

Part of the DePuy Synthes Locking Compression Plate (LCP®) System

# 3.5 mm LCP® Medial Distal Tibia Plates

Surgical Technique



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**MR Information**

The 3.5 mm LCP Medial Distal Tibia Plate System has not been evaluated for safety and compatibility in the MR environment. It has not been tested for heating, migration or image artifact in the MR environment. The safety of the 3.5 mm LCP Medial Distal Tibia Plate System in the MR environment is unknown. Scanning a patient who has this device may result in patient injury.

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 Image intensifier control

## 3.5 mm LCP® Medial Distal Tibia Plates

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The 3.5 mm LCP® Medial Distal Tibia Plate is part of the DePuy Synthes LCP System that merges locking screw technology with conventional plating techniques.

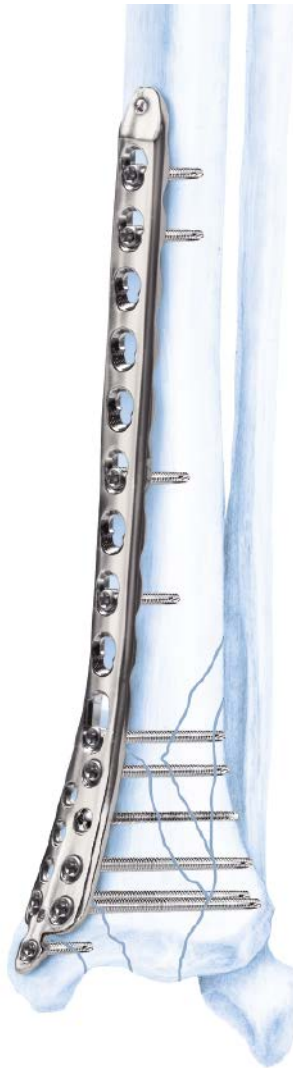
The plate is offered in stainless steel and features a limited-contact shaft profile, Combi holes in the shaft, and locking screw holes in the head. The Combi holes in the plate shaft combine a dynamic compression unit (DCU) hole with a locking screw hole. The Combi hole provides the flexibility of axial compression and locking capability throughout the length of the plate shaft.

Fixation with the 3.5 mm LCP Medial Distal Tibia Plate 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 multifragmentary 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.

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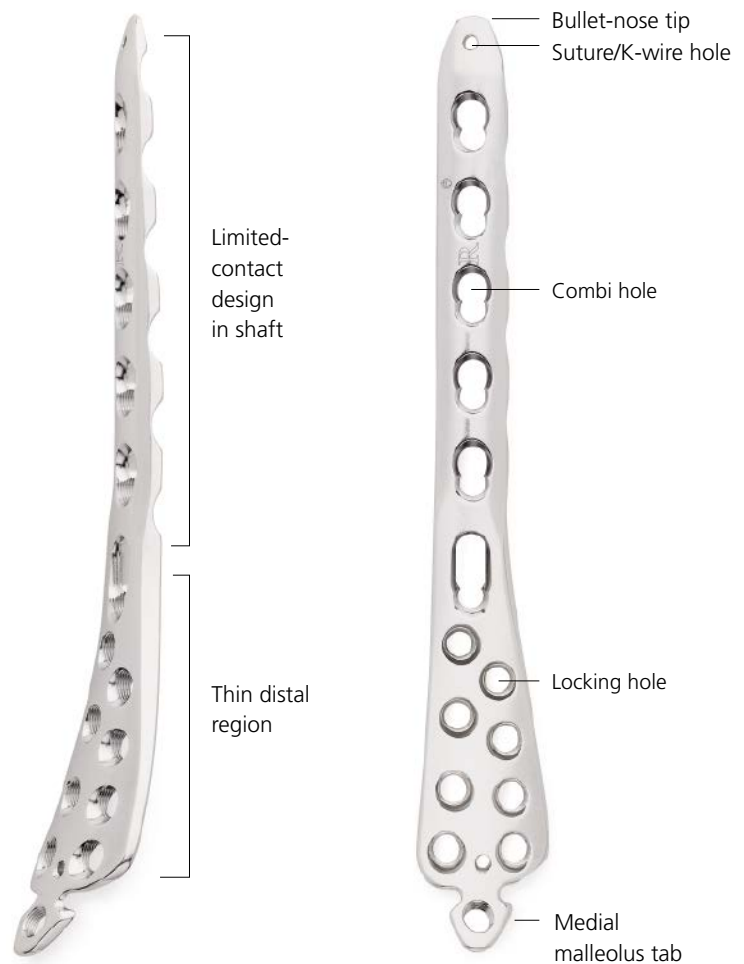
**Note:** For information on fixation principles using conventional and locked plating techniques, please refer to the *Small Fragment Locking Compression Plate (LCP) Technique Guide*.

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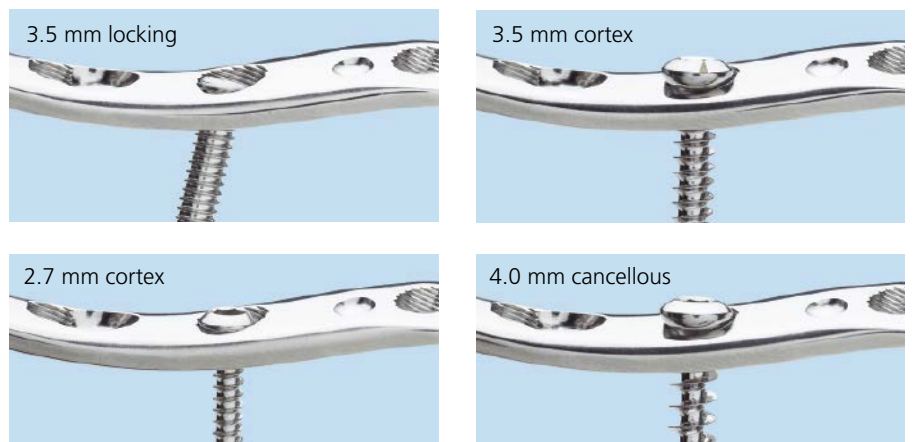


**Plate features**

- Anatomically contoured; plate is twisted 20° and bent to fit the distal tibia
- Available for left and right tibias
- Limited-contact shaft design with 4 to 14 combination locking/compression holes
- Eight distal locking holes accept 2.7 mm cortex, 3.5 mm locking, 3.5 mm cortex, or 4.0 mm cancellous bone screws
- Proximal and distal holes for 1.6 mm or 2.0 mm Kirschner wires
- 316L stainless steel
- Locking holes in distal region are parallel to the joint
- Elongated hole in shaft aids in initial plate positioning
- The shaft holes accept 3.5 mm locking screws in the threaded portion and 3.5 mm cortex screws, 4.0 mm cortex screws and 4.0 mm cancellous bone screws in the compression portion
- Distal tab for optional medial malleolus screw accepts 3.5 mm locking, 2.7 mm cortex, 3.5 mm cortex, 4.0 mm cortex or 4.0 mm cancellous bone screws



**Distal screw profile in round locking holes**



# AO Principles

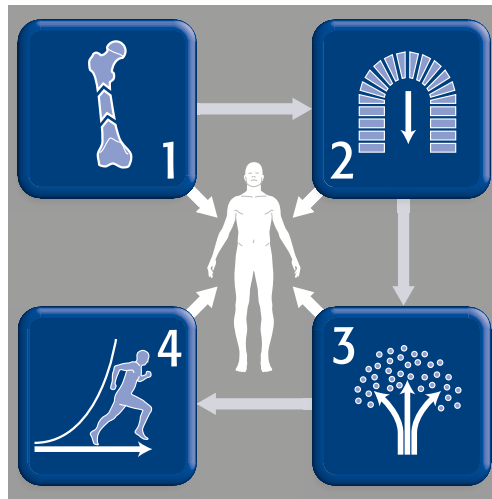
In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.<sup>1,2</sup>

## Anatomic reduction

Fracture reduction and fixation to restore anatomical relationships.

## Early, active mobilization

Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.



## Stable fixation

Fracture fixation providing absolute or relative stability, as required by the patient, the injury, and the personality of the fracture.

## Preservation of blood supply

Preservation of the blood supply to soft tissues and bone by gentle reduction techniques and careful handling.

1. Müller ME, Allgöwer M, Schneider R, Willenegger H. *Manual of Internal Fixation*. 3rd ed. Berlin, Heidelberg, New York: Springer-Verlag; 1991.  
2. Rüedi TP, RE Buckley, CG Moran. *AO Principles of Fracture Management*. 2nd ed. Stuttgart, New York: Thieme; 2007.

## Indications

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The Synthes LCP Distal Tibia Plates are intended for fixation of complex intra- and extra-articular fractures and osteotomies of the distal tibia, as a part of the Synthes Small Fragment LCP System.

# Preparation

## 1

### Preparation

#### Required set

105.434	Small Fragment LCP Instrument and Implant Set, with self-tapping screws
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#### Optional sets

105.90	Bone Forceps Set
105.954	Small Battery Drive Set
115.700	Large Distractor Set

#### Optional instruments for contouring

329.02	Bending Iron
329.30	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 11.

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.

# Reduce Articular Surface

## 2

### Reduce articular surface

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#### Instrument

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394.35      Large Distractor

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**Note:** Prior to reduction, application of an external fixator or large distractor may facilitate visualization and reduction of the joint.

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- Reduce the fracture fragments and confirm reduction using image intensification. Reduction may be stabilized using the following methods:
  - Independent Kirschner wires
  - K-wires through the plate
  - Independent lag screws
  - Lag screws through the plate
  - Locking screws through the plate

Locking screws do not provide interfragment compression; therefore, any desired compression must be achieved with standard lag screws. The articular fractures must be reduced and compressed before fixation of the 3.5 mm LCP Medial Distal Tibia Plate with locking screws.

2.7 mm or 3.5 mm cortex screws may also be used as lag screws through the plate by overdrilling the near fragment.

- **Note:** To verify that independent lag screws will not interfere with plate placement, evaluate placement with AP and lateral fluoroscopic image.
- 





# Insert Plate

## 3

### Bend distal tab (optional)

#### Instrument

391.963 Universal Bending Pliers

Contour the distal tab as necessary with the universal bending pliers.

**Precaution:** Do not repeatedly bend the distal tab back and forth.



## 4

### Insert plate

#### Instruments

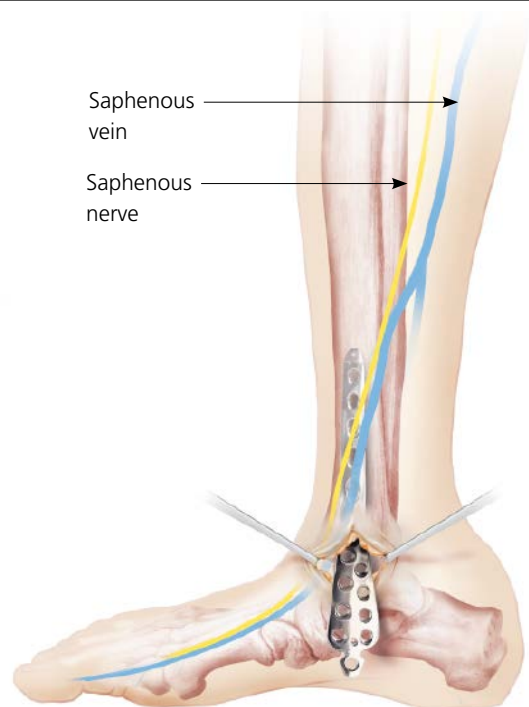
312.648 2.8 mm Threaded Drill Guide

324.031 Threaded Plate Holder

For minimally invasive insertion, make a single incision distally and carefully push the plate under the soft tissue. Make stab incisions to insert screws into the shaft.

#### Notes:

- Use a threaded plate holder in one of the distal holes as a handle for percutaneous insertion.
- Prior to placing the plate against the bone, thread the 2.8 mm threaded drill guide into the distal holes. It is easier to thread these guides into the plate when the plate is off the bone.



# Position Plate and Fix Provisionally

## 5

### Position plate and fix provisionally

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#### Instrument

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324.024	Push-Pull Reduction Device
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The plate may be temporarily held in place with standard plate holding forceps or the push-pull reduction device, to prevent plate rotation while inserting the first locking screw.

K-wires may be used through the plate for provisional fixation.

Assure proper reduction prior to insertion of the first locking screw. Locking screw insertion may prevent any further reduction.



# Insert Screws

## 6

### Insert screws

#### Instruments

310.288	2.8 mm Drill Bit
312.648	2.8 mm Threaded Drill Guide
314.115	StarDrive Screwdriver
314.116	StarDrive Screwdriver Shaft
319.01	Depth Gauge
511.770	Torque Limiting Attachment, 1.5 Nm or
511.773	Torque Limiting Attachment, 1.5 Nm, quick coupling



Determine the combination of 2.7 mm, 3.5 mm and 4.0 mm cortex, 4.0 cancellous bone screws, and 3.5 mm locking screws that will be used for fixation.

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

**Note:** For reasons of stability, only use the locking screws 2.7 mm and the cortex screws 2.7 mm in the distal section of the plate (round threaded holes).

If using a locking screw 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.

**Note:** The locking screw is not a lag screw. Use standard screws when requiring a precise anatomical reduction (e.g. joint surfaces) or interfragmentary compression. Before inserting the first locking screw, perform anatomical reduction and fix the fracture with lag screws, if necessary. After the insertion of locking screws, an anatomical reduction will no longer be possible without loosening the locking screws.

#### Distal locking screw insertion

Screw the 2.8 mm threaded drill guide into an LCP Plate hole until fully seated. Use the 2.8 mm drill bit to drill to the desired depth. Remove the drill guide. Use the depth gauge to determine screw length.

**Note:** Do not bend the plate with the drill sleeve as this may damage the sleeve. Drill the screw hole with a suitable drill bit.

Whenever possible, locking screws should be inserted under power using the torque limiting attachment and the StarDrive™ Screwdriver shaft. Screws may also be inserted manually using the StarDrive Screwdriver. Be sure the plate is held securely to the bone to prevent plate rotation.

The audible 'click' on the torque limiting attachment will notify the surgeon that the maximum torque value has been reached and that power insertion is completed. After screw insertion using the torque limiting attachment, always check that the screws are fully inserted by hand tightening them.

**Warning:** Never insert locking screws under power unless using a torque limiting attachment.

#### Notes:

- Do not lock the screw at full speed as this risks damaging the hexagonal or StarDrive Recess, making implant removal more difficult.
- With porous bone there is a risk that the locking screw will fail to follow the drilled 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 drilled hole.



# Implant Removal

## 6

### Insert screws *continued*

#### Shaft screw insertion

If using the threaded portion of the Combi holes, repeat the steps for distal locking screw insertion.

For nonlocking screws, use the standard AO screw insertion technique.

Depending on the bone quality, screws through the plate shaft can be either bicortical or unicortical.

#### Optional techniques

##### Medial malleolus screw insertion

If the tab for the medial malleolus screw is to be utilized, insert either a 3.5 mm locking screw or a nonlocking 2.7 mm, 3.5 mm, or 4.0 mm cortex screw, or a 4.0 mm cancellous bone screw through the screw hole for malleolus fixation. Use the screw insertion techniques previously described.

##### Screw placement verification

Final position of the locking screws should be verified under image intensification with a K-wire prior to insertion. This is especially important when changing the contour of the plate, or in metaphyseal regions close to joint surfaces.

Please refer to the *Small Fragment LCP Technique Guide* for screw placement verification technique.



## 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.

## 3.5 mm LCP Medial Distal Tibia Plate Instrument and Implant Set (115.358)

### Graphic Case

690.376 3.5 mm LCP Medial Distal Tibia Plate Set Graphic Case

### Instrument

391.963 Universal Bending Pliers

### Implants

3.5 mm LCP Medial Distal Tibia Plates

Right	Left	Holes	Length (mm)
239.900	239.901	4	116
239.904	239.905	6	142
239.908	239.909	8	168
239.912	239.913	10	194
239.916	239.917	12	220
239.920	239.921	14	246



### Required Set

105.434 Small Fragment LCP Instrument and Implant Set, with self-tapping screws

### Also Available

105.90 Bone Forceps Set  
105.954 Small Battery Drive Set  
115.700 Large Distractor Set  
329.02 Bending Iron  
329.30 Plate-Bending Press  
394.35 Large Distractor  
511.770 Torque Limiting Attachment, 1.5 Nm  
511.773 Torque Limiting Attachment, 1.5 Nm, quick coupling

Note: For additional information, please refer to package insert.

For detailed cleaning and sterilization instructions, please refer to [www.synthes.com/cleaning-sterilization](http://www.synthes.com/cleaning-sterilization) or sterilization instructions, if provided.

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