Hallux Varus Correction With the 2.7 mm Knotless Mini TightRope® System

Surgical Technique



Arthrex®

Hallux Varus Correction With the 2.7 mm Knotless Mini TightRope® Implant System

Introduction

Hallux varus is a medical condition characterized by the medial deviation of the hallux relative to the 1st metatarsal bone. While it can be caused by a congenital defect or trauma, hallux varus typically results from complications of a previous hallux valgus surgery (eg, overcorrection, overresection of the medial eminence, excessive lateral release, and/or imbalance of the joint due to soft-tissue release).

Ligament reconstruction is typically indicated for painless, flexible deformities that can be passively reduced and maintained on weightbearing. However, 1st MTP joint arthrodesis may be more appropriate for a painful, arthritic joint.

Historically, capsular repair techniques to realign the joint included a variety of tendon transfers (EHL, split EHL, EHB, abductor hallucis, etc); however, such techniques are technically challenging and time consuming and require sacrificing healthy tissue.

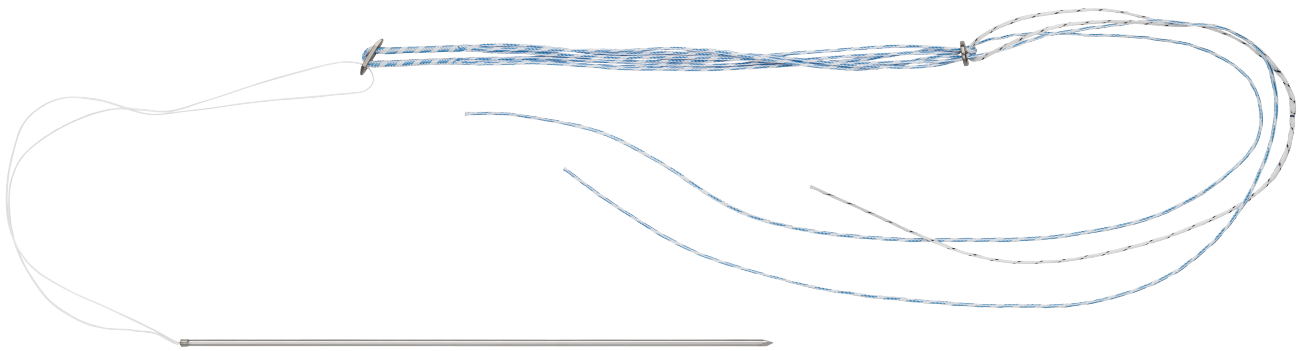
Synthetic devices, such as the Knotless Mini TightRope system, overcome the shortcomings of autograft and allograft procedures and afford surgeons a strong,[1,2] reproducible construct to stabilize the MTP.

Advantages

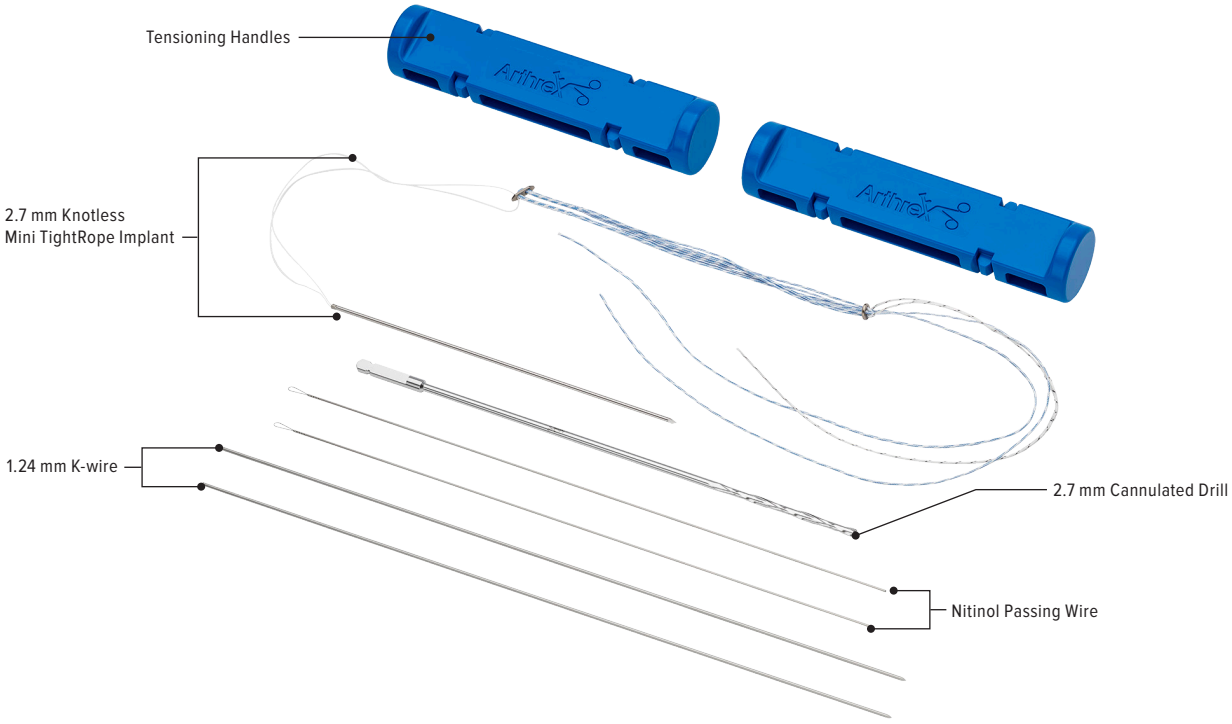
- Eliminates the need to harvest and transfer tendons, which can result in donor-site morbidity and the loss of and/or transference of motion
- No need for allograft use, which carries a theoretical risk of infection and potential graft rejection and has unpredictable construct strength
- Low profile, knotless implant fixation
- Patented, tensionable technology allows for dynamic motion across the MTP joint
- 40% increase in mechanical strength
- Novel 6-strand construct[1,2]

References

1. Arthrex, Inc. Data on file (APT-05278). Naples, FL; 2021.
2. Arthrex, Inc. Data on file (APT-05279). Naples, FL; 2021.



Knotless Mini TightRope® Implant System



2.7 mm Knotless Mini TightRope Implant System



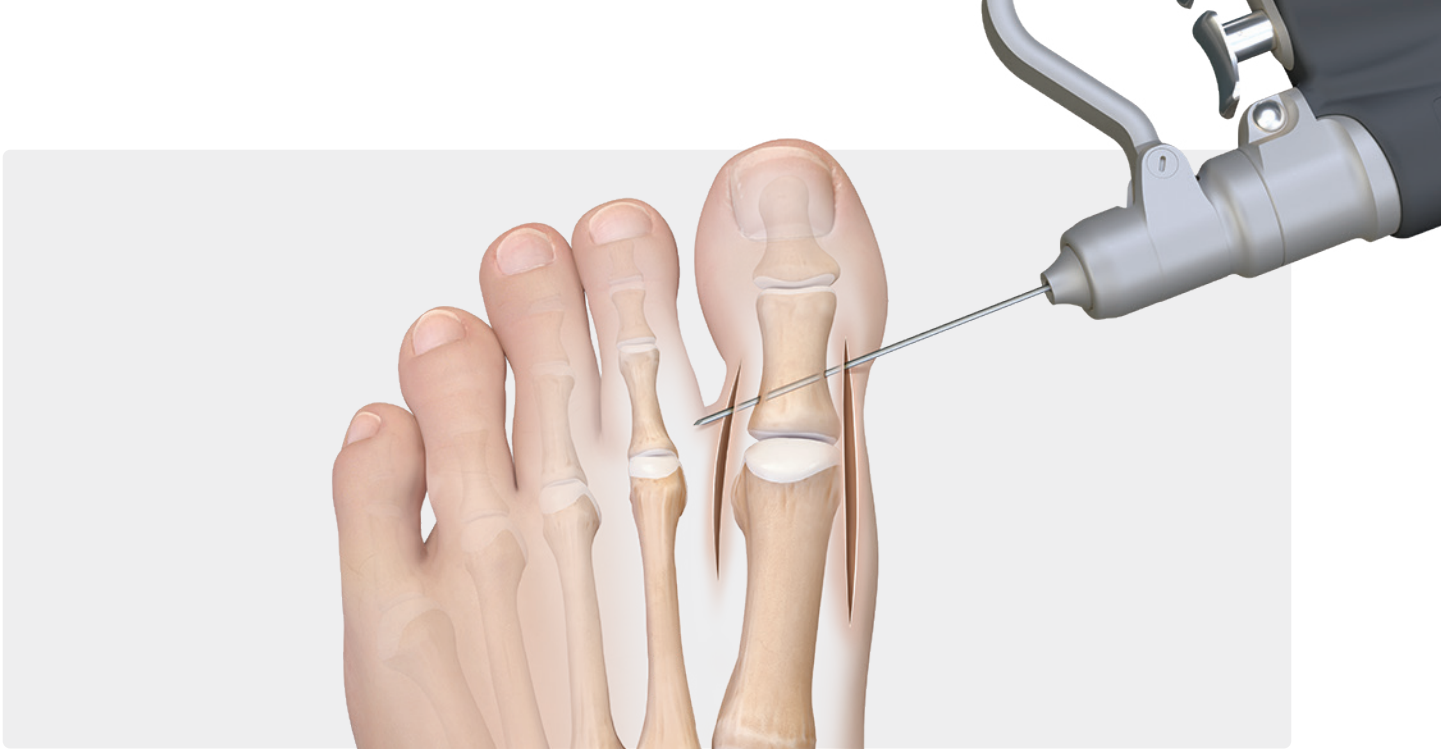
1

Using a 2-incision technique, make the first incision dorsomedially or medially over the MTP joint, parallel to the extensor hallucis longus (EHL).

Start the incision 2 cm to 3 cm proximal to the MTP joint and extend distally to the interphalangeal joint.

Incise the deep fascia in line with the incision; take care to protect the EHL and dorsal digital nerve.

Create the second incision in the 1st intermetatarsal space.



2

Complete any medial and/or lateral soft-tissue releases. Ensure the toe can passively correct. Position the toe in proper alignment and maintain reduction.

Next, insert two 1.24 mm K-wires (one each across the metatarsal and phalanx). Check position using fluoroscopy. Orient each K-wire midline in the bone. Start proximally from the MTP joint medially and aim to exit distal to MTP joint laterally. Ensure the K-wire exits the bone close to the MTP joint.

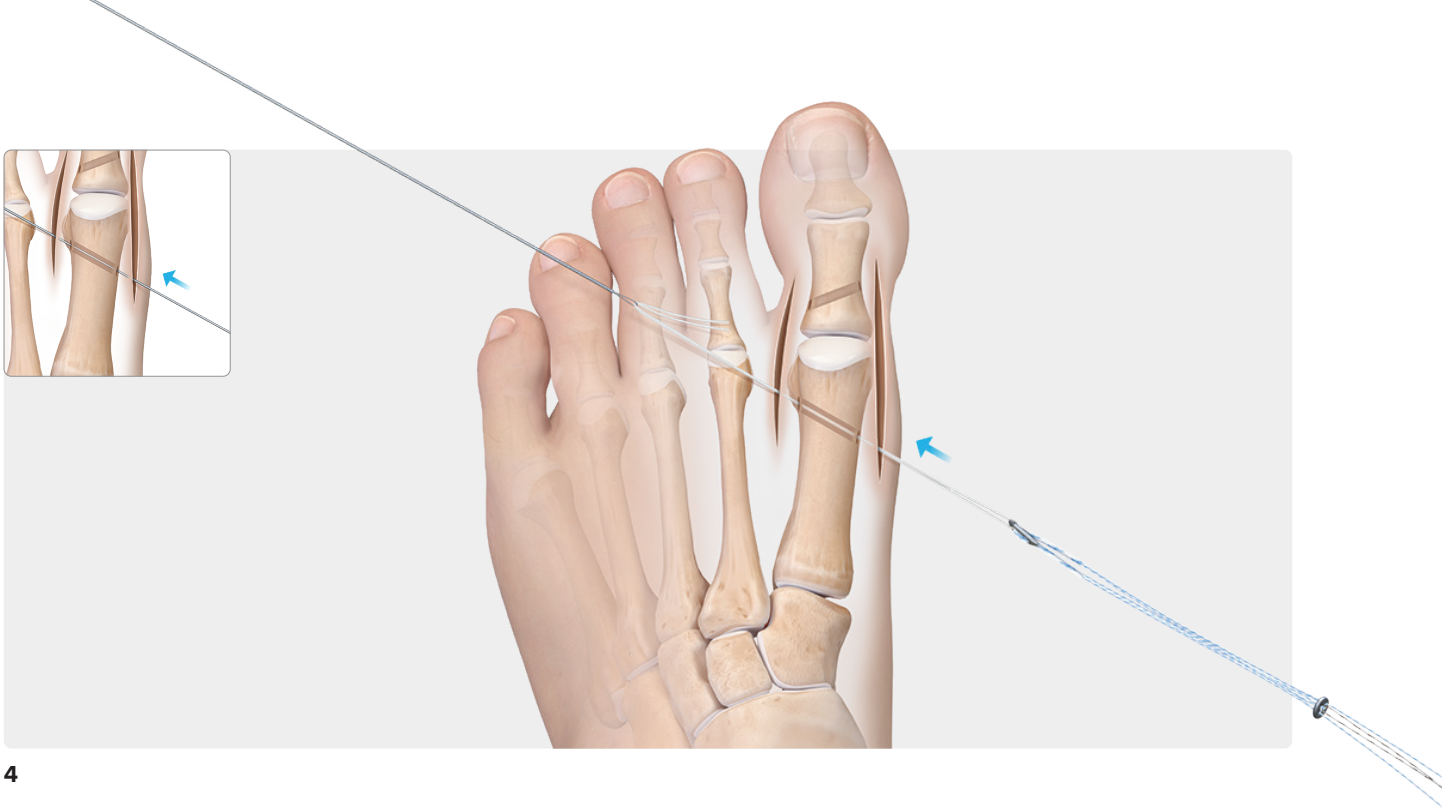


3a



3b

Overdrill each K-wire with the 2.7 mm cannulated drill. The K-wires can then be removed.

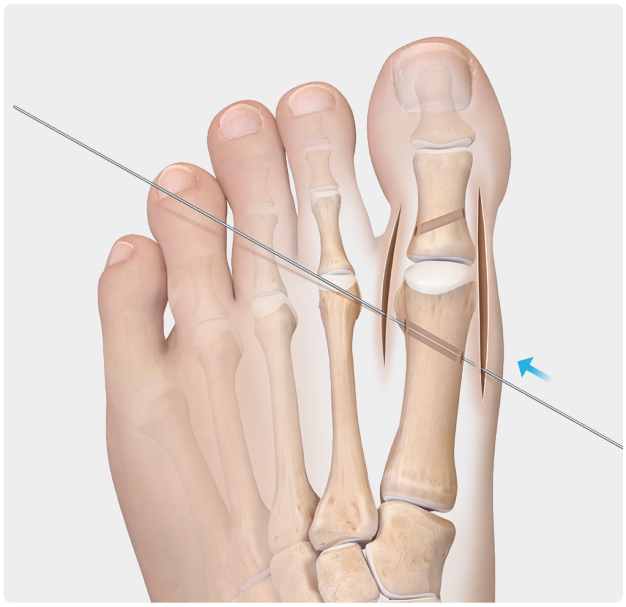


4

Remove the attached K-wire from the Knotless Mini TightRope® implant by cutting the white traction suture at the back of the K-wire.

Load the tails of the white traction suture through the distal loop on the nitinol passing wire.

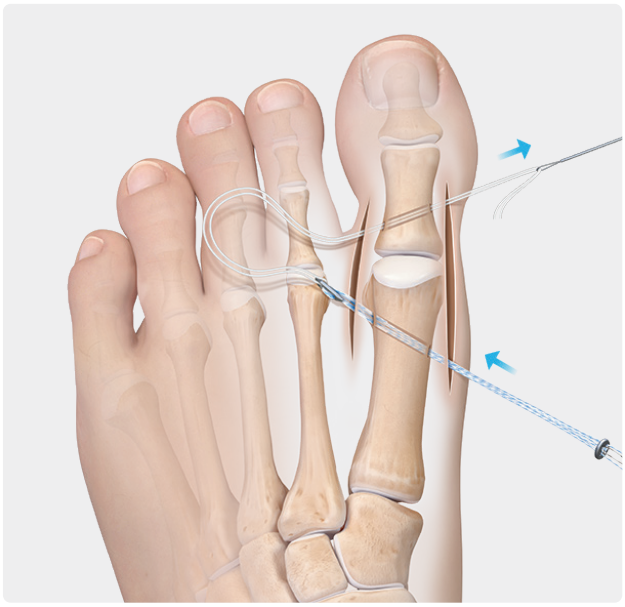
Alternative: If neighboring anatomy allows for space and access, the attached K-wire on the Knotless Mini TightRope implant can be used to pass the implant through the bone tunnels.



5

First, pass the nitinol passing wire through the proximal bone tunnel in the metatarsal, moving from medial to lateral.

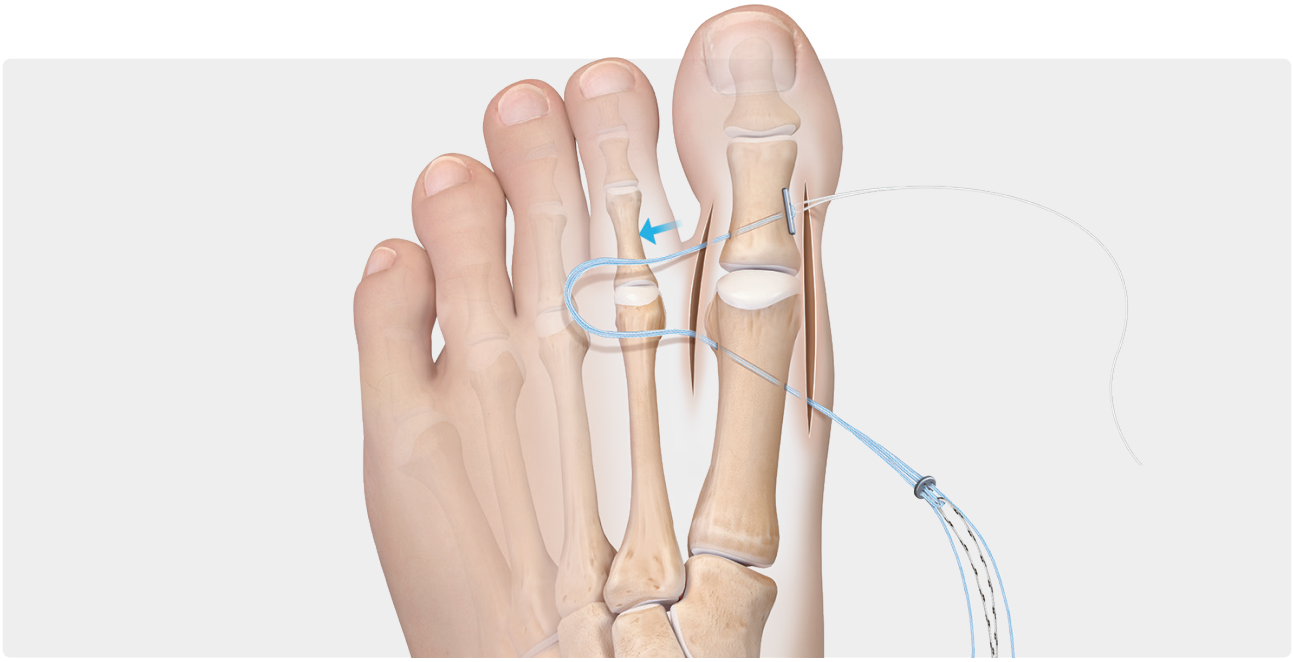
Keep tension on both sides of the oblong button while passing through the bone tunnel to the first webspace. This will ensure the button remains flat in the bone tunnel.



6

Next, pass the nitinol passing wire through the distal bone tunnel in the phalanx, moving from lateral to medial.

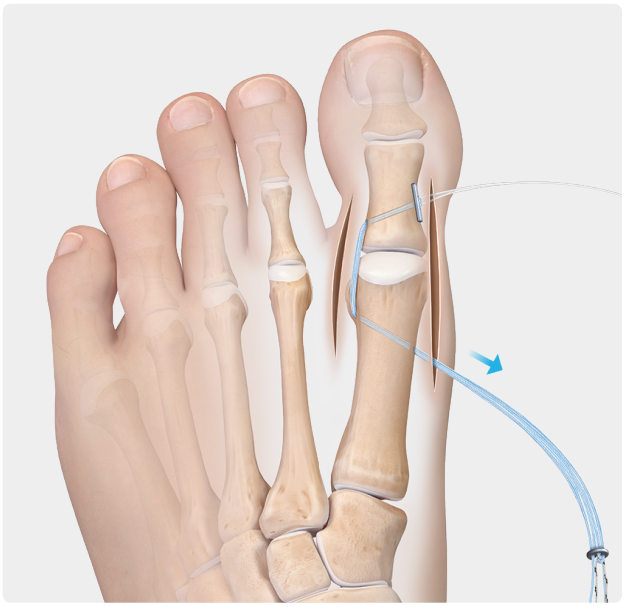
Again, keep tension on both sides of the oblong button while passing through the bone tunnel to keep the button flat.



7

Place the oblong button flat on the phalanx by pulling tension laterally through the webspace. Use forceps to ensure button is not impinging on soft tissue. If required, rotate the button so it is aligned to the long axis of the bone.

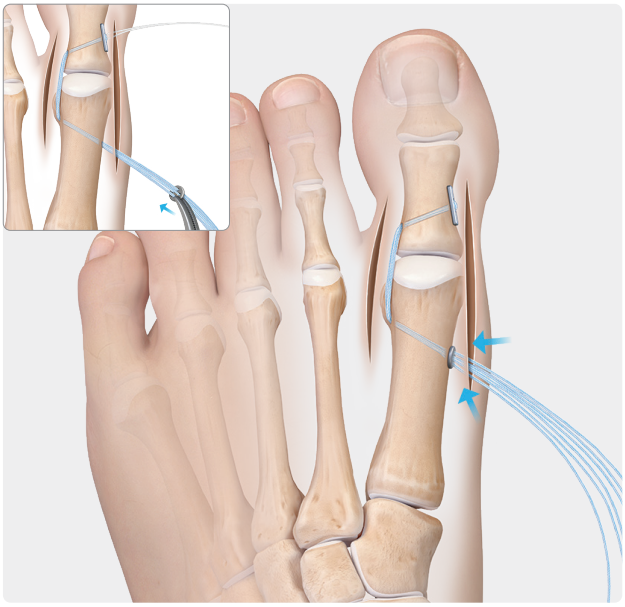
Caution: Do not use the Knotless Mini TightRope® implant to reduce the deformity and maintain correction. Proper toe alignment and reduction should be held using clamps, K-wires, etc.



8

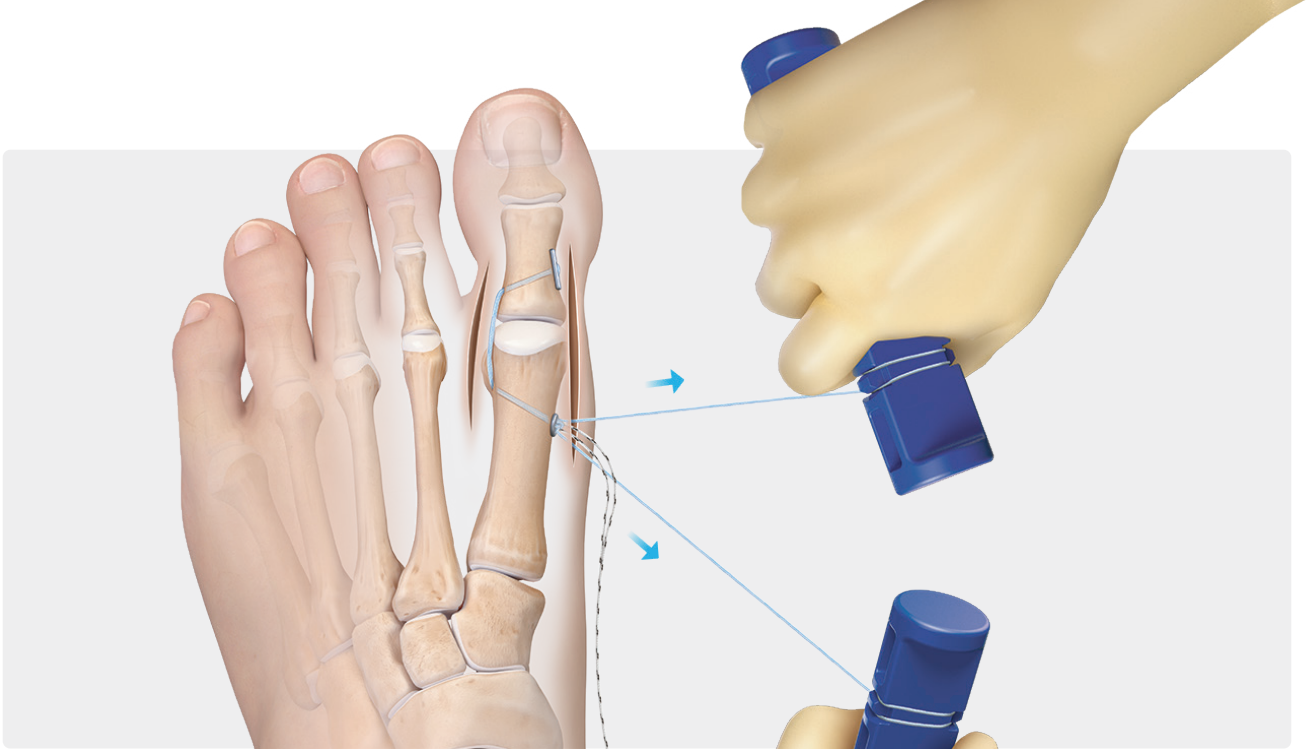
Remove lateral slack and create some preliminary tension across the MTP joint by pulling the sutures medially across the proximal bone tunnel in the metatarsal.

Take care to pull on the suture, rather than the round button, to generate tension.



9

Hold all sutures in one hand while using forceps to guide the round button down the sutures until it contacts bone. This will minimize suture entanglement when completing final tensioning.



10

Tension the Knotless Mini TightRope® implant by pulling straight axially on the suture tails of the round button. The included tensioning handles can be used to assist.

Note: If suture entanglement occurs during tensioning, pull axially on the white/black safety sutures.

Caution: Overtensioning may result in the loss of toe alignment and reduction. If this occurs, the implant may need to be removed by cutting the sutures.



11

Once desired tension is achieved, evaluate the reduction under direct visualization and fluoroscopy. Cut the safety sutures and suture tails for the final construct.

Explant Information

The Knotless Mini TightRope® implant can be removed by cutting the sutures with a surgical knife or FiberWire® scissor (AR-11796).

Ordering Information

Knotless Mini TightRope Implant System, 2.7 mm	AR-8908DS

- Knotless Mini TightRope Implant, 2.7 mm
  - #2 Coreless Machine-Tapered Suture
  - 5.5 mm Round Button
  - Oblong Button, 2.6 mm
  - TightRope Guide Pin, 1.6 mm
- Cannulated Drill, 2.7 mm, qty. 1
- Nitinol Passing Wires, qty. 2
- K-wire, 1.24 mm, qty. 2
- Tensioning Handles, qty. 2



Hallux Valgus

The 2.7 mm Knotless Mini TightRope implant can be used to correct mild, flexible hallux valgus deformities.

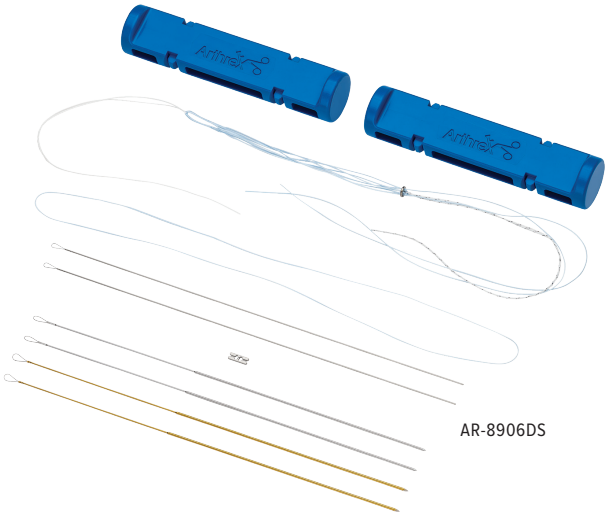
For this technique, mirror the surgical steps outlined above but instead start from the lateral side of the hallux and exit medially.

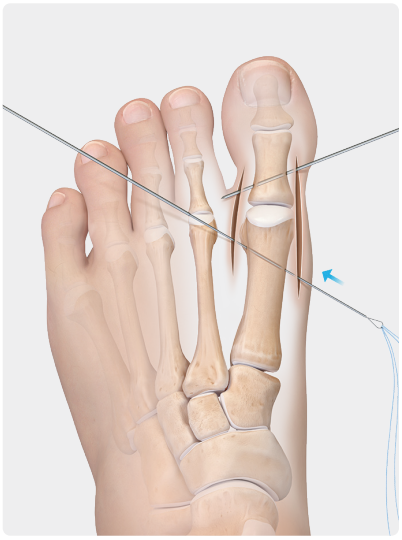
1.1 mm Knotless TightRope® Implant

The 1.1 mm Knotless Mini TightRope implant is an alternative option for hallux varus and valgus correction.

When deciding between 1.1 mm and 2.7 mm TightRope implant options, consider the amount of correction required and patient selection, expectation, and demand.

An abbreviated surgical technique highlighting the variations in instrumentation for the 1.1 mm surgical technique is presented below.

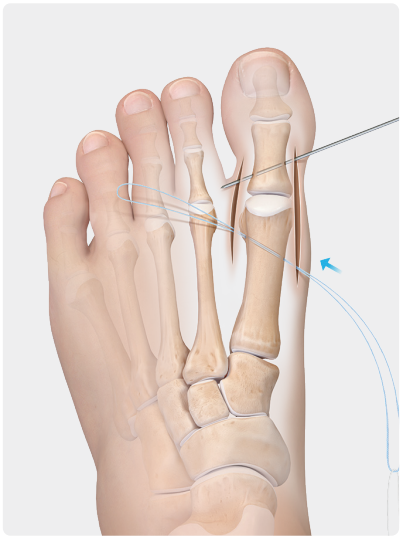




1

Use the 1.3 mm guidewires to pass FiberLoop® sutures across the bone tunnels.

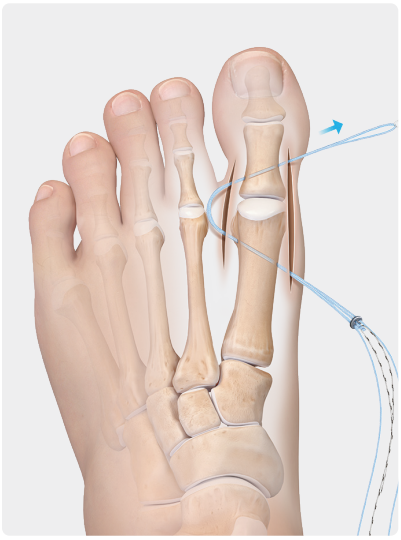
> **Note:** It is recommended to use a FiberLoop suture, rather than the guidewire, to pass the implant construct.



2

Load FiberLoop suture with the tails of the Knotless Mini TightRope construct and pull the implant from the medial metatarsal to the lateral webspace.

Repeat guidewire and FiberLoop suture-passing steps in the phalanx.



3

Attach the included button onto the sutures in the medial phalanx using a hemostat.

Follow the remaining surgical steps from the technique presented in this guide.

Ordering Information

Knotless Mini TightRope® Implant System, 1.1 mm	AR-8906DS

- Knotless Mini TightRope Implant, 1.1 mm
  - #0 Coreless Machine-Tapered Suture
  - 5.5 mm Round Button
- Oblong Button, slotted, 2.6 mm
- #0 FIberLoop® Suture, blue, qty. 1
- Nitinol Passing Wires, qty. 2
- K-Wire, 1.1 mm, qty. 2
- K-Wire, 1.3 mm, qty. 2
- Tensioning Handles, qty. 2

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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US patent information

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