930MC</b>
SutureLasso Suture, pigtail, left, curved	<b>AR-8690SLL</b>
SutureLasso Suture, pigtail, right curved	<b>AR-8690SLR</b>
0 FiberWire® Suture	<b>AR-7254</b>
SutureTape, 1.3 mm	<b>AR-7500</b>

#### Disposables

Product Description	Item Number
Guidewire w/ Trocar Tip, .062 in (1.6 mm)	<b>AR-8941K</b>
Guidewire w/ Trocar Tip, threaded, .062 in (1.6 mm)	<b>AR-8941KT</b>
Guidewire w/ Trocar Tip, .078 in (2 mm)	<b>AR-8945K</b>
Guidewire w/ Trocar Tip, threaded, .078 in (2 mm)	<b>AR-8945KT</b>



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 and/or outcomes.

View U.S. patent information at [www.arthrex.com/corporate/virtual-patent-marking](http://www.arthrex.com/corporate/virtual-patent-marking)

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