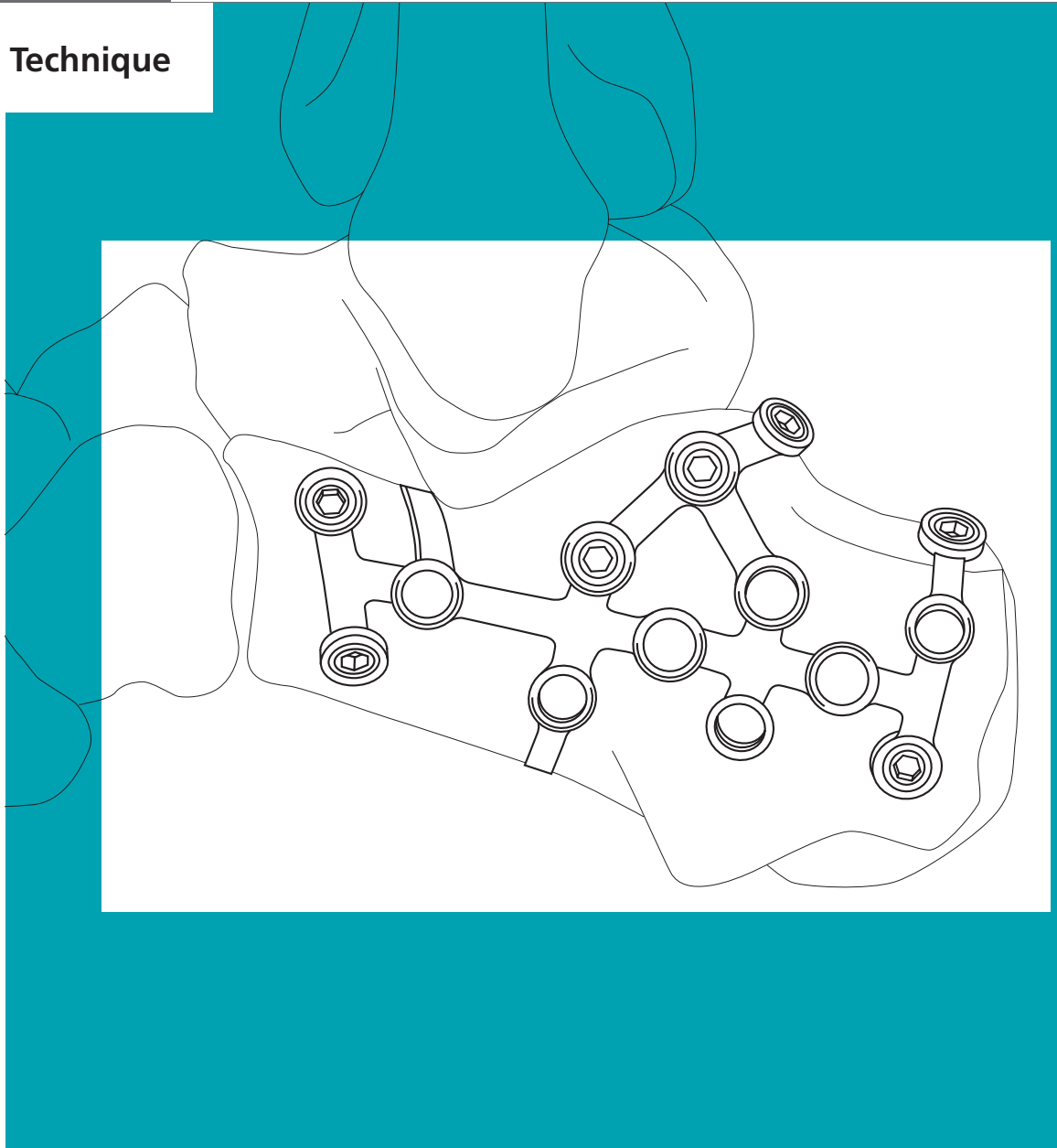


Calcaneal Locking Plate

Surgical Technique




SYNTHES[®]

Original Instruments and Implants of the
Association for the Study of Internal Fixation –
AO/ASIF

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 Image intensifier control

Warning

This description is not sufficient for immediate application of the instrumentation. Instruction by a surgeon experienced in handling this instrumentation is highly recommended.

Indications

-
- Extra- and intra-articular calcaneal fractures
 - Multifragment calcaneal fractures
 - Tongue-type fractures
 - Joint depression fractures

Implants

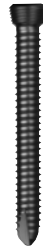
Plates

- Calcaneal Locking Plate right, 69 mm (X41.622)
- Calcaneal Locking Plate left, 69 mm (X41.623)
- Calcaneal Locking Plate right, 76 mm (X41.624)
- Calcaneal Locking Plate left, 76 mm (X41.625)



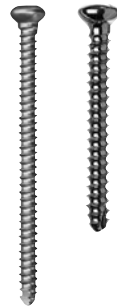
LCP locking screws

- LCP Locking Screw \varnothing 3.5 mm, self-tapping (X13.010–060)
- LCP Locking Screw Stardrive® \varnothing 3.5 mm, self-tapping (X12.101–124)



Standard screws

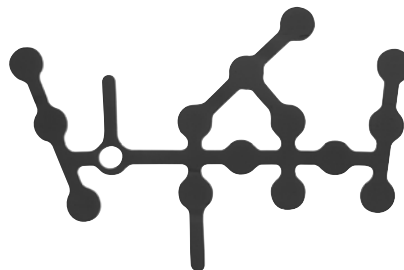
- Cortex Screw \varnothing 2.7 mm, self-tapping (X02.820–860)
- Cortex Screw \varnothing 3.5 mm, self-tapping (X04.810–860)



Instruments

Bending templates

- Bending Template for Calcaneal Locking Plate, 69 mm (329.607)
- Bending Template for Calcaneal Locking Plate, 76 mm (329.608)



Cutting instrument

- Cutting Pliers with Positioning Pin (329.151)



Bending instruments

- Bending Pliers for Plates (391.963)
- Bending Pin for LCP Plates 3.5, with Thread (329.916)



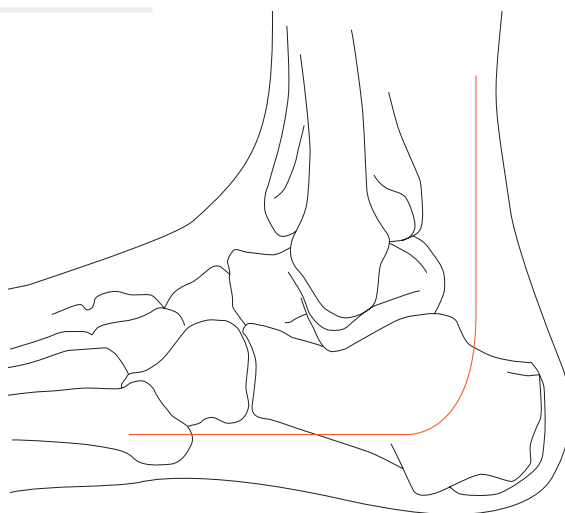
Note: The LCP standard instruments and LCP small fragment instruments are not listed.

Surgical technique

1

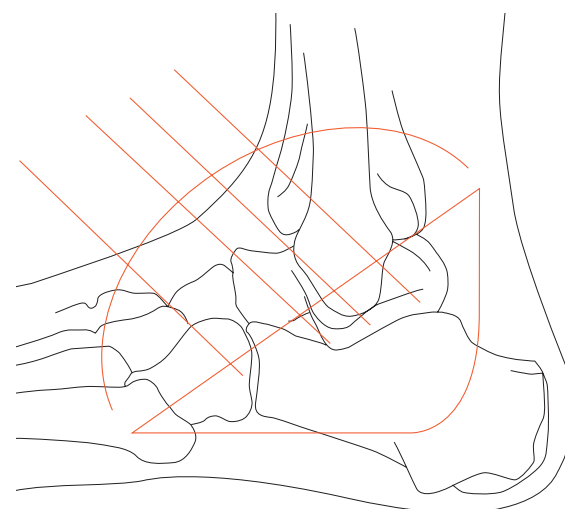
Surgical access

With the patient in the lateral position, start with an extended, almost right-angled, lateral skin incision. The vertical part of the incision should run just in front of the Achilles tendon and turn with a slight curve to run horizontally along the plantar aspect. The calcaneo-cuboid joint can be reached by extending the incision distally. The skin incision should extend down to the bone so that a complete flap consisting of skin and subcutaneous tissue, and containing the peroneal tendon, the sural nerve and the detached calcaneofibular ligament, can be lifted off the periosteal surface.



Alternatively, a no-touch technique, in the sense of the avoidance of constant hook retraction, can be used in which the flap is retracted using Kirschner wires inserted into the talus and cuboid.

Note: Prolonged traction on the flap should be avoided, particularly if Kirschner wires are used.



2

Reduce fracture

Reduce the fracture under direct vision or under the image intensifier, and fix temporarily using Kirschner wires or reduction forceps. If Kirschner wires are used as a reduction aid, ensure that they do not interfere with the anatomically correct insertion of the plate. A bending template (329.607/608) can be used as a guide.

Precise reduction of the fracture can also be achieved by manipulating a Schanz screw, using the universal chuck with T-handle, in the tuber fragment via a dorsal stab incision.

3

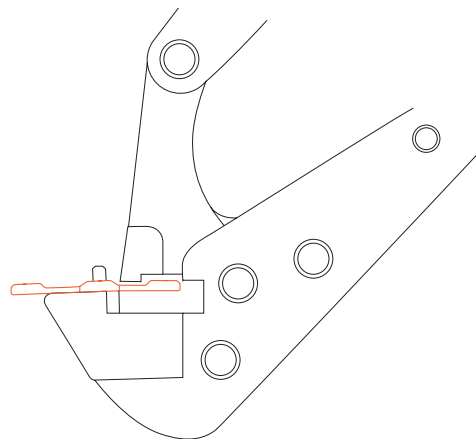
Adapt bending template (optional)

Place the bending template on the calcaneus, check the length and contour the template.

4

Cut plate

Cut the plate to match the anatomical requirements using the Cutting Pliers with Positioning Pin (329.151). Individual holes and either, or both, tabs on the plate can be cut off. To ensure a clean cut, position the plate in the cutting pliers as shown in the illustration. For correct orientation of the plate in the cutting pliers, the positioning pin must be inserted through the plate hole adjacent to the cut. Only one hole can be cut per cutting operation. If a pair of cutting pliers with positioning pin is not available, use the Cutting Pliers for Plates (391.931).

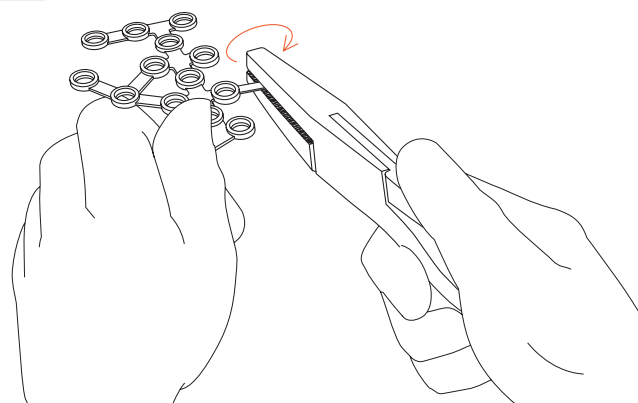


5

Bend tabs

In order to take account of the soft tissue situation at the calcaneus, the tabs must be bent before the plate is placed against the bone. Bend the tabs in stages using the Bending Pliers for Plates (391.963) until the desired shape is achieved. Do not bend the tabs back and forth repeatedly.

Note: The proximal tab on the plate should be bent and applied at the level of Gissane's angle so that it applies downward pressure on the fragment of the anterior calcaneal process.



6

Contour plate

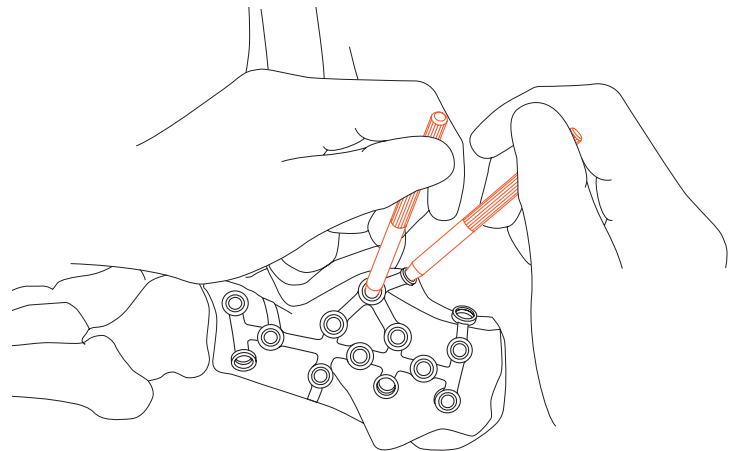
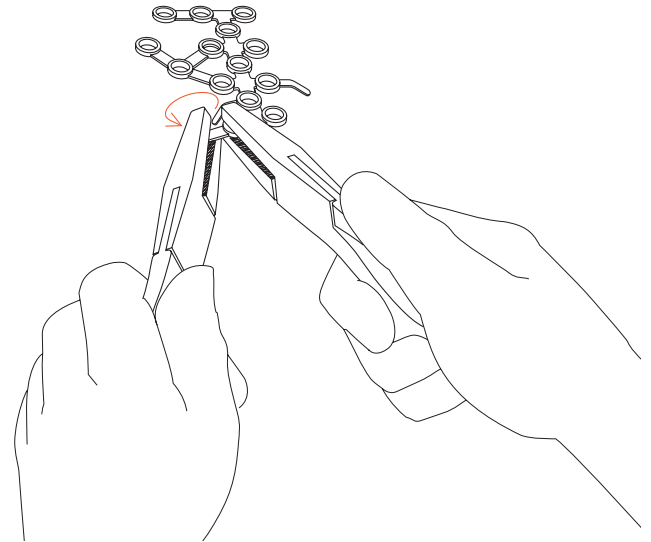
Contour the plate with the bending pliers, taking care not to deform the threaded holes, otherwise problems may arise during insertion of the LCP locking screws. If possible, bend the plate between the holes.

The Bending Pins (329.916) can be used to adapt the bent plate optimally during the operation. Screw one bending pin into the desired hole and a second bending pin into the adjacent hole. Bend the plate as desired using the minimum amount of force.

The reduction can be maintained even if the plate is not bent sufficiently. Since a LCP locking screw does not behave like a lag screw, any tendency of the fracture fragment of being pulled up is avoided.

Notes:

- Do not bend the plate more than 25–30° and do not bend it back and forth.
- Do not bend the plate with the centering sleeve as this may damage the sleeve.
- **Never** bend the plate along its longitudinal axis.



7

Determine screw type and diameter

Select cortex screws \varnothing 2.7 mm or 3.5 mm or LCP locking screws \varnothing 3.5 mm. Both screw types may be combined if desired.

Note: If both cortex and LCP locking screws are used in one plate, the cortex screws must be inserted first in order to compress the plate against the bone.

8

Predrill screw holes

a. When predrilling for **standard screws** with the Universal Drill Guide (323.260 or 323.360) and the matching bit, predrill the screw hole neutrally.

Use the following bits:

For cortex screw \varnothing 2.7 mm: Drill Bit \varnothing 2.0 mm (310.190 or 310.210)

For cortex screw \varnothing 3.5 mm: Drill Bit \varnothing 2.5 mm (310.230 or 310.250)

Note: When using a cortex screw \varnothing 2.7 mm or 3.5 mm as a lag screw, predrill the cortex of the nearby fragment with a larger bit (Drill Bit \varnothing 2.7 mm [310.260] for cortex screw \varnothing 2.7 mm; Drill Bit \varnothing 3.5 mm [310.350] for cortex screw \varnothing 3.5 mm).

b. When predrilling for **LCP locking screws**, screw the LCP Drill Sleeve 3.5 (323.027) into the desired threaded hole until the sleeve is fully gripped by the thread.

The LCP drill sleeve ensures that the LCP locking screw is correctly locked in the plate. The angular stability is reduced if the LCP locking screw is inserted obliquely.

Use the following drill bits:

For LCP locking screw \varnothing 3.5 mm: Drill Bit \varnothing 2.8 mm (310.284)

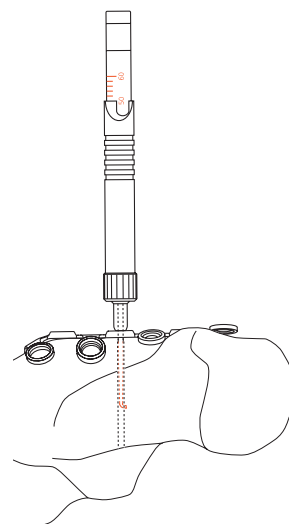
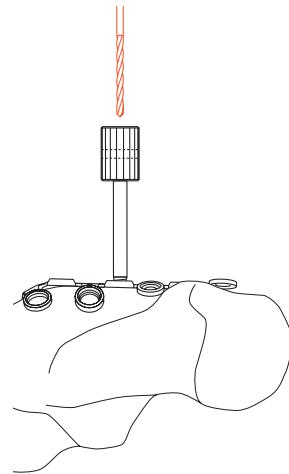
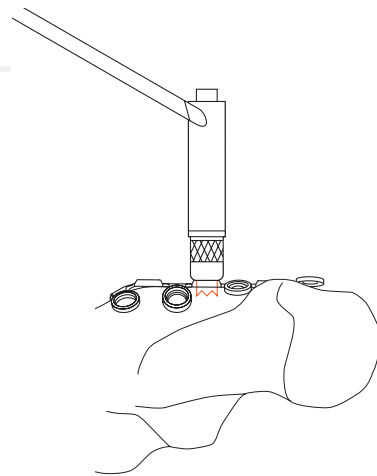


Note: If a gap between the lateral and medial posterior facets is apparent under the image intensifier, short-threaded cancellous bone screws instead of LCP locking screws should be inserted subthalamically.

9

Determine screw length

Determine the screw length with the Depth Gauge (319.010).



10

Insert screws

Standard screws

Insert the cortex screws with the small, hexagonal Screwdriver \varnothing 2.5 mm (314.070).

LCP locking screws

The LCP locking screws can be inserted mechanically or by hand.

a. To insert the LCP locking screws **mechanically**, attach the Torque Limiter 1.5 Nm (511.770) to the power tool unit (Compact Air Drive 511.701 or Power Drive 530.100). Insert the Hexagonal Screwdriver Shaft (314.030) or the Stardrive® Screwdriver Shaft 3.5 (314.116) into the torque limiter. Pick up the LCP locking screw and insert it into the plate hole. To insert the screw, start the power tool unit slowly, increase the speed and then reduce again before the screw is fully tightened. The torque is automatically limited and a clearly audible click signifies that the maximum level has been reached. Stop the power tool unit immediately and disconnect from the screw.

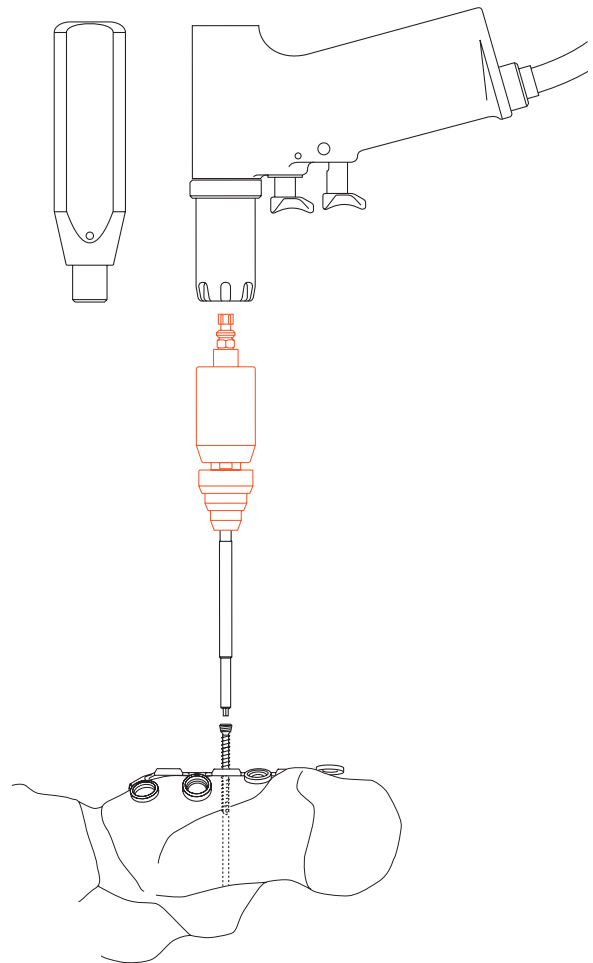
Notes: Do not lock the screw at full speed as this risks damaging the hexagonal or Stardrive recess, making implant removal more difficult.

Ensure that adequate cooling is provided when inserting fairly long screws into thick cortical bone.

With porous bone there is a risk that the LCP locking screw fails to follow the predrilled hole, resulting in a slightly oblique hole during mechanical insertion of the screw with subsequent partial loss of angular stability. In case of porous bone, manual locking (with the handle for torque limiter) of the screws is recommended to ensure better guidance through the predrilled hole.

b. To insert the LCP locking screws **manually**, attach the torque limiter 1.5 Nm to the Handle for Torque Limiter (397.705) and insert the screwdriver shaft.

Lock the LCP locking screws in the plate.



Implant removal

To remove the plate, first unlock all screws before removing them definitively in a second step, otherwise the plate may rotate while the last screw is being removed and cause soft tissue damage.

If the screws cannot be removed with the screwdriver (e.g. if the hexagonal or Stardrive recess of the LCP locking screw is damaged or if the screws are stuck in the plate), insert the Conical Extraction Screw with Left-handed Thread (309.521) in the screw head using the T-handle with Quick Coupling (311.440) and loosen the locking screw by turning counter-clockwise.