Forefoot InternalBrace™ Implant System

Surgical Technique

Extensor Digitorum Brevis InternalBrace Technique

Hallux Varus InternalBrace Technique
Arthrex has developed a comprehensive, completely disposable system for various augmentation procedures about the forefoot. Most commonly, this implant system can be used for crossover toe deformities of the lesser metatarsals or for hallux varus correction.

Features:

- **All-in-one system** – the implant system comes complete with 3 mm × 8 mm Tenodesis screws, FiberTape® suture and LabralTape™ suture, drill bits, guidewires, and suture-shuttling devices in one convenient sterile package

- **Knotless repair technique** – allows surgeons to create a strong no-profile repair construct

- **Multiple technique options** – implant system can be used to treat many different pathologies about the forefoot
Second toe deformities are relatively common and represent one of the more difficult corrections a foot surgeon encounters. This guide describes a technique to correct sagittal and transverse plane deformities of the second toe at the metatarsal-phalangeal joint using an extensor digitorum brevis (EDB) tendon transfer with LabraTape™ suture augmentation and fixation with 3 mm × 8 mm PEEK Tenodesis screws. This technique may be performed in isolation or in conjunction with other procedures such as hallux valgus correction or hammertoe correction.

In situations where the plantar plate is irreparable or the collateral ligaments need to be restored, surgeons have the option to perform an EDB tendon transfer with InternalBrace augmentation using LabraTape suture. This technique gives surgeons a great amount of variability for correction of any transverse and sagittal plane deformities of the lesser metatarsals by simply altering the location and direction of the bone tunnels.

**Ordering Information**
Forefoot InternalBrace Implant System (AR-1530P-CP) includes:
- PEEK Tenodesis screw, 3 mm × 8 mm, qty. 2
- LabraTape suture, 1.5 mm, white/black, 36 in
- #2 FiberTape® suture, blue
- #0 TigerWire® suture w/ needle, white/green
- 4-0 FiberLoop® suture w/ needle, blue, 12 in
- Micro SutureLasso® suture passer w/ wire, straight
- Oblong button, 2.6 mm
- Guidewires, 43 in. × 4.75 in
- Drills, cannulated, 2.5 mm and 3.0 mm
- Suture retrieval funnels, qty. 2
- Suture passing wire, 8 in
A dorsal longitudinal capsulotomy is performed followed by soft-tissue dissection to expose the metatarsal head and base of the proximal phalanx. The surgeon may choose to release the medial collateral ligament if it is deemed to be contracted.

A McGlamry elevator is carefully inserted under the metatarsal head to release the plantar plate.

The EDB is carefully dissected free of its surrounding soft tissue from distal to proximal and then transected at the musculotendinous junction. It is important to transect the EDB as far proximal as possible so that adequate tendon length can be obtained. Distally, the raphe between the EDL and EDB is taken down to provide more length and allow for easier mobilization of the EDB. It is important that the insertion of the EDB tendon be left intact. A 4-0 FiberLoop® whipstitch is used at the free proximal end of the EDB.

A dorsal longitudinal incision is made starting proximal to the second toe PIP joint and is extended proximally just medial to the extensor digitorum longus (EDL) tendon.

The EDL and EDB tendons are identified. In cases of sagittal plane deformity, an EDL Z-lengthening is typically carried out.

A dorsal longitudinal capsulotomy is performed followed by soft-tissue dissection to expose the metatarsal head and base of the proximal phalanx. The surgeon may choose to release the medial collateral ligament if it is deemed to be contracted.

A McGlamry elevator is carefully inserted under the metatarsal head to release the plantar plate.
Starting approximately 1 cm proximal to the distal-most aspect of the 2nd metatarsal head, a smooth guidewire is inserted through the metatarsal from dorsal medial to plantar lateral with similar orientation to the phalangeal tunnel.

A smooth guidewire is passed from dorsal medial to plantar lateral through the base of the proximal phalanx approximately 4 mm from the joint. If the base of the proximal phalanx is a clock face, the guidewire is directed from 10 o’clock to 4 o’clock in the right foot and 2 o’clock to 7 o’clock in the left foot.

A 2.5 mm cannulated drill bit is used to create a bicortical tunnel over the guidewire. The tunnel can be overdrilled with a 3.0 mm drill if a wider tunnel is needed.

A bicortical metatarsal tunnel is drilled with a 2.5 mm cannulated drill. Again, the tunnel can be overdrilled with a 3.0 mm cannulated drill if necessary.
With tension applied to the EDB tendon and LabraTape™ suture, insert a 3 mm × 8 mm PEEK Tenodesis screw from medial to lateral until flush with the medial cortex.

**Option A:** Using the straight Micro SutureLasso™ suture passer, pass the Nitinol suture-passing wire into the proximal phalanx bone tunnel.

**Option B:** Use the PEEK suture-retrieval funnel to shuttle the suture-passing wire into the proximal phalanx bone tunnel.

Shuttle the LabraTape™ suture and whipstitched EDB through the tunnel from medial to lateral.

With tension applied to the EDB tendon and LabraTape suture, insert a 3 mm × 8 mm PEEK Tenodesis screw from medial to lateral until flush with the medial cortex.
Option A: Using the straight Micro SutureLasso™ suture passer, shuttle the suture-passing wire through the metatarsal tunnel.

Option B: Use the PEEK suture-passing funnel to shuttle the suture-passing wire into the proximal phalanx bone tunnel. Care should be taken to ensure the loop is exiting laterally in this instance.

Shuttle the whipstitched EDB tendon and proximal end of the LabralTape™ suture from lateral to medial through the bone tunnel.

Pull equal tension on both the EDB and LabralTape suture until the desired correction is achieved.
Insert a 3 mm × 8 mm PEEK Tenodesis screw from medial to lateral until flush with the medial cortex to achieve final fixation of the construct. The joint capsule may be closed per surgeon preference.

Post-op Protocol:
When the procedure is performed in isolation, patients are instructed to bear weight in the heel in a post-op shoe for 6 weeks before transitioning to normal shoe wear. If the procedure is performed in conjunction with another procedure, then the postoperative protocol may be dictated by the more major procedure. However, post-op protocol is surgeon- and patient-dependent.
Arthrex has developed a technique that allows for a knotless, low-profile fixation option for patients presenting with hallux varus using FiberTape® suture and the Tenodesis screw system for interference fixation. In situations with soft bone at the proximal phalanx, a cortical button has been included to increase the strength of the construct. Using a #1 FiberWire® suture laterally, the capsule can be sutured into the FiberTape suture and tied off to create a direct biologic repair.

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- #2 FiberTape suture, blue
- #0 TigerWire® suture w/ needle, white/green
- 4-0 FiberLoop® suture w/ needle, blue, 12 in
- Micro SutureLasso™ suture passer w/ wire, straight
- Oblong button, 2.6 mm
- Guidewires, 43 in. × 4.75 in
- Drills, cannulated, 2.5 mm and 3.0 mm
- Suture retrieval funnels, qty. 2
- Suture passing wire, 8 in
A guidewire is placed into the medial metatarsal in the metadiaphyseal junction at midline and is advanced laterally, exiting just proximal to the articular cartilage. A second guidewire is placed into the proximal phalanx, exiting just distal to the articular cartilage.

Surgical Technique

1. An incision is made over the medial aspect of the 1st metatarsophalangeal joint. The incision should be long enough to visualize the metadiaphyseal junction of the 1st metatarsal and the proximal phalanx. The joint capsule is exposed.

2. A vertical incision is made over the 1st MTP joint to release the contracted medial capsule. The tissue between the medial sesamoid and the metatarsal head may also need to be removed or released to mobilize the medial sesamoid.

3. A second incision is made in the 1st web space. The loose lateral 1st MTP joint capsule is incised in a vertical fashion (dorsal to plantar) in preparation for plicaton.

4. A guidewire is placed into the medial metatarsal in the metadiaphyseal junction at midline and is advanced laterally, exiting just proximal to the articular cartilage. A second guidewire is placed into the proximal phalanx, exiting just distal to the articular cartilage.
Next, the proximal phalanx guidewire is overdrilled next with the 2.5 mm drill.

A straight Micro SutureLasso™ suture passer with a Nitinol suture-passing wire is advanced into the 1st metatarsal drill hole. A needle driver is used to pull wire out of the lasso. Alternatively, the PEEK suture retrieval funnel may be used to shuttle the suture-passing wire from lateral to medial.

A doubled-over FiberTape® suture is inserted laterally into the Nitinol suture-passing wire and is pulled medially through the 1st metatarsal drill hole.
The toe is placed into the corrected position. The FiberTape suture is tensioned and the second 3 mm × 8 mm PEEK Tenodesis screw is placed into the metatarsal head bone tunnel. While holding tension on the FiberTape suture, a 3 mm × 8 mm PEEK Tenodesis screw is inserted into the bone tunnel at the proximal phalanx. The Micro SutureLasso™ suture passer with the Nitinol passing wire is inserted into the proximal phalanx drill hole. The PEEK suture retrieval funnel may be used in a similar fashion as described earlier. The distal end of doubled FiberTape® suture is pulled through the proximal phalanx drill hole from lateral to medial using the suture-passing wire. While holding tension on the FiberTape suture, a 3 mm × 8 mm PEEK Tenodesis screw is inserted into the bone tunnel at the proximal phalanx. The toe is placed into the corrected position. The FiberTape suture is tensioned and the second 3 mm × 8 mm PEEK Tenodesis screw is placed into the metatarsal head bone tunnel.
Optional: The excess FiberTape® suture is cut flush with the bone. In a situation where the bone in the proximal phalanx is deemed to be too soft, a cortical button may be used with a looped FiberTape suture. In this case, screw fixation is performed in the 1st metatarsal only.

If desired, the lateral capsule may be sutured into the FiberTape suture using the FiberWire® suture provided to augment the repair.
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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