Arthrex Presents:

Breakthroughs in Foot and Ankle Technology

ACFAS 2025

We are excited to welcome you to the 2025 ACFAS Annual Meeting in Phoenix! After more than 20 consecutive years of supporting ACFAS meetings, Arthrex has realigned our internal team to further prioritize the needs of foot and ankle surgeons. Over the past year, Arthrex has been proud to support the advancement of foot and ankle surgery through a variety of initiatives, including conducting over 65 hands-on educational trainings in minimally invasive surgery (MIS), featuring both MD and DPM faculty and attendees. These collaborative events have played a pivotal role in driving innovation and enhancing surgical outcomes. In addition, we trained more than 2700 DPMs at our global headquarters in Naples, FL, and in single-day labs at our national agency offices. We also launched groundbreaking products such as the DualCompression hindfoot fusion nail and the MIS FiberTak® Achilles SpeedBridge™ repair implant system as we continued our unwavering commitment to foot and ankle surgeons.

Our innovative DualCompression hindfoot fusion nail remains the only nail on the market featuring a patented cable technology, delivering significant time-zero compression for ankle and subtalar joints while leveraging a nitinol core for continuous postoperative compression.

Additionally, the MIS FiberTak Achilles SpeedBridge implant system introduces the latest evolution of our trusted double-row fixation technique for insertional Achilles tendon repair, now in an MIS or percutaneous technique and featuring 25% less implant material.

We invite you to visit our booth to explore these innovative solutions and experience them hands-on with our 3DAnatomy™ technology. Join us as we continue to advance surgical innovation and patient care together.

Michael Karnes
Director, Product Management
Foot & Ankle and Trauma

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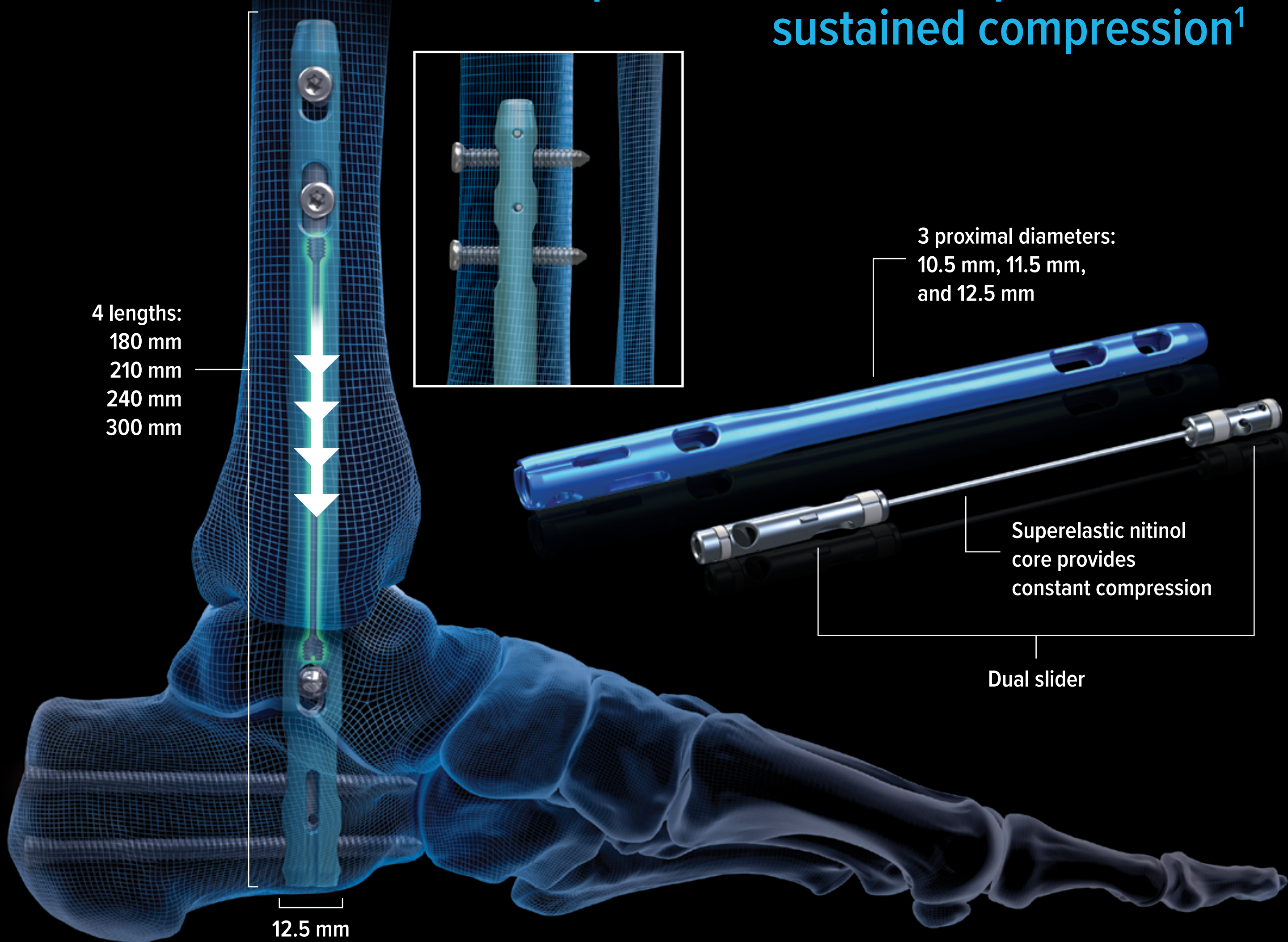
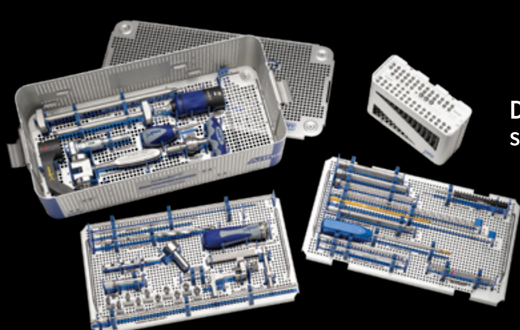
Arthrex®

DualCompression

HINDFOOT NAIL

Up to 10 mm of intraoperative and sustained compression[1]





DualCompression system

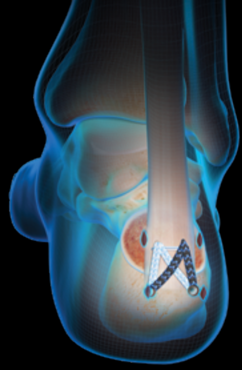
Learn more about DualCompression Hindfoot Nail

Arthrex®

Reference
1. Arthrex, Inc. Data on file (APT-04782G). Naples, FL; 2020.

Case Review

Insertional Achilles



Joseph K. Park, DPM

Arthrex MIS FiberTak® Achilles SpeedBridge™ Implant System

Presentation

The patient was a 52-year-old healthy male with no significant medical history who did not respond to conservative treatment. The surgical plan involved removing the posterior calcaneal osseous prominence with Achilles tendon debridement, repair, and reattachment.

Decision-Making

Arthrex has now provided an MIS insertional Achilles technique and system that facilitates a stronger repair construct and addresses the potential postoperative wound closure complications. Smaller incisions mean less trauma and injury with less swelling and pain postoperatively.

Surgical Technique

Using fluoroscopy, I mark out the anatomical landmarks and prepare for the four small stab incisions, which will be the basis of the minimally invasive approach.

Using a combination of the MIS burr in the kit and arthroscopy, I debride the bony and soft-tissue pathology. Once the debridement has been completed, I prepare for the Achilles tendon repair using the MIS FiberTak Achilles SpeedBridge system. This consists of two 2.6 mm Knotless FiberTak® DX anchors for the proximal row. I insert these anchors using the new MIS-specific instrumentation.

Once the proximal anchors have been inserted and the knotless rip-stop (which doubles the biomechanical strength[1]) is secure, I pass the FiberTape® sutures percutaneously using a Banana SutureLasso™ suture passer. Then I fix the distal row using the DX 3.9 mm BioComposite SwiveLock® anchors, completing the repair.

Final Thoughts

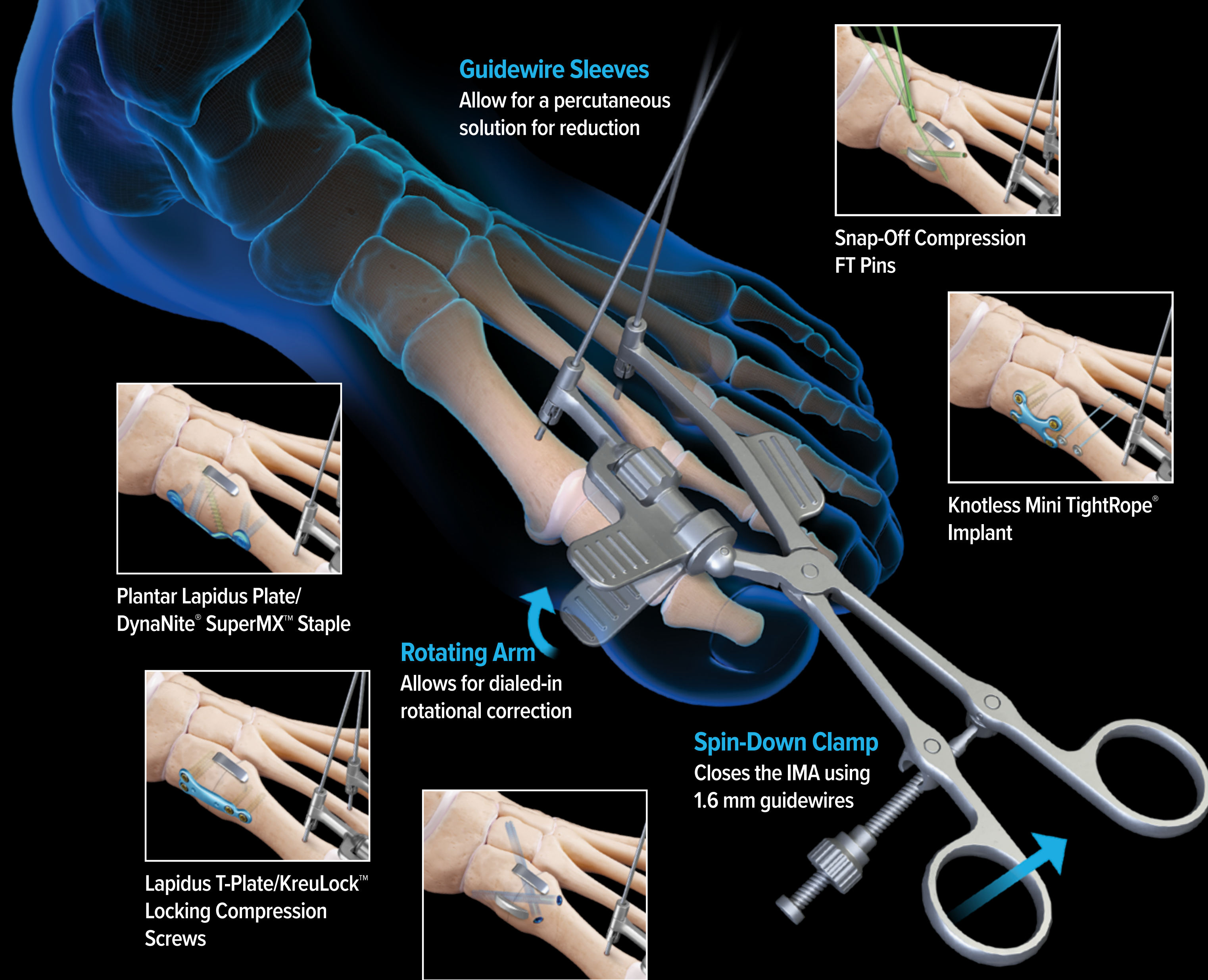
Traditionally, with an open approach, this surgery would have required a longer recovery, with up to 8 weeks non-weight–bearing. The Arthrex MIS FiberTak Achilles SpeedBridge system allowed my patient to return to full weight-bearing 2 weeks postoperatively, exercise on stationary machines at 6 weeks, and return to work (which required 4 hours of standing at a time per day) at 8 weeks. The Arthrex MIS FiberTak Achilles SpeedBridge repair made a tremendous impact and improvement for these surgical patients.

Learn more about
MIS FiberTak Achilles SpeedBridge System

Lapidus Reduction Clamp

Design Simplicity Allows Surgeons to Choose Their Implant and Approach

Frontal plane rotation and intermetatarsal angle can be corrected independently and secured using one instrument.



Learn more about the Lapidus Reduction Clamp

Arthrex®

Case Report and Literature Review

Screw vs TightRope® Implant—Is There Even a Question?

Ryan B. Rigby, DPM

What cases changed your mind about using screws for the syndesmosis?

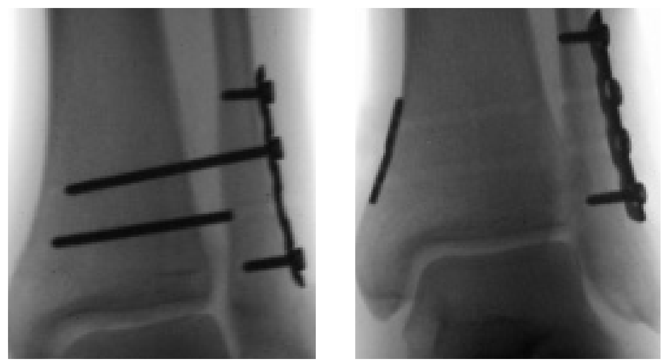
Initial Injury and Surgery

- Hockey player
- Collision with wall while skating
- X-rays showed instability
- Screws used due to proximal fibula fracture

Follow-Up and Revision Surgery

- Hardware removal required—further complicated by broken screw
- Required additional time and bone loss
- Screw removal slowed return to activity
- TightRope implant from the first operation provided stability

Figures 1 and 2. Initial surgery



Figures 3 and 4. Second surgery

Which studies shifted your opinion from screws to the Syndesmosis TightRope implant vs other fixation options?

For me, it started in 2012, and by 2020, we had seven Level 1 or Level 2 studies showing that the TightRope implant is superior to screws. These high-level studies solidified my decision-making regarding syndesmotic fixation.

2012

- **Naqvi (*AJSM*)**[2] 20% screw group malreduced, 0% TightRope group malreduced

2015

- **Laflamme (*JOT*)**[3] Prospective randomized screw vs TightRope implant, improved clinical/radiographic outcomes in TightRope group
- **Kortekangas (*Injury*)**[4] End result—more screws than TightRope implants were malreduced

2018

- **Hoffman (*Knee Surg Sports Trauma*)**[5] Screw vs TightRope implant—quicker return to sport and fewer complications with TightRope implant
- **Andersen (*JBJS*)**[6] Screw vs TightRope implant—better outcome scores and radiographic findings for TightRope implant

2019

- **Sanders (*JOT*)**[7] Malreduction screws 39%, TightRope implant 15% (post-op CT scans)

2020

- **Ræder (*Bone Joint J*)**[8] 5-year comparison TightRope implant vs screws—better outcome scores and radiographic findings in TightRope group

Case Review

Ankle Fracture and Syndesmosis Repair

Spencer Monaco, DPM

Ankle Fracture, *Internal*Brace™ Ligament Augmentation Repair, and Syndesmosis TightRope® Implant System

Presentation

A 22-year-old male sustained an isolated rotation ankle injury while playing football. The mechanism of injury was a direct lateral force by another player, followed by external rotation.

X-Rays

Images showed a proximal Weber C oblique fibular fracture with widening of the tibiotalar clear space and medial clear space. Lateral subluxation of the talus within the ankle mortise was present.

Assessment

The patient had left ankle join subluxation with Weber C fibular fracture and syndesmotic and deltoid ligament disruption.

Plan

The case proceeded with arthroscopic evaluation and debridement with the NanoScope™ camera. Open reduction internal fixation (ORIF) was planned for the fibular fracture and syndesmotic multiligament stabilization (interosseous and anterior tibiofibular ligament) with deltoid ligament repair.

Figure 1. Preoperative

Figure 2. Postoperative

Surgical Technique

Establish standard anterior medial and anterolateral portals. Introduce the endoscope through the anteromedial portal. Debride the acute synovitis and hemorrhagic plug as well as the syndesmosis.

Direct lateral approach — Apply a fibular ORIF using a long ⅓ tubular plate in a posterolateral fashion. Clamp the plate to the bone and use as a reduction tool, which is useful with more proximal short oblique fibular fractures.

Inspect and debride the syndesmosis and reduce manually with temporary K-wire fixation. Debridement is critical to ensure no soft tissue or bone will impede the fibula from falling back into the tibial incisura.

Multiligament stabilization of the syndesmosis

1. Secure the *Internal*Brace ligament augmentation repair into the distal fibula in an anterior-to-posterior fashion using a 3.5 mm SwiveLock® anchor.
2. Prep the anterolateral tibia for the 4.75 mm SwiveLock anchor using a 3.4 mm drill and 4.75 mm tap. Leave the tap in the tibia until the TightRope implants are placed to avoid drilling into the anchor.
3. Insert 2 TightRope implants through the end of the ⅓ tubular plate.
4. Insert the SutureTape into the anterolateral tibia using a 4.75 mm SwiveLock anchor to close down the anterior syndesmosis.

Case Review

Ankle Fracture and Syndesmosis Repair (Cont.)

Syndesmosis TightRope® XP Implant

Deltoid ligament repair — FiberTak® anchors and *Internal*Brace™ ligament augmentation repair

Insert two FiberTak anchors into the anterior colliculus. Due to both superficial and deep portions of the deltoid ligament being compromised, I augmented my construct with an *Internal*Brace ligament augmentation repair.

Place a 3.5 mm anchor into the talus. Hand-tie the suture from the FiberTak anchors. Insert a 4.75 mm SwiveLock® anchor into the medial mal.

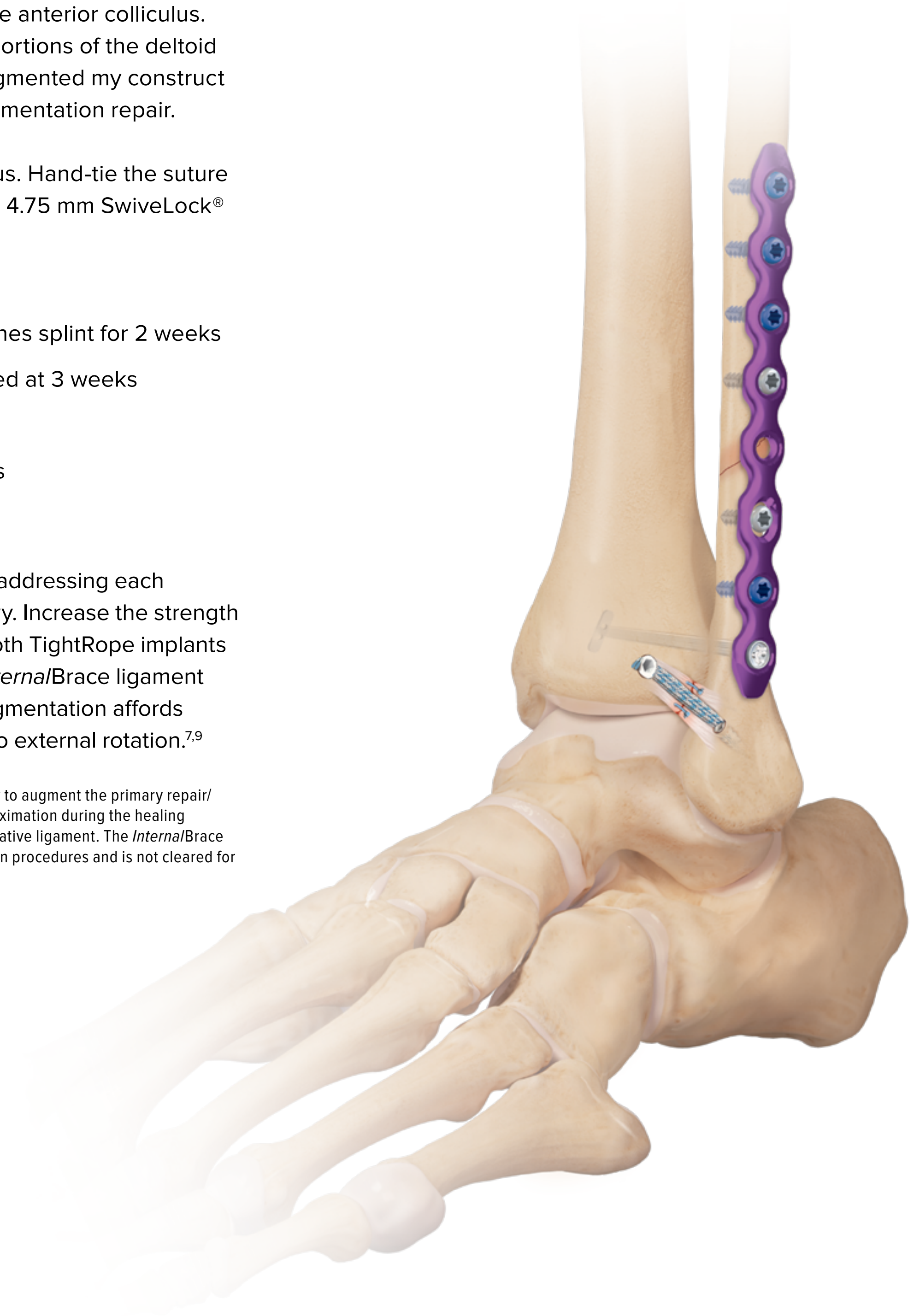
Post-op Protocol

- Non-weight–bearing in bulky Jones splint for 2 weeks
- Partial weight-bearing as tolerated at 3 weeks
- Full weight-bearing at 1 month
- Start physical therapy at 2 weeks

Key Points

Quicker return to function requires addressing each component of the ligamentous injury. Increase the strength of your syndesmotic repair using both TightRope implants and AITFL augmentation with an *Internal*Brace ligament augmentation repair. The AITFL augmentation affords increased stability with resistance to external rotation.[7,9]

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.



Case Review

Arthrex Mini-Rail Fixation System

Zachary Flynn, DPM

Presentation

The patient was a 51-year-old male who presented for a third opinion on a chronic right foot deformity. Two previous attempts at Lapidus fusion resulted in persistent nonunion and hardware failure. His main complaint was elevation and contracture of the right great toe, resulting in blisters and pain wearing shoes. Additionally, he had a painful nonunion of the 1st TMT fusion site with 1st ray shortening, resulting in overload of the 2nd and 3rd metatarsals, as well as residual hammertoe deformity.

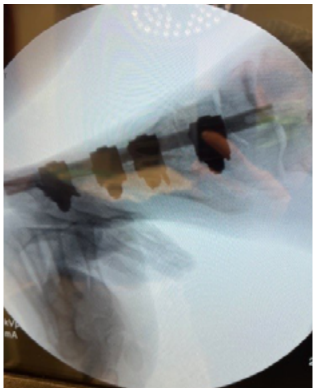
Surgical consultation included revising the hammertoes, lesser metatarsal osteotomies, and 1st TMT fusion. MPJ fusion was recommended but deferred due to the patient's wish to continue to work and engage in recreational activities.

We elected to perform a 1st metatarsal lengthening with simultaneous revision 1st TMT fusion and soft-tissue balancing procedures, which would allow us to preserve the 1st MPJ to allow accommodative motion of the 1st ray/medial column.

Final procedure selection included tibia autograft harvest, hardware removal, revision 1st TMT fusion, EHL lengthening, 1st metatarsal osteotomy, and revision hammertoe and lesser metatarsal osteotomies.

Decision-Making

The decision was made to use the Arthrex Mini-Rail Fixation System as opposed to standard screw and plate fixation for various reasons. Primarily, this method allowed for the metatarsal lengthening to safely restore the length of the 1st metatarsal. The Mini-Rail System allowed me to compress one segment (TMT fusion), while distracting the metatarsal and the 1st MPJ. This allowed me to fully customize the desired length during the recovery period. Additionally, this afforded better preservation of the soft tissues and surrounding blood supply. Given his previous hardware failure, the patient was very amenable to external fixation.



Case Review

Arthrex Mini-Rail Fixation System (Cont.)

Surgical Technique

After completion of the procedure, the TMT site was compressed intraoperatively. After a latency period of 10 days, distraction was initiated in the office. Distraction was performed on the 1st metatarsal distal segment and the MPJ to avoid arthrosis and jamming. The initial target length was 15 mm, but upon completion, an additional 3 mm was added when radiographs indicated that it would be ideal for parabola restoration.

Post-op Protocol

After lengthening was complete, the Mini-Rail was left in place for 4 weeks and crutch-assisted weight-bearing was initiated.

Due to return-to-work constraints, the Mini-Rail needed to be removed before complete maturation of the callus distraction, resulting in the placement of a bridge plate for stability.

What features or benefits did the Arthrex Mini-Rail provide that allowed you to treat this patient in a way that other systems may not offer?

The Arthrex Mini-Rail was ideal for this patient. Having the ability to independently compress and/or distract independent segments gave me the ability to address his deformity in its entirety while preserving his MPJ and range of motion.

What technique pearls can you offer from your experience using the Arthrex Mini-Rail?

Placement of the Mini-Rail is comparable to other systems. My personal preference is a pin-first approach, then assembling the clamps and rail. Having this flexibility allows ease of use and decreased operative time. Postoperative adjustments are easy for the patient following standard clockwise and counterclockwise principles for lengthening and compression with color-coded drivers that allow uniform or isolated clamp adjustments as necessary along the rail.

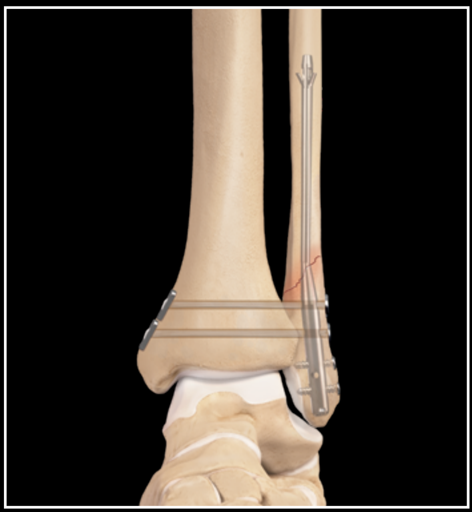
For which foot and ankle pathologies in your practice do you see the Arthrex Mini-Rail providing a solution?

The Mini-Rail has become my main tool for revision 1st ray pathologies, including nonunion TMT arthrodesis, MPJ fusions, and failed 1st MPJ arthroplasty. Additionally, it is vital for brachymetatarsia and arthrodiastasis cases.

Arthrex Syndesmosis TightRope® for Ankle Injuries

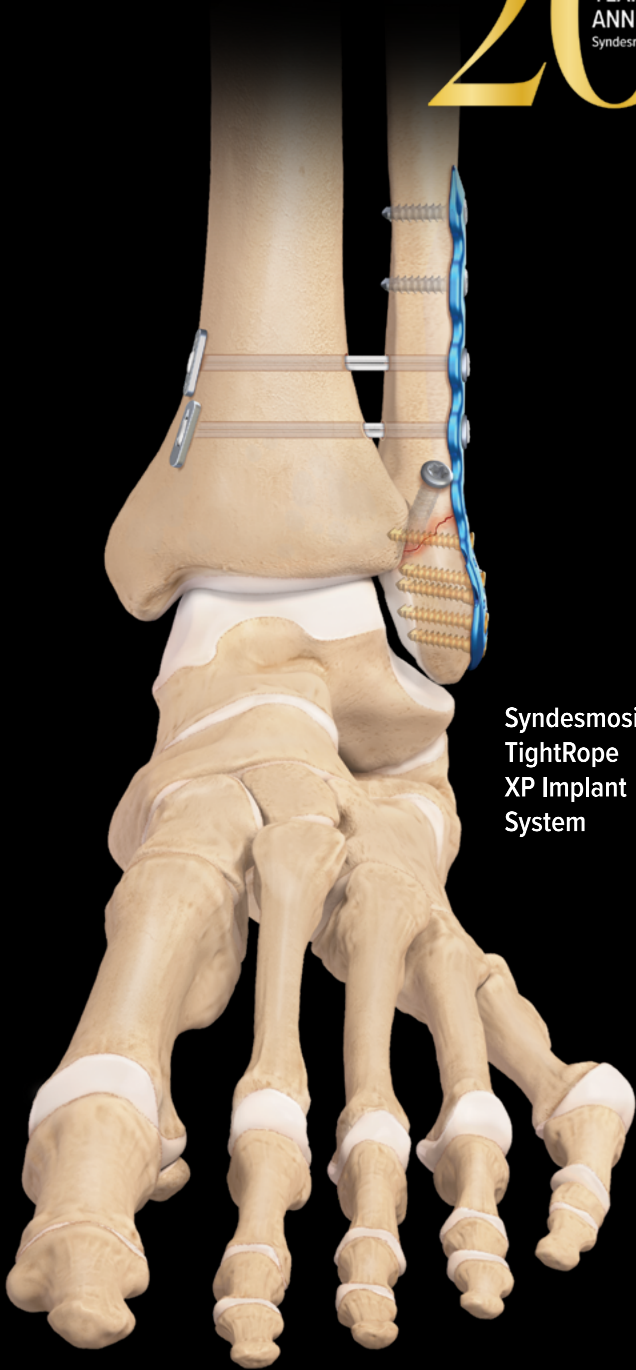
With over 40 published studies and 20 years of innovation and research, Arthrex is the industry leader in syndesmosis flexible fixation.[1]

20 YEAR ANNIVERSARY Syndesmosis TightRope®



FibuLock® Fibular Nail System with Syndesmosis TightRope XP Implant

Syndesmosis TightRope XP Buttress Plate Implant System



Syndesmosis TightRope XP Implant System

Learn more about Syndesmosis TightRope

Arthrex®

Reference

1. ECRI market data, 2023.

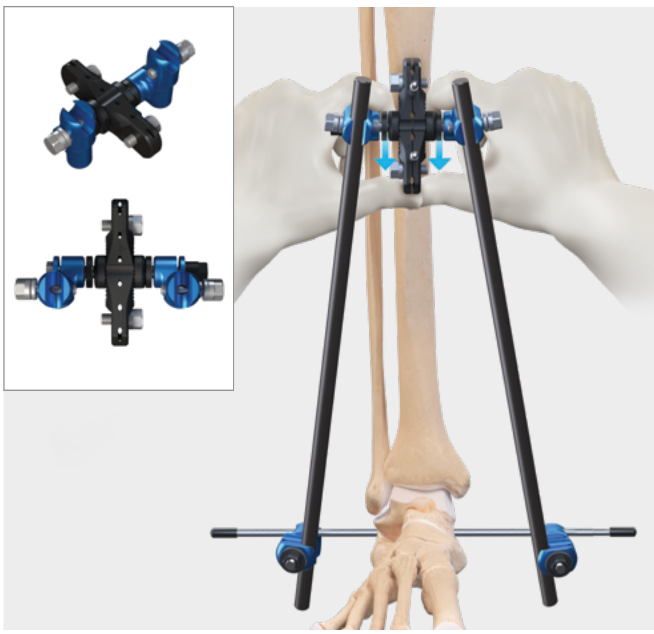
New Product Highlight

ArthroFX® External Fixation System

ArthroFX Clamp Additions

Arthrex is proud to announce the launch of two upgraded components to its ArthroFX external fixation system: the end-to-end clamp and the compression distraction multiclamp. Both of these additions greatly enhance the versatility of the ArthroFX system.

Compression/Distraction Multiclamp



The reattaching base of this updated multiclamp allows surgeons to make intraoperative adjustments after the bars have been locked in the construct.

- 34 mm of compression or distraction
- 14° of varus/valgus adjustment
- Independently locked
- Provisionally holds compression or distraction prior to final tightening

End-to-End Bar Clamp

The end-to-end bar clamps enable additional stability by reducing the degrees of freedom and enabling constructs to be connected together.

- Clamps are independently locked to bars
- Provide controlled rotation
- Aids in intraoperative reduction techniques

Learn more about
ArthroFX System

Scientific Update

Methods of Augmentation

Ryan B. Rigby, DPM

Native anterior talo-fibular ligament tensile characteristics compared to allograft, suture tape, and copolymer augmentation elements: a biomechanical study. Pedowitz D, Ingwer SJ, Rigby R, Rosenbaum A, Hauck O, Khoury AN. *J Foot Ankle Surg*. 2025;64(1):49-53. doi:10.1053/j.jfas.2024.08.016

What was the purpose of this study?
To biomechanically compare 3 methods of augmentation (SutureTape, allograft, and copolymer) for lateral ankle stabilization versus the native ATFL. Both elongation and load to failure were employed for each method and compared to the native ATFL.

What were the key findings?
Compared to the native ATFL, both SutureTape and allograft demonstrated no significant elongation or ultimate load to failure. Copolymer, however, demonstrated significant biomechanical changes compared to the native ATFL such as statistically greater elongation.

How has this changed the way we understand native anatomy, allograft reconstructions, and various augmentation methods?
To restore ankle mechanics, the type of procedure and augmentation to the repair should closely match the native ATFL mechanical properties, especially elongation and load to failure. This data demonstrates that allograft reconstruction and SutureTape are both sufficient to accomplish this goal. The characteristics of copolymer, however, fall short in comparison to native stability and function. Surgeons should consider and match this data to their choice of repair and augmentation.

What are the key elements when considering type of augmentation for ligament repair?
Employ methods that restore native mechanical properties. Time-zero strength and long-term sustained protection are a must. The simplicity of SutureTape in an *Internal*Brace™ construct combined now with proven biomechanical data demonstrate it to be an ideal choice.

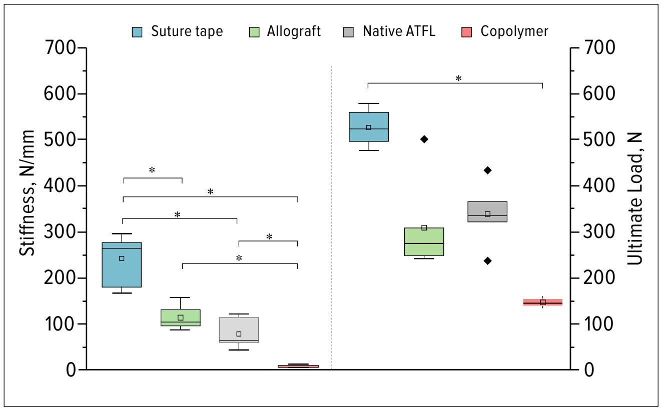


Figure 1. Box and whiskers plot of stiffness (left) and ultimate load (right). *Indicates significant findings.

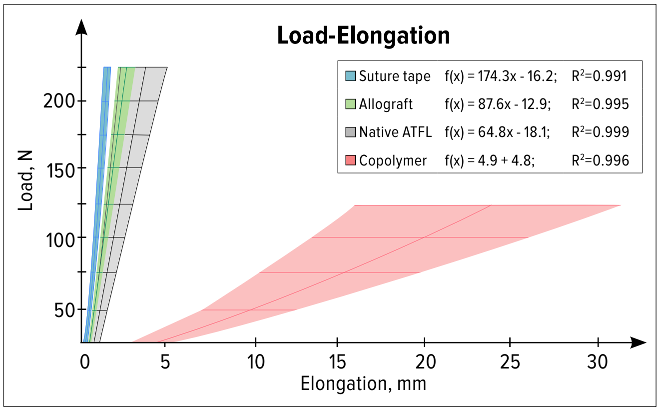


Figure 2. Mean elongation ± standard deviation up to native function load range, 225 N. Shaded region indicates elongation range from standard deviation values. Suture tape group experienced 100% survivorship up to 450 N (not shown).

New Literature Highlight

KreuLock™ Locking Compression Screws

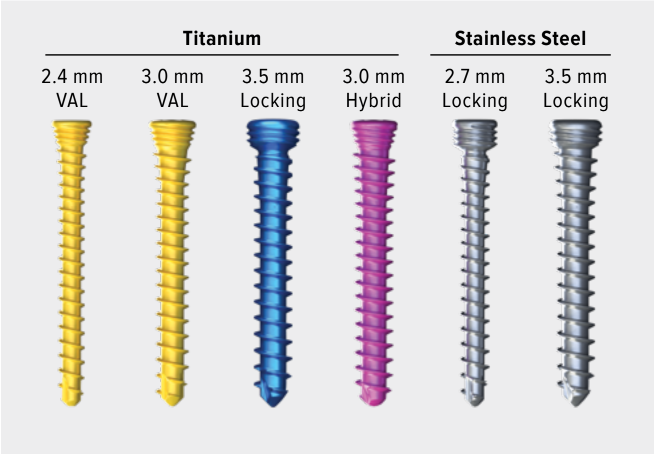
Bicortical compression and construct stability with variable pitch locking screws in cadaveric specimens.
Koroneos ZA, Alwine S, Tortora P, et al.
J Orthop Trauma. 2024;38(10):e339-e346. doi:10.1097/BOT.0000000000002869

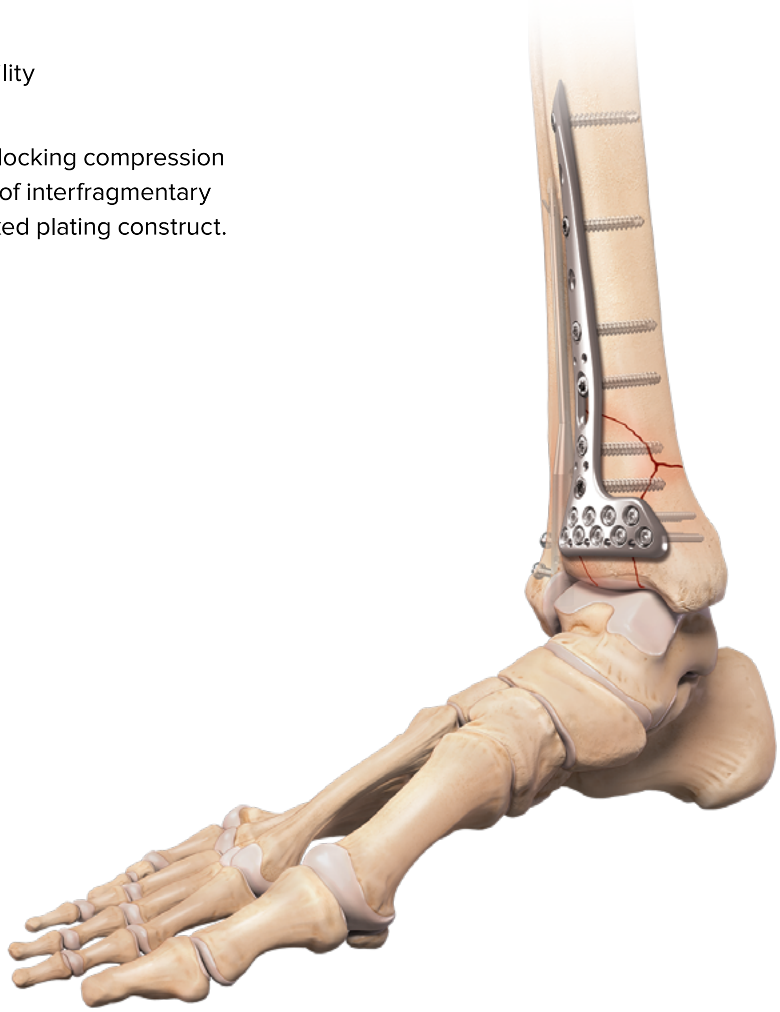
A recent article in the *Journal of Orthopedic Trauma* (*JOT*), was the first peer-reviewed publication to highlight the benefits of KreuLock locking compression screws.

When compared to standard locking screws:

- Increased interfragmentary compression
- Increased plate-to-bone compression
- Comparable construct stiffness
- Comparable axial and angular stability

For intra-articular fractures, KreuLock locking compression screws provide a unique combination of interfragmentary compression within a fixed-angle, locked plating construct.





Learn more about
KreuLock Locking Compression Screws

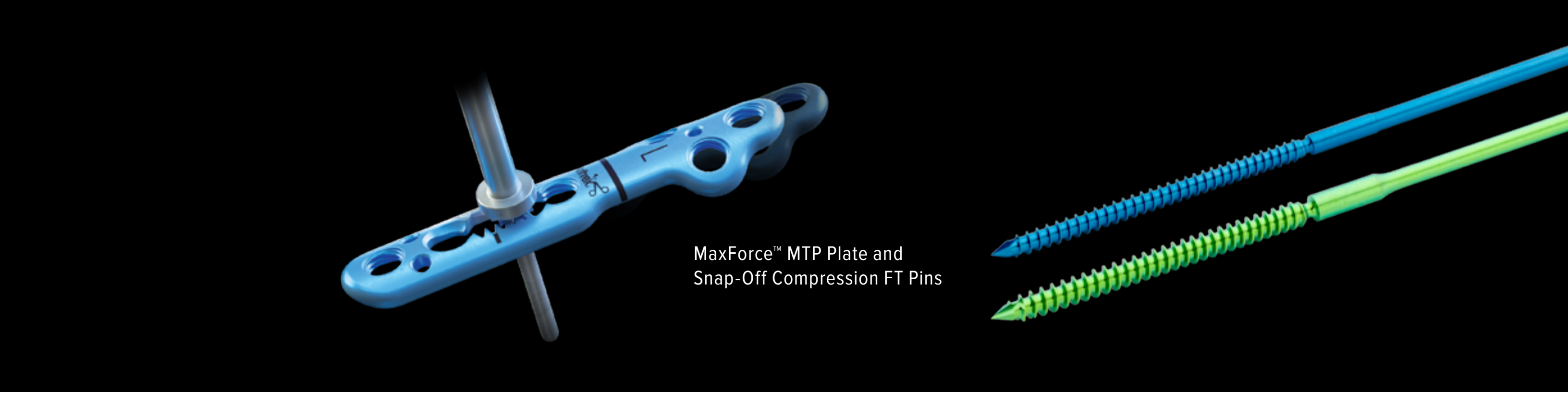
What's in My Bag?

MaxForce™ MTP and Snap-Off Compression FT Pins

Derek McLister, DPM

What intrigued you to start using the MaxForce MTP plate for your MTP fusions?
During training, I used various MTP plating solutions; this gave me enough experience to know what I was looking for. Once I started using the MaxForce MTP plating system, it was a simple and seamless transition. This system includes a unique compression mechanism in the plate that allows me to dial in and be in control of my compression for each patient. This, paired with the compatibility of the KreuLock locking compression screw and the Snap-Off Compression FT pins for an interfragmentary screw option, provides a full solution. Historically, MTP fusions have a high patient-satisfaction rate, but as a surgeon I look for ease of use, reproducibility, and leading technology. The MaxForce MTP plating system and snap-off pins achieve all of these things for me and my practice.

The MaxForce plate has a unique compression mechanism that allows up to 4.0 mm of manual compression. How has this benefited your MTP fusions? How do you determine how much compression is adequate for each patient?
Glissan's principles of fusion seek to obtain good bone-to-bone apposition, and the MaxForce compression mechanism helps achieve and exceed this. Each patient has different bone characteristics, and you treat the patient, not by what the technology can do. The ability to dial in as much or as little compression through the MaxForce plate creates a unique solution for each patient. In general, I adhere to the "two-finger tightness" adage when using the compression mechanism in each case. Once the bony fusion site is apposed, the MaxForce MTP plate will engage in compression and, paired with the KreuLock locking technology, leads to robust fixation and ultimately fusion, getting that high patient satisfaction that we all want.



MaxForce™ MTP Plate and
Snap-Off Compression FT Pins

Are there any technical pearls that you can offer on your experience with the MaxForce technique?
The MaxForce plate allows significant compression and keeping that in mind throughout the case is imperative. I have found ways to help obtain compression and proper alignment, starting with provisional fixation. I prefer to use two points of fixation for provisional fixation. I use the K-wires for the Snap-Off Compression FT pin to stabilize across the fusion area, using a cross or "X" pattern to set position. With the compression mechanism, I stop turning the driver when I start to feel resistance, confirming desired compression has been achieved through the plate. The resistance is the "two-finger tightness" that I previously mentioned. As noted above, I use two points of temporary fixation so when the compression system is used, I maintain good position and alignment of the toe.

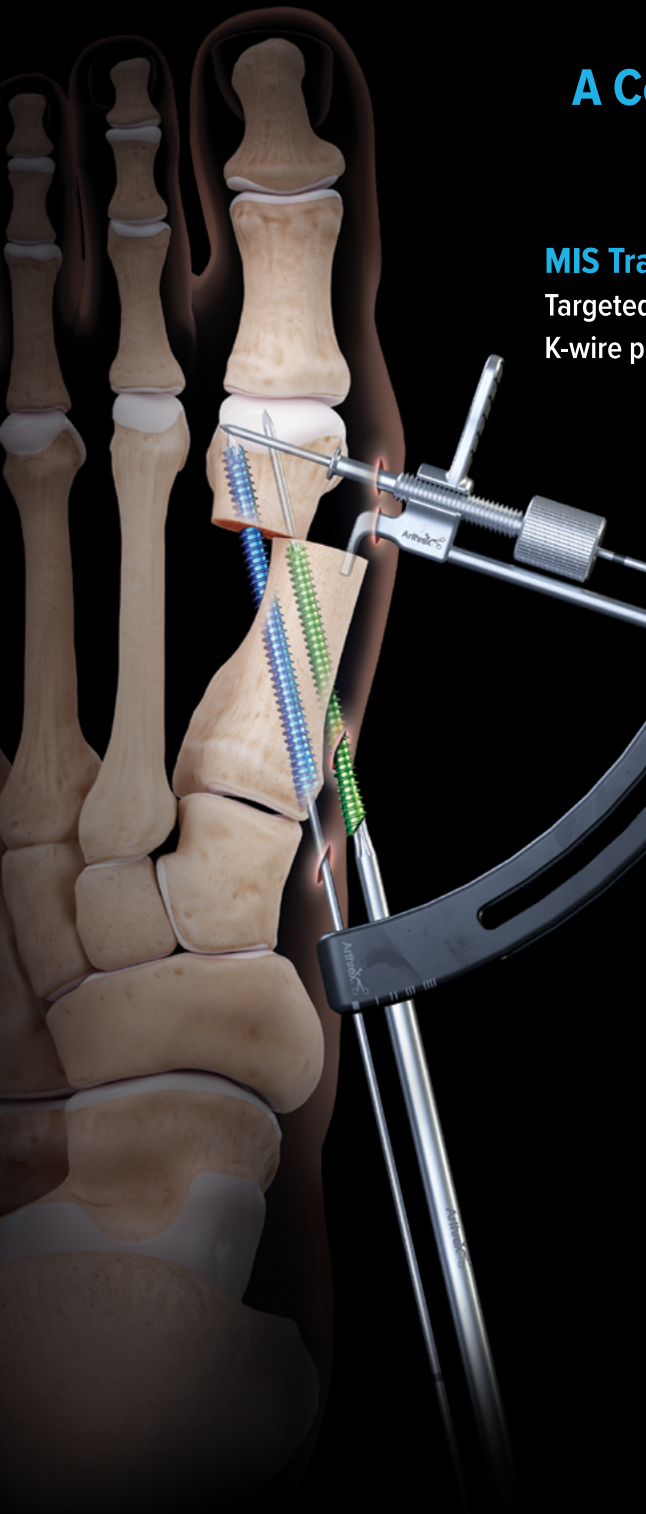
Can you explain how you started implementing Snap-Off Compression FT pins and what advantages you have found in your MTP fusion cases?
I started using 2.4 mm Snap-Off Compression FT pins to aid in my reduction, temporary fixation, and final positioning. As I gained confidence with the snap-off pins, my OR time went down and position, final construct, and satisfaction went up. I believe Snap-Off Compression FT pin fixation helps further achieve my goals of MTP fusion with the MaxForce plate. A few of the advantages I have seen from using the snap-off pins include:

- Setting position – the wires for the pins allow for temporary fixation to final fixation all in one step. I temporarily fixate to set my position and then exchange to set compression and position.
- Setting compression – the snap-off pins provide significant compression.[10] Once you feel the bite as it advances, it changes your mind on small joint fixation.
- Smaller footprint across fusion site – the snap-off pins allow more bone-to-bone apposition and optimal initial position/compression fixation. It also allows you to avoid additional hardware in the fusion site due to implant size.

Arthrex Bunionectomy

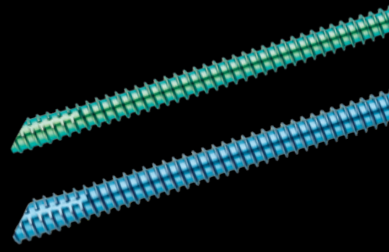
Minimally Invasive Bunion Correction

A Complete MIS Instrumentation System for Guided Trajectory and Fixation



MIS Trajectory Guide

Targeted precision for dialed-in K-wire placement

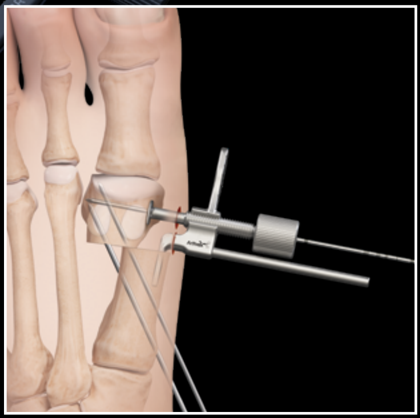


3.5 mm

4.0 mm

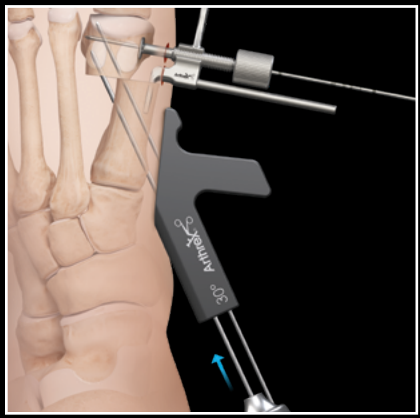
Beveled FT Screws

Increased cannulation allows for larger guidewires and reduced cortical skiving



Shifting Device

Use with the trajectory guide or alone to shift and maintain rotational correction



MIS Parallel Guide

Ergonomically designed for simple, accurate placement of secondary K-wires or complete construct

Resources and Procedure Information for Patients at BunionPain.com

Arthrex®

What's in My Bag?

TightRope® Implant, *Internal*Brace™ Ligament Augmentation Repair, and the Syndesmosis

Spencer J. Monaco, DPM

Can you describe the evolution of syndesmotic treatments and what sets the Arthrex TightRope implant apart from other syndesmotic fixation devices?
The syndesmotic complex is a complicated fibrous joint that requires heightened awareness in ankle fracture management and certainly with subtle injuries without concomitant fractures. My treatment algorithm has shifted away from rigid fixation to flexible fixation for the majority of the injuries I treat. We know this joint has motion and I prefer to limit the number of surgeries that are needed (ie, planned hardware removal). My goal is to anatomically restore the syndesmotic complex with strong flexible TightRope implant fixation and augment the AITFL when instability persists. The TightRope implant has a competitive advantage due to the increased strength, ease of use, and not requiring an additional incision on the medial tibia.[7] The anatomic distal fibular plates allow for multiple points of distal locking fixation, low-profile acceptance of the TightRope button, and accessory holes for temporary fixation and SutureTape *Internal*Brace ligament augmentation for the AITFL.

How has the TightRope implant changed your practice?
The complexity of the syndesmosis and its function has always intrigued me. Since this joint has motion in all 3 planes and rotates about its axis, it makes most logical sense to me that flexible fixation is superior to rigid fixation. The benefits of the TightRope device are that it allows for anatomic alignment, stable fixation, and early rehabilitation of the ankle joint.[7,9] Coupling the syndesmotic ligament repair by addressing the interosseous ligament and AITFL has significantly enhanced my confidence in the strength of my repair, which in turn has resulted in earlier return to normal activity and sports in particular.

What do you think is often overlooked when treating the syndesmosis?
By far, the anterior aspect of the syndesmosis and the AITFL. Stabilizing the anterior aspect of the syndesmosis is an extremely important step in complete stability. If any residual instability remains, I prefer to augment my TightRope construct by stabilizing the anterior aspect of the syndesmosis with an *Internal*Brace ligament augmentation repair. This subtle instability can be commonly overlooked by focusing more on the intraoperative fluoroscopic 2D images rather than direct visualization while performing a dorsiflexion and external rotation stress test.

For you, what is the most important component when choosing an implant system for your patients?
My preference is to have a “toolbox” with various options to address the syndesmotic ligaments individually rather than as one complex, as well as having various plating options to address the osseous components. Each injury pattern is unique and may require a different fixation construct depending on the fracture pattern, mechanism of injury, amount of syndesmotic disruption, etc. Arthrex has a comprehensive portfolio that allows me to address any injury pattern commonly seen with ankle fractures.

Where do you think the future of syndesmotic treatments is headed?
I believe we will continue to move away from rigid fixation and appreciate the syndesmosis for being a dynamic joint. Having experience in both rigid and flexible fixation, there is no doubt a distinction in how patients subjectively describe their range of motion. Patients with a screw fixation generally describe incomplete satisfaction with their motion and the feeling of having a vice around the ankle. Prior to using more dynamic fixation, I generally removed my syndesmotic screws around 3 to 4 months following the index procedure, at which point patients would immediately say their ankle joint ROM felt more normal and they had less pain. This reinforced my belief about the benefits of flexible fixation and addressing the syndesmosis ligaments individually with both the interosseous ligament and the AITFL.

Advancing Bunion Care

Why MIS Bunionectomy Is Replacing Lapidus

Ryan B. Rigby, DPM

The Lapidus procedure was my go-to solution for bunion correction. Through years of dedicated practice, I refined the technique to achieve consistent results with excellent outcomes, and was confidently able to address even the most challenging of cases.

As I found my stride with Lapidus, the popularity of MIS bunion surgery was on the rise. My friends, colleagues, and even patients were proudly sharing their x-rays and impressive outcomes. Despite the outcomes, I was unconvinced. Several unanswered questions lingered—it looks unstable, there is no bone-to-bone contact, will the head elevate, is this supported by literature, what will patients think of the x-rays, is it a medicolegal risk?

I continued to rely on the Lapdius procedure, appreciating its reliability in achieving stability. However, MIS Bunionectomy was giving me pause. The prospect of reduced pain and swelling, smaller scars, and better preservation of motion was compelling, especially when paired with higher patient satisfaction.[11,12]

CHAPTER **27**

Intraosseous Torsion of the First Metatarsal: Assessment of Prevalence Using Weightbearing Computed Tomography

Allison McNamara, DPM
Michael Burns, DPM
Jill Waalen, MD, MPH
Kent Feldman, DPM

INTRODUCTION

Bunion deformities are one of the more common complaints when a patient presents to a podiatric office. The standard for evaluating these deformities for many decades has been standard radiographs. Typically, when planning for surgery, a podiatrist or orthopedic surgeon will utilize measurements such as the intermetatarsal angle (IMA), hallux abductus angle (HAA), metatarsus adductus angle (MAA), Seiberg's index, tibial sesamoid position (TSP), as well as a variety of others. One plane that is exceedingly difficult to evaluate on standard radiographs is deformity in the frontal plane. This frontal plane deformity has drawn a great deal of attention recently, with efforts being made to develop surgical systems to correct this. With the advent of the weight-bearing computed tomography (CT) scanner, more and more practitioners are able to evaluate the frontal plane deformity right in their office, with the benefit of a fully-loaded foot. With this technology we have seen research evaluating the frontal plane deformity of the metatarsophalangeal joint, as well as the relationship between the head of the metatarsal, the sesamoids, and the base of the proximal phalanx. This has provided information regarding the driving force of the deformity, and in which plane we should be focusing our correction. However, starting out distally, we may of course be missing the origin of this frontal plane deformity.

The purpose of this study was to further evaluate where this frontal plane rotation was coming from, and if there was truly diaphyseal torsion or pronation of the bone itself. We hypothesized that a proportion of the population actually has frontal plane torsion within the metatarsal bone itself, or diaphyseal torsion. In order to evaluate this, we must first establish a set of reproducible reference points. We will be looking at not only the head of the metatarsal, but also the head with respect to the ground, and the rotation of the head of the first metatarsal with respect to the base of the first metatarsal and more proximal structures.

MATERIALS AND METHODS

We reviewed preoperative weightbearing CT images of 150 adult feet using a PedCAT weightbearing CT machine. This included data from patients from January 2016 to January 2018. Other inclusion criteria were the availability of fully weightbearing CT images, and views that included the entire foot. Patient images were excluded if they met any of the following criteria: history of surgical intervention to the first ray; hardware that distorted CT views; fracture or other injury that distorted landmarks required for analysis; or nonweight-bearing images. We then utilized CubeView CurveBeam version 3.2.1.0 software to complete evaluation of the following reference points: 1) Position of cristae compared to the base of the first metatarsal; 2) Position of crista relative to the second metatarsal; 3) Position of the cristae relative to the ground; 4) Position of the navicular relative to the cristae; and 5) Position of the first cuneiform relative to the cristae. The intermetatarsal angle was also established.

In order to evaluate these areas of interest, criteria for measuring these reference points had to first be established. Criteria for the intermetatarsal angle is shown in Figure 1; the position of the base of the first metatarsal is shown in Figure 2; position of the second metatarsal is shown in Figure 3; position of the navicular is shown in Figure 4; position of the first cuneiform is shown in Figure 5; and the position of the cristae relative to the ground is shown in Figure 6.

The above-mentioned landmarks and positions were then superimposed onto the frontal view of the cristae of the first metatarsal, which allowed us to measure the angles of the above markers to the cristae of the first metatarsal head, which for our purposes represents the position of the first metatarsal head. The above markers were also run against the position of the ground. These superimposed markings can be visualized in Figure 6. Once these data were obtained, a trained biomedical statistician, JW, ran

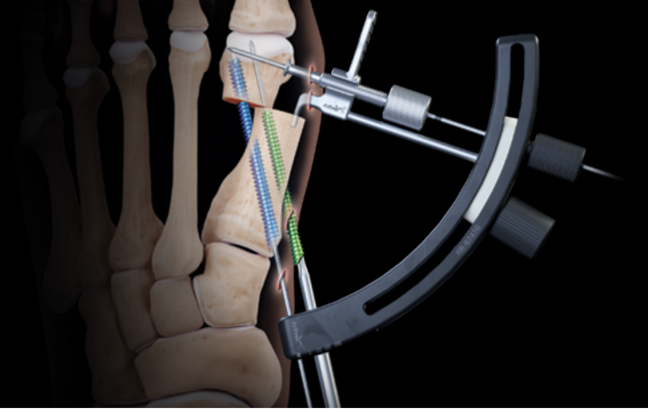
Despite these factors, I continued with Lapidus, as it enabled me to correct the deformity at the COR and achieve frontal plane correction.

It wasn't until a read an article by McNamara et al entitled "Intraosseous Torsion of the First Metatarsal: Assessment of Prevalence Using Weightbearing Computed Tomography" that it finally clicked. The data was compelling—the frontal plane deformity was not at the 1st TMT joint, but rather a result of torsion of the metatarsal itself. Critically reflecting on my own experience, I concluded that to be true—I had never seen a 1st TMT appear malrotated during the Lapidus correction and fusion.

With the realization that the best way to correct frontal plane deformity was through unraveling it from the bone itself, rather than at the joint, I was left beginning to explore MIS bunion metatarsal osteotomy.

Committing to the MIS Bunionectomy was a deliberate process. I began by attending courses, then refined my skills in the cadaver lab. Collaborating with experienced colleagues taught me key pearls and when I applied them in the OR, the results spoke for themselves

Two years after adopting MIS Bunionectomy, I have not done a single Lapidus—concluding MIS Bunionectomy isn't just an alternative technique, but a superior one for the right patient. What I know now is that the osteotomy is stable, it doesn't need bone-to-bone contact, and it still heals. The medial shelf reabsorbs over time. X-rays are still unusual, but patients feet are corrected and cosmetically appealing. Any deformity can be corrected, which is quickly making MIS Bunionectomy standard for my practice.



Advancing Bunion Care

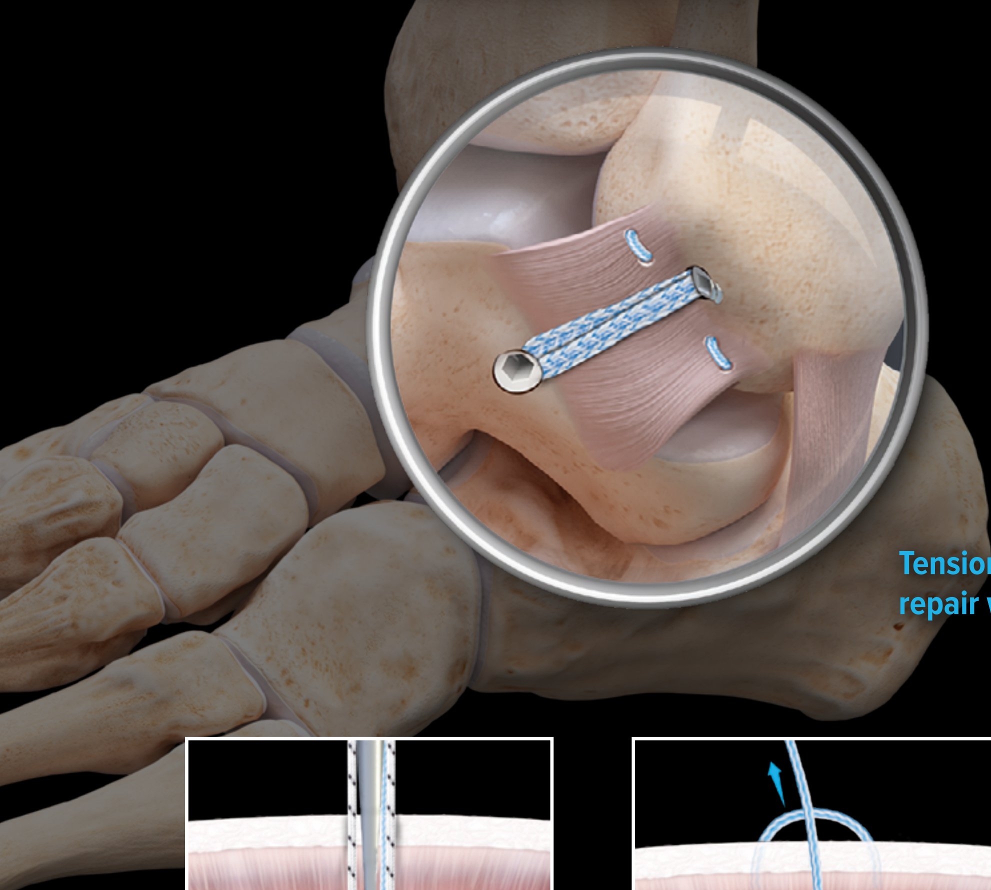
Why MIS Bunionectomy Is Replacing Lapidus (Cont.)

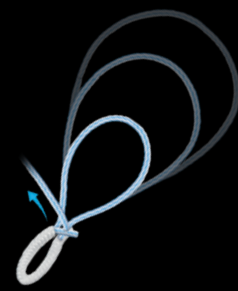
The Lapidus **(a)** and MIS Bunionectomy Procedures **(b)** are entirely different.

Lapidus (a)	**MIS Bunionectomy (b)**
3-6 weeks to weight-bearing	Immediate weight-bearing
6-12 weeks to regular shoes	2-4 weeks to regular shoes
Large extensile incision	3 poke-hole incisions
Frontal plane correction not at the CORA	Frontal plane correction at the CORA
Higher chance of nonunion and incision healing issues	Low incidence of nonunion and incision healing
Unaddressed intercuneiform instability may result in recurrence	Reduced incidences of intercuneiform instability with 1st TMT/midfoot lockout
Decrease ROM from capsule scarring and extended immobilization	Joint mobility preserved with no capsule interruption and quick return to ambulation
Higher incidences of plate removal due to soft-tissue irritation	Two beveled screws rarely require removal
Dissection, joint prep, correction, fixation, layered closure = longer OR time	Osteotomy, correction, fixation, skin closure = shorter OR time

Tensionable and Knotless

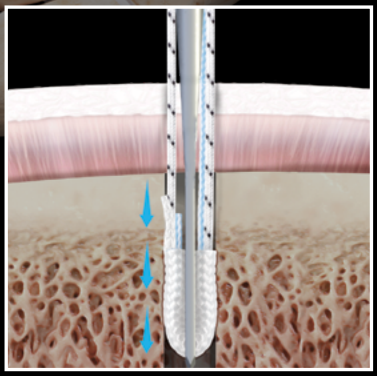
Feel the difference with no-profile DX Knotless FiberTak® anchors and the Knotless *Internal*Brace™ technique



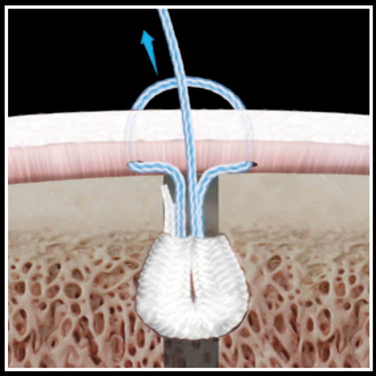


1.8 mm drill hole

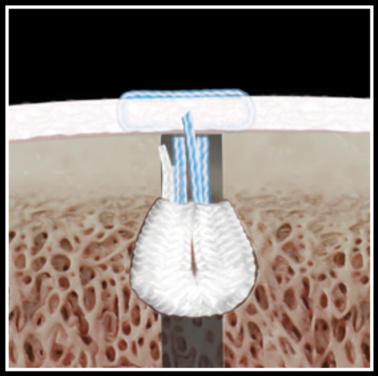
Tensionable, knotless soft-anchor ligament repair with the *Internal*Brace technique



Pass it...



Cinch it...



Cut it.

Celebrating 10+ years of the *Internal*Brace ligament augmentation procedure

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.

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Extremities and Trauma Medical Education

Course Schedule

Upcoming Medical Education Events

Date	Course Name	Location
2025		
May 5	Getting It Right: Novel Approaches to Hindfoot Surgery	Naples, FL
June 6	Foot and Ankle Surgeons (DPM) Symposium	Naples, FL
June 13	Western Foot and Ankle Minimally Invasive Surgery Course	Englewood, CO
July 14	Foot and Ankle MIS Course	Naples, FL
July 31	Western Foot and Ankle MIS Course	Englewood, CO
September 5	Solutions: Addressing Challenges for Foot and Ankle Surgeons (DPM)	Naples, FL
September 22	Foot and Ankle Minimally Invasive Surgery Course	Naples, FL
October 17	Foot and Ankle Minimally Invasive Surgery Course	Naples, FL
November 17	Foot and Ankle Minimally Invasive Surgery Course	Naples, FL
December 12	Women in Foot and Ankle Surgery	Naples, FL
2026		
January 9	East Coast Foot and Ankle Summit	Naples, FL
January 23	Western Foot and Ankle Minimally Invasive Surgery Course	Englewood, CO
February 9	Foot and Ankle Minimally Invasive Surgery Course	Naples, FL
March 9	Foot and Ankle Minimally Invasive Surgery Course	Naples, FL

2023 Sports Medicine Fellowship Forum

2023 Foot and Ankle MIS Course

Notes

Notes

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