The Locking Calcaneal Plate Instrument and Implant Set

Technique Guide

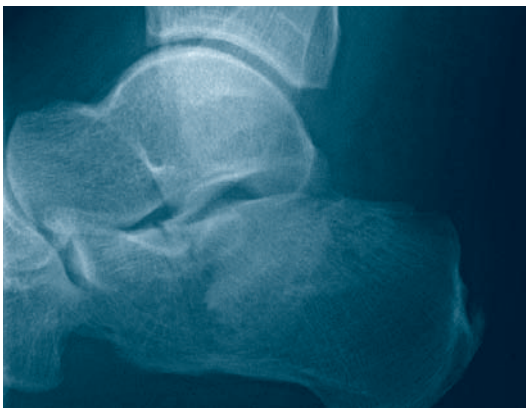
SYNTHES®

Contents

Warning
This description is not sufficient for an immediate application of the instrumentation. An instruction by an experienced surgeon in handling this instrumentation is highly recommended.

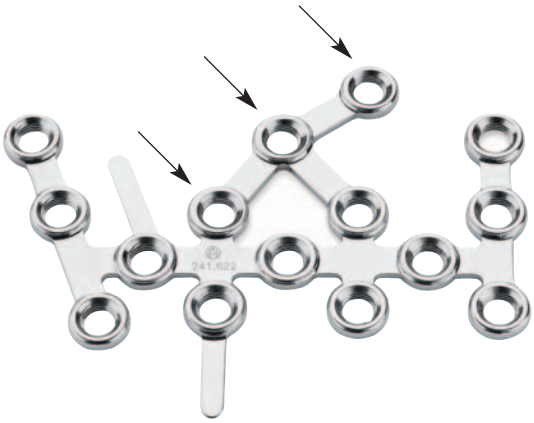
The Locking Calcaneal Plate

The Locking Calcaneal Plates address complex fractures of the calcaneus.



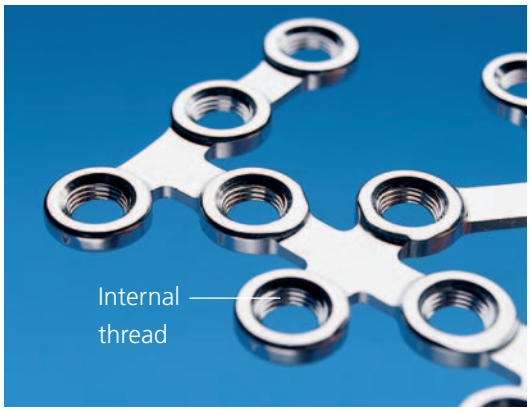
Indications

Fractures of the calcaneus including, but not limited to, extraarticular, intraarticular, joint depression, tongue type, and multifragmentary fractures.



Features

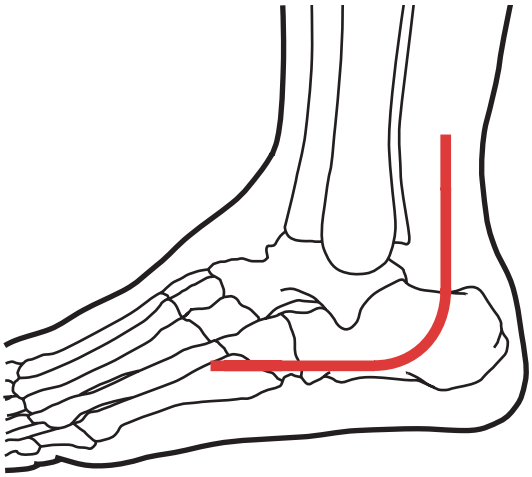
- Available in long and short, left and right designs
- Versatile: 15 holes address multiple fracture patterns
- «Cut-to-shape» design minimizes inventory
- Bendable tabs provide support for the anterior process and plantar fragments
- Angled and ascending holes (arrows) buttress the sustentaculum and provide better support of the calcaneotalar articular surface
- Lateral application
- Locking head screws provide standard bicortical and/or unicortical fixation



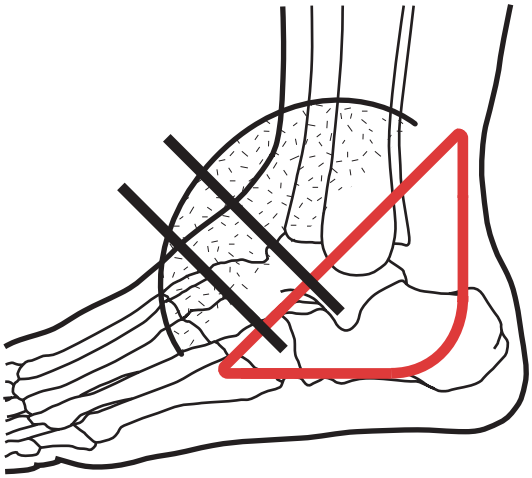
Threaded locking holes

- Offer a fixed-angle construct to buttress the articular surfaces of the calcaneus
- Permit multiple points of fixation to buttress small fragments
- Suitable for 3.5mm Locking Head Screws, but also for standard 2.7mm and 3.5mm Cortex Screws
- Provide 15° degrees of angulation when using 2.7mm Cortex Screws and 5° of angulation when using 3.5mm Cortex Screws

Surgical Approach



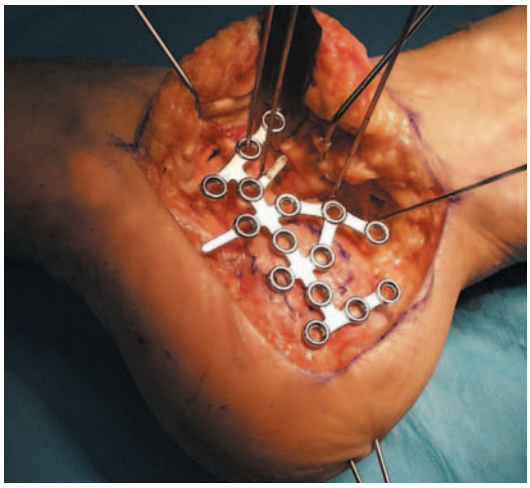
Place the patient in lateral decubitus position. Make an extensile, right-angled lateral incision. The vertical portion of the incision should be just anterior to the heel cord and extend down to the plantar and lateral skin junction. Continue the incision forward, horizontally, approximately to the area of the calcaneocuboid joint. The incision is carried straight down to bone at its angle and then developed to allow a single, thick flap to be lifted from the periosteal surface. This approach allows raising a single flap consisting of skin and soft tissue, which includes peroneal tendons, sural nerve and the detached calcaneofibular ligament.



A «no-touch» technique may be employed by retracting the flap with K-wires in the talus and in the cuboid, or with an oral surgery tongue retractor.

Note:
Care must be taken to avoid prolonged traction of the flap, especially if K-wires are used.

Surgical Technique



1 Reduce the fracture

Reduce fracture fragments. If K-wires are used to temporarily reduce the fracture, they must be placed to avoid interference with final plate placement. To accomplish this, lay a plate or bending template on the calcaneus.

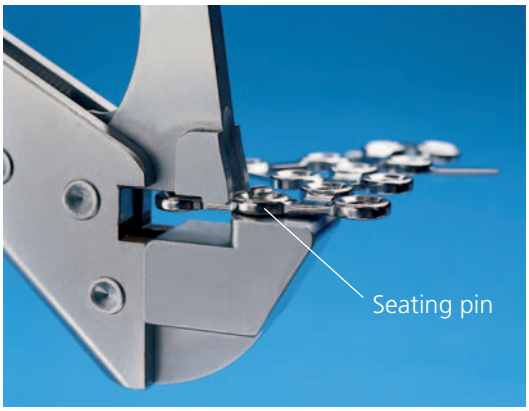
Notes:
A Schanz screw and Universal Chuck with T-Handle or the SYNTHES® Small Distractor can be used to aid in the reduction of fracture fragments.
The proximal tab should be placed in front of the crucial angle of Gissane to push down the anterior process fragment.

2 Shape the template

Temporarily position the Bending Template (329.607) over the calcaneus. Verify template length and contour.

Use the template to assist in selecting the appropriate plate and length (left or right, long or short).

Note:
The Bending Template can be used for either left or right, long or short plates.

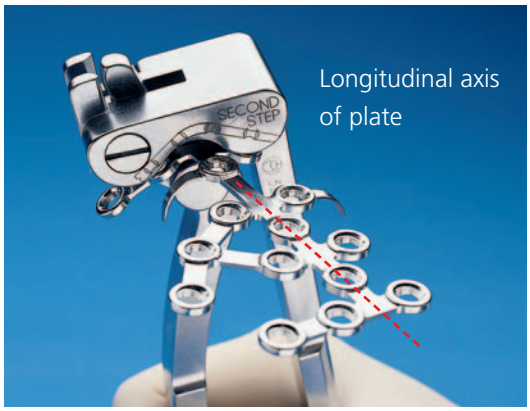


3 Cut/contour the plate

If necessary, remove a hole or tab of the plate using the Locking Calcaneal Plate Cutter (329.151). A combination of holes and/or tabs may be removed as needed. Place the plate into jaws of the cutter as shown.

Note:
The hole or tab to be removed should be inside the jaws as depicted. To aid in alignment, the adjacent plate hole should be positioned on the seating pin.

Due to calcaneal soft tissue anatomy, it is necessary to prebend the superior and inferior tabs prior to plate application. Using the Universal Bending Pliers (391.963) contour the tabs in fine increments until a desired fit is achieved.



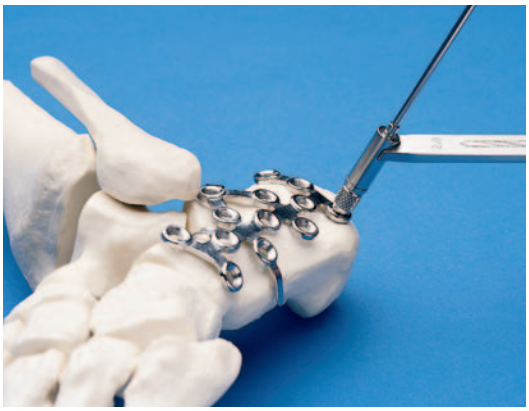
Using the Bending Template (329.607) as a guide, contour the plate using the Combination Bending Pliers (329.142) until an acceptable fit is achieved.

Note:
With a well-reduced calcaneus, it should not be necessary to contour the longitudinal axis of the plate.

Position the Threaded Plate Holder(s) (324.023) in adjacent holes for fine bending of the plate.

If necessary, fine bending may be achieved in situ with the Threaded Plate Holder(s) (324.023). Thread one holder into a hole and thread a second holder into an adjacent hole. Apply small incremental force to achieve the required bending.

Warning:
Care should be taken to avoid overbending because the benders may become dislodged from the plate hole and damage the plate threads.



The plate can be secured with 2.7mm Cortex Screws.

The plate can be secured with 3.5mm Cortex Screws.

4 Secure plate to bone

Determine whether 2.7mm or 3.5mm Cortex Screws or 3.5mm Locking Head Screws will be used for fixation. A combination of all three screws may be used.

Note:
If a combination of cortex and locking head screws is used, a cortex screw should be utilized first to achieve plate-to-bone contact.

A. To secure the plate with 2.7mm Cortex Screws, insert the 2.0mm end of the 2.7mm Universal Drill Guide (323.260) into the plate hole and drill through both cortices with a 2.0mm Drill Bit (310.210).
Measure for screw length using the Depth Gauge (319.010).
Select and insert an appropriate length 2.7mm self-tapping cortex screw using the small Hexagonal Screwdriver (314.070) with Holding Sleeve (314.090).

Note:
To lag a 2.7mm screw through a plate hole, use a 2.7mm Drill Bit to over-drill the near fragment.

B. To secure the plate with 3.5mm Cortex Screws, insert the 2.5mm end of the 3.5mm Universal Drill Guide (323.360) into a plate hole and drill through both cortices with a 2.5mm Drill Bit (310.230).
Measure for screw length using the Depth Gauge (319.010).
Select and insert an appropriate length 3.5mm self-tapping cortex screw using the small Hexagonal Screwdriver (314.070) with Holding Sleeve (314.090).

Note:
To lag a 3.5mm Cortex Screw through a plate hole, use a 3.5mm drill bit to overdrill the near fragment.

The Threaded Drill Guide (323.027) is used to ensure proper drilling angle.

C. To secure the plate with 3.5mm Locking Head Screws, screw a 2.8mm Threaded Drill Guide (323.027) into a threaded plate hole until seated.

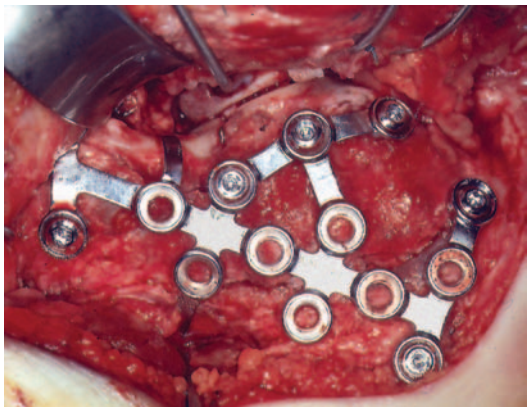
Note:
To assure the locking head screw seats itself fully into the threaded hole, the threaded drill guide must be used to ensure the proper drilling angle.

Warning:
Do not bend the plate using the Threaded Drill Guide because damage may occur to the plate threads and/or guide.
Using the 2.8mm Drill Bit (310.284) through the threaded drill guide, drill through one or both cortices.

Note:
Unlike standard cortex screws that use both cortices to achieve solid fixation, locking head screws offer the advantage of unicortical screw fixation. The screws lock to the plate; therefore, solid fixation does not rely solely on the pullout strength of the screws as with traditional cortex screws.

The plate can be secured with 3.5mm self-tapping locking head screws.

Measure for screw length using the Depth Gauge (319.010). Select and insert appropriate length 3.5mm self-tapping locking head screw using the small Hexagonal Screwdriver (314.070). To approach the plate to the bone, slide the Screw Holding Sleeve **(314.091)** onto the Hexagonal Screwdriver (314.070) until it clicks into place. With the Screw Holding Sleeve jaws open, mount the appropriate 3.5mm Locking Head Screw onto the screwdriver, and then pull the holding sleeve until it secures the screw. Note that the Screw Holding Sleeve covers the threaded head of the 3.5mm Locking Head Screw.
Tighten the screw until the plate approaches the bone. Remove the Screw Holding Sleeve and tighten the 3.5mm Locking Head Screw until locking.

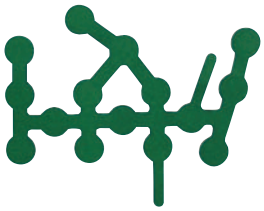


Note:
This technique is only suitable for pulling the bone towards the plate. Use cortex screws to achieve interfragmentary compression.

5 Closure

Close the wound in a routine fashion.

Featured Instruments

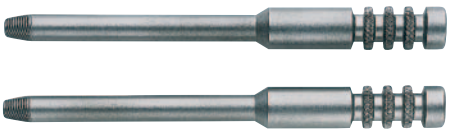


Bending Template for Calcaneal Plate (329.607)

Provides a visual aid for 3D contouring of the plates.

Threaded Drill Guide (323.027)

Used to guide a 2.8mm drill bit perpendicular to the plate to ensure proper mating of the 3.5mm Locking Head Screw and plate hole threads.



Threaded Plate Holders (324.023)

Used as an aid to position the plate on the bone. May also be used for fine in situ bending to achieve a better plate fit.

Bending Pliers (329.142)

Used to achieve gross contouring of the plate before implantation. The bender has three separate bending areas to allow for 3D contouring of the plate if necessary.

Cutter for Calcaneal Plate (329.151)

A specially designed cutter that facilitates precise hole/tab removal without creating upward facing burrs.

Holding Sleeve/Screw Holding Sleeve (314.090/314.091)

Use to hold 3.5mm screws. The Screw Holding Sleeve 314.091 countersinks the threaded head of the 3.5mm Locking Head Screw allowing the plate to approach the bone.

Torque-limiting Attachment (TLA) (511.115)

When inserting 3.5mm Locking Head Screws by power tool, the torque-limiting attachment limits the tightening moment to 1.5Nm. Stop the power insertion before locking occurs and proceed to final hand tightening using the small Hexagonal Screwdriver (314.070).

Important
The TLA is an instrument with a measuring function. Due to this function it has to be serviced and recalibrated regularly by the producer. The recommended service cycle is one year.

Locking Calcaneal Plate
Instrument and Implant Set (105.444)

Graphic Case for Locking Calcaneal Plate Instrument and Implant Set (690.358) (includes Implant Module no. 304.312).

Instruments

310.210	Drill Bit, 2.0mm dia., length 125/100mm, 2 units
310.230	Drill Bit, 2.5mm dia., length 180/155mm, 2 units
310.284	Drill Bit, 2.8mm dia., length 165mm, 2 units
310.350	Drill Bit, 3.5mm dia., length 110/85mm, 2 units
323.027	Threaded Drill Guide for 2.8mm Drill Bit, 2 units
314.070	Hexagonal Screwdriver, small
314.090	Holding Sleeve
314.091	Screw Holding Sleeve for Locking Head Screws
319.010	Depth Gauge for 2.7mm to 4.0mm screws
319.970	Screw Forceps, self-retaining
323.260	Universal Drill Guide 2.7
323.360	Universal Drill Guide 3.5
324.023	Threaded Plate Holder, 2 units
329.142	Bending Pliers
329.151	Cutter for Calcaneal Plate
329.607	Bending Template for Calcaneal Plate, 2 units
391.962	Bending-Cutting Pliers
391.963	Universal Bending Pliers, 2 units

Implants

241.622	Locking Calcaneal Plate, short, right, 2 units
241.623	Locking Calcaneal Plate, short, left, 2 units
241.624	Locking Calcaneal Plate, long, right, 2 units
241.625	Locking Calcaneal Plate, long, left, 2 units
202.816– 202.855	2.7mm Cortex Screws, self-tapping, lengths 16mm–50mm*, 55mm, 4 ea.
213.018– 213.055	3.5mm Locking Head Screws, self-tapping, lengths 18mm- 40mm*, 45mm, 50mm, 55mm, 3 ea.
204.818– 204.855	3.5mm Cortex Screws, self-tapping, lengths 18mm–50mm*, 55mm, 4 ea.
292.160	Kirschner Wire, 1.6mm dia., with trocar tip, L 150mm
292.200	Kirschner Wire, 2.0mm dia., with trocar tip, L 150mm

* In 2mm increments

Additionally Available

241.610	Calcaneal Plate, length 60mm
241.620	Calcaneal Plate, length 70mm
241.650	Calcaneal Y-Plate
304.312	Implant Module for Locking Calcaneal Plate Instrument and Implant Set, without contents
511.115	Torque-limiting Attachment, 1.5Nm

SYNTHES®

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