Arthrex #1 in the Minds of Foot & Ankle Surgeons!

Does innovation change everything? We believe that it does. In 2005, Arthrex launched the Ankle TightRope® for syndesmosis repair of the ankle. At the time, both foot and ankle, and trauma surgeons scratched heads and responded to the product launch with comments like, “two metal screws work fine” or “this device won’t add value for the surgeon or patient because current treatment methods [screws] work great.” In 2015, the reaction to the TightRope product is much different. The device is now recognized as the new “gold standard” for syndesmosis fixation, offering ease for the surgeon. In fact, in May of this year, the Journal of Orthopaedic Trauma published a scientific paper that demonstrates how the Ankle TightRope is superior to screw fixation**.

At this year’s upcoming AOFAS meeting in Long Beach, come to the Arthrex exhibit and see how listening to our customers has produced other innovative devices to help you, the surgeon, treat your patients better. This is the mission. Whether it’s the InternalBrace™ Ligament Augmentation Repair for lateral ankle ligament repair, the Deltoid Reconstruction kit for chronic Deltoid insufficiency or the newest profile Ankle Fusion plates available today, Arthrex continues to focus on innovation and providing better solutions to the foot and ankle problems you treat. We are driven to support you. Come see all the things we are working on. Does innovation change everything? You bet it does! Spend some time with us. See you in Long Beach!

Pete Denove
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PIP Dart

The new Arthrex® PIP Dart for proximal interphalangeal joint fusions offers the surgeon the advantage of exact sizing PIPJ implants every time, without leaving material across the Distal Interphalangeal Joint (DIPJ). The PIP Dart is made out of PEEK (Polyetheretherketone) material which is strong but radiolucent and can be easily cut or drilled through. This unique implant gives the surgeon the ability to fuse the PIP joint without leaving metal or bioabsorbable material in the toe. The barbs hold compression and the ridges of the Dart prevent rotation.

See page 29 for more details

BioSync® – Reconstruction Wedge

Innovative Porous Titanium Wedge indicated for fusions and osteotomies of the foot. BioSync reconstructive wedges provide an alternative to allograft/autograft bone most commonly for Evans and Cotton procedures. The wedges consist of BioSync, a three-dimensional open-celled titanium scaffold for bone and tissue ingrowth. This osteoconductive environment is designed to enhance the potential for bone integration and attempt to minimize loss of correction.

"Arthrex has the only anatomic cotton wedge on the market. In addition, the Evans wedge innovation is utilizing screw fixation through the wedge for added stability and rotational control."

Kent Ellington, MD (OrthoCarolina)

See page 28 for more details

* Bio-Sync is a registered trademark owned by SMED-TA/TD, LLC

This is not medical advice and Arthrex recommends that surgeons be trained in the use of any particular product before using it in surgery. A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. A surgeon must always refer to the package insert, product label and/or instructions for use before using any Arthrex product. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your Arthrex representative if you have questions about availability of products in your area. The views expressed in this brochure reflect the experience and opinions of the presenting surgeons and do not necessarily reflect those of Arthrex, Inc.
High ankle sprains are increasing in prevalence amongst athletes. Classically, high ankle sprains have been treated with rest, immobilization and functional rehabilitation. Often these injuries take athletes several weeks to return to play, resulting in significant missed in-season time. Subtle syndesmosis instability can be difficult to diagnosis and can result in significant morbidity for these athletes.

Case 1 – College Quarterback

22-year-old college Quarterback sustained a right ankle injury during a game. He was tackled and dragged to the ground from behind. He twisted to the ground around a planted foot, with the leg externally rotating around the planted foot before it gave way. He was unable to be ambulated off the field on his own power. He had immediate swelling and was diagnosed with a high ankle sprain on the sidelines. On exam, he had a positive midshaft fibular squeeze test, pain greater than 5 cm above the ankle joint line, swelling over the syndesmosis and medial deltoid tenderness. Initial weightbearing X-rays the following day did not show any significant widening. There was concern for instability so an MRI was ordered (Figure 1). The MRI confirmed tears to the Anterior Inferior Tibiofibular Ligament (AITFL), interosseous membrane, and a portion of the Posterior Inferior Tibiofibular Ligament (PITFL).

I recommended examination under anesthesia, stress fluoroscopy, ankle arthroscopy, and syndesmosis repair with TightRope fixation. Stress fluoroscopy with the patient under anesthesia revealed syndesmosis instability with widening of the medial clear space and loss of normal tib-fib overlap. Ankle arthroscopy was performed which confirmed the syndesmosis instability. The joint was debrided, including the torn interosseous membrane, which was flipped into the joint. A small incision was made over the fibula, extending from the near tibio-talar joint line proximally about 3 cm. A periarticular clamp was used to reduce the syndesmosis with the ankle held in neutral or slight dorsiflexion. The ankle was externally stressed with the clamp in place to ensure stability of the syndesmosis. Two TightRopes were then placed, using a one centimeter bone bridge between the drill holes. The TightRopes were then diverged in an attempt to increase stability.

Postoperatively, the patient was splinted for four days to help control swelling. The splint was removed, and he was transitioned to a boot and weightbearing was initiated. Physical therapy was also utilized to begin range of motion exercises, swelling control modalities and strength maintenance. He was transitioned out of the boot on POD 8. Flat surface exercises were initiated and progressed as tolerated. Swelling and discomfort were used to dictate pace of progression. He was allowed to begin full running at POD 12, cutting at POD 15, and returned to play in a college football game POD 21.
Published May 2015

A prospective randomized multicenter trial comparing a static implant and a dynamic implant (TightRope) in the surgical treatment of ankle syndesmosis rupture.

<table>
<thead>
<tr>
<th>Screws (36 patients)</th>
<th>TightRope (34 patients)</th>
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<tbody>
<tr>
<td>Implant failure 37%</td>
<td>Implant failure 0%</td>
</tr>
<tr>
<td>Loss of reduction 12%</td>
<td>Loss of reduction 0%</td>
</tr>
<tr>
<td>Lower plantar range of motion</td>
<td>Higher plantar range of motion</td>
</tr>
<tr>
<td>Lower AOFAS scores</td>
<td>Higher AOFAS scores</td>
</tr>
<tr>
<td>Slower return to previous activity</td>
<td>Quicker return to previous activity</td>
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CONCLUSION:
"TightRope gives better clinical and radiographic outcomes without breakage, loss of reduction or reoperation."

SUMMARY:
This prospective randomized control trial of TightRope versus screws has been published in the May 2015 Journal of Orthopaedic Trauma. It is a double blinded (patient and evaluator) multicenter trial comparing TightRope versus screws for syndesmotic ruptures. Syndesmosis TightRope outperformed screws clinically with 0% failure, 0% loss of reduction and higher AOFAS scores.

Minimally invasive Achilles tendon repair continues to gain in popularity amongst foot and ankle surgeons. There is a decreased risk of wound complications and repair strength can be equivalent to a formal open procedure. Several recent clinical studies demonstrate improved patient outcomes with minimally invasive repair in both recreational and professional athletes. The PARS Achilles Repair System provides a reproducible, cost efficient technique for minimally invasive Achilles tendon repair.

Case 1

An 18-year-old female high school basketball player presented with an acute Achilles tendon rupture diagnosed by history, physical examination, (Thompson’s test, loss of resting tone and a palpable gap 5 cm proximal to the calcaneal insertion) as well as an MRI (Figure 1). She elected to proceed with surgery because of her high level of athletic activity. A 2 cm incision was made over the tendon defect. The proximal edge was secured with an Allis clamp and the PARS jig was introduced into the paratenon and advanced proximally. The contour of the jig matches the anatomy of the tendon to facilitate passage. The sutures were sequentially passed (see Figure 2) and the jig was removed.

Each suture was tested independently to ensure passage through the Achilles tendon. The locked suture was created using the two looped sutures. The PARS jig was then placed distally and the same technique was used to secure the distal tendon. The foot was placed into maximal plantar flexion and the sutures were tied from outside to inside. Appropriate resting tone was restored to the tendon (Figures 3 & 4).

Postoperatively, the patient was placed into a plantar flexion splint for two weeks. She was transitioned to a boot with heel lifts at two weeks with initiation of weight bearing. Sutures were removed at four weeks with gradual peeling of heel lifts over a two week period. The boot was weaned at six weeks with initiation of strengthening and physical therapy. She returned to basketball at six months.
Case 2
A 50-year-old male, an avid tennis player and runner (20-30 miles per week) ruptured his Achilles seven months ago. It was misdiagnosed as an ankle sprain by his primary care physician.

Thompson’s test reveals Achilles rupture with palpable defect in the midsubstance area and unable to perform single-limb heel rise or hop on the affected leg.

Imaging: MRI shows an 8 cm Achilles rupture with retraction and scarring (Fig 1).

Surgical Plan: Achilles repair with the Achilles Midsubstance SpeedBridge™, gastrocnemius recession to obtain length and FHL tendon transfer to augment power.

Step 1: Posterior medial calf incision was made and a gastrocnemius recession was performed, being careful to protect the sural nerve.

Step 2: The PARS jig was placed proximally and the sutures were passed and locked according to the standard protocol.

Step 3: The FHL was safely transected and FiberLoop® grasping suture was placed. The FHL measured 6 mm in width. A Guidewire was placed into the calcaneus and passed out the bottom of the foot. A Cannulated Drill was then passed over the guidewire and drilled to a depth of 25 mm.

Step 4: The FHL was then pulled through the bone tunnel and a 6.25 mm BioComposite™ Tenodesis screw™ was placed.

Step 5: Two small vertical incisions were made over the medial and lateral Achilles insertion and then drilled and tapped.

Step 6: A Banana SutureLasso® was placed into the distal small incision and passed up through the distal Achilles segment into the rupture site.

Step 7: The ankle was plantar flexed and the proximal segment was pulled distally until the two native segments were in apposition. A 4.75 x 15 mm Swivelock® was placed in the medial and lateral distal anchor sites.

Step 8: Layered closure was completed without tension. Patient was then splinted in plantar flexion for two weeks, then transitioned to a boot with two heel wedges and physical therapy was initiated. Weight bearing was allowed at three weeks postoperatively in the boot with wedges. Layer wedges were peeled weekly.
Q. Screws have been considered the gold standard for ankle arthritis. Recent literature indicates plating constructs increase construct rigidity and reduce micromotion of the ankle joint which in turn, decreases nonunion rates. Can you define your patient selection when using the Arthrex® Ankle Fusion Plating System?

Dr. Coetzee: Even though simple screws are good for some ankle fusions there are situations where a plate is the best option. The most common scenarios include failure of a previous ankle fusion done with screws, removal of a failed ankle replacement and bone graft, fusion in the face of partial AVN and situations with large cystic lesions in the tibia or talus.

Further good options include ankle fusions in Rheumatoid patients or any situation of compromised bone quality, where a major corrective osteotomy is required and in obese people or other situations were non-weightbearing post-op is difficult to maintain. My personal indications are below.

**Screws**

1. Arthroscopic fusion
2. Straight forward primary fusion
   a. No comorbidities
   b. BMI < 33
3. Minimal/moderate deformity correction
4. No AVN or other bone loss

**Anterior plate**

1. Revision of a failed fusion with screws
2. Seriously consider a plate with BMI > 33
3. No choice with BMI > 40
4. Any varus or valgus pre-op of > 20 degrees
5. Previous partial AVN of the talus
6. Conversion of a failed TAA to fusion
7. Comorbidities including IDDM and difficulty limiting weight bearing
8. Primary fusion of severely comminuted distal pilon fracture

As a rule, the subtalar joint should be normal using the anterior plate. It is possible to use the anterior plate for a TTC fusion, but it will need the longest screws to cross the STJ. It is also recommended to use 6.5 mm Cannulated screws across the STJ as well.

Dr. Vora: In the past, I would reserve plating for patients with increased BMI, smoking, diabetes, systemic or localized osteopenia, AVN, bone loss, revision procedures, or noncompliant patients. In this difficult patient population we were able to achieve a high degree of successful union using plating techniques, perhaps even higher than in the low risk patients that were treated with screws alone. For this reason, I now prefer plating for any open procedure, even in low risk patients. The exposure and dissection is not dramatically different and there is no identifiable downside.

Q. As the volume of Ankle Arthroplasty procedures increases, what benefits can these plates provide to your patients?

Dr. Coetzee: With the aging of the baby-boomers, the incidence of symptomatic ankle arthritis is on the rise. Some patients opt for replacement which works well, but like any joint replacement it will eventually fail. The conversion of a failed ankle replacement to a fusion is more complex than a simple fusion, and a well-designed, anatomic and strong plating system will go a long way in making the reconstruction more predictable and reproducible.

Dr. Vora: Managing the complications of failed ankle arthroplasty can be incredibly difficult. As advantageous as arthroplasty has become for some patients, failure still occurs and successful conversion to fusion demands constructs that can address the associated bone loss. The Arthrex ankle fusion plates are designed to address these issues by allowing for optimal fixation in the proximal and distal segments to optimize construct rigidity.

Q. We often hear “Screws for my fusions all do fine.” Knowing the clinical value, what would be your response to those conversations?

Dr. Coetzee: I know from my own practice they do not all do well. The nonunion rate for simple primary ankle fusions is about 10%, and it is substantially higher for complex fusions. The goal is to try to figure out which patients will be best off starting with a plate fixation and hopefully avoid secondary surgeries.

The reality is that once you get used to the superior stability afforded by the plate construct, it becomes much more appealing to use for any more complex ankle.

Dr. Vora: Many patients with minimal risk factors or deformity may be candidates for ankle arthroplasty. By default, this leaves us with a much more difficult patient population in whom we consider ankle fusion. A patient who suffers a painful nonunion of an ankle fusion is one of the most disappointed patients in our practice. Plating does not add much additional dissection or morbidity and seems to minimize the risk of nonunion. An analogy could be drawn to that of plating constructs for 1st MTP fusion.

Screws alone have traditionally done reasonably well in achieving union, however plating constructs have demonstrated higher rates of union and improved construct rigidity. These same principles seem to apply for ankle arthrodesis.
Q. Why do you prefer the Arthrex® Ankle Fusion Plating System to other vendor systems that are available?

Dr. Coetzee: The anatomic design is superior and very simple to use. There are different compression modes through the plate but also adequate ability for locking screws. With the four divergent screws in the talus the fixation is excellent. The set also comes with a full set of instruments for joint preparation.

Dr. Vora: The main advantages that make the Arthrex fusion system are as follows:

1) Provides the most options for obtaining compression of the arthrodesis site. This can be achieved by use of the the compressor distractor, external lag screw fixation, oblong plate compression hole and/or the anatomic compression hole and thus allowing for any combination of individual or additive points of compression.

2) Provides the most points of fixation in the distal bone segment of any plating system available in all plate constructs. This was a critical element considered by the engineers and was accomplished by creating anatomic side specific plates and/or recognizing the salient anatomical bony considerations to optimize screw fixation where most critical.

3) The plate designs are contoured to allow for appropriate rigidity where necessary yet still able to be contoured so as not to force malposition of the fusion site to the plate. In simple terms, the plates are appropriately rigid but still can be contoured to the fusion site rather than the fusion position being dictated by the rigidity of the plate which may result in malunion. The plates are also nicely contoured to prevent soft tissue irritation where critical.

4) The anatomic compression lag screw is a large, 5.5 hybrid type screw that allows for robust lag fixation directly through the plate and the technique ensures screw placement in optimal location for bone purchase while avoiding the other screws in the construct.

5) The system is all inclusive with all necessary retractors and instruments to allow for successful joint preparation with ease.

Q. Can you describe a positive experience you had with using the Ankle Fusion Plating System for your patients?

Dr. Coetzee: My first experience with the plating system was to salvage ankle fusion nonunions. One was especially complicated because of a BMI of 58 in a very deconditioned individual.

She developed a painful nonunion with large lytic areas around the screws due to movement.

By ten weeks she was out of the boot and back on an exercise schedule.

The 11/11/14 X-ray shows everything well aligned at six weeks, but still large open areas where the screws created a "windshield-wiper" bone loss effect.

By 1/27/15 bone healing is near complete and she was completely pain free.

Q. Please offer any technique pearls you have learned and can pass along.

Dr. Coetzee: Most long-standing ankle DJD will have bone loss on the talar neck and large osteophytes on the distal tibia. The original contour should be restored to allow the plate to sit flush on the ankle. Before any permanent fixation is placed, a lateral X-ray should be done to ensure that the talus is in the correct position under the tibia.

Once you confirm it is in the correct position in all planes, a temporary K-wire can be place across the joint to keep the reduction while the plate is positioned.

Dr. Vora: For lateral tibiotalar and tibiotalocalcaneal arthrodesis, it is usually necessary to resect the lateral flare of the distal tibia to allow the plate to rest properly on bone. Prior to plate fixation, external lag screw fixation is performed on the ankle and subtalar joints. Plate fixation is then performed in the talus initially. Individual joint compression through the plate is then performed using the oblong compression hole in the tibia (TT and TTC arthrodesis) and calcaneus (TTC arthrodesis) allowing for directional individual joint compression of the ankle and subtalar joints. The anatomic compression hole is then utilized for final step in compression of the tibiotalar joint and this screw can be extended to lag the subtalar joint as well for a TTC fusion.
Current treatment options for advanced hindfoot arthritis include lateral, posterior, TTC fusion plates and hindfoot fusion nails. In patients with significant deformity, TTC fusion plates can reliably assist in achieving anatomic alignment with compression across both the ankle and subtalar joints. The Arthrex® lateral TTC fusion plate is a rigid, anatomic plate that aids in deformity correction with multiple locking, nonlocking and compression options to achieve excellent fixation.

Case 1
T.T. is a 60-year-old male who sustained what he thought was a severe ankle “sprain” one year prior to his presentation in my office. His family urged him to seek medical attention due to significant swelling and pain but he did not. He noticed a gradual collapse of the ankle with progressive discomfort and difficulty ambulating. On physical examination, he had significant right ankle valgus with limited, painful range of motion of both the ankle and subtalar joints. The patient’s clinical picture, X-ray and CT scan are shown in figures 1-3. Because of his progressive pain and deformity, the patient elected to proceed with surgery.

The patient was placed into the supine position. A lateral approach to the ankle was utilized and the fibula was osteotomized 7 cm above the ankle joint. An acetabular reamer was used to morselize the fibula for use as bone graft. The ankle and subtalar joints were prepared in standard fashion. The valgus deformity was then corrected with a lateral to medial applied force and the anatomic lateral TTC fusion plate was provisionally fixed to the tibia and calcaneus with BB-Taks™. Lateral c-arm views confirmed excellent fixation options in the talus, tibia and calcaneus. Two screws were placed into the talus, followed by the compression screw in the tibia. Multiple nonlocking screws in the tibia provided additional fixation. Lastly, the calcaneal compression screw was placed along with an additional nonlocking screw.

For additional compression, a “home run” screw was placed from the calcaneus to the tibia. Postoperatively, the patient was strict non weight bearing for six weeks. He then transitioned to a boot for an additional six weeks and was back to a shoe by three months. Follow up clinical and radiographic X-rays are shown in figures 4 and 5.
CASE REVIEW

Double Compression Plates
Treatment Considerations for Acute Midfoot Lisfranc Injuries: Bridge Plateing and Primary Arthrodesis Techniques

Post-traumatic arthritis following a Lisfranc complex injury is a common occurrence. Although the injury itself predisposes to this complication, popular fixation modes using transarticular screw stabilization result in iatrogenic damage to the joint and results in another possible mechanism of post-traumatic DJD. This complication often results in the need for tarsal metatarsal joint fusion as the definitive treatment.

This case involved a 32-year-old male status post motocross injury. Three years earlier he was treated with an ORIF of his Lisfranc injury using transarticular screws. Patient has continued to have pain. Radiographs suggested, and CT scan confirmed post-traumatic degenerative changes.

Treatment consisted of hardware removal and fusion of the 1st, 2nd, and 3rd TMT articulations. Fusion preparation consisted of meticulous joint preparation along with the addition of StimuBlast® DBM mixed with bone marrow concentrate with the Arthrex Angel® system. Fixation was obtained using three Arthrex® Double Compression Plates with the addition of an LPS 4.0 partially threaded Cannulated screw.

The Arthrex® Double Compression Plate system is a revolutionary fixation construct that allows maximal surgical compression across fusion sites. The hallmark of this design is the improved compression achieved using the double compression mechanism. Initial compression is achieved using standard compression hole principles. Additional secondary compression is achieved through the bridge “arms” of the plate construct. This double compression mechanism allows the surgeon maximal compression potential with direct visual and tactile controlled feedback.

The low profile design allows decreased risk of irritation in areas with little soft tissue coverage such as the dorsum of the foot. Once the locking screw is placed flush to the bone, the nonlocking screw will provide not only initial compression, but will mold the plate flush over the osseous bed.

The fixation system’s simplicity, ease-of-use and multiple plate configurations allow these plates to be used for talonavicular, calcaneocuboid, transverse tarsometatarsal, forefoot, and hindfoot arthrodesis sites.

The improved overall compression achieved with the double compression mechanism allows for the maximal potential for bone-to-bone opposition, which is known to be the most critical factor in overall construct stability. Clinically, this can translate to improved fusion rates for simple and complex arthrodesis throughout the foot and ankle.

Mark Campbell, MD
Core Orthopaedics
Sun City, AZ

Pre-op oblique demonstrating transarticular fixation with degenerative changes 1, 2, 3 TMT joints.

Pre-op lateral

Joints prepared and StimuBlast®/Angel® bone marrow concentrate mixed

Intra-op showing anatomic, low profile compression plate application.

* Stimublast is a registered trademark of AlloSource. Angel is a registered trademark of Cytomedix Acquisition Company LLC.
Q. Please explain your Algorithm for stage IIa and IIb flexible flatfoot correction?

Dr. Curry: I assess the amount of hindfoot valgus, Meary’s angle (MA – arch collapse) and any evidence for plantar opening (sag) of the naviculo-cuneiform and the 1st TMT joints on the lateral radiograph. The AP radiograph shows the amount of talonavicular uncoverage (TNU-forefoot abduction). A medializing calcaneal osteotomy is done in most cases. If the TNU is less than 40% and MA less than 20°, a spring ligament reconstruction with InternalBrace™ augmentation is performed. The posterior tibial tendon pathology is addressed with debridement or resection of an FDL to navicular tendon transfer. The 1st NC and/or 1st TMT joints are used if there is evidence of instability. In cases where the TNU is greater than 40% and MA is greater than 20°, a lateral column lengthening is added (Evans osteotomy or calcaneo-cuboid distraction arthrodesis in cases of advanced calcaneo-cuboid DJD). I now rarely perform an Evans osteotomy without first addressing the medial side of the foot. A gastrocnemius recession is added if the ankle cannot be dorsiflexed to 15° after the correction is completed. Finally, a Cotton osteotomy is added if there is residual forefoot varus.

Dr. Ellington: I begin with a careful clinical and radiographic evaluation. The clinical exam depends on both the flexibility of the foot with the patient seated, and also their standing alignment, observed from the front and also behind the patient. I obtain the following radiographs: 3 view weightbearing foot, AP ankle, and axial heel views.

Once it is determined that the patient has a flexible deformity and meets indication for reconstruction, and has also failed conservative treatment, surgical planning is discussed along with patient expectations and length of recovery.

For a stage 2A deformity, I correct all patients with a medial displacement calcaneal ostectomy and FDL tendon transfer through a bone tunnel in the navicular. Before I perform these steps, I will assess the call tightness and perform a gastrocnemius recession or TAL as required. Commonly, I excise the degenerative PTT as it can be a pain generator. Rarely, if the PTT appears healthy and has good excursion, I will leave it and after FDL transfer to the navicular, I will also perform a side-to-side tenodesis of the two tendons.

In addition, I am now repairing the spring ligament in all cases and augmenting the repair with the InternalBrace. I believe that to at least some degree, the spring ligament is attenuated with long-standing deformity and should be addressed to restore static medial column stability.

Q. What compelled you to use the InternalBrace Ligament Augmentation to your primary spring ligament repair?

Dr. Curry: I was dissatisfied with my ability to repair or reconstruct the spring ligament, especially in cases of long-standing chronic ruptures. Suture repair alone was always inadequate, particularly with thin, degenerated tissues, and I was forced frequently to perform an Evans osteotomy. Even in relatively mild cases, InternalBrace adds a significant amount of restraint, especially to plantar collapse of the talonavicular joint, and allows the spring ligament to remodel.

Dr. Ellington: I first began to use it in stage 2B, with significant uncoverage of the talonavicular joint. I found many cases in which the spring ligament was severely torn and I felt less than confident with the strength of the primary repair. I have had extensive experience with the InternalBrace for medial and lateral ankle instability, and have seen its tremendous benefit with the ligamentous reconstructions. Thus, I translated its use over to the spring ligament. I found that I obtained better correction with the InternalBrace for spring ligament repair. I believe this may prevent recurrence postoperatively as well. Lastly, restoring static medial column support may decrease the need for lateral column lengthening.

Q. Please provide any surgical tips or pearls you have learned and can pass along?

Dr. Curry: The surgical sequence starts with the medial incision to inspect the posterior tibial tendon and the spring ligament. I will frequently use live fluoroscopy to look for 1st NC or 1st TMT joint instability. Next, the medializing calcaneal osteotomy is performed. I usually place my calcaneal sustentaculum 3.5 mm SwiveLock® with FiberTape® first. All the medial procedures (FDL transfer, fusions, spring ligament repair/reefing) are completed, and as the final step, both strands of the FiberTape are inserted into the 1st cuneiform rather than the navicular. This allows me to better control the plantar talonavicular and sag and any 1st NC joint instability. Spring ligament repair/reefing is performed with #2 FiberWire® sutures. I use a separate Bio-Tenodesis™ screw for the FDL transfer, usually a 5.5 mm. The X-plate from the CFS set and the 4.5 mm screw from the 4.5/6.7 mm set work well for the 1st NC fusion. I use the Lapidus plate (or the short locking LPS plate for small feet) for the 1st TMT fusion.
Dr. Ellington: I place a Guidewire in the sustentaculum and then check an axial heel view to confirm its position. Once in the proper position, I drill over this wire with 2.7 mm cannulated drill. I place the InternalBrace™ 3.5 mm SwiveLock® with FiberTape® into this hole and then use one limb plantarly, one limb dorsally to act like a “hammock”. I secure the InternalBrace into the navicular bone tunnel with the FDL tendon transfer using a 4.75 mm Swivelock. If a blind navicular tunnel is used, then both plantar limbs can be placed together along with the FDL tendon.

Q. It is understood that this procedure is relatively new with limited, long-term clinical follow-up. Can you comment on the outcomes and your experience with your patients you have treated? Please explain the difference between repair prior to using InternalBrace ligament augmentation and those that have InternalBrace? Are you doing less lateral column lengthening? When do you feel you still need to do LCL procedures?

Dr. Curry: Prior to the InternalBrace introduction, I performed Evans osteotomies on over 90% of my patients since I did not have a reliable way to protect my medial repair. I am now performing very few lateral column lengthenings and more InternalBrace augmentations and limited midfoot fusions, especially since the availability of the new plates in the CFS set. Evans osteotomies can result in a number of complications, including calcaneocuboid subluxation and/or arthritis, nonunion, peroneal tendon irritation or tear, sural nerve injury, overcorrection with lateral column overload, painful hardware and unexplained persistent lateral pain. I still perform them in patients with a large degree of talonavicular uncoverage, but I am also now more likely to consider a talonavicular fusion instead.

“I performed Evans osteotomies on over 90% of my patients; I am now performing very few lateral column lengthening and more InternalBrace Augmentations.”

Dr. Ellington: I have placed the InternalBrace in about 20 flatfoot reconstructions. My patients are a couple weeks ahead of schedule each time I see them back in the office postoperatively. My talonavicular uncoverage angles are much improved, along with any sag on the lateral radiograph since my adoption of its use. I have decreased my use of the lateral column lengthening in the appropriate settings.

Q. What has been your experience with FiberTape® and its performance after surgery?

Dr. Curry: I have seen some loss of correction in a few patients after the InternalBrace augmentation. In the vast majority of patients, the alignment is well maintained. I have to be careful not to overcorrect the InternalBrace to avoid overcorrection and subsequent lateral column overload.

Q. Can you discuss when you would perform a Cotton osteotomy? What products do you find useful for fixation?

Dr. Ellington: My use of the Cotton osteotomy has dramatically increased over the years. I’ve never regretted doing a Cotton osteotomy, but I have frequently regretted not doing it. I believe a Cotton osteotomy should not be reserved for only stage 2C deformity. It can be an excellent adjunct to all flatfoot corrections. I often perform it for stage 2A and 2B, even if just a small correction. I also use it in stage 3 and 4 when needed. It can turn a good X-ray and clinical outcome into a great one. It is a very nice tool to increase medial column support without having to perform a TMT or NC arthrodesis. I always use the Cotton plate, however, with the new BioSync® wedge coming in fall of 2015, I will be able to place this extremely strong and stable, bone in-growth wedge. This will expedite the procedure and provide reliable correction with ease.

Dr. Curry: I check for residual forefoot varus after the hindfoot correction is completed. If no medial fusion was performed, but the 1st metatarsal head remains higher than the 5th with the forefoot loaded to dorsiflex the ankle, I will add the Cotton osteotomy. The Arthrex® Cotton plate is typically used with tricortical allograft, such as an iliac crest wedge, but a small plate from the CFS set can be used also. The graft usually has to be modified slightly to fit the 1st cuneiform osteotomy. The new BioSync WEDGE may eliminate the need for allograft. The design of the implant will allow for fixation with a small plate or a screw placed across the WEDGE through the opening (dorsal distal to plantar proximal).
WHAT’S NEW!
Mini-Incision Brostrom utilizing Arthrex® Brostrom Repair System

Q. What is the newest operative trend in your practice for patients presenting with chronic lateral ankle instability that have failed conservative treatment?

A. Recently, I have been using the Arthrex Brostrom Repair System to perform a Mini-Incision Brostrom and it has become my procedure of choice when arthroscopy is not an essential part of the lateral ligament repair (ie. cavovarus correction) or augmentation is needed (ie. Hyperlaxity syndrome). It is also ideal for surgeons who prefer the open repair but would like to offer their patients a more “minimally invasive” approach. The Mini-Incision Brostrom uses the latest technology, already tested in other approaches, avoiding the need for large open incisions. Today it is my “go to” procedure for cases of instability when augmentation is indicated.

Q. What are the benefits of the Mini-Incision Brostrom procedure when compared to a standard open Modified Brostrom repair?

A. “The Mini-Incision Brostrom requires a much smaller incision compared to a traditional open repair, allowing me to perform the entire operation through a 1.5 cm to 2.0 cm incision. This technique has allowed me to cut down my OR time considerably (average 15 – 20 minute repair) compared with the traditional open Modified Brostrom. The Mini-Incision technique is ideal for surgeons who prefer an open repair along with a quick diagnostic arthroscopy. Additionally, it can also be used in cases where arthroscopy may not be an inherent part of the procedure, such as during a cavovarus reconstruction or ligamentous balancing of a total ankle replacement. In these instances, the Mini-Incision Brostrom is a “game changer”.

Q. What do you like about the Arthrex Brostrom Repair system?

A. The Arthrex Brostrom Repair system offers the convenience and reproducibility of a time tested system in one all-inclusive kit. The same drills, anchors, and SutureLassos which greatly facilitate and expedite my lateral ligament repairs are nicely packaged in one kit avoiding implant complexity for the OR staff. Specifically, the SutureLasso™ allows us to shuttle sutures through the capsule, ATFL and inferior extensor retinaculum in a percutaneous fashion.

Q. Are there any important surgical pearls to keep in mind for this procedure?

A. It is important to respect the “Safe Zone” which we recently reported at the AOFAS/IFFAS 2014. This zone lies between the superior peroneal tendon margin, distal fibula tip, and intermediate branch of the superficial peroneal nerve (Acevedo JI, Ortiz C, Golano P, Nery C). Also, passage of sutures at least 1.5 cm from the distal fibular tip with the foot in neutral position will allow inclusion of the inferior extensor retinaculum. Similar to the ArthroBrostrom®, the sutures can be brought out of the mini-incision subcutaneously without the need for extending the incision.

Q. With the excellent clinical performance of Arthrex’s InternalBrace™ Ligament Augmentation procedure for lateral ankle instability, is it possible to incorporate this augmentation in conjunction with the Brostrom repair through the mini incision?

A. Yes, the InternalBrace Ligament Augmentation can be performed through the same mini-incision. The Arthrex Brostrom Repair system allows us to use a cannulated drill to start the talar tunnel and follow with the standard drill and tap from the InternalBrace system. Once the 4.5 SwiveLock® anchor is inserted in the talus, the Mini-Incision Brostrom is performed with placement of the fibular 3.0 anchors and shutting of the suture limbs percutaneously. Adequate space is left between the anchors to accommodate drilling and insertion of the fibular 3.5 SwiveLock and thus securing the InternalBrace as a checkrein. At this point, the Brostrom sutures are tied with appropriate tension.

Q. What is your standard post-op protocol for your patients that present with isolated lateral ankle instability?

A. Postoperative Management

0-2 weeks: Postoperative dressing and short leg splint remain in place. No weightbearing is allowed. Sutures are removed at 10-14 days.

2-4 weeks: Patients allowed weightbearing as tolerated in a bootwalker or brace. Gentle range of motion exercises avoiding inversion.

4-6 weeks: Transition to a lace-up style gauntlet ankle brace and the patient is progressed to full weightbearing. Dorsiflexion/plantarflexion exercises are continued. Formal physical therapy is initiated (if not already initiated) emphasizing peroneal muscle strengthening.

6+ weeks: The ankle brace is continued up to 12 weeks and thereafter used for any sports and higher impact activities until 6 months after surgery.
The titanium Lisfranc Plates were designed to provide fixation for acute Lisfranc injuries. The unique four hole design provides compression along the Lisfranc ligament and allows the surgeon to visualize the healing process during the recovery.

Another alternative or addition is the Lisfranc TightRope®. It maintains the stability of the Lisfranc joint without having to worry about screw removal.

Case
16-year-old with left proximal tibia fracture, left ankle fracture, left complex midfoot fracture (1-5 TMT)

Plan:
Stabilize the 1st TMT with an X-plate
Stabilize the 2nd and 3rd TMT with T-plates
Stabilize the Lisfranc ligament with the Lisfranc Mini-Tightrope from the base of the 2nd to the medial cuneiform
Stabilize the 4th and 5th TMT with dorsal Lisfranc plate
Q. Why do you use the Arthrex 5th Metatarsal Fracture System?
A. It is designed to provide immediate stability for fractures of the 5th Metatarsal. It contains 4.5, 5.5 and 6.0 mm solid screws and a unique hook plate. It also contains cannulated instrumentation and taps for accurate placement and efficiency.

Q. Can you describe how you decide the diameter of the solid Jones screw?
A. I will use the largest diameter that the bone will accommodate with 5.5 mm being the most common. 6.0 mm is an option in larger bones. Insert the screw until a good “bite” can be felt in the bone. I frequently check fluoroscopy as the screw is advanced.

Q. What is your treatment for Acute-on-Chronic Stress Fractures of the 5th Metatarsal?
A. I will use a solid Jones screw with a high speed burr to remove sclerotic bone. I will then harvest local bone graft. Options include cuboid, calcaneus, distal or proximal tibia, allograft or a bone graft substitute such as Quickset™.

Q. What is your treatment for displaced avulsion fractures of the 5th Metatarsal?
A. I now use the 5th Metatarsal Hook Plate. Historically, they have been treated with tension band wiring, screw fixation and plating. It is technically challenging because the small proximal fragments can make fixation difficult.

Q. Can you describe your postoperative protocol for a standard Jones Fracture surgical repair?
A. Weeks 1-2: Protected crutch WB, in a boot
   Weeks 3-5: WBAT in a boot, start ankle ROM, resistance band exercises
   Weeks 6-9: Stiff soled shoe, or a carbon fiber insert in a regular shoe, more aggressive ankle strengthening exercises, may add 50% body weight WB jogging in a pool or on Alter-G type unloading treadmill
   Weeks 10-12: More aggressive sport-specific rehab, professional or high level athletes return to regular sports
   Weeks 13+: Return to regular activities for most patients
Quickset™

Arthrex® Quickset is a macroporous, injectable, hardening, resorbable bone cement provided in an easy-to-use, closed mixing system. The end product is a calcium-deficient apatite very similar to the mineral phase of bone with the following features and benefits:

- Global porosity of 70% (10% Macroporosity)
- Within 24 hours of implantation, porosity and mechanical strength is present (24 MPa)
- Excellent cohesiveness, which prevents wash out by biological fluids
- Non-exothermic reaction
- Radioopaque

Clinical case report supports Arthrex Quickset

A complex fracture was treated with ORIF. Quickset was used to fill in the bone voids that remained. At four months, the wires and a screw were removed and a biopsy was taken. Histological analysis demonstrated good osteointegration of the Quickset in direct contact with new bone trabeculae (no fibrous interface). An intertwining network developed as the biomaterial resorbed and mineralized lamellar bone was laid down. Osteoblastic cells (cuboid) were along the osteoid borders going through mineralization; osteoclastic cells (multinuclear cells) were along the borders of the biomaterial representing the resorption process. In addition, numerous blood vessels had been established through the implant (Figure 1). At eight months, fracture healing, along with osteointegration of Quickset, was noted via X-ray. By 20 months, the remaining hardware was removed and histologic analysis indicated near complete resorption of the biomaterial with mineralized lamellar bone. Surgery performed by Sébastian Parratte, MD, PhD, Ste Marguerite University Hospital, Marseille, France.

JumpStart™ Antimicrobial Wound Dressings

JumpStart dressings are an easy-to-use, conformable and protective solution for postoperative management of surgical incisions and chronic wounds. This advanced wound dressing with Advanced Microcurrent Technology™ provides sustained, broad-spectrum antimicrobial efficacy, including efficacy against antibiotic resistant and biofilm resistant pathogens. Embedded in the JumpStart dressing are islands of elemental silver and zinc, which create microcell batteries designed to generate electrical currents. These microcurrents initiate a stimulus to initiate cell migration and re-epithelialization, which is essential to the wound healing process. Available in multiple sizes and configurations to meet the needs of our Foot and Ankle surgeons.

Contact your Arthrex Technical Consultant to learn more about this new product from Arthrex.

* Quickset is a registered trademark owned by Graftys, S.A.
James McWilliam, MD
Specialty Orthopaedics
Harrison, NY

WHAT’S IN MY BAG?
BioCartilage® and Cartiform®*

Q. Surgeons are presented with many options for articular cartilage repair. What compelled you to select BioCartilage and Cartiform for your patients?

A. Marrow stimulation via microfracture is the preferred surgical treatment for non-cystic osteochondral lesions of the talus (OLTs) with a surface area of less than 1.5 cm². Even though this is currently the “best” treatment that we have available, published good/excellent rates only approach 85%. I started using BioCartilage after being introduced to the “MicroFx Plus” principle. By adding a cartilage matrix, with its associated cytokines and matrikines, I feel that we can improve the quality and quantity of cartilage stimulated by microfracture.

Current literature supports procedures such as autologous cartilage implantation (ACI) and mosaicplasty (OATS®) for OLTs greater than 1.5 cm². Cartiform expands these indications. Like BioCartilage, Cartiform contains cartilage matrix. This matrix is intact, however, not micronized. The 3D nature of this intact scaffold provides a prebuilt, organized scaffold for cartilage growth. The cytokines and matrikines contained within the matrix provide a powerful “chondroinductive signal” for cartilage formation. In addition to an intact matrix, Cartiform provides viable chondrocytes to participate in the repair process. Cartiform is, therefore, a true triple threat: chondroinductive, chondroconductive and chondrogenic.

Q. When utilizing BioCartilage and Cartiform, what features have you found to be most valuable?

A. Aside from the features noted above, both BioCartilage and Cartiform have a number of other advantages.

BioCartilage has a 5 year shelf life and is stored at room temperature. It can be constituted in bone marrow concentrate, presumably increasing the availability of mesenchymal stem cells for healing. The handling characteristics of constituted BioCartilage allow for easy arthroscopic application. Fixation of BioCartilage with fibrin glue is quick, easy, and durable.

Cartiform has a 2 year shelf life at -80°C. It is prefenestrated, allowing for migration of MSCs from the subchondral bone to which it is applied. Cartiform includes the cartilage tidemark (Figure 1) which results in a flexible and surprisingly durable graft, simplifying its application. Because Cartiform is preprocessed, there is no need for a separate harvesting procedure (as with ACI), and there is no wait for a compatible donor talus (as with allograft OATS). Finally, there is no donor site morbidity (as with autograft OATS).

Q. What is your algorithm on when to use BioCartilage vs Cartiform vs Fresh Allografts?

A. I use BioCartilage for all OLTs < 1.5 cm² requiring surgical treatment. For smaller cystic lesions, I have been filling the defect with StimuBlast® (demineralized bone matrix in a novel reverse phase medium that can be applied arthroscopically) and top this with BioCartilage and fibrin glue.

Until the introduction of Cartiform, I was treating larger OLTs with allograft OATS. I have since been applying Cartiform to these larger lesions assuming adequate bony support. With massive compromised bone beneath a larger OLT, I use allograft OATs or inlay allograft.

Q. With the unique features of Cartiform, have you found there to be new biologic treatment options vs traditional fusion or metal implant?

A. In my practice, Cartiform is applicable to larger OLTs as well as larger osteochondral lesions of the 1st metatarsal head (assuming intact proximal phalangeal articular surface and good range of motion).

*Cartiform is a registered trademark of Osiris Therapeutics, Inc.

Figure 1. H&E stains of Cartiform (left) and fresh cartilage (right) reveal that Cartiform maintains the natural tissue architecture, including the superficial, transitional, and radial zones of articular cartilage, the tidemark, and an osseous layer (scale bar = 500 µm).
Q. What are the technique pearls you have learned when fixating Cartiform®?

A. Cartiform is slightly curved and has a “top” and “bottom.” The concave side of the graft is applied to the subchondral surface. To aid in orientation, the side with the “score mark” is the bone side of the graft. Cartiform is best trimmed with sharp Iris-type scissors. It is a relatively strong material and is difficult to cut with more delicate dissecting scissors or a scalpel. While sharp suture scissors are certainly adequate, they lack the precision necessary to accurately fashion the graft.

Cartiform may be sutured into place by fixing to the adjacent intact articular cartilage. I prefer to use suture anchors as I find the fixation superior.

When passing sutures through the fenestrations of the Cartiform, it is best to avoid those fenestrations very close to or adjacent to the edge, as the sutures could potentially pull through.

Q. In simple terms, explain your surgical technique in talar lesions? How about for 1st MTP resurface?

A. In the talus, I will perform the approach as needed +/- malleolar osteotomy. The defect is prepared via curettage (trying to achieve vertical lesion “walls”) and microfracture. I template the defect using the plastic sheathing that contains the drill bits for the suture anchor (any thin plastic or paper will do). I then fixate the graft to the defect using (4) 2.5 mm Bio-PushLock™ preloaded with an absorbing 4-0 suture. The sutures/anchors are typically placed in the 3, 6, 9 and 12 o’clock positions. The periphery of the lesion is fixated with fibrin glue. I will then apply coagulated bone marrow concentrate to the lesion prior to closure.

The metatarsal head is resurfaced much as has been described with resurfacing using an acellular dermal allograft. Vertical drill holes are placed in the metatarsal just proximal to its articular surface. In this case, sutures are placed in roughly the 11, 1, 5 and 7 o’clock positions relative to the metatarsal head. The 11 and 1 o’clock sutures are passed through the drill holes in a dorsal to plantar direction. The 5 and 7 o’clock sutures are passed in a plantar to dorsal direction through the drill holes. The graft is oriented properly on the metatarsal head and initially stabilized by firm tension on the suture ends. Final interference fixation is obtained by insertion of an appropriate suture anchor (I use the 3 x 8 mm BioComposite™ Tenodesis Screw™) while maintaining firm tension on the suture ends. Once again, I apply coagulated bone marrow concentrate prior to closure.

Q. What is your rehab protocol with Cartiform in Talar and 1st MTP lesions?

A. Postoperatively for talar lesions, patients may bear weight as tolerated once their wounds have healed. Early range of motion is encouraged. Patients wear a CAM walker for 3 months and are told to avoid impact, cutting, contact, and pivoting activity for 6 months. For 1st MTP lesions, patients are in a short CAM walker for 6 weeks and a stiff soled shoe until three months.

*Cartiform is a registered trademark of Osiris Therapeutics, Inc.
Current surgical treatment considerations for hallux rigidus can be controversial and difficult to negotiate. First MTP arthrodesis is a very reliable procedure for pain relief but obviously limits motion. It is not desirable for those who wish to retain motion in the great toe and wear high (er) heeled shoes. We present two cases that illustrate when we perform fusions vs. joint preserving procedures.

Case 1

A 44-year-old female underwent a distal chevron bunionectomy 12 months prior and she complained of pain and stiffness at the first MTP with activity. She had decreased range of motion, especially in dorsiflexion and tenderness with both forced dorsiflexion and plantarflexion. She had no pain at rest but was unable to wear high-heeled footwear. (Figures 1 & 2)

Radiographs demonstrate a healed distal metatarsal osteotomy with internal fixation but in some dorsiflexion and with joint space narrowing.

For this patient given her young age, desire to wear heels, and lack of pain at rest, we thought she was a candidate for a cheilectomy and proximal phalanx dorsiflexion osteotomy (also known as a “Moberg” osteotomy). We commonly use a Plaple® for a Moberg osteotomy given its strength of fixation, low profile nature, and ease of insertion. Her most recent films demonstrate a healed osteotomy in good alignment. (Figures 3 & 4) She has obtained a nearly full range of motion and is able to wear heels again.

Note that we placed the staple aspect of the Plaple close to the joint and the plate aspect of the Plaple in the diaphyseal bone with bicortical fixation. Care must be taken to ensure the proximal Plaple is away and free of the joint as the proximal phalanx is concave in that area. Also, if needed, more bone can be removed during the osteotomy from the medial aspect of the phalanx adding an “Akin” component to the osteotomy and decreasing any hallux valgus interphalangeus present at the same time. Another tip is to hold the osteotomy provisionally with one or two K-wires diagonally placed outside the path of the Plaple to make its insertion easier.
Case 2

A 68-year-old gentleman complained of unrelenting pain at the first MTP with any activity and at rest. On physical exam he was noted to have a total arc of motion of about 200° at the MTP joint and tenderness with axial loading. He was interested in walking long distances for exercise again. Radiographs demonstrated severe end stage hallux rigidus with subchondral sclerosis, a large dorsal osteophyte, and bone on bone alignment (Figures 5 & 6).

For this case, several points direct us to performing an MTP arthrodesis. The patient has pain at rest, limited motion and a positive “grind test.” Also, shoe wear is not a concern of his and his goals are reasonably addressed by a fusion. Next, his radiographs show very severe arthritis and we have found that with this degree of degeneration, patients do poorly with joint preserving procedures.

The patient underwent an arthrodesis (Figures 7 & 8) and within six weeks was wearing a tennis shoe with minimal pain and swelling.

Using the Arthrex MTP locking fusion plate has allowed us to follow a faster weight bearing protocol than we would normally with solely crossed screws or K-wires. The plate itself also allows compression by first placing the screws distal (both locking and non-locking) to the joint and then placing the proximal screw in the oval hole to obtain compression. After plate placement, I like to add a derotational, compression screw from the proximal phalanx medially to the lateral metatarsal head.

Technically, the reamers that come with the plate allow a controlled resection of bone. One of the most difficult parts of performing fusions in severe hallux rigidus is achieving enough intra-op plantarflexion to obtain access for the reamers to ream the proximal phalanx. It is worth spending time to free all the soft tissue adhesions around the plantar capsule and the plantar proximal phalanx to obtain plantarflexion for the reamer. If needed, a 4-5 mm burr can also be used to remove this bone in cases with a severe soft tissue contracture.

Figures 5 & 6 (Radiographs show severe joint space narrowing, sclerosis, large dorsal spur and loose body)

Figures 7 & 8 (status post arthrodesis with solid bony fusion and satisfactory alignment)
Dr. Michael Coughlin has noted that in his two year prospective study he is seeing good long term results and high patient satisfaction following direct plantar plate repairs.

Surgical repair of plantar plate tears using CPR Viper™

Plantar plate tears of the lesser metatarsophalangeal joints are common, and painful conditions that can lead to substantial deformities of the involved digits. Early on conservative treatment may relieve discomfort, but with the passage of time, these conditions tend to worsen with the development of angular deformities of the toes, and in time, development of a fixed hammertoe.

The CPR Viper™ is a unique concept that allows exposure of the plantar plate through a dorsal approach without the use of a Weil metatarsal osteotomy. While typically a plantar plate repair necessitates the combined shortening of the involved lesser metatarsal with the plantar plate repair, there are situations where shortening is not necessary. Often an involved 3rd or 4th MTP joint does not require shortening, and in revision cases where an osteotomy has previously been performed, an osteotomy may not be indicated or desired.

When the conditions do indicate shortening, such as a long second metatarsal, a Weil osteotomy may be performed in conjunction with the use of the Mini Scorpion™.

Step 1: The involved MTP joint is approached through a dorsal longitudinal incision and deepened in the interval between the two extensor tendons. The collateral ligaments are taken down from their phalangeal attachment, and a McGlamry elevator is used to release the proximal plantar plate attachments from the metatarsal metaphysis.

Step 2: Vertical Kirschner wires are placed in the base of the proximal phalanx and the metatarsal head, and the Arthrex small joint retractor is used to distract the joint. (Typically a 4-5 mm interval is achieved). The plantar plate tear is visualized, and if incomplete, is taken down, completing the tear transversely. (This allows for easier passing of the sutures).

Step 3: The Arthrex CPR Viper is then used to pass two sets of horizontal FiberWire® sutures securing the distal plantar plate. These sutures are then passed through two oblique drill holes in the base of the proximal phalanx.

Step 4: With the toe held in 20° of plantar flexion, the sutures are tied over the bony bridge. The skin is closed in a routine fashion. (Jastifer and Coughlin* report passing of these sutures without Weil osteotomy in a cadaveric study with 100% success.)

Compression FT

“The headless Compression FT screw has been a game changer to foot and ankle surgeons. Its many unique applications include 1st MTP fusions, IP joint fusions and bunionectomy fixation. The headless design combined with the fully threaded nature of the screw allows ultimate continuous compression without the drawbacks of a traditional headed or Herbert style headless screw.”

Jonathan Feibel, MD (Columbus, Ohio)

Case 1

Case 2

Case 3

Case 4
The pan metatarsal head resection with PIPJ fusions is a longstanding and reliable solution to advanced forefoot derangement cases. The procedure is particularly gratifying in cases of destruction of the MTP joints due to rheumatoid arthritis with subluxation of the bases of the phalanges onto the metatarsal heads. The standard incisional approaches vary depending on the amount of digital subluxation and soft tissue quality. The most common is 2 longitudinal incisions, the first between the 2nd and 3rd metatarsals and the second between the 3rd and 4th metatarsals. PIPJ fusions are typically performed at the same setting.

Case 1

The use of the 2.0 mm PLA TRIM-iT drill pin offers reliable longstanding correction. Contrasted with external metal pins this allows faster return to bathing, faster return into closed shoe wear which discourages forefoot edema and the maintenance of digital alignment as the pins remain traversing the MTP joints until they absorb.

The pins are placed full length, 100 mm, entering at the exposed PIP joint and antegrade drilled out the tips of the toes. Then the PIP and MTP joints are aligned and the pins are retrograde drilled into the proximal phalanx shaft and then across the MTP joints. The pins are advanced until the metal tip of the pin is touching the tip of the toes. The metal tip of the pins are cut off. Then, a small transverse stab incision is made in the toe tip and the cannula for the pin tamp is placed over the pin and into the skin contacting the distal phalanx. The pin is then tamped into the toe until the tamp is fully seated and in contact with the cannula. This ensures accurate countersinking of the TRIM-iT pin into the distal phalanx. Closure is per surgeon preference.

**Pre-op of pt with RA and subluxed MTP joints, hammertoes and painful metatarsalgia.**

2 year post-op follow-up of pan metatarsal head resection with excellent maintenance of correction as well as excellent fusions of the PIP joints of toes 2, 3, 4 and arthroplasty of the 5th toe.
Case 2

81-year-old female presented with painful hammertoes of the 3rd and 4th toes. She had a previous PIPJ fusion of her 2nd toe on the same foot. It was well fused and stable at the PIP joint but the toe was excessively straight. She wished for surgery on the 3rd and 4th toes but without an external pin like had been used on the 2nd toe elsewhere and a more aesthetic result. The 2.5 mm PIP Dart with the 10 degree bend was chosen to allow for an “all inside” technique approach and a flexed PIP joint fusion. The PIP dart is made out of PEEK and features barbs to hold compression and ridges to prevent rotation. PEEK is radiolucent and avoids the use of any metal pins. The 2.5 mm PIP Dart is ideally suited for the 3rd and 4th toes and the size of the medullary canals of the proximal and middle phalanges. The PIP darts may be cut to exact length, are easily revised if necessary and come in sterile kits with all instruments needed. The “all-inside” technique avoids any traversing of the unaffected distal IP joint as well as any pin exiting the tip of the toe.

Preoperative X-rays showing flexion contracture at the PIP joint of toes 3 and 4 and a previously fused 2nd PIP joint.

Postoperative X-rays show the ghost tracks of the PIP darts and well aligned PIP joints of toes 3 and 4.
**SOFT TISSUE SPOTLIGHT**

**Tenodesis Screw™ System**

Available in BioComposite™ and PEEK, the Arthrex® Tenodesis Screw System provides surgeons the most technologically advanced interference screw fixation options while eliminating transosseous tunnels in tendon repairs and ligament reconstruction by utilizing Arthrex’s patented Blind-Tunnel Technique.

This comprehensive product line provides superior and immediate fixation for foot and ankle indications such as flatfoot reconstruction (FDL), chronic Achilles reconstruction (FHL), lateral ankle reconstruction and deltoid ligament reconstruction.

The Arthrex Bio-Tenodesis™ Screw System interactive iBook featuring products and techniques is available for download by logging into Arthrex.com.

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**BioComposite 3 mm x 8 mm Tenodesis Screw w/Inserter**
**Anchor Spotlight**

- 2.2 x 4 mm Micro Corkscrew FT
- 2.7 x 7 mm Mini Corkscrew FT
- 3.5 x 10 mm Corkscrew FT
- 3.5 x 12 mm Corkscrew®
- 5 x 15 mm Corkscrew
- 2.4 x 7.5 mm FASTak™

**Absorbable Anchors**

- 2.5 x 8 mm Bio-PushLock™
- 3 x 14 mm Small Joint SutureTak®
- 2.4 x 0.5 mm Mini SutureTak
- 2.4 x 6.5 mm Micro SutureTak
- 2.9 mm BioComposite® DEX PushLock®
- 4.5 mm BioComposite™ Corkscrew
- 2.5 x 8 mm PEEK Pushlock™

**Non-Absorbable Anchors**

- 5.5 x 15 mm Bio-Corkscrew® FT

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**Pull-out Strength in 30 lb/ft³ (lbf) Ultimate Load:**

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*Data on file
Deltoid Ligament Reconstruction

The Deltoid Ligament Reconstruction Implant System provides a turnkey repair technique to treat chronic deltoid ligament pathology. By using a free tendon graft to recreate both the superficial and deep bands of the deltoid ligament, surgeons are able to achieve a reproducible, rigid, anatomic reconstruction for patients presenting with chronic, medial instability.

Product Highlights

All-in-One Implant System – specifically designed to reconstruct both the superficial and deep deltoid ligament

Dynamic Control of Final Tension – dial in final tension of repair construct by toggling TightRope® sutures

BioComposite™ Tenodesis Screw™ – provide solid aperture fixation of the graft in the talus and calcaneus

Presutured & Tensioned Allograft – save time in the OR with a consistent graft length and diameter

VersaGraft™

The VersaGraft Presutured Tendon is a new solution for reconstruction of the deltoid ligament or lateral ankle ligament complex. The presutured and presized nature of the VersaGraft tendon allows for surgeons to use a graft that specifically meets their needs for these procedures with fantastic biomechanical strength to ensure a successful repair. All VersaGraft tendons are assembled by highly trained tissue technicians according to Arthrex® specifications to ensure consistent quality and workmanship.

Ordering information:

Allografts are ordered separately through our tissue partners, JRF Ortho or LifeNet Health™.

JRF Orders: 877-255-6727
JRF Part Number: LAT-01

LifeNet Health Orders: 888-847-7831
LifeNet Health Part Number: FPSST
**ARTHROSCOPY UPDATE**

**4K Ultra HD Camera System**

Arthrex® recently launched the first autoclavable 4K UHD Camera and Image Management System boasting unparalleled image quality. Aside from a broad range of sports specific blades and burrs, Arthrex has also released a specialized distal extremity shaver hand piece and camera head. The shaver handpiece incorporates a variety of specialty shaver blades and burrs ranging in diameter from 2.0 – 3.5 mm. The Distal Extremity camera head has a nice, ergonomic feel and is ideal for arthroscopy in the smaller joints of the foot.

![Distal Extremity Shaver Handpiece](image)

**Newly Designed GPS Targeting Drill Guide Set**

Available as an adjunct to the Ankle Arthroscopy Set or as a stand-alone instrument set, the GPS Targeting Drill Guide offers the ability to precisely place Kirschner wires for ankle arthrodesis using cannulated screws, retrograde drilling of osteochondral lesions, as well as a multitude of other applications where precise K-wire placement is desired.

The sturdy aluminum frame offers a lightweight and precise instrument capable of rotating and telescoping, allowing for pinpoint placement of 1.1 mm, 1.6 mm and 2.4 mm K-wires. A variety of patterns can be achieved using either the single or quad bore guide sleeves for the 1.1 mm and 1.6 mm K-wires allowing the surgeon multiple options for pinpoint arthroscopic placement.

![GPS Targeting Drill Guide Set](image)
**BioSync®* Wedge**

Innovative Porous Titanium Wedge indicated for fusions and osteotomies of the foot. BioSync reconstructive wedges provide an alternative to allograft/autograft bone most commonly for Evans and Cotton procedures. The wedges consist of BioSync, a three-dimensional open-celled titanium scaffold for bone and tissue ingrowth. This osteoconductive environment is designed to enhance the potential for bone integration and attempt to minimize loss of correction made.

**Product Highlights:**
- Six anatomically-derived profiles developed for Cotton Procedures (Plantar Flexion Opening Wedge Osteotomy of the Medial Cuneiform).
- Medial (convex) and lateral (concave) shape maximizes bone contact while not violating the intercuneiform joint.
- Twelve profiles available for Evans Procedure providing reliable and precise correction.

“Arthrex® has the only anatomic Cotton wedge on the market. In addition, the Evans wedge innovation is utilizing screw fixation through the wedge for added stability and rotational control.”

Kent Ellington, MD
OrthoCarolina

* BioSync is a registered trademark owned by SMED-TA/TD, LLC
† Pending release 2015

NEW PRODUCTS

PIP Dart

The new Arthrex® PIP Dart for proximal interphalangeal joint fusions offers the surgeon the advantage of exact sizing PIPJ implants every time, without leaving material across the DIPJ. The PIP Dart is made out of PEEK material which is strong, radiolucent and can be easily cut or drilled through. This unique implant gives the surgeon the ability to fuse the PIP joint without leaving metal or bioabsorbable material in the toe. The unique barbs help hold compression while the ridges prevent rotation.

The PIP Darts are offered in both 2.5 mm and 3.0 mm diameters with the option of a straight or bent implant. The convenient all-in-one implant system includes the PIP Dart along with all the necessary instrumentation to perform the procedure. This added convenience simplifies stocking and allows physicians to focus on the task at hand.

Product & Technique Highlights:

- Simple all-inside technique
- Reverse angled barbs maintain fixation & compression on both sides of the fusion site
- PEEK Material - strong & radiolucent, easily trimmed and revised as needed
- Multiple Diameter Options - 2.5 & 3.0 mm Diameters, straight & ten degree bends available for anatomic fusion
We have had significant changes in our Medical Education Department and Distal Extremities Division this past year. Christopher Adams, MD, our new Director of Medical Education, joined Arthrex® in August of 2014. Dr. Adams trained as an orthopaedic surgeon at the Mayo Clinic in Rochester, MN. He then completed a Shoulder Fellowship at the San Antonio Orthopaedic Group under Stephen Burkhart, MD. He built a very successful private practice in shoulder surgery for 8 years in Jupiter, FL before coming on board to steer the educational team for Arthrex. Jamie Bradshaw, PA-C got promoted to a managerial level. Jamie is now in charge of our Technology Consultant educational programs. He had a great four and a half year ride with DEX MedEd team. We also hired Michelle Chargot, MD as an Associate Clinical Specialist to further drive additional DEX educational offerings. Lorena Reyes, our DEX MedEd coordinator, relocated to Oregon due to family reasons after doing a fantastic job for the last four years.

As part of our large courses, we had simultaneous Foot & Ankle and Hand & Wrist symposiums in Seattle. We assembled a great Faculty group with renowned surgeons to instruct around 50 Foot & Ankle and 30 Hand & Wrist surgeons. A two-day Advanced Ankle Instability, Arthroscopy and Sports Injuries course was also held in Naples in the spring of 2015. Most of these symposiums included live cadaveric demonstrations, video demonstrations and very dynamic discussions on hot topics/techniques through expert panels. We will be holding another two-day large Foot & Ankle symposium in La Jolla, CA on August 7 and 8.

Our industry workshop at the combined 2014 AOFAS Summer Annual Meeting-IFFAS in Chicago was extremely successful. Troy Watson, MD, George Lian, MD, James McWilliam, MD, and Anand Vora, MD shared their experience and expertise on InternalBrace Ligament Augmentation Repair, Deltoid Ligament Reconstruction, Achilles Midsubstance SpeedBridge and Ankle Fusion plating respectively. This nice educational event with a hands-on cadaveric session got sold out with attendance of US and International Foot & Ankle surgeons. We obtained excellent feedback and comments from the participant surgeons.

We had to increase our number of Foot & Ankle and Hand & Wrist courses in the past year due to the high demand from across the country. We have assigned a good number of the courses to our headquarters in Naples, and at our off-site training locations (NYC, Miami, Phoenix, Vail, Los Angeles, and Irvine) to fulfill this demand. Similarly, we have noticed an increase in the number of single-day surgeon visits to Naples to get trained on the safe and effective use of our techniques by our Medical Education experts.

Our first two Fellows courses of this calendar year, Ortho Foot & Ankle on April 10-11 (31 Fellows) and Podiatry Fellows on March 20-21 (37 Fellows) were very successful.

ArthroParis, one of the ArthroSeries events (Arthrex’s largest international educational events), was held with tremendous success at the CNIT on June 27 and 28 of 2014. The Distal Extremities program was planned and executed to showcase all of our open and arthroscopic techniques for Hand & Wrist and Foot & Ankle to almost 200 surgeons in attendance. We had a total of 21 live cadaveric demonstrations during the Distal Extremities sessions.

We want to take this opportunity again to extend our gratitude to all of our DEX Consultants and Surgeon Instructors from our Educational Force for such an amazing job during 2013 and 2014.

Felix Riano, MD
Medical Education Manager
Distal Extremities, Orthopaedic Trauma and OrthoBiologics

Christopher Adams, MD
Director of Medical Education
Diplomate of the ABOS
# 2015 Course Schedule

<table>
<thead>
<tr>
<th>Course</th>
<th>Date</th>
<th>Location</th>
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<tr>
<td>Foot &amp; Ankle Masters Course</td>
<td>7/11</td>
<td>SOM</td>
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<tr>
<td>AOFAS</td>
<td>7/15 – 18</td>
<td>Long Beach, CA</td>
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<tr>
<td>Hand, Wrist &amp; Elbow Symposium</td>
<td>8/7 – 8/15</td>
<td>Vail, CO</td>
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<tr>
<td>West Coast Dextravaganza</td>
<td>8/6 – 8/8</td>
<td>La Jolla, CA</td>
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<tr>
<td>Advanced Wrist and Elbow Course</td>
<td>8/14 – 8/15</td>
<td>Naples, FL</td>
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<tr>
<td>Foot &amp; Ankle Masters Course</td>
<td>8/22</td>
<td>Phoenix, AZ</td>
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<tr>
<td>Combined Sports</td>
<td>09/11</td>
<td>Naples, FL</td>
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<tr>
<td>ASSH Workshop</td>
<td>9/10 – 12</td>
<td>Seattle, WA</td>
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<tr>
<td>Foot &amp; Ankle Masters Course</td>
<td>9/18</td>
<td>Miami, FL</td>
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<tr>
<td>Hand &amp; Wrist Masters Course</td>
<td>9/19</td>
<td>KJOC</td>
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<tr>
<td>Distal Extremities PA Course</td>
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<td>Naples, FL</td>
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<tr>
<td>OTA</td>
<td>10/7 – 10</td>
<td>San Diego, CA</td>
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<tr>
<td>Foot &amp; Ankle Masters Course</td>
<td>10/10</td>
<td>SOM</td>
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<tr>
<td>Ankle Instability Symposium</td>
<td>10/23 – 24</td>
<td>Naples, FL</td>
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<tr>
<td>Foot &amp; Ankle Masters Course</td>
<td>11/7</td>
<td>Phoenix, AZ</td>
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<tr>
<td>Hand and Wrist Symposium</td>
<td>12/11 – 15</td>
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<td>12/12</td>
<td>KJOC</td>
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