LCP Anterolateral Distal Tibia Plate 3.5. The low profile anatomic fixation system with optimal plate placement and angular stability.
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Warning
This description is not sufficient for immediate application of the instrumentation. Instruction by a surgeon experienced in handling this instrumentation is highly recommended.
LCP Anterolateral Distal Tibia Plate 3.5. The low profile anatomic fixation system with optimal plate placement and angular stability.

Overview
The LCP Anterolateral Distal Tibia Plate 3.5 is part of the Synthes Small Fragment LCP 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 four locking holes that accept locking screws Ø 3.5 mm, cortex screws Ø 2.7 mm and Ø 3.5 mm or cancellous bone screws Ø 4.0 mm.

The combi-holes in the plate shaft accept locking screws Ø 3.5 mm, cortex screws Ø 3.5 mm and cancellous bone screws Ø 4.0 mm.

Fixation with the LCP Anterolateral Distal Tibia Plate 3.5 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).
**Features**
- Anatomically shaped
- Two different plate designs to fit right or left tibia (indicated with R or L on plate)
- Shaft holes accept locking screws Ø 3.5 mm, cortex screws Ø 3.5 mm and cancellous bone screws Ø 4.0 mm
- Head holes accept locking screws Ø 3.5 mm, cortex screws Ø 2.7 mm and Ø 3.5 mm and cancellous bone screws Ø 4.0 mm.
- 3.6 mm shaft thickness tapers to 2.5 mm distally
- Tapered tip for submuscular insertion
- Screw heads are recessed in the plate to minimize screw prominence

**Benefits**
- Distal locking screws provide support for the articular surface
- Targeted locking for Volkmann’s triangle and the Chaput fragment
- The head of the plate is designed to provide a low profile construct when using locking screws or cortex screws Ø 2.7 mm, resulting in less soft tissue irritation.
- 60° twist in shaft is contoured for the distal tibia anatomy: less plate contouring is required.
In 1958, the AO ASIF (Association for the Study of Internal fixation) formulated four basic principles, which have become the guidelines for internal fixation. These principles, as applied to the LCP Anterolateral Distal Tibia Plate 3.5, are:

**Anatomic reduction**
Anatomic plate profile and four parallel screws near the joint assist reduction of metaphysis to diaphysis to restore alignment and functional anatomy. Anatomic reduction is mandatory for intra-articular fractures to restore joint congruency.

**Stable fixation**
The combination of conventional and locking screws offers optimum fixation regardless of bone density.

**Preservation of blood supply**
Limited-contact plate design reduces plate-to-bone contact and helps to preserve the periosteal blood supply.

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

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Indications

The LCP Anterolateral Distal Tibia Plate 3.5 is indicated for:
- Extra-articular and simple intra-articular distal tibia fractures
- Distal tibia fracture, percutaneous or reducible by limited arthrotomy
- Distal tibia fracture extending into the diaphyseal area
Clinical Cases

Case 1
50-year-old male, fall from wall

Case 2
51-year-old female, corrective osteotomy
Case 3
75-year-old male, MVA

Case 4
52-year-old female, MVA
Preoperative Planning

1 Preparation

**Required set (one of the following)**

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

**Optional sets**

- 105.900 Bone Forceps Set
- 117.700 Instrument Set for Large Distractor
- 01.900.022 Extraction Module for Screws Ø 3.5, 4.0 and 4.5 mm

**Optional instruments**

- X92.200 Kirschner Wire Ø 2.0 mm with trocar tip
- X92.710 Kirschner Wire Ø 1.6 mm with threaded tip
- 309.520 Extraction Screw, conical
- 310.250 Drill Bit Ø 2.5 mm
- 311.430 Handle with Quick Coupling
- 321.120 Tension Device, articulated
- 321.150 Socket Wrench Ø 11 mm
- 323.360 Universal Drill Guide 3.5
- 324.024 Instrument for Temporary Reduction
- 324.031 Plate Holder with Thread Ø 3.5 mm
- 324.214 Drill Bit Ø 2.8 mm, with Scale, length 200/100 mm
- 329.040 Bending Iron for Plates 2.4 to 3.5
- 329.050 Bending Iron for Plates 2.4 to 3.5
- 329.300 Bending Press
- 394.350 Large Distractor
- 395.490 Medium Distractor

X=2: stainless steel
X=4: titanium

Complete the preoperative radiographic assessment and prepare the preoperative plan. Determine plate length and instruments to be used. Determine distal screw placement to ensure proper screw placement in the metaphysis.
Position patient

Position the patient supine on a radiolucent operating table. Visualization of the distal tibia under fluoroscopy in both the lateral and AP views is recommended. Elevate the leg on a padded rest with the knee moderately flexed to placement in a neutral position. Place the opposite leg level on tabletop.

**Warning:** The direction of locking screws is already determined for normal anatomy based on the design of the plate. If manual contouring in the metaphyseal area is necessary, verify new screw trajectories using the Kirschner wire screw placement verification technique on page 14.
Reduction

2
Reduce articular surface

Optional instrument

<table>
<thead>
<tr>
<th>Code</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>394.350</td>
<td>Large Distractor</td>
</tr>
<tr>
<td>395.490</td>
<td>Medium Distractor</td>
</tr>
</tbody>
</table>

Approach
A longitudinal and straight incision should be centered at the ankle joint, parallel to the fourth metatarsal distally, and between the tibia and fibula proximally. Proximal extension of the incision should end seven or eight centimeters above the joint. Distally the incision can be extended to the level of the talonavicular joint, allowing exposure of the talar neck. The joint can be exposed using an arthrotomy.

Note: The superficial peroneal nerve usually crosses the surgical incision proximal to the ankle joint and should be protected throughout the surgical procedure.

Reduce fracture/articular surface

Technique tip: Application of an external fixator or a distractor may facilitate visualization and reduction of the joint. A lateral distractor can be placed from the talar neck to the mid-tibia (from lateral to medial) to maximize joint visualization by distracting and plantar-flexing the talus.

The articular reduction is confirmed with image intensification. Temporary reduction can be obtained with multiple Kirschner wires. Multiple options exist for maintaining the reduction including:
- Independent lag screws
- Lag screws through the plate
- Locking screws through the plate

Kirschner wires can be placed through the distal end of the plate to assist with temporary maintenance of the reduction and for plate placement.

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 Anterolateral Distal Tibia Plate 3.5 with locking screws.

Technique tip: To verify that independent lag screws will not interfere with plate placement, evaluate placement intraoperatively with AP and lateral fluoroscopic images.
Plate Insertion

3
Insert plate

Optional instrument

324.031 Plate Holder with Thread

Open the area as necessary to expose the metaphysis.

Slide the shaft submuscularly along the lateral tibial cortex, beneath the anterior compartment muscles and neurovascular bundle. Use special care to protect the superficial peroneal nerve, which typically crosses under the incision proximal to the ankle joint. The distal row of screws will sit just proximal to the joint. Use fluoroscopic imaging during plate placement in both the AP and lateral planes to ensure a safe implant location proximally along the lateral tibia.

Technique tip: Insert a threaded plate holder into one of the distal holes as a handle for insertion.
Position plate and fix provisionally

Optional instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X92.200</td>
<td>Kirschner Wire Ø 2.0 mm, with trocar tip</td>
</tr>
<tr>
<td>324.024</td>
<td>Instrument for Temporary Reduction</td>
</tr>
</tbody>
</table>

The plate may be temporarily held in place using any of the following options. These options also prevent plate rotation while inserting the first locking screw:

- Instrument for temporary reduction in a screw hole that will not immediately be used (as shown in this technique guide)
- Cortex screw Ø 3.5 mm or cancellous bone screw Ø 4.0 μm in a locking or combi-hole
- Standard plate holding forceps
- Kirschner wires through the plate
- Cortex screw Ø 2.7 mm in one of the distal holes

After plate insertion, check alignment on the bone using fluoroscopy. Ensure proper reduction before inserting the first locking screw. Once locking screws are inserted, further reduction is not possible without loosening the locking screws.

**Note:** This locking plate is precontoured to fit the anterolateral 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 on page 14.

**Technique tip:** To adjust the plate into final position, insert a Kirschner wire or partially insert a cortex screw or cancellous bone screw into the elongated hole or a combi-hole before inserting a locking screw.
Optional instruments

324.214 Drill Bit 2.8 mm, with Scale, length 200/100 mm

324.024 Instrument for Temporary Reduction

The instrument for temporary reduction is placed through plate holes to push or pull bone fragments in relation to the plate. This instrument can be used for:

- Minor varus-valgus adjustment
- Translational adjustments
- Provisional fixation
- Stabilization of plate-bone orientation during insertion of the first screws
- Alignment of segmental fragments

Connect the instrument for temporary reduction to a power drive and place it in the desired hole. With the nut in the highest position possible, begin power insertion of the instrument for temporary reduction into the near cortex. Stop insertion before the end of the threaded portion meets the plate surface. Attempting to advance beyond this point may cause screw threads to strip in the bone.

Remove the power tool and begin tightening the nut toward the plate while monitoring progress under C-arm. Stop when the desired reduction is achieved.
Screw Insertion

5
Option: screw placement verification

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X92.710</td>
<td>Kirschner Wire Ø 1.6 mm with threaded tip</td>
</tr>
<tr>
<td>310.284</td>
<td>LCP Drill Bit Ø 2.8 mm</td>
</tr>
<tr>
<td>323.027</td>
<td>LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm</td>
</tr>
<tr>
<td>323.055</td>
<td>Centering Sleeve for Kirschner Wire Ø 1.6 mm</td>
</tr>
<tr>
<td>323.060</td>
<td>Direct Measuring Device for Kirschner Wire Ø 1.6 mm</td>
</tr>
</tbody>
</table>

Since the direction of the locking screw depends on the contour of the plate, final screw position may be verified with Kirschner wires before insertion. This becomes especially important when the plate has been manually contoured, applied near the joint, or for non-standard anatomy.

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

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

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

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

Measure for screw length by sliding the tapered end of the direct measuring device over the Kirschner wire down to the centering sleeve.

Remove the direct measuring device, Kirschner wire and centering 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.
6
Insert screws in distal fragment

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.284</td>
<td>LCP Drill Bit Ø2.8 mm</td>
</tr>
<tr>
<td>323.027</td>
<td>LCP Drill Sleeve 3.5, for Drill Bits Ø2.8 mm</td>
</tr>
<tr>
<td>314.115</td>
<td>Screwdriver Stardrive</td>
</tr>
<tr>
<td>314.116</td>
<td>Screwdriver Shaft Stardrive</td>
</tr>
<tr>
<td>314.070</td>
<td>Screwdriver hexagonal</td>
</tr>
<tr>
<td>314.030</td>
<td>Screwdriver Shaft hexagonal</td>
</tr>
<tr>
<td>319.010</td>
<td>Depth Gauge for Screws</td>
</tr>
<tr>
<td>511.770</td>
<td>Torque Limiter</td>
</tr>
<tr>
<td>511.773</td>
<td></td>
</tr>
</tbody>
</table>

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

**Note:** To secure the plate to the tibia prior to locking screw insertion, it is recommended to pull the plate to the bone using a cortex screw or the Instrument for Temporary Reduction (324.024).

If a locking screw is used as the first screw, be sure the fracture is reduced and the plate is held securely to the bone. This prevents plate rotation as the screw is locked to the plate.
Screw Insertion

**Locking screw insertion**

– Insert the drill sleeve into a locking hole or combi-hole until fully seated.
– Use the 2.8 mm drill bit to drill to the desired depth.
– Remove the drill sleeve.
– Use the depth gauge to determine screw length.
– Insert screw.

Insert the locking screw under power, using the torque limiter and the screwdriver shaft, or insert it manually, using the screwdriver. Hold the plate securely on the bone to prevent plate rotation as the screw is locked to the plate.

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**Note:** When using the torque limiter, the screw is securely locked into the plate when a “click” is heard.

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**Warning:** Never use the screwdriver shaft directly with power equipment unless using a torque limiter.
Alternative

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Dimensions</th>
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<tbody>
<tr>
<td>323.027</td>
<td>LCP Drill Sleeve 3.5, for Drill Bits 2.8 mm</td>
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</tr>
<tr>
<td>324.214</td>
<td>Drill Bit 2.8 mm, with Scale, length 200/100 mm</td>
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</tbody>
</table>

Instead of using the LCP drill bit and depth gauge, the drill bit with scale can be used for drilling the hole and determining the required screw length.

7

Option: articulated tension device

Instrument

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>321.120</td>
<td>Tension Device, articulated</td>
</tr>
</tbody>
</table>

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

Note: In simple fracture patterns, the articulated tension device may facilitate anatomic reduction. This device may be used to generate either compression or distraction.
8

Insert screws in proximal fragment

A Non-locking screws

<table>
<thead>
<tr>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.250 Drill Bit Ø 2.5 mm</td>
</tr>
<tr>
<td>323.360 Universal Drill Guide 3.5</td>
</tr>
<tr>
<td>314.070 Screwdriver hexagonal</td>
</tr>
<tr>
<td>314.030 Screwdriver Shaft hexagonal</td>
</tr>
<tr>
<td>319.010 Depth Gauge</td>
</tr>
</tbody>
</table>

Use the drill bit through the universal drill guide to predrill the bone. For the neutral position, press the drill guide down in the nonthreaded hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Note: To safely place screws in the tibial diaphysis, a second incision may be required to avoid damage to the neurovascular bundle in the anterior compartment and the superficial peroneal nerve.
Measure for screw length using the depth gauge for small screws.

Select and insert the appropriate cortex screw ∅ 3.5 mm using the hexagonal screwdriver or the hexagonal screwdriver shaft.

If used, remove the Instrument for Temporary Reduction (324.024).

B Locking screws

If using the threaded portion of the combi-holes, repeat the steps as described for distal locking screw insertion (see pages 15–16).
Bone Graft and Implant Removal

Option: bone graft

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

Problems with screw removal

<table>
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<tr>
<th>Set</th>
<th>Description</th>
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<tbody>
<tr>
<td>01.900.022</td>
<td>Extraction Module for Screws</td>
</tr>
<tr>
<td></td>
<td>Ø 3.5, 4.0 and 4.5 mm</td>
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<table>
<thead>
<tr>
<th>Instruments</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>309.520</td>
<td>Extraction Screw, conical</td>
</tr>
<tr>
<td>311.430</td>
<td>Handle with Quick Coupling</td>
</tr>
</tbody>
</table>

If a screw cannot be removed with the screwdriver (e.g. if the hexagonal or Stardrive recess of the locking screw is damaged or if the screw is stuck in the plate), use the conical extraction screw which has a left-hand thread. Mount the extraction screw onto the handle with quick coupling and insert the tip of the extraction screw into the problem screw head. Remove the screw by turning the handle in a counter-clockwise direction.
### Implants

<table>
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<th>Stainless Steel</th>
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<th>Holes</th>
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</tbody>
</table>

All plates are available sterile packed. For sterile implants add suffix S to article numbers (e.g. 241.440S).

### Trays

<table>
<thead>
<tr>
<th>Article Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>68.124.001</td>
<td>Tray for Implants, for LCP Anterolateral Distal Tibia Plates X41.440–X41.449</td>
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<tr>
<td>68.124.002</td>
<td>Tray for Implants, for LCP Anterolateral Distal Tibia Plates extra-long X41.450–X41.457</td>
</tr>
<tr>
<td>689.508</td>
<td>Vario Case Framing</td>
</tr>
<tr>
<td>689.507</td>
<td>Vario Case Lid</td>
</tr>
</tbody>
</table>
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