

# LCP Posterior Medial Proximal Tibial Plate 3.5. Part of the Synthes small fragment LCP system.

Technique Guide





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 Image intensifier control

## **Warning**

This description alone does not provide sufficient background for direct use of the instrument set. Instruction by a surgeon experienced in handling these instruments is highly recommended.

## **Reprocessing, Care and Maintenance of Synthes Instruments**

For general guidelines, function control and dismantling of multi-part instruments, please refer to: [www.synthes.com/reprocessing](http://www.synthes.com/reprocessing)

## LCP Posterior Medial Proximal Tibial Plate 3.5. Part of the Synthes small fragment LCP system.

The LCP Posterior Medial Proximal Tibial Plate 3.5 is part of the Synthes small fragment LCP system that merges locking screw technology with conventional plating techniques.

The LCP Posterior Medial Proximal Tibial Plate 3.5 is available in stainless steel or titanium and has a limited-contact shaft profile. The head and neck portions of the plate accept locking, conical and cortex screws  $\varnothing$  3.5 mm or cancellous bone screws  $\varnothing$  4.0 mm.

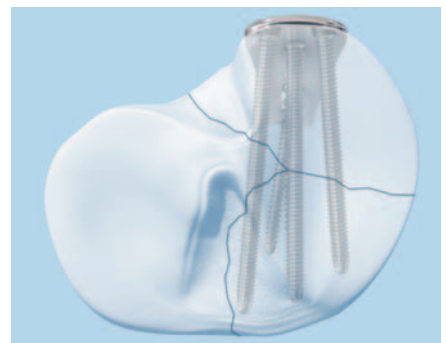
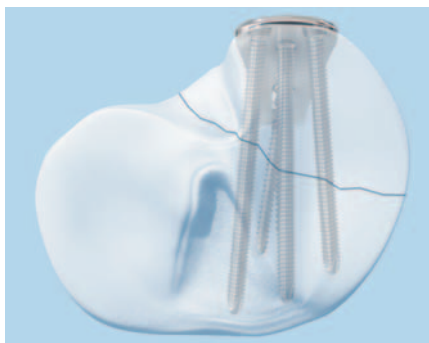
### Screw divergence

The two proximal screw holes have 10° divergent trajectories, each diverging 5° from the plate midline.



**Features**

- Plate tapers from 3.4 mm to 1.9 mm thick
- Available with 1, 2, 4, 6, 8 or 10 holes in the plate shaft
- Available in implant-quality 316 L stainless steel or titanium alloy (Ti-6Al-7Nb)



In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.<sup>1,2</sup> Those principles, as applied to the LCP Posterior Medial Proximal Tibial Plate 3.5 are:

### **Anatomic reduction**

Restoration of the bone by exact screw placement using threaded drill sleeves.

### **Stable fixation**

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

### **Preservation of blood supply**

Tapered end for submuscular plate insertion. Limited-contact shaft profile reduces plate-to-bone contact and minimizes vascular trauma.

### **Early, active mobilization**

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

1 Müller ME, Allgöwer M, Schneider R, Willenegger H (1995) Manual of Internal Fixation. 3rd, expanded and completely revised ed. 1991. Berlin, Heidelberg, New York: Springer

2 Rüedi TP, Buckley RE, Moran CG (2007) AO Principles of Fracture Management. 2nd expanded ed. 2002. Stuttgart, New York: Thieme

## Indications

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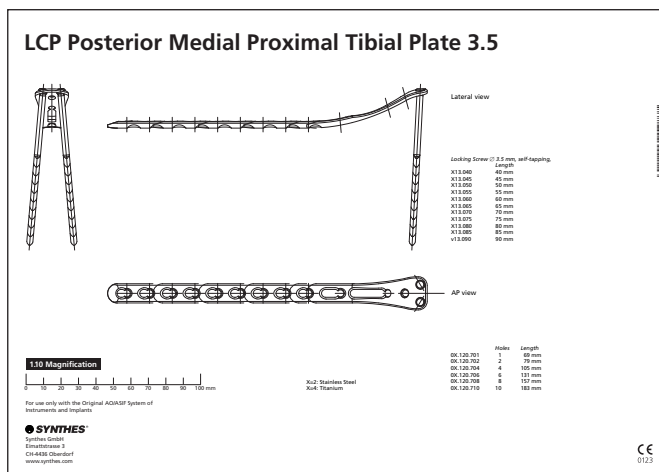
The Synthes LCP Posterior Medial Proximal Tibial Plate 3.5 is indicated for internal fixation of posteromedial proximal tibia fractures including buttressing of fractures of the proximal, distal and metaphyseal areas of the tibia.

# Preoperative Planning

Use the preoperative planning template for the LCP Posterior Medial Proximal Tibial Plate 3.5 (034.000.657)

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

**Important:** Determine proximal screw placement and screw lengths to ensure proper screw placement in the metaphysis.





# Preparation

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## Sets

01.120.702	LCP Posterior Medial Proximal Tibial Plates 3.5 (Stainless Steel), in Modular Tray, Vario Case System
or	
01.120.703	LCP Posterior Medial Proximal Tibial Plates 3.5 (TAN), in Modular Tray, Vario Case System
<hr/>	
01.122.013	Small Fragment Basic Instruments, in Modular Tray, Vario Case System
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01.122.015	Screw Insertion Instruments 3.5/4.0, in Modular Tray, Vario Case System

## Optional instruments

394.350	Large Distractor, complete
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323.055	Centering Sleeve for Kirschner Wire Ø 1.6 mm, length 70 mm, for Nos. 323.027 and 323.054
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312.648*	LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm
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324.214*	Drill Bit Ø 2.8 mm, with Scale, length 200/100 mm, 3-flute, for Quick Coupling (for use with 312.648)
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319.090*	Depth Gauge for Long Screws Ø 3.5 mm, measuring range up to 110 mm

\* Required for inserting LCP and conical screws longer than 60 mm

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**Note:** For information on fixation principles using conventional and locked plating techniques, please refer to the Synthes LCP Locking Compression Plate Surgical Technique Guide (036.000.019).

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# Approach – Posteromedial

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## 1

### Position patient

Position the patient on a radiolucent operating table.

Visualization of the proximal tibia under fluoroscopy in both the lateral and AP views is necessary.

If the patient's hip is normal, position the patient supine, abduct and externally rotate the leg and put it in a figure of four position. A bump under the contralateral hip may help.

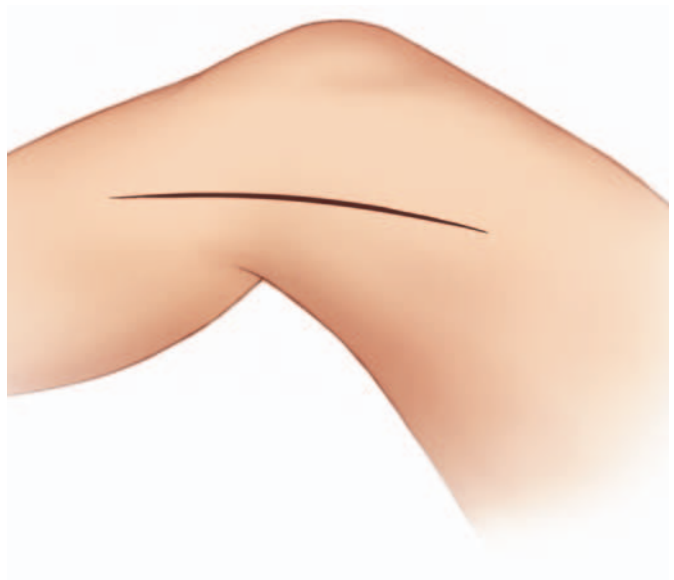
If the hip is stiff, position the patient in a lateral decubitus with the involved limb down.

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## 2

### Make incision

With the knee in slight flexion, make a straight or slightly curved incision running from the medial epicondyle toward the posteromedial edge of the tibia. The incision can be extended as needed both proximally and distally.



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### 3

#### Identify and expose pes anserinus

After opening the fascia, identify and expose the pes anserinus.

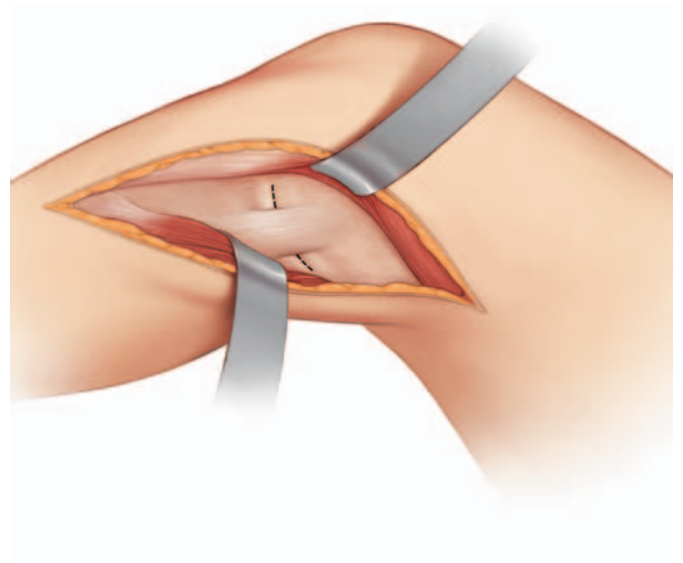
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### 4

#### Access tibial plateau

Retract the pes anteriorly and the gastrocnemius posteriorly and distally. Identify the medial edge of the tibial plateau.

Identify the meniscus and incise the capsule between the meniscus and the edge of the tibial plateau, gaining access to the knee joint.



# Approach – Posterior

The posteromedial side can be approached without exposing and dissecting the neurovascular structures. The posterior approach allows repair of avulsion fractures of the posterior cruciate and tangential fractures of the proximal tibial head.

## 1

### Position patient

Position the patient prone on a radiolucent operating table.

Visualization of the proximal tibia under fluoroscopy in both the lateral and AP views is necessary.

## 2

### Make incision

Make a lazy S-shaped incision in the popliteal fossa.

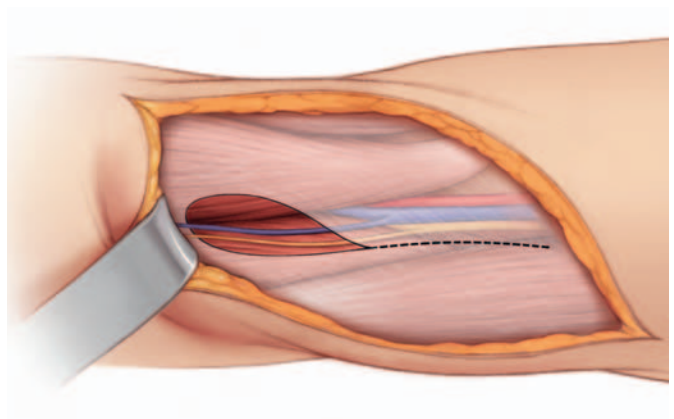
The incision should extend about 8 cm proximally and distally from the joint line.



## 3

### Open crural fascia

Open the crural fascia. Identify and save the short saphenous vein and the medial sural cutaneous nerve.

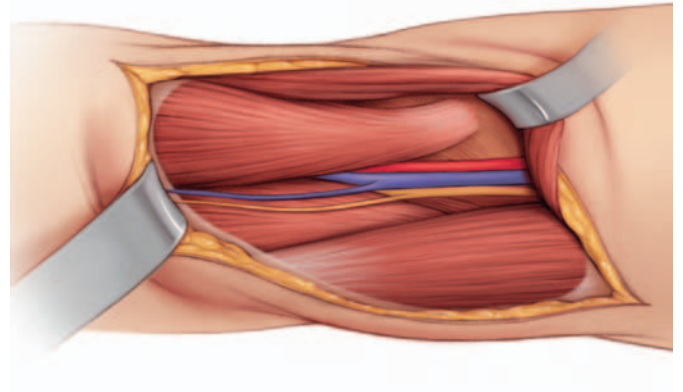


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## 4

### Retract semimembranosus muscle

Identify the semimembranosus muscle and retract it medially. The insertion of the medial head of gastrocnemius becomes visible.



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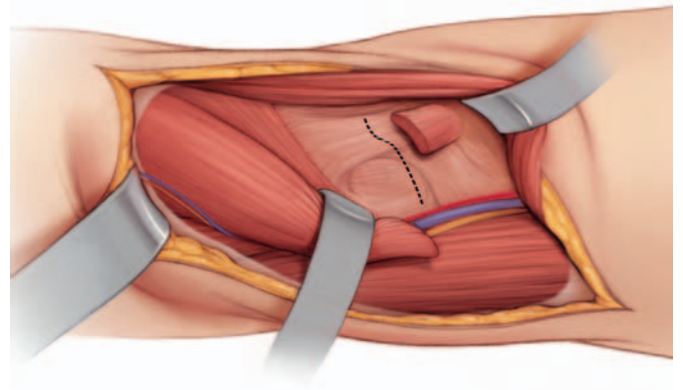
## 5

### Expose

Identify the anterior edge of the gastrocnemius and retract the muscle laterally. The muscle will protect the important neurovascular bundle.

**Option:** Transection of the gastrocnemius close to its insertion may allow easier retraction and protection of the neurovascular bundle.

The posteromedial capsule comes into view. It can be incised where necessary to expose the fracture lines.



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### Alternative technique

Alternatively, a Lobenhoffer approach may be used.<sup>3</sup>

<sup>3</sup> Fakler JK, et al (2007). Optimizing the Management of Moore Type I Postero-Medial Split Fracture Dislocations of the Tibial Head: Description of the Lobenhoffer Approach. J Orthop Trauma 21(5):330-336

# Fracture Reduction and Screw Insertion

## 1

### Reduce fracture

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#### Instruments

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394.350	Large Distractor, complete Kirschner Wires
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**Technique tip:** Before reduction, application of an external fixator or large distractor may facilitate visualization and reduction of the joint.

- Reduce the fracture fragments and confirm reduction using fluoroscopy. Fragments may be reduced using independent Kirschner wires.

The locking screws do not provide interfragment or plate-to-bone compression; therefore, any desired compression must be achieved with conical screws  $\varnothing$  3.5 mm in the plate or independent lag screws.

**Technique tip:** To verify that independent lag screws will not interfere with plate placement, hold the plate to the bone.



## 2

### Position plate

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#### Instruments

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310.250	Drill Bit $\varnothing$ 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling
314.070	Screwdriver, hexagonal, small, $\varnothing$ 2.5 mm, with Groove
314.030	Screwdriver Shaft, hexagonal, small, $\varnothing$ 2.5 mm
319.010	Depth Gauge for Screws $\varnothing$ 2.7 to 4.0 mm, measuring range up to 60 mm
323.360	Universal Drill Guide 3.5

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#### Alternative instrument

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319.090	Depth Gauge for Long Screws $\varnothing$ 3.5 mm, measuring range up to 110 mm
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Using anatomic landmarks and fluoroscopy, mount the plate on the bone.

Place the universal drill guide 3.5 into the nonlocking portion of an elongated plate hole. Use the 2.5 mm drill bit to drill into the bone.

The plate may be temporarily held in place by a cortex screw  $\varnothing$  3.5 mm or cancellous bone screw  $\varnothing$  4.0 mm.

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#### Notes:

- When used as a buttress plate, cortex screws placed through the plate below the fracture can be used to assist with indirect reduction of the fragment. Placing a nonlocking screw in an elongated LCP hole below the fragment allows easy adjustment of plate positioning before inserting screws into combi holes in the shaft or plate head.
  - It is not recommended to drill through both cortices as the posteromedial position of the plate may direct the drill bit into the anterior soft tissues. The tibial tubercle is a suggested aiming point.
- 



### 3

#### Insert cortex screws

##### Instruments

310.250	Drill Bit $\varnothing$ 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling
314.070	Screwdriver, hexagonal, small, $\varnothing$ 2.5 mm, with Groove
314.030	Screwdriver Shaft, hexagonal, small, $\varnothing$ 2.5 mm
319.010	Depth Gauge for Screws $\varnothing$ 2.7 to 4.0 mm, measuring range up to 60 mm
323.360	Universal Drill Guide 3.5

##### Alternative instrument

319.090	Depth Gauge for Long Screws $\varnothing$ 3.5 mm, measuring range up to 110 mm
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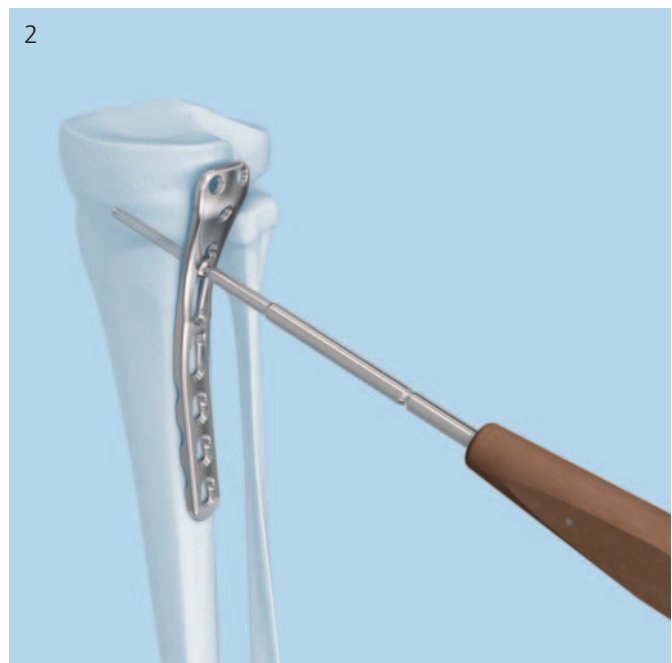
Measure for screw length with the depth gauge. (1)

Insert a screw with a small hexagonal screwdriver manually or under power. Determine the final position of the plate before tightening completely. (2)

Insert additional cortex screws in combi holes as necessary using the above technique.

For the neutral position within a combi hole, press the drill guide down in the nonthreaded portion of the hole. To obtain compression, place the drill guide at the end of the non-threaded hole away from the fracture. Do not apply downward pressure on the drill guide's spring-loaded tip.

**Important:** All of the cortex or cancellous bone screws must be inserted before insertion of locking screws  $\varnothing$  3.5 mm.





## 4

### Insert locking screws

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#### Instruments

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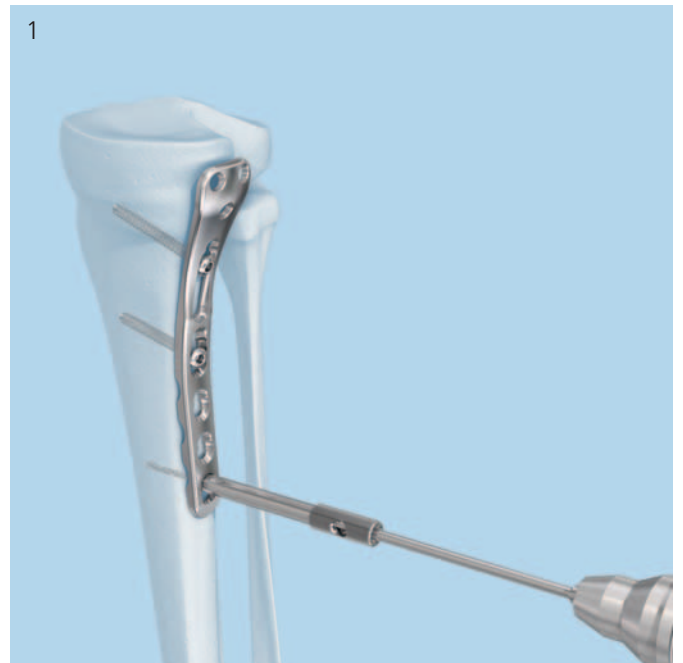
310.284	LCP Drill Bit $\varnothing$ 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling
323.027	LCP Drill Sleeve 3.5, for Drill Bits $\varnothing$ 2.8 mm
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling
311.431	Handle with Quick Coupling
319.010	Depth Gauge for Screws $\varnothing$ 2.7 to 4.0 mm, measuring range up to 60 mm
511.770 or 511.773	Torque Limiter, 1.5 Nm, for Compact Air Drive and for Power Drive Torque Limiter, 1.5 Nm, for AO/ASIF Quick Coupling

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Thread the LCP drill sleeve 3.5 into an appropriate locking hole.

Use the LCP drill bit  $\varnothing$  2.8 mm to drill into the bone. (1)

Remove the LCP Drill Sleeve 3.5 and measure with the depth gauge. (2)



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Insert the appropriate length locking screw using a Stardrive screwdriver.

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**Notes:**

- 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.
  - Always use a torque limiting attachment when using power to insert locking screws. Final tightening should be performed by hand.
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**Note:** If longer screws (65 mm–95 mm) are used, alternative instruments may be needed.

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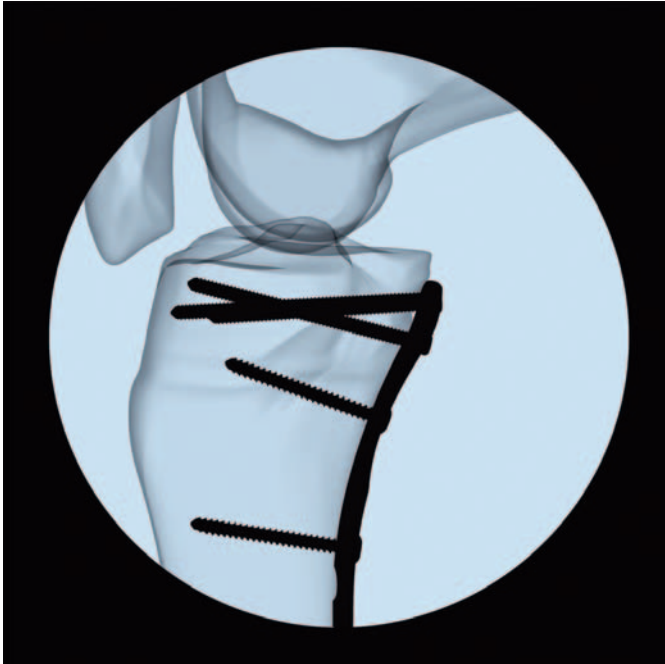
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**Alternative instruments**

319.090	Depth Gauge for Long Screws $\varnothing$ 3.5 mm, measuring range up to 110 mm
312.648	LCP Drill Sleeve 3.5, for Drill Bits $\varnothing$ 2.8 mm
324.214	Drill Bit $\varnothing$ 2.8 mm, with Scale, length 200/100 mm, 3-flute, for Quick Coupling (for use with 312.648)

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Insert additional locking screws as necessary.



# Alternative Technique for Screw Lengths up to 60 mm

## 1

### Screw placement verification with Kirschner wire

#### Instruments

292.160	Kirschner Wire Ø 1.6 mm with trocar tip, length 150 mm, Stainless Steel
310.284	LCP Drill Bit Ø 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling
323.027	LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm
323.055	Centering Sleeve for Kirschner Wire Ø 1.6 mm, length 70 mm, for Nos. 323.027 and 323.054
511.770 or 511.773	Torque Limiter, 1.5 Nm, for Compact Air Drive and for Power Drive Torque Limiter, 1.5 Nm, for AO/ASIF Quick Coupling



Attach a LCP drill sleeve 3.5 to the plate. Insert a centering sleeve for Kirschner wire Ø 1.6 mm into the LCP drill sleeve.(1)

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

- ① Verify Kirschner wire placement under image intensification to determine if final screw placement is acceptable. (2)

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



## 2

### Measure for screw length and insert screw

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#### Instruments

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314.070	Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling
311.431	Handle with Quick Coupling
323.060	PHILOS Direct Measuring Device for Kirschner Wire Ø 1.6 mm

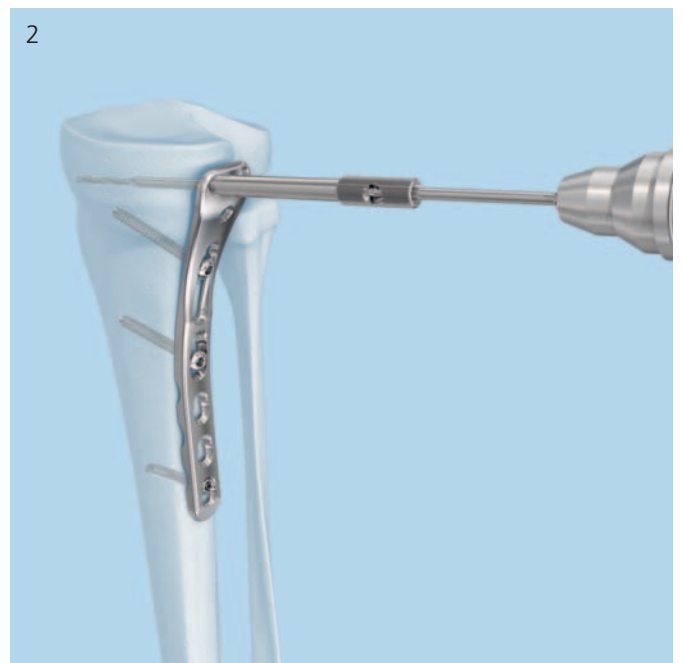
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Measurement may be taken by sliding the tapered end of the direct measuring device over the Kirschner wire and down to the wire sleeve. (1)

Remove the direct measuring device, Kirschner wire and centering sleeve, leaving the LCP drill sleeve 3.5 in place.

Use the LCP drill bit Ø 2.8 mm to drill the near cortex (2). Remove the LCP drill sleeve 3.5. Insert the appropriate length locking screw.

Insert additional locking screws as necessary.



# Plates

## LCP Posterior Medial Proximal Tibial Plate 3.5 mm\*

Stainless steel	Titanium	Shaft holes	Length (mm)
02.120.701	04.120.701	1	69
02.120.702	04.120.702	2	79
02.120.704	04.120.704	4	105
02.120.706	04.120.706	6	131
02.120.708	04.120.708	8	157
02.120.710	04.120.710	10	183



\* Available non-sterile or sterile packed. Add "S" to catalog number to order sterile product.

# Screws

## Locking Screw $\varnothing$ 3.5 mm, self-tapping

- Threaded conical head
- Fully threaded shaft
- Hexagonal or Stardrive recess
- Self-tapping tip
- Lengths: 10 mm–95 mm

	Titanium	Stainless Steel
⊙	413.010–413.095	213.010–213.095
⊕	412.101–412.131	212.101–212.131



## Screw $\varnothing$ 3.5 mm with Conical Head, self-tapping, short thread

- Smooth conical head
- Partially threaded shaft
- Hexagonal or Stardrive recess
- Self-tapping tip
- Lengths: 40 mm–95 mm

	Titanium	Stainless Steel
⊙	412.467–412.481	212.467–212.481
⊕	412.417–412.431	212.417–212.431



## Screw $\varnothing$ 3.5 mm with Conical Head, self-tapping, fully threaded

- Smooth conical head
- Fully threaded shaft
- Stardrive or hexagonal recess
- Self-tapping tip
- Lengths: 40 mm–95 mm

	Titanium	Stainless Steel
⊙	412.367–412.381	212.367–212.381
⊕	412.317–412.331	212.317–212.331



## Cortex Screw $\varnothing$ 3.5 mm, self-tapping, hexagonal recess

- May be used in the DCU portion of the combi-holes
- Used to compress the plate to the bone or create axial compression
- Self-tapping tip
- Lengths: 10 mm–110 mm

	Titanium	Stainless Steel
⊙	404.810–409.910	204.810–209.910









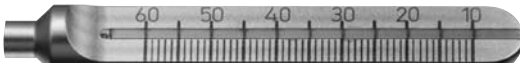


# Instruments Used with 3.5 mm LCP Posteromedial Proximal Tibial Plates

394.350	Large Distractor	
323.055	Centering Sleeve for Kirschner Wire Ø 1.6 mm, length 70 mm, for Nos. 323.027 and 323.054	
312.648*	LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm	
324.214*	2.8 mm Percutaneous Drill Bit, 100 mm calibration (for use with 312.648)	
319.090*	Depth Gauge for Long Screws Ø 3.5 mm, measuring range up to 110 mm	
310.250	Drill Bit Ø 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling	
314.070	Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove	
314.030	Screwdriver Shaft, hexagonal, small, Ø 2.5 mm	
319.010	Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm	
323.360	Universal Drill Guide 3.5	

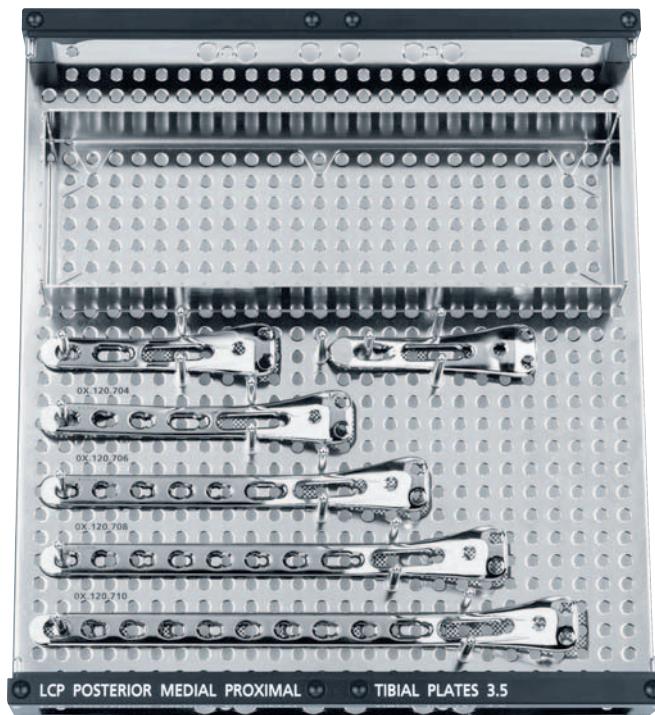
\* Required for inserting LCP and conical screws longer than 60 mm



310.284	LCP Drill Bit $\varnothing$ 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling	
323.027	LCP Drill Sleeve 3.5, for Drill Bits $\varnothing$ 2.8 mm	
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling	
311.431	Handle with Quick Coupling	
511.770	Torque Limiter, 1.5 Nm, for Compact Air Drive and for Power Drive	
or 511.773	Torque Limiter, 1.5 Nm, for AO/ASIF Quick Coupling	
292.160	Kirschner Wire $\varnothing$ 1.6 mm with trocar tip, length 150 mm, Stainless Steel	
323.055	Centering Sleeve for Kirschner Wire $\varnothing$ 1.6 mm, length 70 mm, for Nos. 323.027 and 323.054	
292.180	Kirschner Wire $\varnothing$ 1.6 mm with trocar tip, length 280 mm, Stainless Steel	
323.060	PHILOS Direct Measuring Device for Kirschner Wire $\varnothing$ 1.6 mm	

## Plate Set LCP Posterior Medial Proximal Tibial Plate 3.5 in Vario CAsE

01.120.702	LCP Posterior Medial Proximal Tibial Plates 3.5 - SSt
01.120.703	LCP Posterior Medial Proximal Tibial Plates 3.5 - TAN
68.120.702	Modular Tray for LCP Posterior Medial Proximal Tibial Plates 3.5, size 1/2, without Contents, Vario Case System
684.060	Lid for Modular Tray, size 1/2
689.513	Vario Case, Framing, size 1/2, height 45 mm
689.515	Vario Case, Framing, size 1/2, height 88 mm
689.516	Vario Case, Framing, size 1/2, height 126 mm
689.537	Lid (Stainless Steel), size 1/2, for Vario Case
68.120.703	Labelling Clip for LCP Posterior Medial Proximal Tibial Plate Set 3.5, System Vario Case



## 01.122.013 Small Fragment Basic Instruments, in Modular Tray, Vario Case System

684.060	Lid for Modular Tray, size 1/2
68.122.013	Modular Tray for Small Fragment Basic Instruments, size 1/2, without content, Vario Case System

## 01.122.015 Screw Insertion 3.5/4.0, in Modular Tray, Vario Case System

684.060	Lid for Modular Tray, size 1/2
68.122.015	Modular Tray for Screw Insertion 3.5/4.0, size 1/2, without content, Vario Case System





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