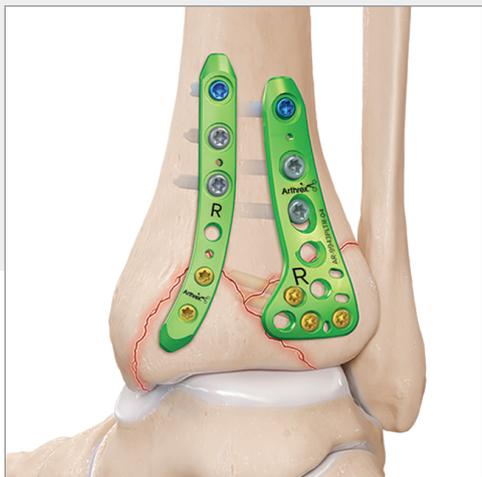


Titanium Ankle and Fracture System

Surgical Technique



Titanium Ankle and Fracture System

Introduction

Ankle fractures are frequently complicated by variables out of the surgeon's control. The amount of comminution, bone quality, location of the fracture, and size of the patient can all lead to challenging obstacles. Designed to be the most comprehensive set available for the treatment of these common injuries, the Titanium Ankle and Fracture System incorporates optimized small-fragment implants, fracture-specific anatomically contoured plates, and 4.0 mm cannulated screws into a single system.

Plate options include:

- Locking distal fibula plates
- Locking straight plates and locking third tubular plates
- Posterolateral fibula plates and anatomic posterolateral fibula plates
- Medial and lateral hook plates
- Fragment-specific posterior plates



All plates except the medial hook plate have specific features to facilitate use of the clinically proven Syndesmosis TightRope® implant for stabilization of associated syndesmotic injuries. Additionally, the locking distal fibula plates have suture eyelets for use with the AITFL *InternalBrace*™ ligament augmentation procedure when reinforcing a primary AITFL repair as an adjunct to the Syndesmosis TightRope implant. See the Syndesmosis TightRope XP implant system and AITFL *InternalBrace* ligament augmentation surgical techniques for more information.

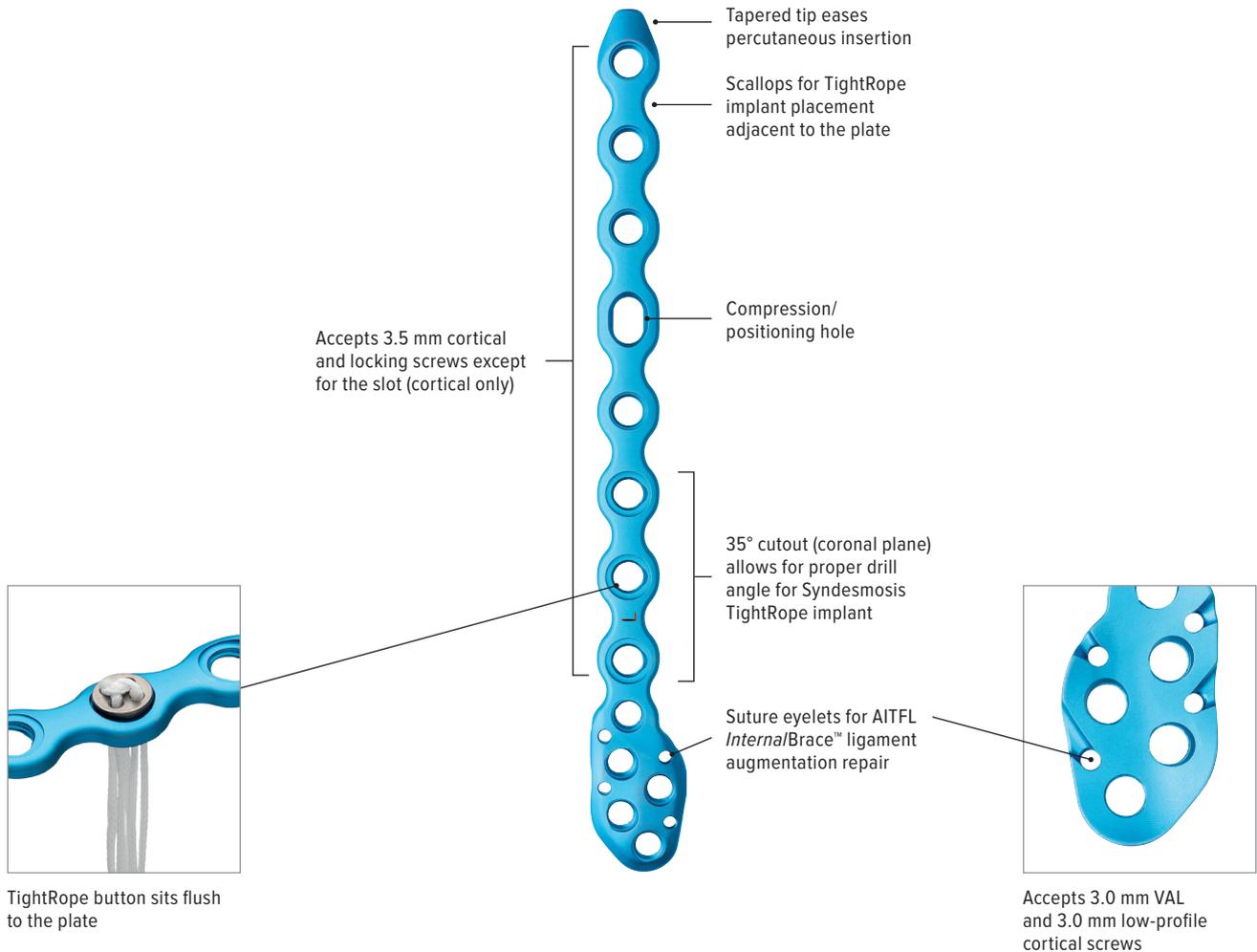
Drill Quick Reference Guide

Screw	Threaded Drill Size	K-wire Size	Screwdriver
3.5 mm cortical and 3.5 mm locking	2.5 mm	–	T15 hexalobe
2.7 mm locking	2.0 mm	–	T10 hexalobe
4.0 mm cannulated	2.6 mm	1.35 mm	Cannulated T15
4.0 mm cancellous	2.5 mm	–	T15 hexalobe

Locking Distal Fibula Plates

Locking distal fibular plates are designed for use in the most challenging lateral malleolus fractures. The distal portion, or head, of the plate thins and spreads to encompass a large portion of the lateral malleolus. The head accepts multiple 3.0 mm variable-angle locking (VAL) screws or 3.0 mm low-profile screws, making this plate ideal for patients with highly comminuted or distal lateral malleolus fractures.

Divergent fixed-angle locking screw holes distally allow for secure fixation. The shaft portion of the plate thickens to improve rigidity and strength, and the screw holes allow for multiple screw options. As with all of the fibular plates, there are recessed screw holes and a scalloped perimeter, allowing for easier contouring and placement of the Syndesmosis TightRope® implant through or outside the plate.



Offered in **4, 5, 6,** and **8** holes and sterile in **10, 12,** and **14** holes

Locking Distal Fibula Plates Surgical Technique



Reduce the fracture with the provided **pointed bone reduction forceps** or **lobster claw forceps**. When lag technique is appropriate, drill the near fragment with the **3.5 mm drill bit** and **3.5 mm/2.5 mm drill guide**.



Insert the **drill sleeve** through the drilled hole and drill through the far fragment with the **2.5 mm drill bit**.



Measure the screw length with the **low-profile depth device**.



Insert the desired length 3.5 mm cortical screw with the **T15 screwdriver** or **driver**.



5

Choose the implant with the appropriate size and laterality. Pin the plate to the bone with a **smooth or threaded BB-Tak**.

The 3.5 mm cortical or locking screws can be prepared proximally with the **3.5 mm locking drill guide** and the **2.5 mm calibrated drill bit**. Lengths can be read off the guide or with a depth gauge. Use a **T15 driver** for insertion. Conversely, for 3.5 mm cortical screws, a 2.5 mm drill bit and drill guide can be used as shown in Step 7.



6

For the distal 3.0 mm VAL screws, drill with the **2.0 mm calibrated drill bit** through the **threaded drill guide**. Lengths can be read off the guide or with a depth gauge. Use a **T10 driver** for insertion.



Remove the BB-Tak and replace with a 3.5 mm cortical screw. Drill with the **2.5 mm drill bit** through the **3.5/2.5 mm drill guide**. Measure with the **2.7/3.5/4.0 mm depth device**. Use a **T15 driver** for insertion. This technique can also be used for any proximal 3.5 mm cortical screws. Add additional screws proximally and distally as needed.

Evaluate the syndesmosis. If fixation is required, use the Syndesmosis TightRope® XP implant as shown in Figure 1. The lateral button is designed to fit within the 3.5 mm holes of the plate. The AITFL *InternalBrace*™ procedure can also be used for severe AITFL instability during the healing process as shown in Figure 2.

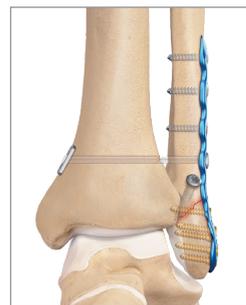


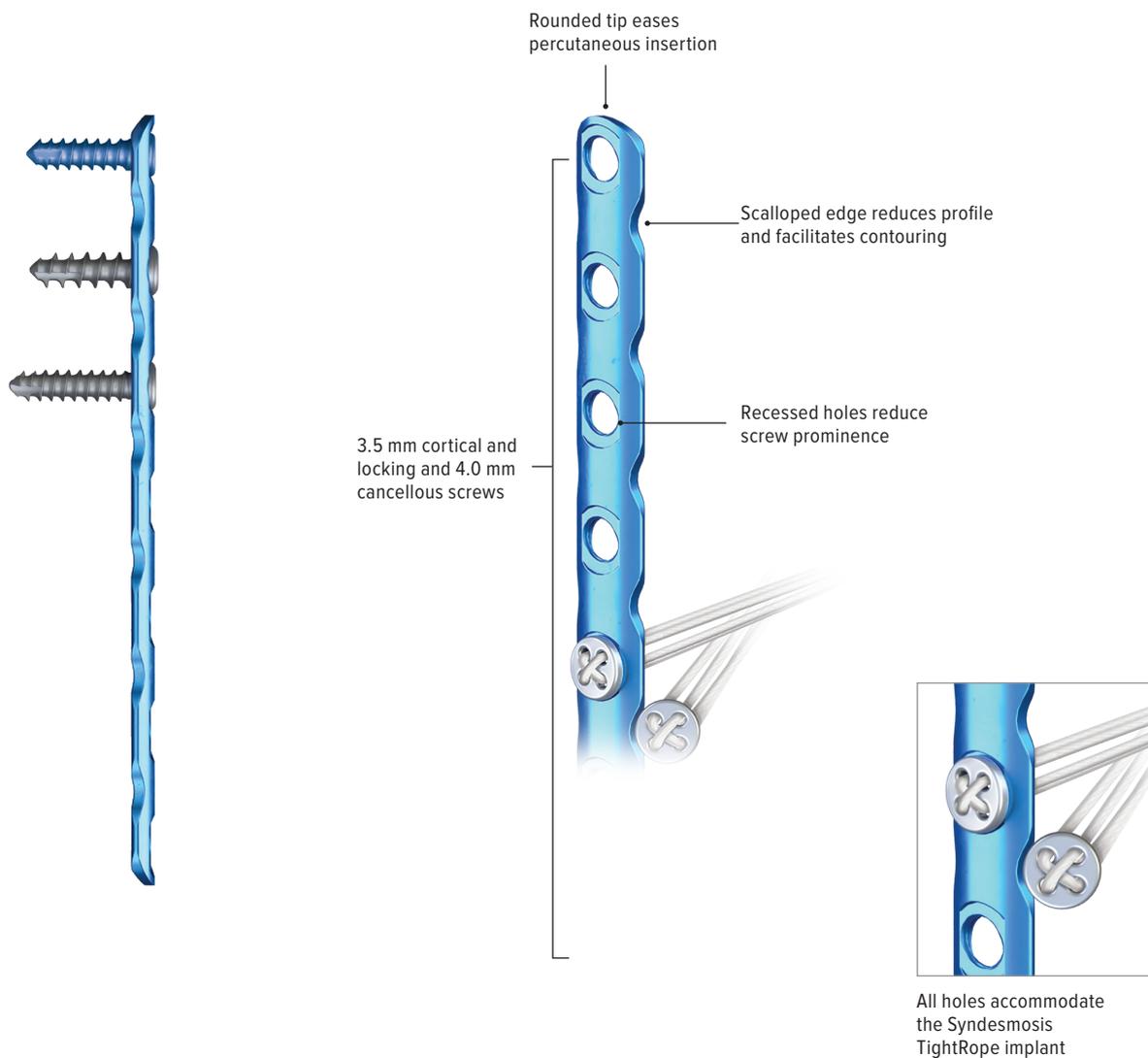
Figure 1



Figure 2

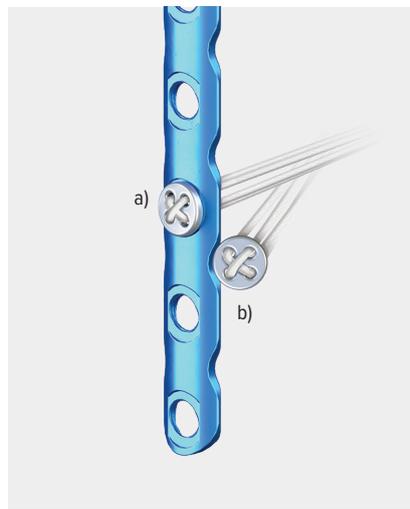
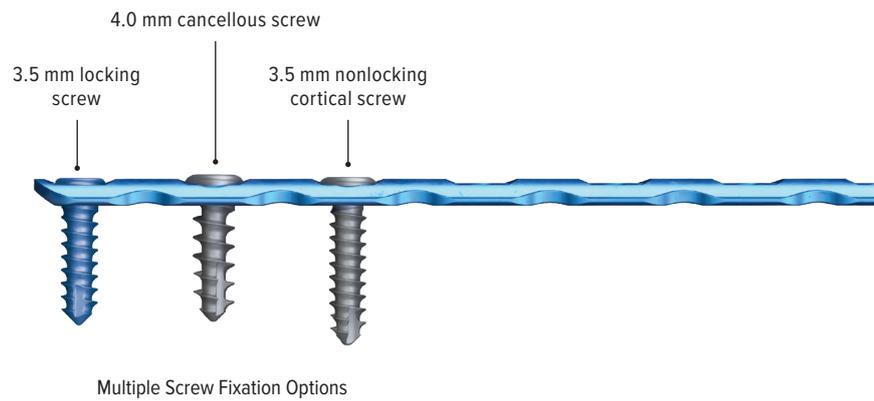
Locking Third Tubular Plates

Recessed screw holes decrease screw head prominence and are designed to allow the TightRope® implant's circular button to fit snug. The low-profile, scalloped design allows for easier contouring and placement of the TightRope implant outside of the plate if desired. All screw holes accept 3.5 mm nonlocking cortical, 3.5 mm locking, or 4.0 mm cancellous screws.



Offered in **4, 5, 6, 7, 8, 10, and 12** holes

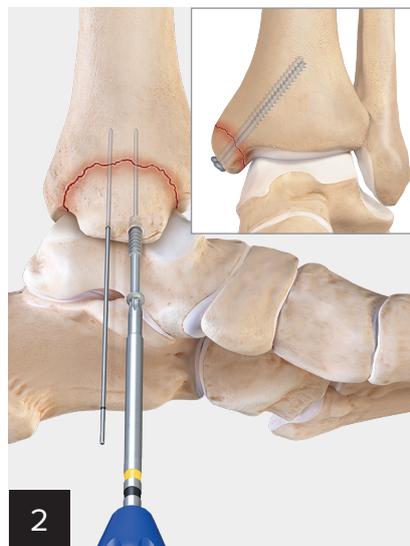
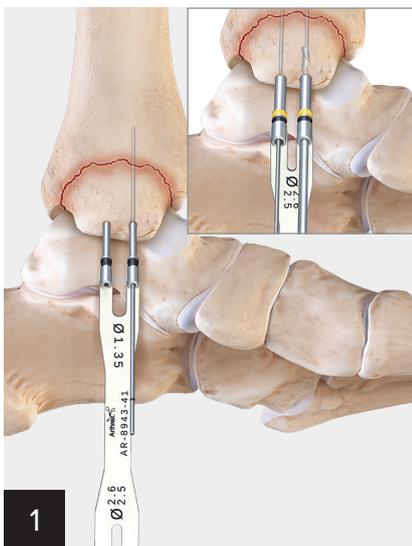
Locking Third Tubular Plates Surgical Technique



TightRope® implant fixation

a) through the plate; b) posterior placement

4.0 mm Cannulated, Partially Threaded, Cancellous Screws

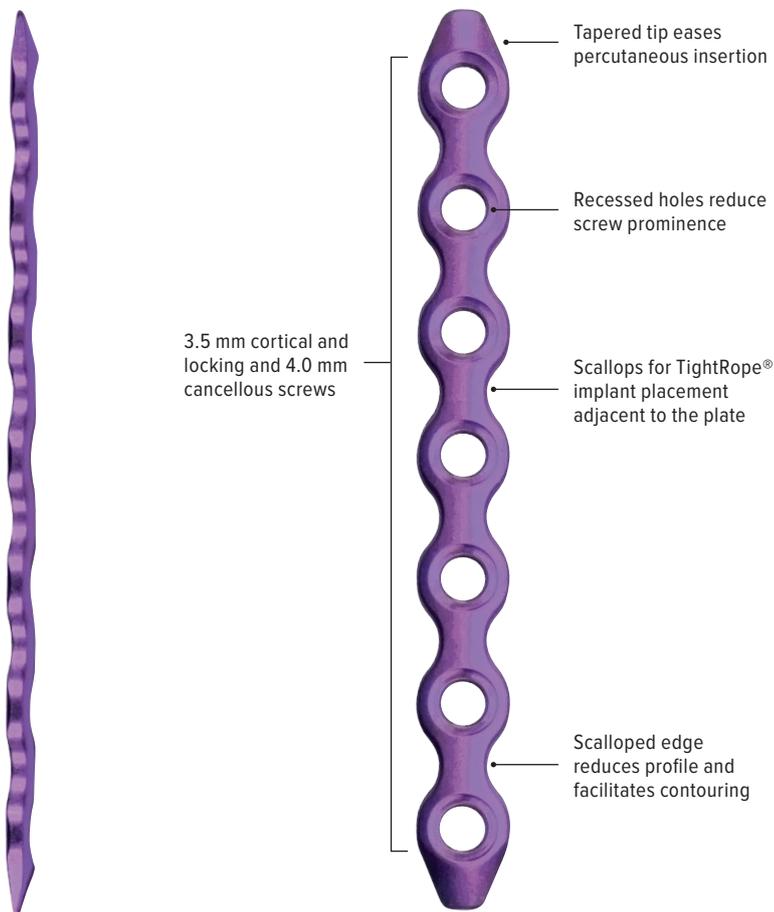


Use the parallel drill guide to accurately place two 1.35 mm guidewires and then use the opposite end of the guide to predrill pilot holes using the 2.6 mm cannulated drill bit. Both short- and long-threaded cancellous screws are available.

Note: When possible, it is recommended that medial malleolus fixation is performed prior to TightRope implant placement to avoid cutting the FiberWire® suture with the drill or screws.

Locking Straight Plates

The locking straight plates were designed for applications in long bones, such as the fibula. The scalloped design still allows for contouring when needed. All screw holes are recessed and accept 3.5 mm cortical, 3.5 mm locking, and 4.0 mm cancellous screws.



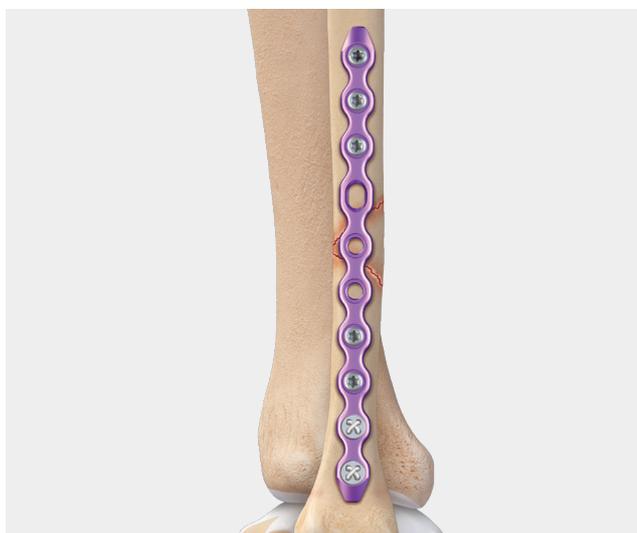
All holes are designed for Syndesmosis TightRope implant

Offered in **4, 6, 7, 8, 10, and 12** holes

Locking Straight Plates

Product Description	Item Number
3.5 mm Cortical Screws and 4.0 mm Cancellous Screws	
Drill Bit, 2.5 mm	AR-8943-30
Drill Guide, 3.5 mm/2.5 mm	AR-8943-14
Depth Device, low profile, 2.7 mm/3.5 mm/4.0 mm	AR-8943-15
Screwdriver, T15 hexalobe	AR-8943-10
Hexalobe Driver, T15	AR-8941DH
3.5 mm Locking Screws	
Drill Bit, calibrated, 2.5 mm	AR-8943-42
Drill Guide, locking, 3.5 mm	AR-8943-43
Depth Device, low profile, 2.7 mm/3.5 mm/4.0 mm	AR-8943-15
Screwdriver, T15 hexalobe	AR-8943-10
Hexalobe Driver, T15	AR-8941DH

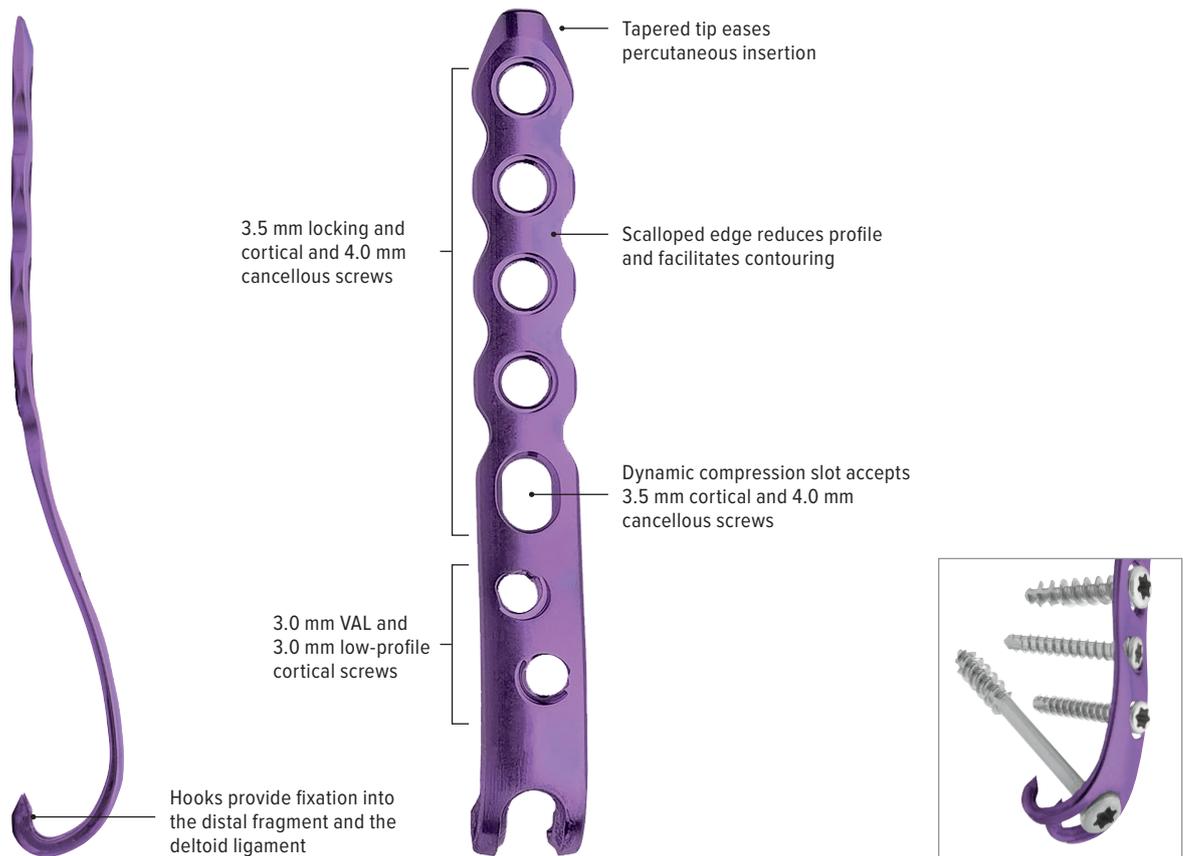
Note: If two TightRope® implants are used, slightly divergent angles are recommended.



Locking Medial Hook Plates

The locking medial hook plate is designed to treat distal or comminuted medial malleolus fractures. The two-hooked, distal prongs are designed to grab the deltoid ligament to reduce the medial malleolus (akin to using the rotator cuff to reduce the greater tuberosity in the shoulder).

The prongs are spaced and recessed to accommodate a 4.0 mm cancellous screw if desired. The proximal screw holes allow for the placement of 3.5 mm nonlocking cortical screws, 3.5 mm locking screws, or 4.0 mm cancellous screws proximally, and 3.0 VAL and 3.0 mm low-profile cortical screws distally.



4.0 mm cancellous screws can be placed through the hooks

Offered in **3, 5, and 7** holes

Locking Medial Hook Plates Surgical Technique



Insert hooks into the deltoid ligament near the attachment on the medial malleolus. Drill at the superior aspect of the compression slot with the **2.5 mm drill bit** through the **3.5 mm/2.5 mm drill guide**. Measure with the depth gauge and implant a 3.5 mm cortical screw with a T15 driver. As the screw contacts the plate, it will pull the plate superiorly to compress distal fractures.

Optional: The hook plate tamp can be used to impact the distal portion if desired.



A partially threaded 4.0 mm cannulated or solid screw can be implanted through the distal hooks.

4.0 mm Cannulated screw: Place a **1.35 mm guidewire** (smooth or threaded) through the **2.6 mm/1.35 mm drill guide**. Flip the guide and then predrill with the **2.6 mm cannulated drill bit**. Measure length with the **cannulated depth device**. Implant with a **cannulated T15 driver**.



The 3.5 mm locking screws are implanted using the yellow **3.5 mm locking drill guide** and the **calibrated 2.5 mm drill bit**.



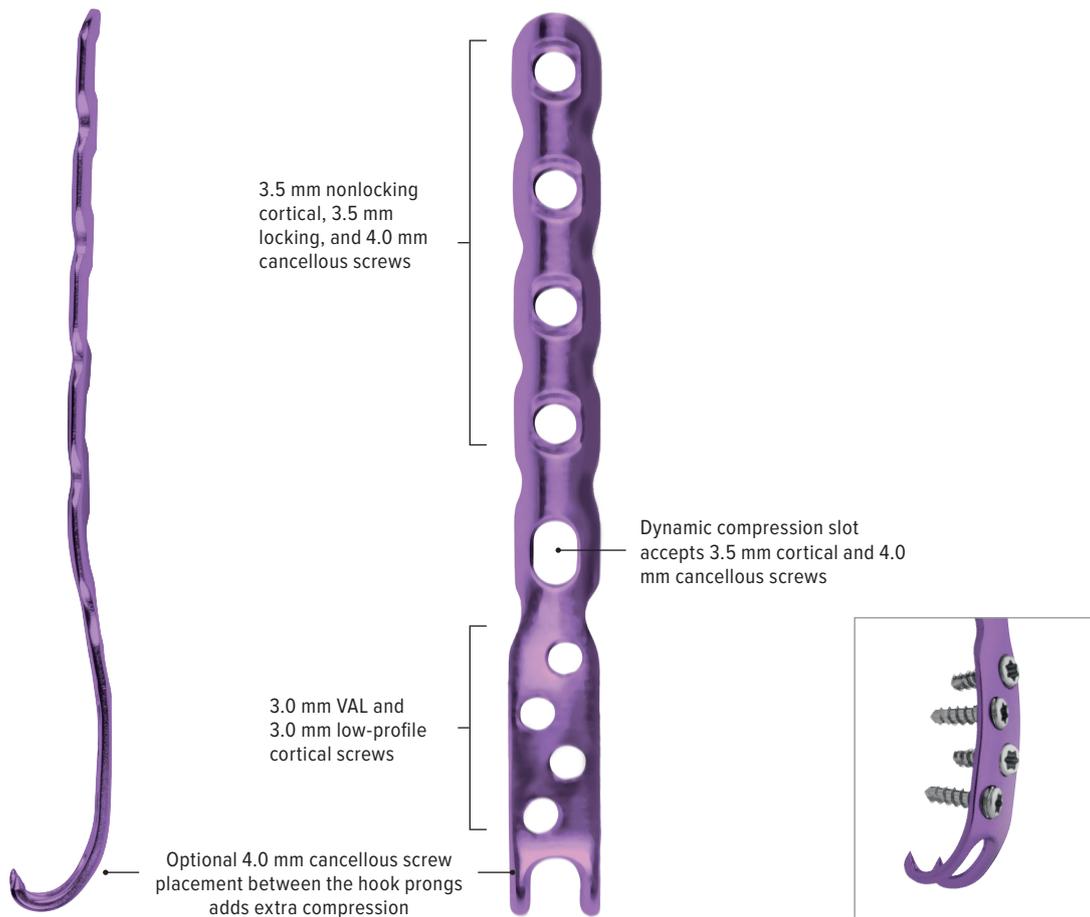
The 3.0 mm fragment-specific locking screws can be implanted using the **locking drill guide** and **2.0 mm calibrated drill bit**.

Note: Impaction of the tines into bone is **NOT** mandatory and is not required to achieve adequate stability of the distal fragment. It is acceptable to leave the hooks slightly proud.

Locking Lateral Hook Plates

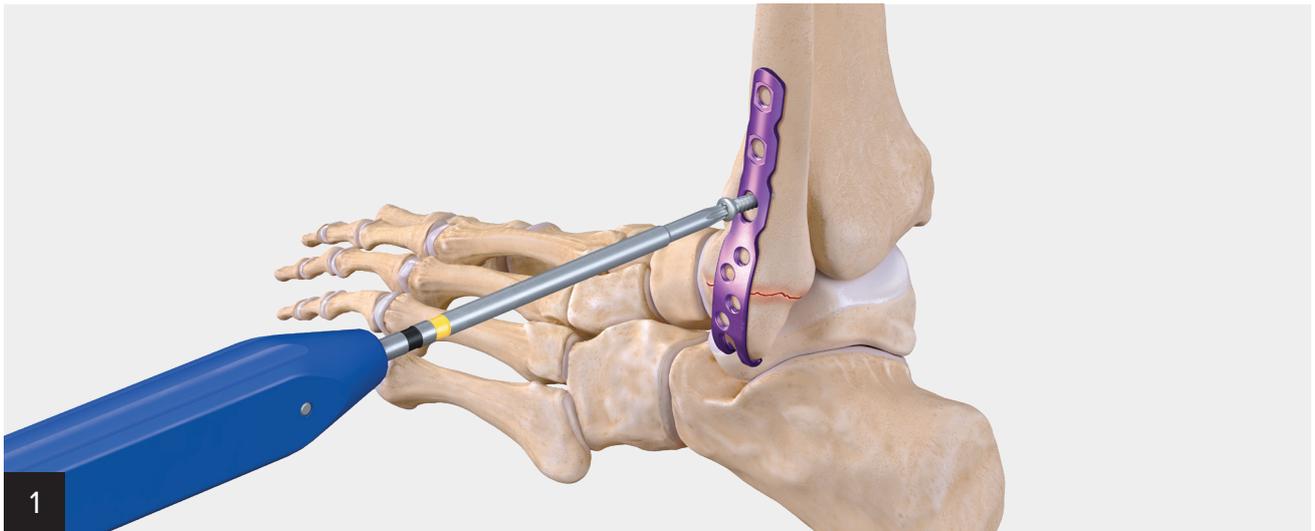
The locking lateral hook plate is designed to treat fibular fractures with distal extension. The plate is anatomically designed to fit the lateral aspect of the fibula, with 3.0 mm VAL screw holes in the distal portion (3.0 mm nonlocking, low-profile cortical screws are also available).

The two-hooked, distal prongs are designed to incorporate the calcaneal fibular ligament attachment (akin to using the rotator cuff in assisting greater tuberosity fixation in the shoulder). These prongs are spaced and recessed appropriately to allow placement of a 4.0 mm cancellous screw if desired.



Offered in **3**, **5**, and **7** holes

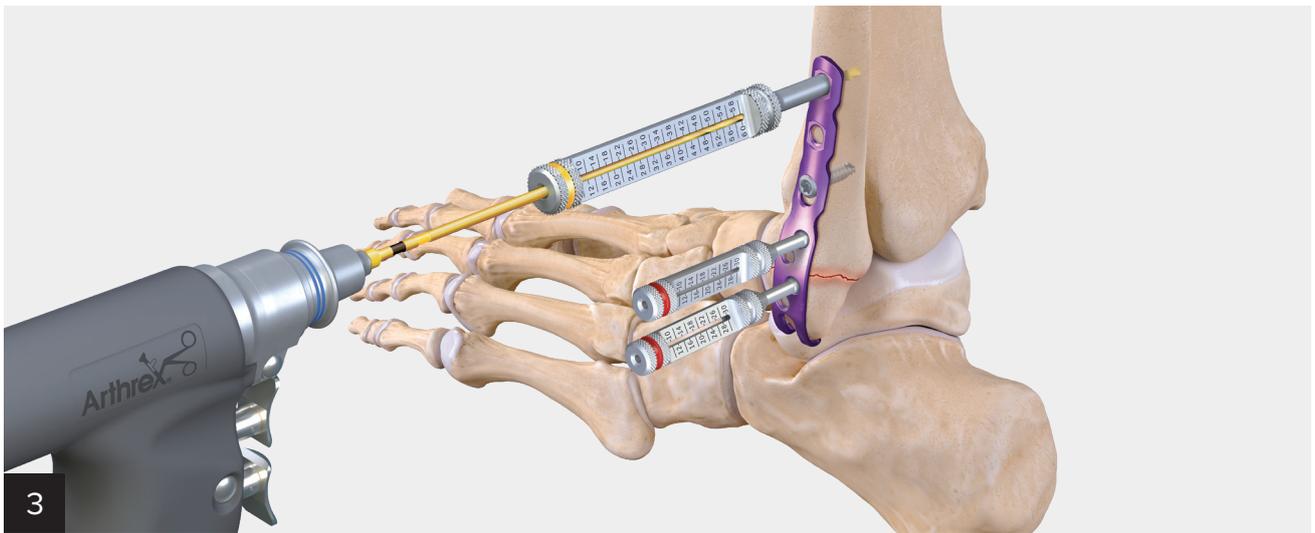
Locking Lateral Hook Plates Surgical Technique



Insert hooks into the calcaneal fibular ligament near the attachment onto the lateral malleolus. Drill with the **2.5 mm drill bit through the 3.5 mm/2.5 mm drill guide** to prepare for a 3.5 mm cortical or 4.0 mm cancellous screw in the superior aspect of the oblong hole to compress the fracture.



Place a 4.0 mm cancellous screw through the distal hooks to seat the plate (this screw does not need to cross the fracture site) using the 2.5 mm drill bit for the pilot hole. If desired, use a bone tamp to impact the tines prior to screw placement.



The plate can fit 3.5 mm cortical and locking and 4.0 mm screws proximally. 3.0 mm VAL screws can be placed distally for rotational stability.



Posterolateral Fibula Plating

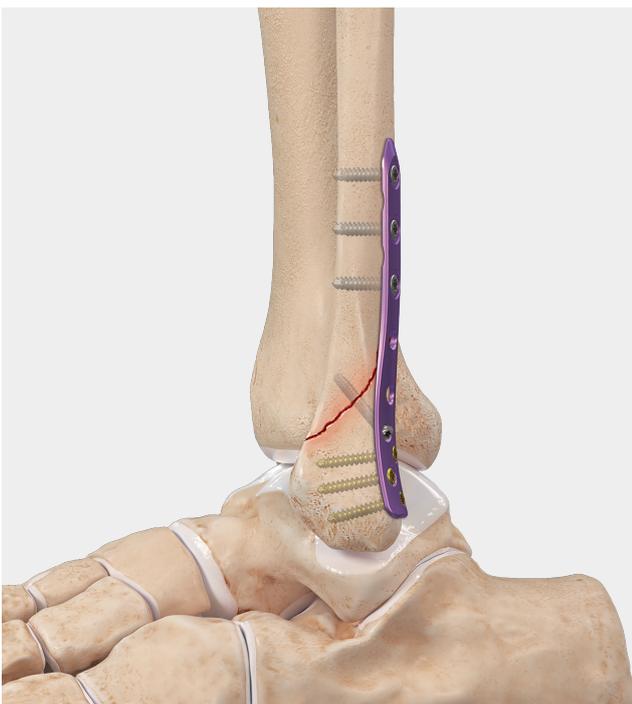
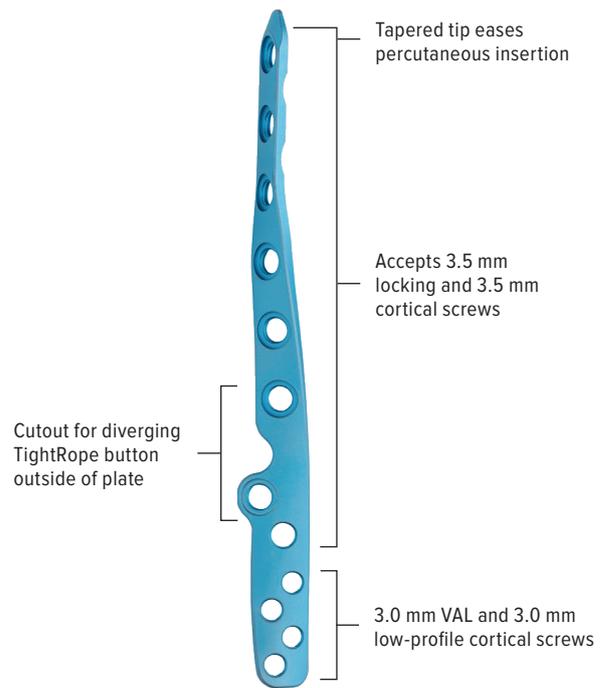
Posterolateral plating may offer biomechanical advantages over lateral plating for some fracture patterns. Two different designs of posterolateral fibula plates, straight and anatomic, are included.

Both are designed to be extremely low profile to minimize potential peroneal tendon irritation. Using

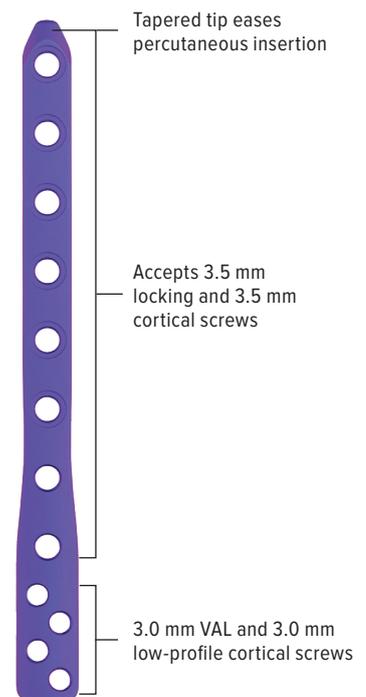
3.0 mm screws distally allows for increased density of fixation in that fragment. The anatomic design has a unique curve that wraps laterally and also includes features in the plate to accommodate the Syndesmosis TightRope® button.



Posterolateral Anatomic Distal Fibula Plate



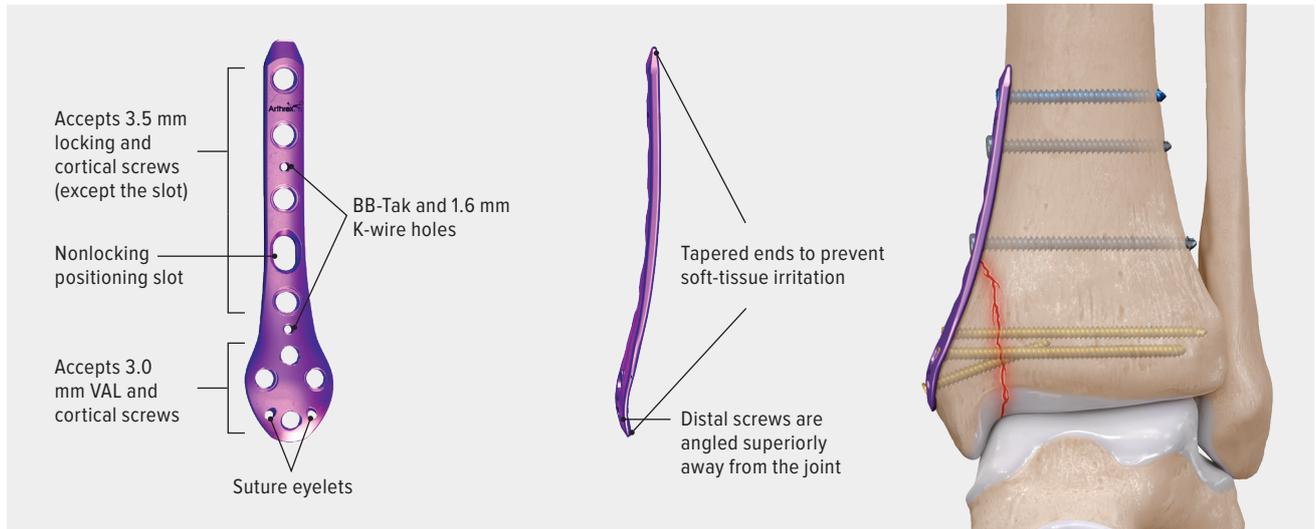
Posterolateral Distal Fibula Plate



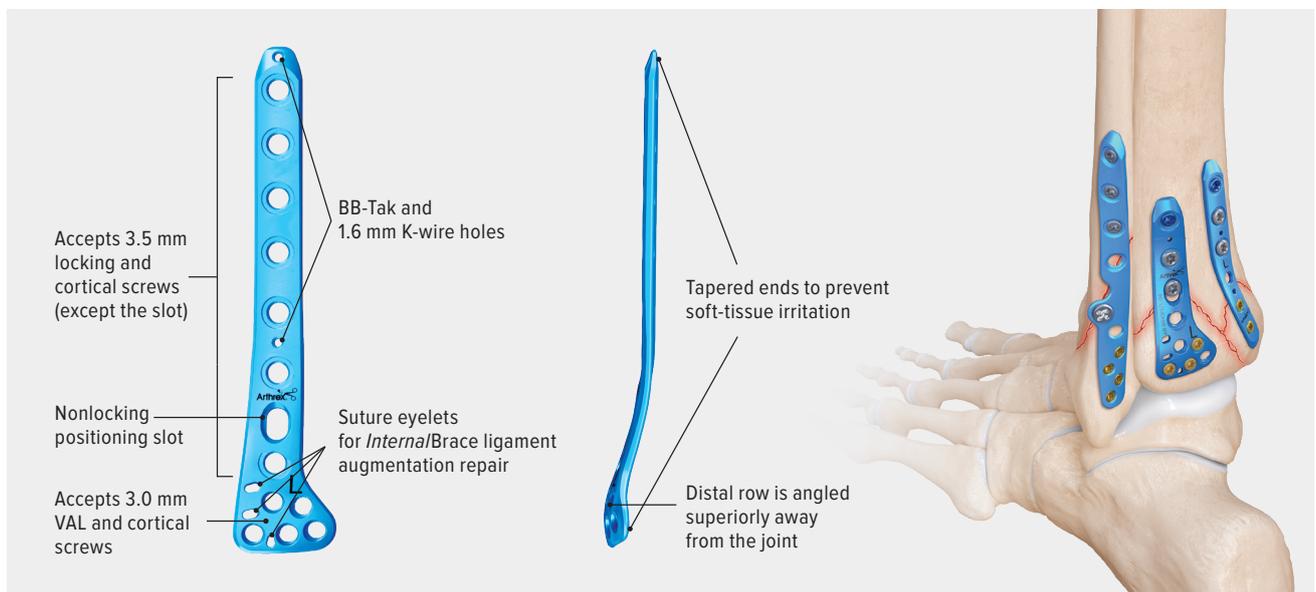
Fragment-Specific Posterior Plates

Titanium posterior ankle fracture plates were designed for use with the Titanium Ankle Fracture Management System. These plates are a collection of fracture-specific titanium plates designed for treating posterior pilon variants. All plates are intentionally undercontoured to buttress fracture fragments and have suture holes for PITFL repair and/or *InternalBrace*™ ligament augmentation repair. This system of plates ensures that we are offering the most comprehensive ankle fracture system on the market.

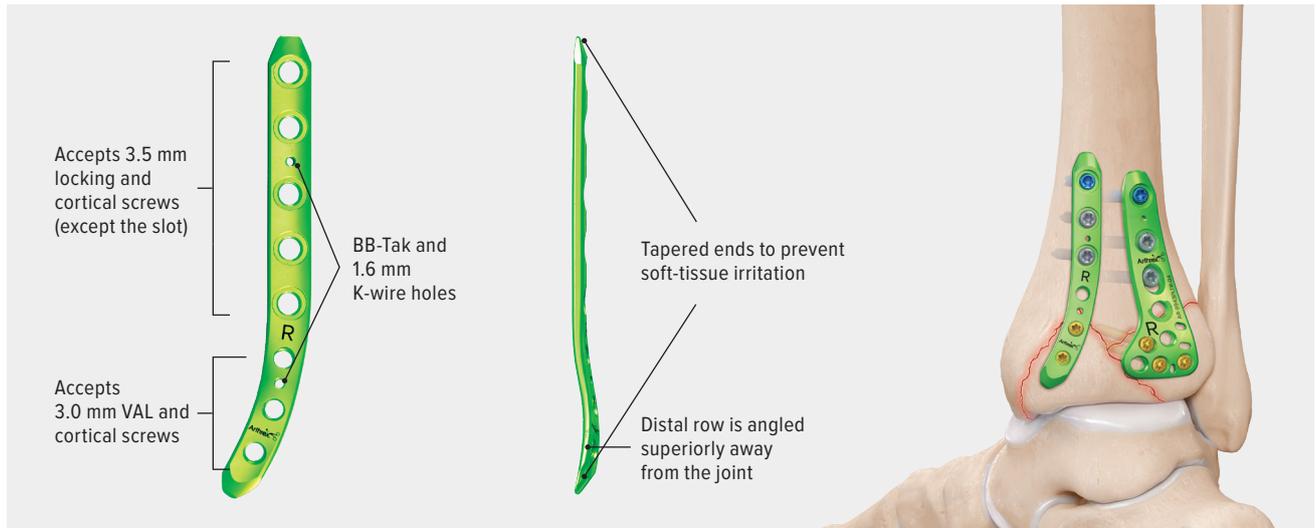
Vertical Shear Distal Tibia Plate



Posterolateral Distal Tibia Plate



Posteromedial Distal Tibia Plate



Fragment-Specific Posterior Plates

Note: All fragment-specific plates, noted on the previous page, follow the same technique.



1 Select the implant with the appropriate size and laterality. Position the plate on the posterior malleolus.



2 Using a smooth or threaded **BB-Tak**, secure the plate to the bone.



3

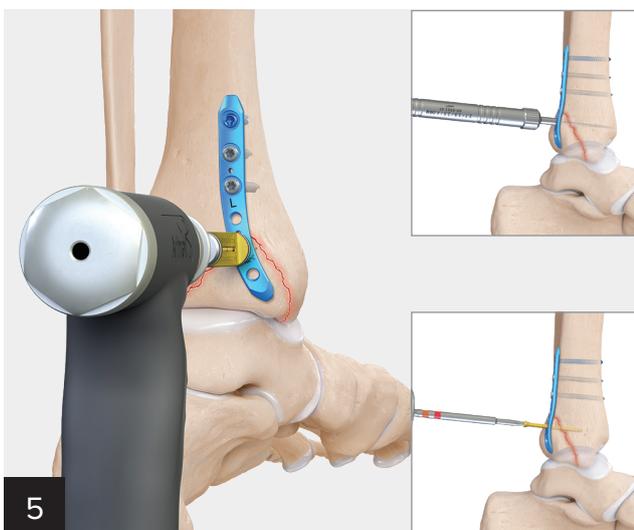
Using the **2.5 mm drill bit**, drill bicortically through the **2.5 mm drill guide**.



4

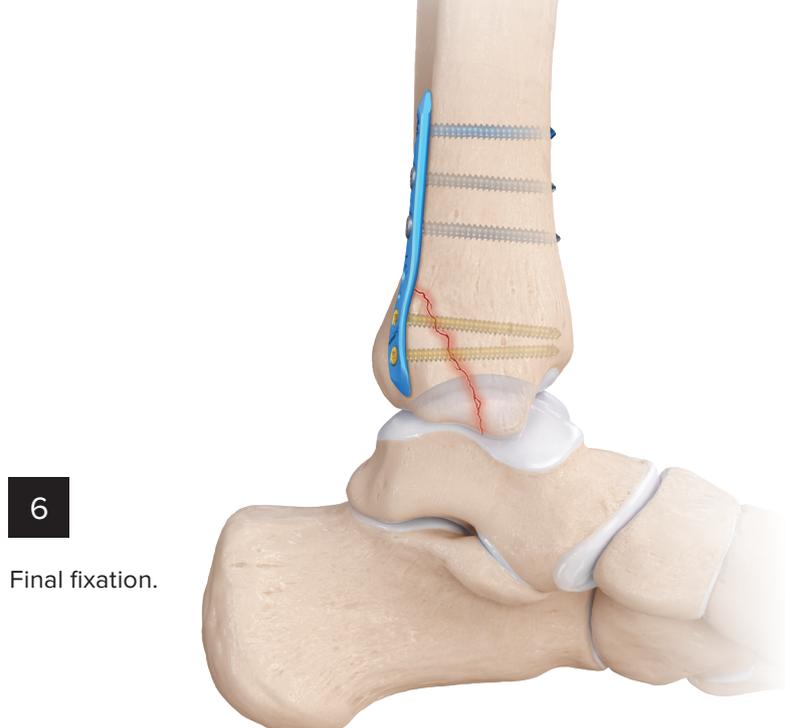


Measure and insert the appropriate length screw. Screw lengths can be read off the drill guide or with a depth gauge.



5

Repeat drilling, measuring, and inserting screws until desired fixation is achieved.



6

Final fixation.

Tray Layout

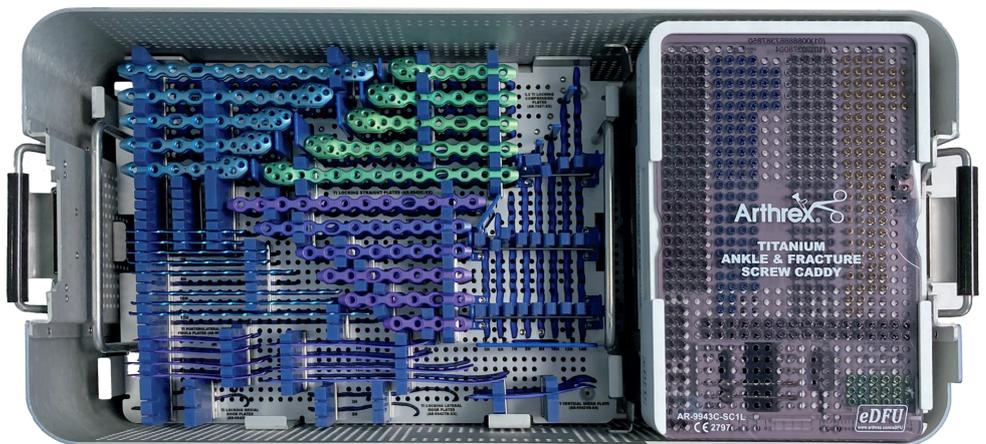
Top Level

Instruments and screws



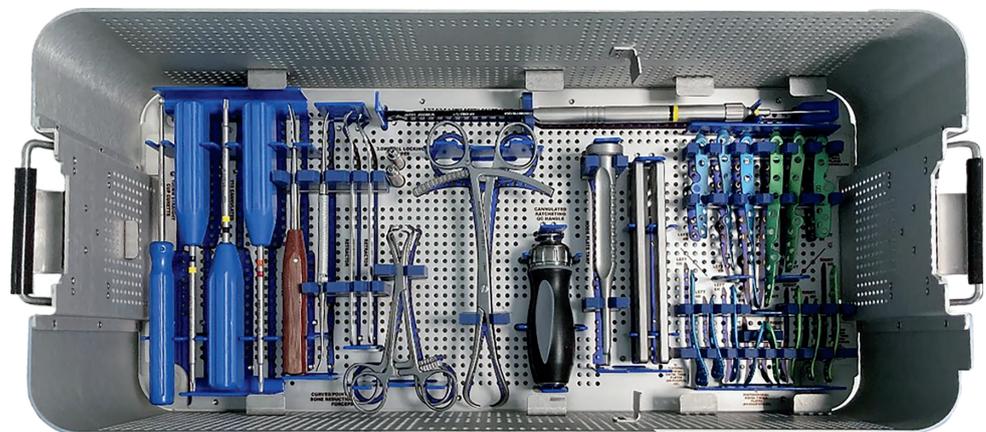
Middle Level

Plates



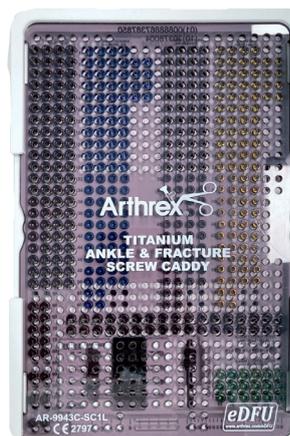
Bottom Level

Instruments and disposables



Screw Caddy

- 3.5 mm cortical screws
- 3.5 mm locking screws
- 3.0 mm cortical screws
- 3.0 mm VAL screws
- 4.0 mm cancellous screws
- 4.0 mm cannulated, short-thread screws



Ordering Information

Titanium Ankle Fracture System (AR-9943S)

Product Description	Item Number
Instruments for 3.0 mm screws	
Screwdriver, T10 hexalobe	AR-8943-08
Drive shaft, T10 hexalobe, qc, qty. 2	AR-8944DH
Drill guide, threaded, low profile, 2.7 mm, qty. 2	AR-8943-17
Drill guide, threaded, low profile, 2.7 mm, 10 mm-60 mm, qty. 2	AR-8963-08
Drill guide, VAL, 3.0 mm	AR-8933GV
Drill guide, 3.0 mm/2.0 mm	AR-8943-31
Disposables	
Drill bit, graduated, 2.0 mm qty. 2	AR-8943-16
Drill bit, calibrated, long, 2.0 mm, qty. 2	AR-8963-05
Drill bit, 3.0 mm, qty. 2	AR-8943-36
Instruments for 3.5 mm cortical, locking, 4 mm cancellous screws	
Bone tap, cancellous, 4.0 mm	AR-8940T
Countersink for 3.5 mm/4.0 mm screws	AR-8950-03
Screwdriver, T15 hexalobe	AR-8943-10
Driver, T15 hexalobe, qty. 2	AR-8941DH
Drill guide, 3.5 mm/2.5 mm	AR-8943-14
Lag drill guide, 3.5 mm/2.5 mm	AR-8963-21
Bone tap, 3.5 mm	AR-8935T
Drill guide, locking, 3.5 mm, qty. 2	AR-8943-43
Drill sleeve insert, 2.5 mm	AR-8943-27
Disposables	
Drill bit, 3.5 mm	AR-4160-35
Drill bit, laser-marked at 3.5 In, graduated, 2.5 mm	AR-8943-42
Drill bit, 2.5 mm, qty. 2	AR-8943-30
Instruments for 4.0 mm cannulated screws	
Drill guide, 2.6 mm/1.35 mm	AR-8943-03
Depth device, cannulated	AR-8943-04
Driver, T15 hexalobe, cannulated	AR-8943-09
Drive shaft, qc, T15 hexalobe, cannulated, qty. 2	AR-8943-12
Bone tap, cannulated, 4.0 mm	AR-8943-06
Countersink, cannulated, 4.0 mm	AR-8943-05
Parallel drill guide, 2.6 mm/1.35 mm	AR-8943-41
Disposables	
Drill bit, cannulated, 2.6 mm, qty. 2	AR-8943-02

Product Description	Item Number
Instruments	
Bone reduction forceps, curved, pointed, qty. 2	AR-8943-07
Holding sleeve for 2.7 mm, 3.5 mm, and 4.0 mm screws	AR-8943-11
Handle, qc, ratcheting, cannulated	AR-8700RH
Depth device, cannulated, long	AR-8943-04L
Depth device, low profile, 2.7 mm/3.5 mm/4.0 mm screws	AR-8943-15
Depth device, low profile, 2.7 mm/3.5 mm/4.0 mm screws, long	AR-8963-13
Bending iron, qty. 2	AR-8943-18
Freer elevator	AR-8943-19
Periosteal elevator, curved blade, 6.0 mm	AR-8943-20
Sharp hook	AR-8943-21
Cup curette, straight shaft, 100 mm	AR-8661
Hohmann retractor, 8.0 mm	AR-13210
Hohmann retractor, 15 mm	AR-8943-22
Lobster claw, qty. 2	AR-8943-23
Weber clamp	AR-8943-24
Screw holding forceps	AR-8941F
Tamp for hook plates	AR-8943-28
Ankle fracture system instrument case, titanium	AR-9943C-1
Disposables	
Guidewire w/ trocar tip, threaded, 0.053 In (1.35 mm × 150 mm), qty. 6	AR-8943-38
Guidewire w/ trocar tip, 0.053 In (1.35 mm × 150 mm), qty. 6	AR-8943-01
Guidewire w/ trocar tip, 0.062 In (1.6 mm × 150 mm), qty. 6	AR-8941K
Guidewire w/ trocar tip, 0.078 In (2.0 mm × 130 mm), qty. 6	AR-8945K
Traction post, threaded, 3.5 mm, sterile	AR-8970JD-35S
Bb-tak, qty. 2	AR-13226
Bb-tak, threaded, qty. 2	AR-13226T
Washer, 7.0 mm, qty. 6	AR-8740W

Product Description	Item Number
Plates	
Locking distal fibula plate, Ti, 4H, right	AR-9943BR-04
Locking distal fibula plate, Ti, 5H, right	AR-9943BR-05
Locking distal fibula plate, Ti, 6H, right	AR-9943BR-06
Locking distal fibula plate, Ti, 8H, right	AR-9943BR-08
Locking distal fibula plate, Ti, 10H, right	AR-9943BR-10
Locking distal fibula plate, Ti, 4H, left	AR-9943BL-04
Locking distal fibula plate, Ti, 5H, left	AR-9943BL-05
Locking distal fibula plate, Ti, 6H, left	AR-9943BL-06
Locking distal fibula plate, Ti, 8H, left	AR-9943BL-08
Locking distal fibula plate, Ti, 10H, left	AR-9943BL-10
Locking straight plate, Ti, 4H	AR-9943C-04
Locking straight plate, Ti, 6H	AR-9943C-06
Locking straight plate, Ti, 7H	AR-9943C-07
Locking straight plate, Ti, 8H	AR-9943C-08
Locking straight plate, Ti, 10H	AR-9943C-10
Locking straight plate, Ti, 12H	AR-9943C-12
Locking third tubular plate, Ti, 4H	AR-9943T-04
Locking third tubular plate, Ti, 5H	AR-9943T-05
Locking third tubular plate, Ti, 6H	AR-9943T-06
Locking third tubular plate, Ti, 7H	AR-9943T-07
Locking third tubular plate, Ti, 8H	AR-9943T-08
Locking third tubular plate, Ti, 10H	AR-9943T-10
Locking third tubular plate, Ti, 12H	AR-9943T-12
Posterolateral distal fibula plate, Ti, 4H	AR-9963PLL-04
Posterolateral distal fibula plate, Ti, 5H	AR-9963PLL-05
Posterolateral distal fibula plate, Ti, 6H	AR-9963PLL-06
Posterolateral distal fibula plate, Ti, 8H	AR-9963PLL-08
Posterolateral distal fibula plate, Ti, 10H	AR-9963PLL-10
Locking medial hook plate, Ti, 3H	AR-9943H-03
Locking medial hook plate, Ti, 5H	AR-9943H-05
Locking lateral hook plate, Ti, 3H	AR-9943TH-03
Locking lateral hook plate, Ti, 5H	AR-9943TH-05
Vertical shear distal tibia plate, Ti, 4H	AR-9943VS-04
Posterolateral distal tibia plate, Ti, left, 4H	AR-9943PLTL-04
Posterolateral distal tibia plate, Ti, left, 6H	AR-9943PLTL-06
Posterolateral distal tibia plate, Ti, right, 4H	AR-9943PLTR-04
Posterolateral distal tibia plate, Ti, right, 6H	AR-9943PLTR-06
Posteromedial distal tibia plate, Ti, left, 4H	AR-9943PMTL-04
Posteromedial distal tibia plate, Ti, left, 6H	AR-9943PMTL-06
Posteromedial distal tibia plate, Ti, right, 4H	AR-9943PMTR-04
Posteromedial distal tibia plate, Ti, right, 6H	AR-9943PMTR-06
Posterolateral anatomic distal fibula plate, Ti, right 4H	AR-9963APLR-04
Posterolateral anatomic distal fibula plate, Ti, right 6H	AR-9963APLR-06
Posterolateral anatomic distal fibula plate, Ti, right, 8H	AR-9963APLR-08
Posterolateral anatomic distal fibula plate, Ti, left, 4H	AR-9963APLL-04
Posterolateral anatomic distal fibula plate, Ti, left, 6H	AR-9963APLL-06
Posterolateral anatomic distal fibula plate, Ti, left, 8H	AR-9963APLL-08

Product Description	Item Number
Plates--Special Order	
Locking distal fibula plate, Ti, right, 12H	AR-9943BR-12
Locking distal fibula plate, Ti, right, 14H	AR-9943BR-14
Locking distal fibula plate, Ti, left, 12H	AR-9943BL-12
Locking distal fibula plate, Ti, left, 14H	AR-9943BL-14
Locking medial hook plate, Ti, 7H	AR-9943H-07
Locking lateral hook plate, Ti, 7H	AR-9943TH-07
Posterolateral distal tibia plate, right, 8H	AR-9943PLTR-08
Posterolateral distal tibia plate, left, 8H	AR-9943PLTL-08
Posteromedial distal tibia plate, right, 8H	AR-9943PMTR-08
Posteromedial distal tibia plate, left, 8H	AR-9943PMTL-08
Posterolateral anatomic distal fibula plate, Ti, right, 10H	AR-9963APLR-10
Posterolateral anatomic distal fibula plate, Ti, left, 10H	AR-9963APLL-10
Low Profile Screws, Titanium	
Cortical, 3.0 mm × 10 mm-50 mm (2.0 mm increments), 55 mm, 60 mm	AR-8933-10-60
Variable angle locking, 3.0 mm × 10 mm-50 mm (2.0 mm increments), 55 mm, 60 mm	AR-8933V-10-60
Cortical, 3.5 mm × 10 mm-50 mm (2.0 mm increments), 55 mm-110 mm (5.0 mm increments)	AR-8935-10-110
Locking, 3.5 mm × 10 mm-50 mm (2.0 mm increments), 55 mm, 60 mm	AR-8935L-10-60
Cancellous, fully threaded, 4.0 mm × 14 mm-24 mm (2.0 mm increments)	AR-8940-14-24
Canulated, short thread, 4.0 mm × 30 mm-50 mm (2.0 mm increments), 55 mm-80 mm (5.0 mm increments)	AR-8740-30PTS-80PTS



This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience, and should conduct a thorough review of pertinent medical literature and the product's directions for use. Postoperative management is patient-specific and dependent on the treating professional's assessment. Individual results will vary and not all patients will experience the same postoperative activity level or outcomes.

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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