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

3.5 mm LCP® Pilon Plates

Surgical Technique
# Table of Contents

## Introduction
- 3.5 mm LCP Pilon Plates

## Surgical Technique
- Preoperative Planning
- Reduce Fracture and Bend Template
- Cut Plate
- Contour Plate
- Insert Plate
- Position Plate
- Select Screws
- Insert Screws
- Verify Placement
- Implant Removal

## Product Information
- Implants
- Instruments
- Product Information

---

**MR Information**
The 3.5 mm LCP Pilon Plates 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 Pilon Plates System in the MR environment is unknown. Scanning a patient who has this device may result in patient injury.

---

Image intensifier control
3.5 mm LCP Pilon Plates

The 3.5 mm LCP® Pilon Plate is part of the Locking Compression Plate (LCP) System that merges locking screw technology with conventional plating techniques.

Features and benefits
- Can be cut and contoured for anatomic fit on left or right distal tibia
- May be placed on the anterior, medial, anteromedial, or anterolateral distal tibia
- The Combi holes in the plate shaft combine a dynamic compression unit (DCU) hole with a locking screw hole, providing the flexibility of axial compression and locking throughout the length of the plate
- Locking screws engaged in the plate create a fixed-angle construct that improves fixation in osteopenic bone and multifragment fractures
- The distal portion and arms may be contoured or holes may be removed as necessary
- 316L stainless steel implants

Screwhead profile in plate arms
- Distal holes accept 3.5 mm locking screws, 2.7 mm cortex screws, and 3.5 mm cortex screws or 4.0 mm cancellous bone screws
- Shaft holes accept 3.5 mm locking screws in the threaded portion, and 3.5 mm cortex screws or 4.0 mm cancellous bone screws

2.7 mm cortex screw
3.5 mm cortex screw
3.5 mm locking screw
AO Principles and Indications

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.\cite{1,2}

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.

Indications
The 3.5 mm LCP Pilon Plate is indicated for extra-articular and intra-articular fractures and osteotomies of the distal tibia.

Preoperative Planning

1

Preparation

Required set

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>105.434</td>
<td>Small Fragment LCP Instrument and Implant Set, with self-tapping screws</td>
</tr>
</tbody>
</table>

Complete the radiographic assessment and prepare the preoperative plan. Decide on plate placement based on the fracture pattern. The plate may be placed on the anterior, medial, anteromedial, or anterolateral distal tibia.

Place the patient in the supine position on a radiolucent operating table. Position the image intensifier to allow visualization of the distal tibia in both the lateral and AP planes.

Notes:
To save time intraoperatively, consider precontouring the plate before the procedure using a preoperative plan.

Care should be taken to avoid collision of the screws by choosing the appropriate holes and screw lengths in the bent distal section.

For more information on fixation principles using conventional and locked plating techniques, please refer to the Small Fragment Locking Compression Plate (LCP) Technique Guide.
2

Reduce fracture

Instrument

394.35 Large Distractor

Reduce the fracture fragments and confirm reduction using image intensification.

**Note:** Application of an external fixator or large distractor may facilitate visualization and reduction of the joint.

Prior to plate application, reduction may be stabilized using independent K-wires or independent lag screws. When using independent K-wires or lag screws, make sure the wires or screws will not interfere with subsequent plate placement.

3

Bend template

Instrument

329.915 Bending Template

Temporarily position the bending template over the distal tibia. Use the template to decide which portions of the plate should be removed and how the plate should be contoured.

**Note:** Most cases will require contouring the plate and/or removing holes from each arm of the plate to fit the patient’s anatomy.
Cut Plate

4

Cut plate

Instrument

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>391.931</td>
<td>Cutting Pliers</td>
</tr>
</tbody>
</table>

Use the cutting pliers to cut the distal arms to fit.

Alternative instrument

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>329.151*</td>
<td>Locking Calcaneal Plate Cutter</td>
</tr>
</tbody>
</table>

The locking calcaneal plate cutter can be used to trim and smooth cut surfaces in the plate arms. The hole to be removed should be inside the jaws of the locking calcaneal plate cutter. To aid in alignment, the adjacent plate hole should be positioned on the seating pin.

Note: If any holes are cut, manually smooth edges before inserting the plate.

* Found in the Locking Calcaneal Plate Instrument and Implant Set (105.442)
Contour Plate

5
Contour plate

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>329.095</td>
<td>Bending Iron (two required)</td>
</tr>
<tr>
<td>391.963*</td>
<td>Universal Bending Pliers</td>
</tr>
</tbody>
</table>

Distal end
Using the bending template as a guide, contour the distal part of the plate with the universal bending pliers. Thread in long locking screws to check screw angles and lengths to avoid possible interference.

Shaft
Contour the plate shaft using the bending irons.

Notes:
Bend the plate between the threaded holes to avoid deforming the threads. Avoid excessive and repeated bending of the plate.

To prevent damaging or deforming the locking holes, thread the threaded drill guides or threaded plate holders into the holes near the area to be contoured, prior to bending.

Precautions:
Reverse bending or use of the incorrect instrumentation for bending may weaken the plate and lead to premature plate failure (e.g. breakage). Do not bend the plate beyond what is required to match the anatomy.

Do not bend the plate at the level of the holes.

* Found in the Locking Calcaneal Plate Instrument and Implant Set (105.442)
Insert Plate

6

Insert plate

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>312.648</td>
<td>2.8 mm Threaded Drill Guide</td>
</tr>
<tr>
<td>324.031</td>
<td>Threaded Plate Holder</td>
</tr>
</tbody>
</table>

Note: Prior to insertion, thread the 2.8 mm threaded drill guides into the distal holes. It is easier to thread the guides into the plate prior to placing the plate on the bone.

Open technique
For proper reduction in complex fractures, perform open reduction and internal fixation according to AO guidelines.

Minimally invasive technique
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.

Use a threaded plate holder in one of the distal holes as a handle for percutaneous insertion.
Position Plate

Position plate

Instrument

| 324.024  | Push-Pull Reduction Device |

Place the plate in position on the distal tibia. The plate may be temporarily held in place with plate holding forceps, a cortex screw or the push-pull reduction device. This is necessary to avoid plate rotation during insertion of the first locking screw.

Assure proper reduction prior to insertion of the first locking screw. Inserting locking screws prevents any further fracture reduction.
Select Screws

Determine the combination of 3.5 mm locking screws, 2.7 mm cortex screws, 3.5 mm cortex screws or 4.0 mm cancellous bone screws to use in the distal portion.

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

If a locking screw is inserted first, care should be taken to ensure that the plate is held securely to the bone to prevent rotation of the plate as the screw is locked into the plate.

The locking screw is not a lag screw. Before inserting the first locking screw, perform anatomical reduction and, if necessary, fix the fracture with lag screws. After the insertion of locking screws, an anatomical reduction will no longer be possible without loosening the locking screw.

For reasons of stability, only use the LCP Locking Screws 2.7 mm and the cortex screws 2.7 mm in the distal section of the plate (round threaded holes).
9

**Insert screws**

**Instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.288</td>
<td>2.8 mm Drill Bit</td>
</tr>
<tr>
<td>312.648</td>
<td>2.8 mm Threaded Drill Guide</td>
</tr>
<tr>
<td>319.01</td>
<td>Depth Gauge</td>
</tr>
</tbody>
</table>

**Locking screws**

Screw the 2.8 mm threaded drill guide into a locking plate hole until fully seated.

Drill with the 2.8 mm drill bit.

Remove the drill guide.

Use the depth gauge to determine screw length.

**Note:** Select the plate holes and screw lengths used in the contoured distal arm of the plate in such a way as to avoid collision of screws.
Insert Screws continued

**Instruments**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>314.115</td>
<td>StarDrive Screwdriver, T15</td>
</tr>
<tr>
<td>314.116</td>
<td>StarDrive Screwdriver Shaft, T15</td>
</tr>
<tr>
<td>511.770</td>
<td>Torque Limiting Attachment, 1.5 Nm</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>511.773</td>
<td>Torque Limiting Attachment, 1.5 Nm, quick coupling</td>
</tr>
</tbody>
</table>

Insert the locking screw using the StarDrive™ Screwdriver shaft or screwdriver.

Whenever possible, locking screws should be inserted under power using the torque limiting attachment. The audible ‘click’ 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.

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

**Nonlocking screw**

When inserting nonlocking screws, use the standard AO screw insertion technique.
Verify Placement

Screw placement verification

<table>
<thead>
<tr>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>292.71 1.6 mm Kirschner Wire with Thread</td>
</tr>
<tr>
<td>323.023 1.6 mm Wire Sleeve</td>
</tr>
<tr>
<td>323.025 Direct Measuring Device</td>
</tr>
</tbody>
</table>

Since the direction of a locking screw is determined by plate design or any contouring, final screw position may be verified with a K-wire prior to insertion. This becomes especially important when the plate has been contoured or applied in metaphyseal regions around joint surfaces.

With the 2.8 mm threaded drill guide in place, insert the 1.6 mm wire sleeve into the threaded drill guide.

Insert a threaded 1.6 mm Kirschner wire through the wire sleeve and drill to the desired depth.

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

**Precaution:** The K-wire position represents the final position of the locking screw. Confirm that the K-wire does not enter the joint or interfere with other screws.

Measurement may be taken by sliding the tapered end of the direct measuring device over the K-wire down to the wire sleeve.
Screw placement verification continued

Remove the direct measuring device, K-wire and 1.6 mm wire sleeve, leaving the threaded drill guide in place.

Use the 2.8 mm drill bit to drill the near cortex. Remove the threaded drill guide. Insert the appropriate length locking screw.
Implant Removal

**Implant removal**

**Set and instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.240.001</td>
<td>Screw Removal Set</td>
</tr>
<tr>
<td>309.520</td>
<td>Conical Extraction Screw</td>
</tr>
<tr>
<td>311.44</td>
<td>T-Handle, with quick coupling</td>
</tr>
</tbody>
</table>

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 locking screws are damaged or if the screws are stuck in the plate), insert the conical extraction screw with left-handed thread in the screwhead using the T-handle with quick coupling and loosen the locking screw by turning counterclockwise.
Screws Used With the 3.5 mm LCP Pilon Plate

4.0 mm Cancellous Bone Screws
Found in the Small Fragment LCP Screw Set
– May be used in the DCU portion of the Combi holes, in the plate shaft or in round locking holes
– Compress the plate to the bone or create axial compression
– Fully or partially threaded shaft

3.5 mm Locking Screws, self-tapping, with StarDrive Recess
Found in the Small Fragment LCP Screw Set
– Create a locked, fixed-angle screw/plate construct
– Fully threaded shaft
– Self-tapping tip
– Used in the locking portion of the Combi holes or in round locking holes

3.5 mm Cortex Screws, self-tapping
Found in the Small Fragment LCP Screw Set
– May be used in the DCU portion of the Combi holes in the plate shaft or in round locking holes
– Compress the plate to the bone or create axial compression
– Fully threaded shaft

2.7 mm Cortex Screws, self-tapping
Found in the Small Fragment LCP Screw Set
– May be used in the distal locking holes
– Compress the plate to the bone
– Fully threaded shaft
### Selected Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>329.095</td>
<td>Bending Iron, for 3.5 mm LCP Pilon Plates</td>
</tr>
<tr>
<td></td>
<td>(two required)</td>
</tr>
<tr>
<td>329.151*</td>
<td>Locking Calcaneal Plate Cutter</td>
</tr>
<tr>
<td>329.915</td>
<td>Bending Template, for 3.5 mm LCP Pilon Plates</td>
</tr>
<tr>
<td>391.931</td>
<td>Cutting Pliers, for 3.5 mm Distal Tibia Plates</td>
</tr>
<tr>
<td>391.963*</td>
<td>Universal Bending Pliers</td>
</tr>
<tr>
<td>394.35</td>
<td>Large Distractor, complete</td>
</tr>
</tbody>
</table>

Note: The required instruments from the Small Fragment LCP System are not shown.
*Found in the Locking Calcaneal Plate Instrument and Implant Set (105.442)
3.5 mm LCP Pilon Plates

### 3.5 mm LCP Pilon Plates

<table>
<thead>
<tr>
<th>Holes</th>
<th>Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>240.082</td>
<td>7</td>
</tr>
<tr>
<td>240.083</td>
<td>9</td>
</tr>
</tbody>
</table>

Additional Instruments for use with 3.5 mm LCP Pilon Plates

- **329.095** Bending Iron, for 3.5 mm LCP Pilon Plates (two required)
- **329.151** Locking Calcaneal Plate Cutter
- **329.915** Bending Template, for 3.5 mm LCP Pilon Plates
- **391.931** Cutting Pliers
- **391.963** Universal Bending Pliers
- **394.35** Large Distractor, complete

Required Set

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

Also Available

- **01.240.001** Screw Removal Set
- **511.770** Torque Limiting Attachment, 1.5 Nm

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

* Found in the Locking Calcaneal Plate Instrument and Implant Set (105.442)

For detailed cleaning and sterilization instructions, please refer to www.synthes.com/cleaning-sterilization or sterilization instructions, if provided.
Limited Warranty and Disclaimer: DePuy Synthes products are sold with a limited warranty to the original purchaser against defects in workmanship and materials. Any other express or implied warranties, including warranties of merchantability or fitness, are hereby disclaimed.

Please also refer to the package insert(s) or other labeling associated with the devices identified in this surgical technique for additional information.

CAUTION: Federal Law restricts these devices to sale by or on the order of a physician.

Some devices listed in this surgical technique may not have been licensed in accordance with Canadian law and may not be for sale in Canada. Please contact your sales consultant for items approved for sale in Canada.

Not all products may currently be available in all markets.

Manufactured or distributed by:
Synthes USA Products, LLC
1302 Wrights Lane East
West Chester, PA 19380

To order (USA): 800-523-0322
To order (Canada): 855-946-8999

Note: For recognized manufacturer, refer to the product label.

www.depuysynthes.com