LCP Medial Distal Tibia Plate, without Tab. The Low Profile Anatomic Fixation System with Angular Stability and Optimal Screw Orientation.

Surgical Technique

LCP Small Fragment System

Instruments and implants approved by the AO Foundation.

DePuy Synthes
COMPANIES OF Johnson&Johnson

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Image intensifier control

Warning
This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance
For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance

Overview and Indications

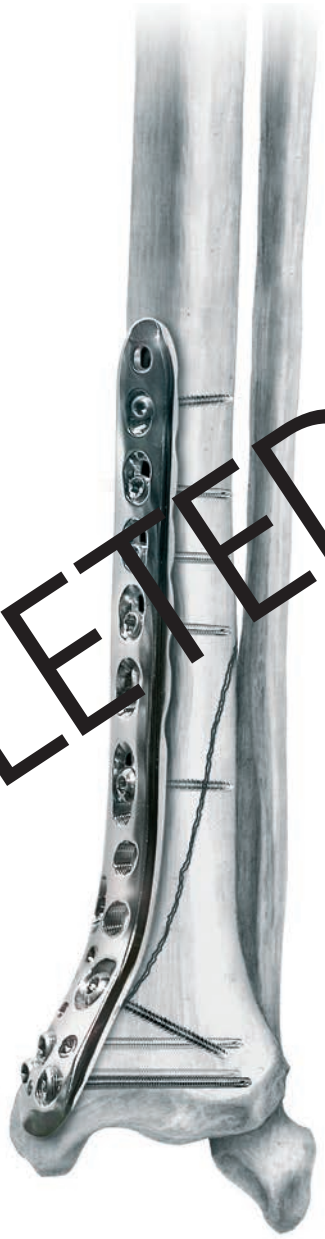
The LCP Medial Distal Tibia Plate without Tab is part of the LCP Small Fragment System that merges locking screw technology with conventional plating techniques.

The combi-holes in the LCP limited-contact plate shaft combine a dynamic compression unit (DCU) hole with a locking screw hole. Combi-holes provide the flexibility of axial compression and locking capability throughout the length of the plate shaft.

The head of the plate features six locking holes and two combi-holes that accept Locking Screws ∅ 3.5 mm. The two combi-holes also accept Cortex Screws ∅ 3.5 mm and Cancellous Bone Screws ∅ 4.0 mm; the screw heads in these holes are recessed to minimize screw prominence.

Fixation with the LCP Medial Distal Tibia Plate without Tab has many similarities to traditional plate fixation methods, with a few important improvements. Locking screws provide the ability to create a fixed-angle construct while using standard AO plating techniques. Locking capability is important for fixed-angle constructs in osteopenic bone or multifragment fractures where screw purchase is compromised. These screws do not rely on plate-to-bone compression to resist patient load, but function similarly to multiple small angled blade plates.

Note: For information on fixation principles using conventional and locked plating techniques, please refer to the LCP Locking Compression Plate Technique Guide (Art.No. 036.000.019).



Indications

The LCP Medial Distal Tibia Plates without Tab are intended for:

- Fixation of complex intra- and extra-articular fractures of the distal tibia
- Osteotomies of the distal tibia

Plate Features

- Head of plate is low profile for minimal prominence on medial malleolus
- Two different plate designs to fit right and left distal tibia (indicated with R or L on the plate)
- Cortex Screws ∅ 3.5 mm and Cancellous Bone Screws ∅ 4.0 mm sit flush with plate in the non-locking portion of the distal combi-holes
- 4–14 combi-holes in the shaft
- Distal K-wire hole for plate placement (2.0 mm maximum diameter)
- Articulated Tension Device (ATD) hole for compression or distraction
- Rounded edges to minimize soft tissue irritation
- Three distal locking screws diverge across subchondral bone and are parallel to joint

ATD hole

Combi-holes in the shaft and head accept the following:
- Cortex Screws ∅ 3.5 mm
- Locking Screws ∅ 3.5 mm
- Cancellous Bone Screws ∅ 4.0 mm

Two distal combi-holes

Round locking holes in the head accept the following:
- Cortex Screws ∅ 2.7 mm
- Locking Screws ∅ 3.5 mm
- Cortex Screws ∅ 3.5 mm
- Cancellous Bone Screws ∅ 4.0 mm

Distal screw profile in round locking holes

Locking Screw ∅ 3.5 mm

Cortex Screw ∅ 3.5 mm

Cortex Screw ∅ 2.7 mm

Cancellous Screw ∅ 4.0 mm

AO ASIF Principles

Anatomic reduction
Precontoured plate assists reduction of metaphysis to diaphysis and facilitates restoration of the articular surface by exact screw placement.

Stable fixation
Locking screws create a fixed-angle construct, providing angular stability.

Preservation of blood supply
Tapered end for submuscular plate insertion, preserving tissue viability.

Limited-contact plate design reduces plate-to-bone contact, limiting vascular trauma and insult to bone.

Early, active mobilization
Plate features combined with AO technique create an environment for bone healing, expediting a return to optimal function.

1
Preparation

Required Set (one of the following)

182.400	LCP Compact Small Fragment Instrument Set with Locking Screws Stardrive ∅ 3.5 mm and Implants (Pure Titanium) in Vario Case
182.405	LCP Compact Small Fragment Instrument Set with Locking Screws Stardrive ∅ 3.5 mm and Implants (Stainless Steel) in Vario Case
182.410	LCP Compact Small Fragment Instrument Set with Locking Screws ∅ 3.5 mm and Implants (Pure Titanium) in Vario Case
182.415	LCP Compact Small Fragment Instrument Set with Locking Screws ∅ 3.5 mm and Implants (Stainless Steel) in Vario Case

Optional Sets and Instruments

105.900	Bone Forceps Set
117.700	Large Distractor Set
321.120	Articulated Tension Device

Optional Instruments for Contouring

329.020	Bending Iron
329.040/050	Bending Iron for Plates 2.4 to 3.5
329.150	Bending Pliers for Plates 2.4 to 4.0
329.300	Plate-Bending Press

Warning: The direction of locking screws is already determined based on the design of the plate. If manual contouring is necessary, verify new screw angles using the screw placement verification technique on page 10.

Complete the preoperative radiographic assessment and prepare the preoperative plan. Determine plate length and instruments to be used.

Position the patient supine on a radiolucent operating table.

2
Reduce articular surface

Approach
An open or a percutaneous approach may be used depending on the fracture. For a percutaneous approach, make an incision to access the medial malleolus and slide the plate under the soft tissue.

Reduction
Reduce the fracture fragments and confirm reduction using image intensification. Methods of stabilizing reduction include the following:

- Independent K-wires
- K-wires through the plate
- Independent lag screws
- Lag screws through the plate
- Locking screws through the plate

Locking screws do not provide interfragmentary compression; therefore, any desired compression must be achieved with standard lag screws. The articular fractures must be reduced and compressed before fixation of the LCP Medial Distal Tibia Plate with locking screws.

Technique Tips: To verify that independent lag screws will not interfere with plate placement, evaluate placement intraoperatively with AP and lateral fluoroscopic images. Application of an external fixator or Large Distractor (394.350) may facilitate visualization and reduction of the joint.

3
Insert plate

Optional Instrument

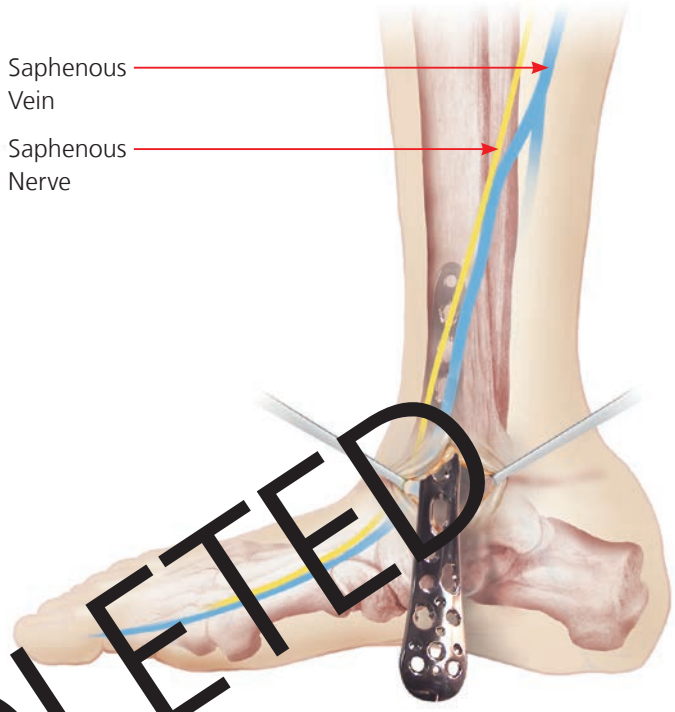
324.031	Threaded Plate Holder

Percutaneous insertion
For a percutaneous approach, insert the plate through the medial incision. Carefully push the plate in under the soft tissue.

Technique Tip: Thread the threaded plate holder into one of the distal holes as a handle for percutaneous insertion.

Open insertion
Open the area as necessary to expose the joint. Carefully push the plate under the soft tissue for placement on the shaft.

Center the plate on the medial malleolus.



4
Position plate and fixate provisionally

After plate insertion, check alignment on the bone using fluoroscopy. Make any adjustments before inserting screws.

Note: This locking plate is precontoured to fit the medial distal tibia. If the plate contour is changed, it is important to check the position of the screws in relation to the joint, using the screw placement verification technique.

The plate may be temporarily held in place using any of the following options:

– Instrument for Temporary Reduction (324.024)
– 4.0 mm Cancellous Bone Screw in a distal combi-hole
– Standard plate-holding forceps
– K-wires through the plate

These temporary fixation options permit positioning of the plate into the final optimal position, and will also prevent plate rotation while inserting the first locking screw.

Note: Ensure proper reduction before inserting the first locking screw. Once the locking screws are inserted, further reduction is not possible without loosening the locking screws.

Screw Insertion

Option: Screw placement verification technique

Instruments	
X92.710	1.6 mm Kirschner Wire with Thread
310.284	2.8 mm Drill Bit
323.027	LCP Drill Sleeve for 2.8 mm Drill Bits
323.055	1.6 mm Wire Sleeve
323.060	Direct Measuring Device

X=2: stainless steel
X=4: titanium

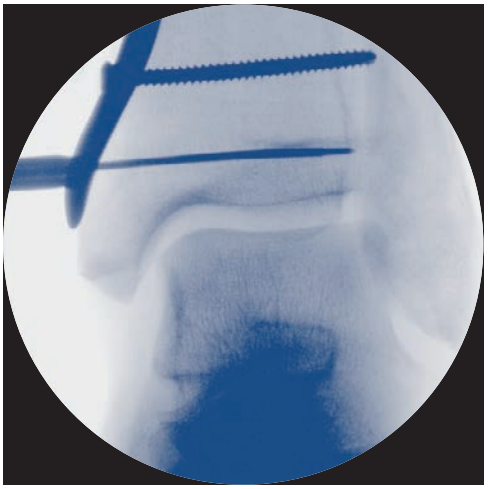
Since the direction of the locking screw depends on the contour of the plate, final screw position may be verified with a K-wire before insertion. This becomes especially important when the plate has been manually contoured or applied near the joint.

With the drill sleeve in the desired locking hole, insert the wire sleeve into the drill sleeve.

Insert a 1.6 mm threaded K-wire through the wire sleeve in the most distal hole and drill to the desired depth.

Verify K-wire placement under image intensification to determine if final screw placement will be acceptable.

Important: The K-wire position represents the final position of the locking screw. Confirm that the K-wire does not enter the joint.



Measure for screw length by sliding the tapered end of the measuring device over the K-wire down to the wire sleeve.

Remove the measuring device, K-wire and wire sleeve, leaving the drill sleeve in place.

Use the 2.8 mm drill bit to drill. Remove the drill sleeve. Insert the appropriate length locking screw.

5
Insert distal screws

Determine the combination of screws to be used for fixation.

If a combination of locking and cortex screws will be used, cortex screws should be inserted first to pull the plate to the bone.

If a locking screw will be used as the first screw, be sure the plate is held securely to the bone to prevent plate rotation as the screw is locked to the plate.

In distal combi-holes
For non-locking screws, use the standard AO screw insertion technique. The two combi-holes in the head can accept Cortex Screws ∅ 3.5 mm, Locking Screws ∅ 3.5 mm, or Cancellous Bone Screws ∅ 4.0 mm. When using a cortex or cancellous bone screw in these combi-holes, the screw head will be recessed in the hole.

For distal locking screws

Instruments	
310.288	2.8 mm Drill Bit
323.027	LCP Drill Sleeve for 2.8 mm Drill Bits
314.115	Screwdriver Stardrive
314.116	Screwdriver Insert Stardrive
314.070	Screwdriver hexagonal
314.030	Screwdriver Shaft hexagonal
319.010	Depth Gauge
511.770 or 511.773	Torque Limiting Attachment

Screw the drill sleeve into a distal locking hole until fully seated.

Use the drill bit to drill to the desired depth.

Remove the drill sleeve.

Use the depth gauge to determine screw length.

Insert the locking screw under power, using the torque limiting attachment and the screwdriver shaft; or insert manually, using the screwdriver. Be sure the plate is held securely to the bone to prevent plate rotation as the screw is locked to the plate.

Note: When using the torque limiting attachment, the screw is securely locked into the plate when a "click" is heard.

Warning: Never use the screwdriver shaft directly with power equipment unless using a torque limiting attachment.

Option: Articulated Tension Device

Instrument	
321.120	Articulated Tension Device

Once reduction is satisfactory, and if it is appropriate based on morphology, the plate can be loaded in tension using the articulated tension device.

Note: With multifragment fractures, it may not always be possible or desirable to achieve anatomic reduction of the fracture. However, in simple fracture patterns, the articulated tension device may facilitate anatomic reduction. This device may be used to generate either compression or distraction.

6

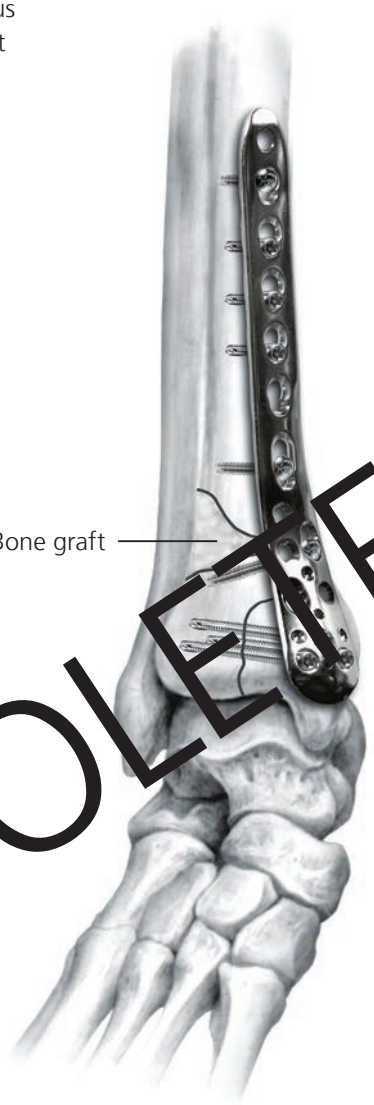
Insert screws in shaft

If using the threaded portion of the combi-hole, repeat the steps for distal locking screw insertion.

For non-locking screws, use the standard AO screw insertion technique.

Optional: Bone Graft

If desired, fill any metaphyseal bone defect with autogenous bone graft or bone graft substitute. When using bone graft substitute, follow the manufacturer's directions for use.



Implant Removal

To remove locking screws, unlock all screws from the plate, then remove the screws completely from the bone. This prevents simultaneous rotation of the plate when unlocking the last locking screw.

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

Set List

68.122.001	Tray for LCP Medial Distal Tibia Plate without Tab
689.508	Vario Case Framing, for Modules
689.507	Lid for Vario Case

Implants

Stainless steel	Titanium	Holes	Length (mm)	
238.700	438.700	4	116	right
238.702	438.702	6	142	right
238.704	438.704	8	168	right
238.706	438.706	10	194	right
238.708	438.708	12	220	right
238.710	438.710	14	246	right
238.701	438.701	4	116	left
238.703	438.703	6	142	left
238.705	438.705	8	168	left
238.707	438.707	10	194	left
238.709	438.709	12	220	left
238.711	438.711	14	246	left

All plates are available sterile packed.

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MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F2119-07

Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF-)induced heating according to ASTM F2182-11a

Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils [whole body averaged specific absorption rate (SAR) of 2 W/kg for 6 minutes (1.5 T) and for 15 minutes (3 T)].

Precautions: The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:

- It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
- Patients with impaired thermo regulation or temperature sensation should be excluded from MR scanning procedures.
- Generally it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
- Using the ventilation system may further contribute to reduce temperature increase in the body.

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