

EXTREMILOCK™

Ankle Plating System

Surgical Technique Guide



Rethinking Possibilities, Reshaping Lives

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System Overview

The ExtremiLOCK Ankle Plating System is a comprehensive ankle fracture system intended to provide solutions for various bony fractures, including simple to complex fractures of the distal tibia and fibula. All system components are contained in a single-instrument tray which houses:

- 6 Different Types of Fracture Plating Options
- 7 Different Types of Screw Fixation Options
- Comprehensive, Color-coded Instrumentation

Indications

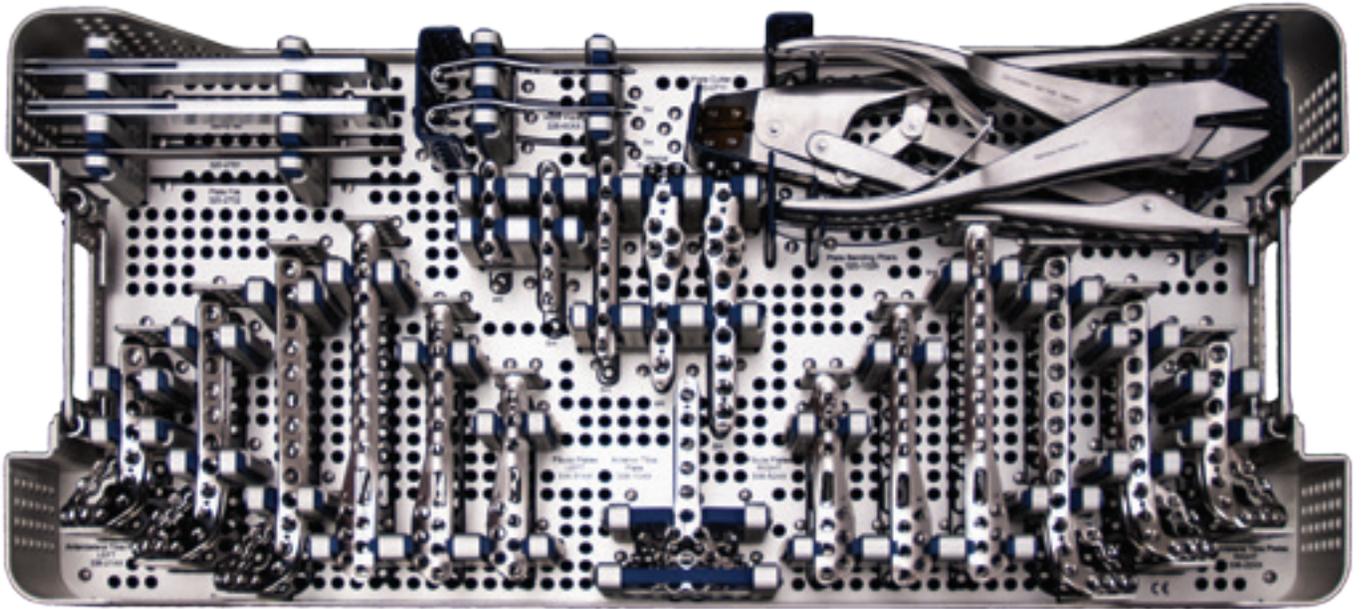
The OsteoMed ExtremiLOCK Ankle Plating System is intended for fixation of fractures, arthrodesis, osteotomies, and non-unions of the tibia and fibula. The ExtremiLOCK Ankle Plating System implants are intended for single use only.

The 1/3 tubular plates, hook plates, screws and washers are also intended for use in trauma, general surgery and reconstructive procedures of bones appropriate for the size of the device.

The OsteoMed ExtremiLOCK Ankle Plating System can be used for adult and pediatric patients.



Implant Tray



320-2921 ExtremitiLOCK Ankle Plate Removable Tray

Anterior Lateral Tibia



336-2107 7H Anterior Lateral Plate, Left
336-2110 10H Anterior Lateral Plate, Left
336-2113 13H Anterior Lateral Plate, Left

336-2207 7H Anterior Lateral Plate, Right
336-2210 10H Anterior Lateral Plate, Right
336-2213 13H Anterior Lateral Plate, Right

Lateral Fibula



336-5103 3H Fibula Fracture Plate, Left
336-5106 6H Fibula Fracture Plate, Left
336-5109 9H Fibula Fracture Plate, Left

336-5203 3H Fibula Fracture Plate, Right
336-5206 6H Fibula Fracture Plate, Right
336-5209 9H Fibula Fracture Plate, Right

Anterior Tibia



336-1006 6H Anterior Tibia Plate, Universal

Universal Hook



336-6007 7H Hook Plate, Universal

Medial Tibia



336-4004 4H Tibia Fracture Plate
336-4006 6H Tibia Fracture Plate

1/3 Tubular



336-0004 4H 1/3 Tubular
336-0006 6H 1/3 Tubular
336-0008 8H 1/3 Tubular

Instruments



320-2780 Slotted Plate Bender #1



320-2781 Slotted Plate Bender #2



320-2702 Plate File

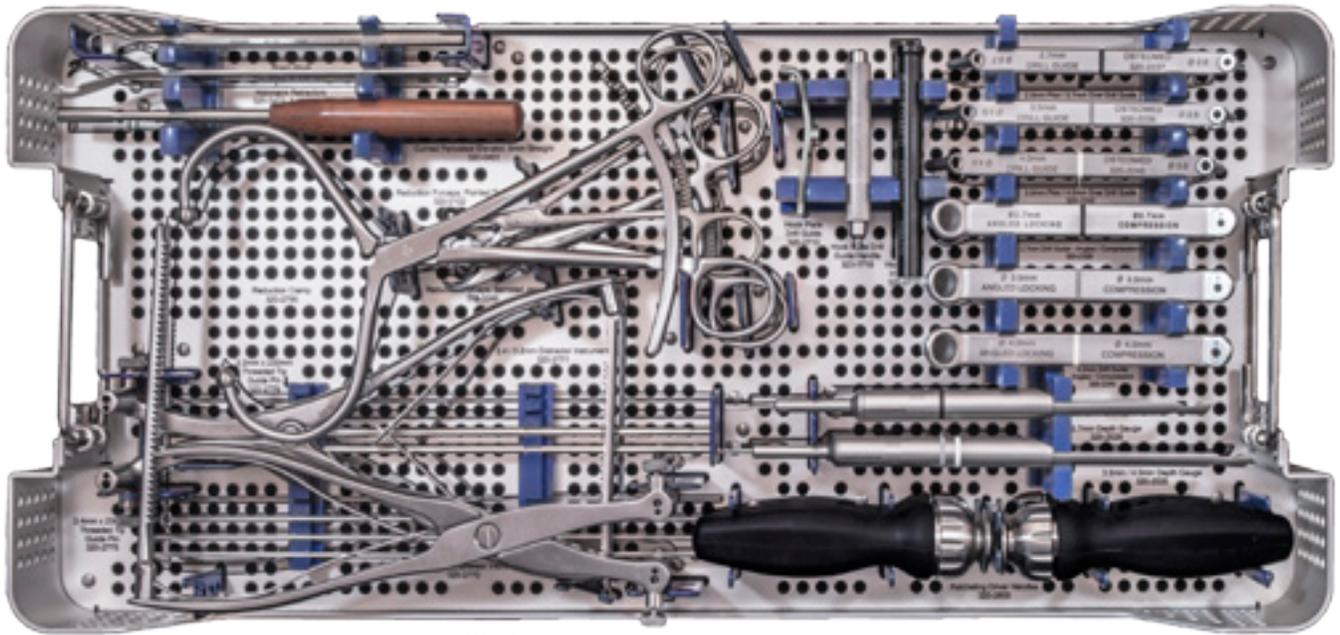


220-0711 Plate Cutter



320-1029 Plate Bending Pliers

Instrument Tray



320-2922 ExtremitiLOCK Ankle Instrument Removable Tray

Instruments



320-2227 2.0mm Pilot/2.7mm Over Drill Guide



320-2235 2.5mm Pilot/3.5mm Over Drill Guide



320-2240 3.0mm Pilot/4.0mm Over Drill Guide



320-2328 2.7mm Drill Guide - Angled / Compression



320-2335 3.5mm Drill Guide - Angled / Compression



320-2340 4.0mm Drill Guide - Angled / Compression



320-2800 Ratcheting Driver Handle



323-1719 Hook Plate Drill Guide Handle



320-2711 Universal Hook Plate Drill Guide



320-2712 Hook Plate Impactor



320-1024 Sharp Hook



320-0402 Hohmann Retractor, 15mm Blade



320-1021 Hohmann Retractor, 8mm Blade



320-0401 Curved Periosteal Elevator, 6mm Straight



320-2775 2.4 x 230mm Threaded Tip Guide Pin



320-2776 3.2 x 230mm Threaded Tip Guide Pin



320-2528 2.7mm Depth Gauge, 10mm - 60mm



320-2535 3.5mm / 4.0mm Depth Gauge, 10mm - 70mm

Instrument Tray

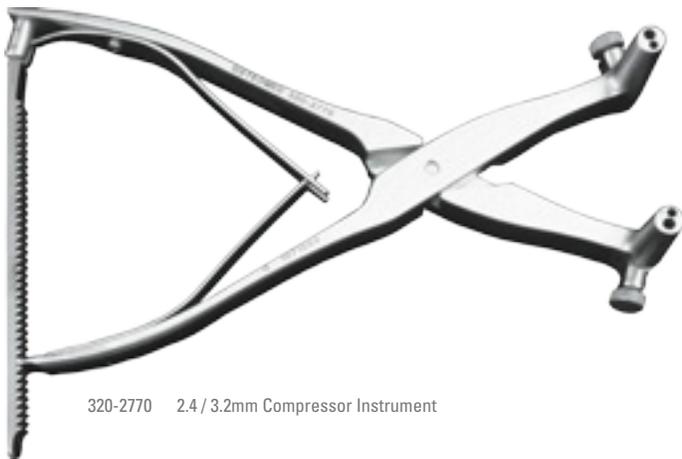
Instruments



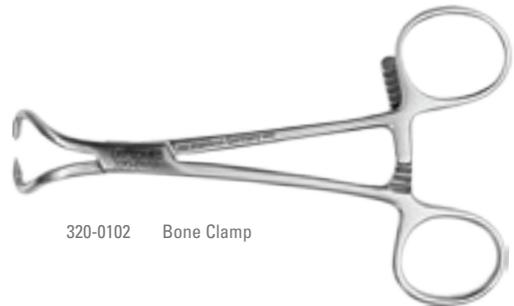
320-2795 Reduction Clamp



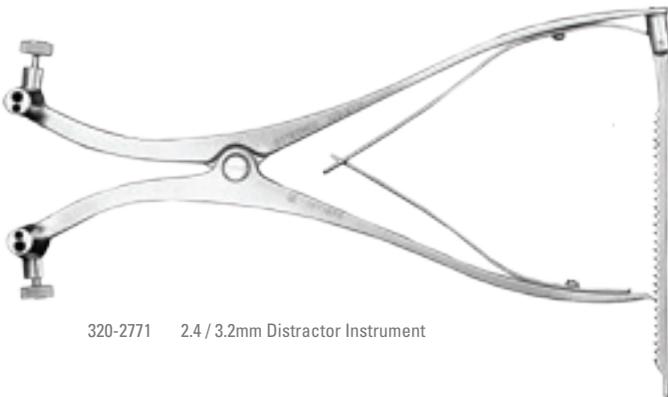
316-0046 Reduction Forceps with Serrated Jaw



320-2770 2.4 / 3.2mm Compressor Instrument



320-0102 Bone Clamp



320-2771 2.4 / 3.2mm Distractor Instrument

Solid Core Screw Module



320-2924 Solid Core Screw Module

Screws



342-27xx



2.7mm, Double Lead, Non-Locking Screw, 10mm - 40mm



337-35xx



3.5mm, Double-Lead Non-Locking, 10mm - 60mm



337-40xx



4.0mm, Double-Lead Non-Locking, 10mm - 60mm



343-27xx



2.7mm, Double Lead, Locking Screw, 10mm - 40mm



338-35xx



3.5mm, Double-Lead Locking, 10mm - 60mm



338-40xx



4.0mm, Double-Lead Locking, 10mm - 60mm

Instruments & Consumables



337-3599

3.5/4.0mm Washer



337-0001

1.6mm Threaded Holding TAK™



320-2720

Driver Sleeve



320-2400

Self-Retaining Screw Driver, Quick Release



320-2020

2.0mm Short Pilot Drill, Quick Release



320-2025

2.5mm Short Pilot Drill, Quick Release



320-2030

3.0mm Short Pilot Drill, Quick Release



320-2120

2.0mm Long Pilot Drill, Quick Release



320-2130

3.0mm Long Pilot Drill, Quick Release



320-2125

2.5mm Long Pilot Drill, Quick Release



320-2027

2.7mm Over Drill, Quick Release



320-2035

3.5mm Over Drill, Quick Release



320-2040

4.0 Over Drill, Quick Release



320-2728

2.7mm Countersink, Quick Release



320-2735

3.5/4.0mm Countersink, Quick Release

Cannulated Screw Module



320-2925 Cannulated Screw Module

Screws



339-40xx



4.0mm, Double-Lead, Non-Locking, Cannulated
20mm - 60mm

Instruments



321-0123 1.6mm x 150mm K-wire



320-2216 Cannulated Drill Guide



320-2627 2.7mm Cannulated Pilot Drill, Quick Release



320-2640 4.0mm Cannulated Over Drill, Quick Release



320-2675 Cannulated Depth Gauge



320-2785 Screw Remover



320-2615 Cannulated Screw Driver, Quick Release



320-2800 Ratcheting Driver Handle

Implant Selection

Plates

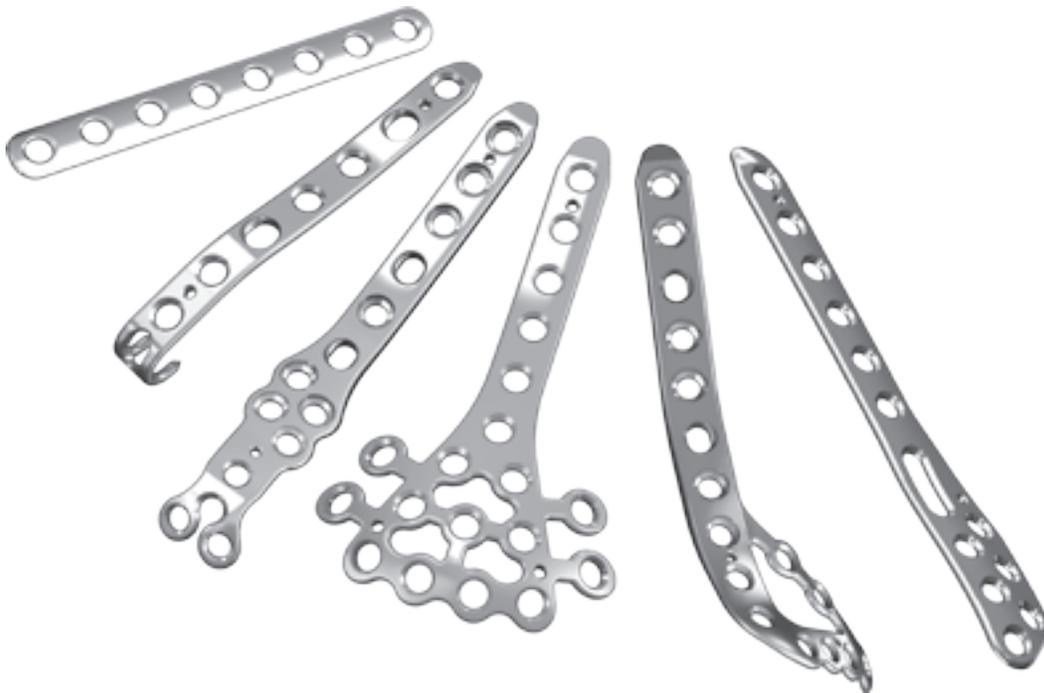
Preoperative planning, knowledge of the surgical technique, proper implant selection and placement are important considerations when using the ExtremiLOCK Ankle Plating System. Choose implants that address the specific needs dictated by the fracture location, type and classification. Additional considerations include the anatomical variables of the patient.

ExtremiLOCK fracture plating options include: Anterior Tibia, Anterior Lateral Tibia, Medial Tibia, Lateral Fibula, 1/3 Tubular and Universal Hook plating options. All plates accommodate 2.7mm, 3.5mm and 4.0mm locking and non-locking screws. Each plating option, excluding the 1/3 Tubular plates, feature a bullet tip to facilitate a minimally-invasive surgical approach.

Screws & Washers

The ExtremiLOCK Ankle Plating System provides surgeons with a broad range of screw fixation options. Screw options include: 2.7mm, 3.5mm and 4.0mm cortical locking and non-locking screws, as well as 4.0mm cancellous non-locking, cannulated screws. Locking screws can be locked on-axis with the plate threads or up to 20 degrees of angled-locking in any direction (40 degree conical). All screws are self-tapping, and feature a universal drive mechanism and a double-lead thread pattern to promote efficient bony purchase. The 4.0mm cannulated screws also incorporate a self-drilling feature to facilitate screw insertion.

Bone screw washers accommodate 2.7mm, 3.5mm and 4.0mm non-locking screws and are intended to prevent screws from breaking through the cortex of the bone. Bone washers are not intended to be used with the fracture plates.



Surgical Procedure

Incision

Preoperative fluoroscopy and/or CT scans should be used to determine the proper approach and surgical incision. The incision location should take into account the fracture type and individual patient anatomy.

Fracture Reduction

Reduction / Tissue Manipulation Instruments

- 1.6mm x 150mm K-wire
- Bone Clamp
- Reduction Forceps, with Serrated Jaw
- Holman Retractor, 8mm Blade
- Holman Retractor, 15mm Blade
- Curved Periosteal Elevator, 6mm Straight
- Sharp Hook
- 2.4 / 3.2mm Compressor Instrument
- 2.4 / 3.2mm Distractor Instrument
- 2.4 x 230mm Threaded Tip Guide Pin
- 3.2 x 230mm Threaded Tip Guide Pin

Anatomic reduction should be performed based on the surgeon's best judgment. In cases of comminution and bone loss, the contra-lateral ankle may be used as a reference to assist with anatomic reduction. Bone reduction forceps and K-wires may be used to facilitate temporary bony fixation. Anatomic reduction should be confirmed fluoroscopically.

Lag Screw Technique (Solid Core Screws)

2.7mm Instruments

- 2.0mm Short Pilot Drill
- 2.0mm Long Pilot Drill
- 2.7mm Over Drill
- 2.0mm Pilot / 2.7mm Drill Guide
- 2.7mm Countersink
- 2.7mm Depth Gauge
- Screw Driver

3.5mm Instruments

- 2.5mm Short Pilot Drill
- 2.5mm Long Pilot Drill
- 3.5mm Over Drill
- 2.5mm Pilot / 3.5mm Drill Guide
- 3.5/4.0mm Countersink
- 3.5/4.0mm Depth Gauge
- Screw Driver

4.0mm Instruments

- 3.0mm Short Pilot Drill
- 3.0mm Long Pilot Drill
- 4.0mm Over Drill
- 3.0mm Pilot / 4.0mm Drill Guide
- 3.5/4.0mm Countersink
- 3.5/4.0mm Depth Gauge
- Screw Driver

The ExtremiLOCK Ankle Plating System incorporates 2.7mm, 3.5mm and 4.0mm fully-threaded screws and corresponding instrumentation to address various types of distal tibia and fibula fractures. The following steps describe insertion of a solid core screw using the lag screw technique:

1. Drill

Choose the appropriate overdrill and drill the proximal fragment to create a gliding hole. To maximize compression, the hole should be drilled as perpendicular to the fracture line as possible. Use the appropriate drill guide and corresponding pilot drill to create the pilot hole through the distal fragment. Care should be taken to ensure the fragments are properly reduced prior to drilling through the distal fragment.



Lag Screw Technique (Solid Core Screws)

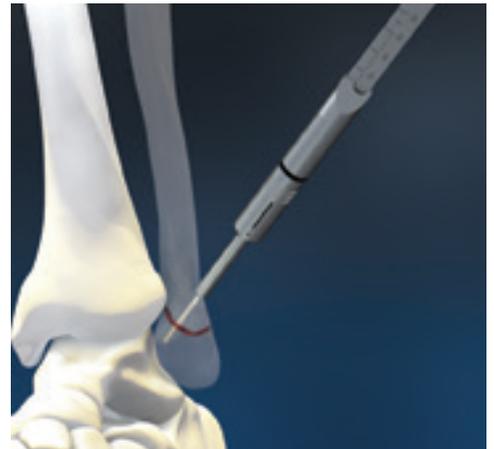
2. Countersink (Optional)

If desirable, the countersink may be used to reduce the profile of the screw head and to decrease cortical stress. Place the appropriately-sized countersink in the pre-drilled hole and rotate clock-wise to remove the desired amount of bone to accommodate the screw head. Care should be taken to not remove too much bone.



3. Determine Screw Length

Select the appropriate depth gauge to determine the correct screw length.



4. Screw Insertion

Select the appropriate screw and insert. Screw length can be verified using the length gauge on the screw block. Closely observe compression along the fracture line as the screw is being inserted. Repeat as necessary for additional screw placement.



Lag Screw Technique (Cannulated Screws)

4.0mm Cannulated Instruments

- 1.6mm x 150mm K-wire
- 4.0mm Cannulated Depth Gauge
- Cannulated Drill Guide
- 2.7mm Cannulated Pilot Drill
- 4.0mm Cannulated Over Drill
- Cannulated Screw Driver

The ExtremiLOCK Ankle Plating System incorporates 4.0mm fully-threaded cannulated screws and corresponding instrumentation. The following steps describe insertion of a cannulated screw using the lag screw technique:

1. Insert K-wire

Insert the k-wire to the appropriate depth under fluoroscopy. Care should be taken to not bend the wire when placing it in bone. The cannulated drill guide may be used to facilitate k-wire insertion.



2. Determine Screw Length

Place the Cannulated Depth Gauge over the K-wire and measure the correct screw length. If desirable, the distal end of the depth gauge can also be used to remove additional bone to accommodate any screw head prominence. Screw length should be measured after any bony removal with the countersink.



3. Drill

Place the cannulated overdrill over the k-wire and drill the proximal fragment to create a gliding hole. The Cannulated Drill Guide can be used to facilitate drill insertion. To maximize compression, the hole should be drilled as perpendicular to the fracture line as possible. Care should be taken to ensure the fragments are properly reduced prior to drilling through the distal fragment. The cannulated pilot drill can be used to drill the distal fragment if desired.



Lag Screw Technique (Cannulated Screws)

4. Screw Insertion

Select the appropriate screw and insert over the K-wire. Screw length can be verified using the length gauge on the screw block. Closely observe compression along the fracture line as the screw is being inserted. Remove and discard the K-wire. Repeat as necessary.



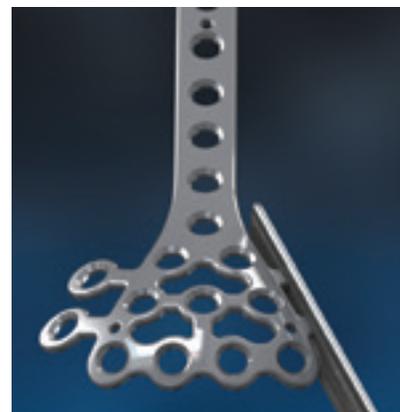
Plating (Contouring)

Contouring Instruments

- Plate Bending Pliers
- Slotted Plate Bender #1
- Slotted Plate Bender #2
- Plate Cutter
- Plate File

The ExtremiLOCK ankle plates are pre-contoured to match the anatomy of the distal tibia and fibula. However, if additional contouring is necessary, plate bending pliers or slotted plate benders may be used to achieve the desired contour. The slotted benders feature various slot heights to accommodate plate thicknesses. Care should be taken to avoid over-bending or bending plates multiple times to prevent stress risers.

A plate cutter is also available to cut the distal aspect of the anterior tibia, medial tibia, and anterior lateral tibia plates. The 1/3 tubular plates can also be cut to the desired length. A plate file is available to blunt any sharp edges.

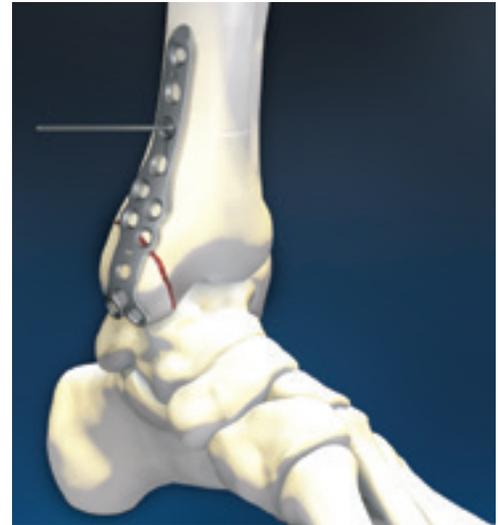


Plating (Provisional Fixation)

Provisional Fixation Instruments

- 1.6mm x 150mm K-wire
- 1.6mm Threaded Plate Holding TAK

Based on the type of fracture, choose the most appropriate ankle fracture plate. Position the plate over the fracture. Care should be taken to ensure adequate points of fixation can be achieved on all sides of the fracture line(s). If desirable, temporary fixation can be achieved using K-wires or plate TAKs.



Plating (Screw Preparation and Insertion)

2.7mm Instruments

- 2.0mm Pilot / 2.7mm Over Guide
- 2.7mm Drill Guide–Angled/Comp
- 2.0mm Short Pilot Drill
- 2.0mm Long Pilot Drill
- 2.7mm Depth Gauge
- Screw Driver

3.5mm Instruments

- 2.5mm Pilot / 3.5mm Over Guide
- 3.5mm Drill Guide–Angled/Comp
- 2.5mm Short Pilot Drill
- 2.5mm Long Pilot Drill
- 3.5/4.0mm Depth Gauge
- Screw Driver

4.0mm Instruments

- 3.0mm Pilot / 4.0mm Over Guide
- 4.0mm Drill Guide–Angled/Comp
- 3.0mm Short Pilot Drill
- 3.0mm Long Pilot Drill
- 3.5/4.0mm Depth Gauge
- Screw Driver

All circular plate holes can accommodate 2.7mm, 3.5mm and 4.0mm locking and non-locking screws as well as 4.0mm cannulated screws. All locking screws can be locked on-axis with the plate threads or up to 20 degrees angled-locking in any direction (40 degree conical). Once the appropriate screw diameter has been selected, follow the steps below for screw insertion through a plate:

Plating (Screw Preparation and Insertion)

1. Drill

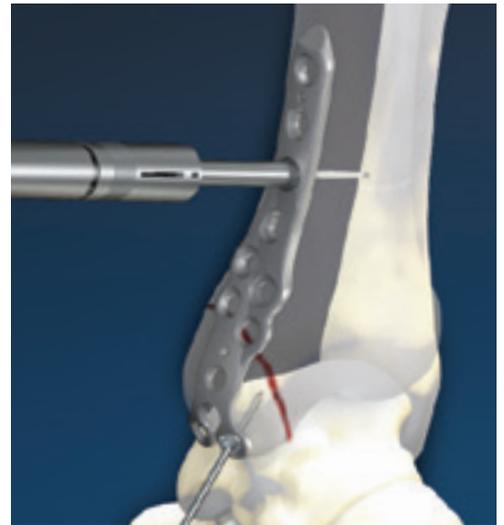
If using **non-locking screws**, select the appropriate pilot/over drill guide and insert the pilot drill side through the target plate hole. Continue to drill a pilot hole using the appropriately-sized pilot drill.

If using **locking screws**, select the appropriate size angled locking/compression drill guide and insert the guide into the desired plate hole. Ensure the guide is fully engaged in the corresponding plate hole. The cone will ensure the drill remains within the 40° angled locking screw range ($\pm 20^\circ$ from center).



2. Determine Screw Length

Select the corresponding depth gauge to determine the correct screw length.



3. Screw Insertion

Select the appropriate screw and insert. Screw length can be verified using the length gauge on the screw block. Final tightening should be performed using a two-finger technique to avoid over-tightening. Locking screws can be locked/unlocked up to three times in a single hole prior to final tightening. Repeat as necessary for additional screw placement.



Plating (Compression Hole)

2.7mm Instruments

2.0mm Short Pilot Drill
2.7mm Drill Guide–Angled/Comp
2.0mm Long Pilot Drill
2.7mm Depth Gauge
Screw Driver

3.5mm Instruments

2.5mm Short Pilot Drill
3.5mm Drill Guide–Angled/Comp
2.5mm Long Pilot Drill
3.5/4.0mm Depth Gauge
Screw Driver

4.0mm Instruments

3.0mm Short Pilot Drill
4.0mm Drill Guide–Angled/Comp
3.0mm Long Pilot Drill
3.5/4.0mm Depth Gauge
Screw Driver

Compression screw holes are used for providing compression across a fracture site and can only accommodate non-locking screws. Compression is created as the screw travels to the distal side of the compression screw hole. Follow the steps below for screw insertion through a compression hole:

1. Drill

Select the appropriate angled/compression guide and insert into the target compression hole. The arrow will be pointing toward the fracture/fusion site to drill eccentrically. To maximize compression, ensure the drill guide is fully engaged with the target compression hole. Drill using the appropriately-sized pilot drill.



2. Determine Screw Length

Select the corresponding depth gauge to determine the correct screw length.



3. Screw Insertion

Select the appropriate screw and insert. Screw length can be verified using the length gauge on the screw block. Final tightening should be performed using a two-finger technique to avoid over-tightening. Repeat as necessary for additional compression screw placement.



Plating (Syndesmosis Fixation)

Syndesmosis Instrument Reduction Clamp

The ExtremiLOCK fibula plates feature a syndesmotic slot that can accommodate up to two non-locking screws. The syndesmotic slot has been designed to place fixation in the correct anatomical location and also accommodate anterior screw angulation. A syndesmotic reduction clamp is available to assist with fixation. Follow the steps below for syndesmotic fixation through a plate:

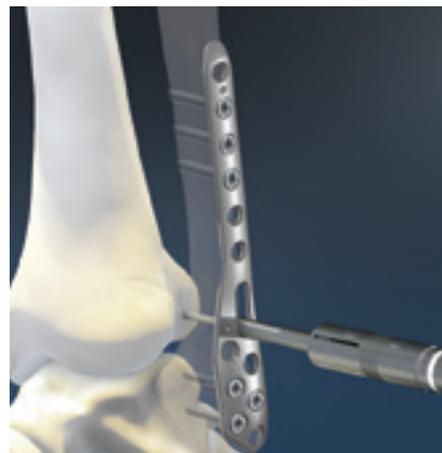
1. Drill

Select the appropriate pilot and drill through the syndesmotic slot.



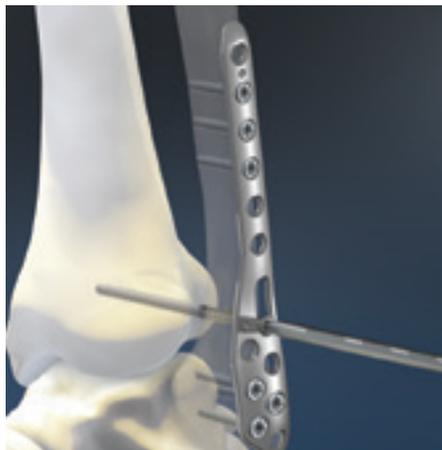
2. Determine Screw Length

Select the corresponding depth gauge to determine the correct screw length.



3. Screw Insertion

Select the appropriate screw and insert. Final tightening should be performed using a two-finger technique to avoid over-tightening. Verify fixation with fluoroscopy.



Plating (Hook Plate Fixation)

Hook Plating Instruments

1.6mm Threaded Plate Holding TAK
1.6mm x 150mm K-wire
Universal Hook Plate Drill Guide
Hook Plate Drill Guide Handle
Hook Plate Impactor

The ExtremiLOCK Hook plates are universal and intended to be used on either the tibia or fibula. The following steps describe implantation of a hook plate:

1. Contour

If applicable, contour the plate as needed to accommodate the patient's anatomy.

2. Pre-Drill (Optional)

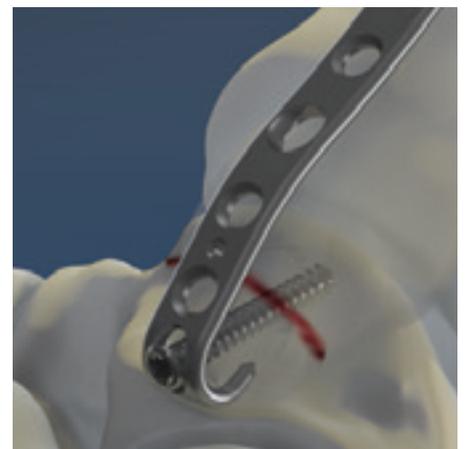
If desirable, pre-drilling for the hooks may be accomplished using either a 2.0mm drill or K-wire. The universal hook plate drill guide, supported by the handle, k-wires, or TAKs, allows the surgeon to generally position the drill.

3. Placement

Position the plate so that the hooks capture the bony fragment(s). The hook impactor may be used to secure the hook plate position.

4. Screw Insertion

Insert screws using the previously described Screw Preparation and Insertion Technique.



Plating (Cannulated Screw)

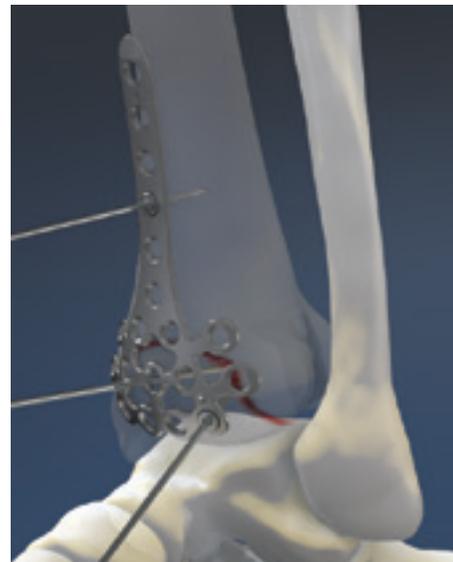
4.0mm Cannulated Instruments

- 1.6mm x 150mm K-wire
- 4.0mm Cannulated Depth Gauge
- Cannulated Drill Guide
- 2.7mm Cannulated Pilot Drill
- Cannulated Screw Driver

The ExtremiLOCK 4.0mm cannulated screws can be used with any ankle fracture plate. When using a cannulated screw, the cannulated screw must be implanted prior to any other screw. Only one cannulated screw can be used per plate. Follow the steps below for cannulated screw insertion through a plate:

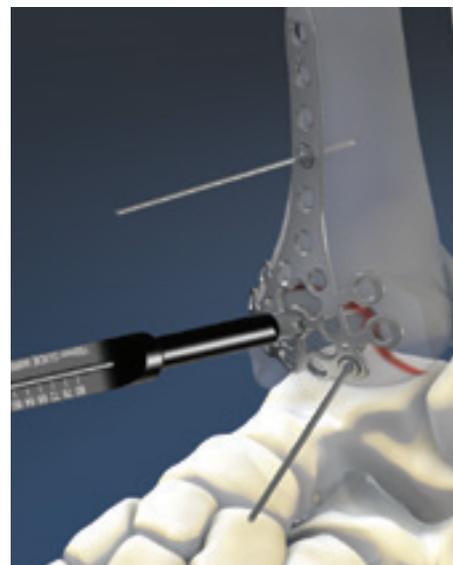
1. Insert K-wire

Insert the K-wire to the appropriate depth under fluoroscopy. Care should be taken to not bend the wire when placing it in bone.



2. Determine Screw Length

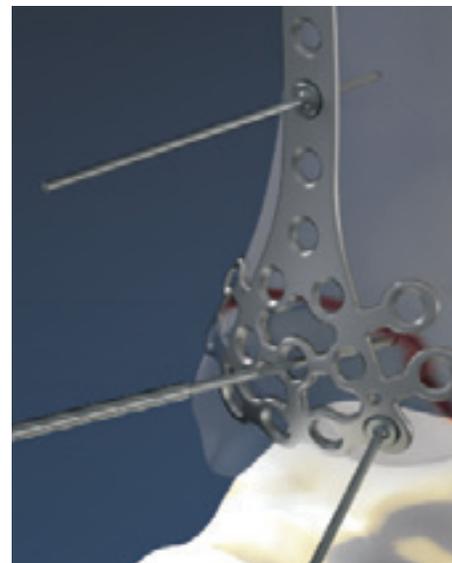
Place the cannulated depth gauge over the K-wire and measure the correct screw length. Care should be taken to ensure the distal end of the depth gauge does not damage the plate.



Plating (Cannulated Screw)

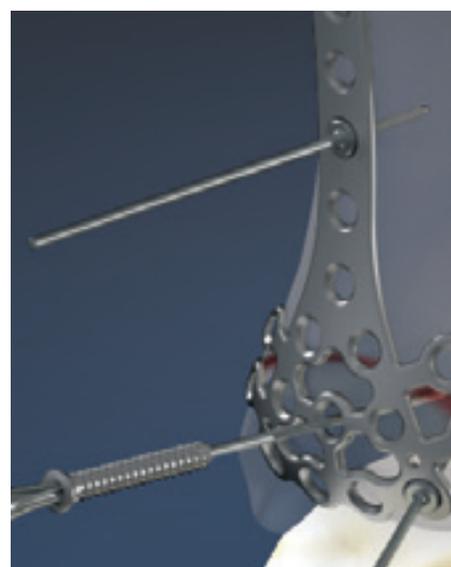
3. Drill

Place the cannulated pilot drill over the K-wire and drill to the corresponding depth.



4. Screw Insertion

Select the appropriate cannulated screw and insert over the K-wire. Screw length can be verified using the length gauge on the screw block. Remove and discard the K-wire. Insert screws using the previously described Screw Preparation and Insertion Technique.



OsteoMed Products



ExtremiLOCK Foot Plating System



ExtremiFix Headless Cannulated Screws



ExtremiFix Cannulated Screws



Large Cannulated Screws



ExtremiFuse



EnCompass



EnCompass Lessers



Hemi



ReFlexion



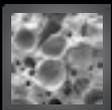
InterPhlex



Talar-Fit



OsteoVation EX



OsteoVation QWIK



Comprehensive Allograft Offering



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