

# LCP Pediatric Hip Plates 3.5 and 5.0 for valgus osteotomies.

## Technique Guide





---

Image intensifier control

**Warning**

This description alone does not provide sufficient background for direct use of the product. Instruction by a surgeon experienced in handling this product 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)

# Table of Contents

Introduction	<b>LCP Pediatric Plate System: Hip and Condylar Plates</b>	2
	<b>AO Principles</b>	4
	<b>Indications</b>	5
	<b>Clinical Cases</b>	6
Surgical Technique	<b>Standard Surgical Technique</b>	8
	Pre-Operative Planning (functional and anatomical)	8
	Patient Positioning and Approach	13
	Guide Wire Insertion	14
	Osteotomy	19
	Proximal Fixation	20
	Reduction	25
	Distal Fixation	26
	<b>Alternative Surgical Technique</b>	29
	Pre-Operative Planning (based on plate/screw angle)	29
	Patient Positioning and Approach	30
	Guide Wire Insertion	31
Product Information	<b>LCP Pediatric Plate System Implant Overview</b>	34
	<b>LCP Pediatric Plate System Instrument Overview</b>	39
	<b>LCP Pediatric Plate System Module Overview</b>	50
Bibliography		52

# LCP Pediatric Hip Plate System

The LCP Pediatric Hip Plates are part of an innovative concept consisting of the LCP Pediatric Hip Plates 2.7\*, 3.5 and 5.0.

Pediatric Hip Plates cover treatment options for stable fixation of varus and valgus as well as rotation osteotomies and fracture treatment of the proximal femur.

The highly successful technique of the locking compression plate (LCP), which has enjoyed great success in adult surgery over recent years, has been incorporated in this system dedicated to pediatrics.



Varus plate 2.7\*



Varus plate 5.0

\*First available in Q2 2011

## LCP Pediatric Hip Plate System



Valgus plate 5.0

The LCP pediatric hip plates have a universal design for the left and right femur. They have the following main characteristics ensuring excellent fixation in the bone:

- LCP Pediatric Hip Plates 3.5 and 5.0 have three neck screws in the proximal part and combi-holes for locking or cortex screws in the distal part
- LCP Pediatric Hip Plate 2.7 has two neck screws in the proximal part and combi-holes for locking or cortex screws in the distal part

### Features and Benefits

In comparison to conventional blade/plate systems the LCP Pediatric Hip Plates have four main advantages:

#### Angular stability

Reduces the risk of primary and secondary loss of correction. Thanks to the angular stability a hip spica is no longer necessary in the majority of older cases.

For the LCP Pediatric Hip Plate 2.7, external splintage such as a spica is recommended as the plate is small and the infant not compliant.

#### Easy and safe surgical technique

Initial plate positioning with Kirschner wires rather than using a chisel allows easy adjustment without bony damage.

#### Medialization

For Pediatric Hip Plates 3.5 and 5.0 there is the possibility of additional medialization that means that just one off-set is required for each plate size.

#### Low profile

Plate design and locking construct allow minimal muscle disruption and reduce soft tissue irritation.

---

## **Stable fixation**

The fixation of the LCP plate with angular stable screws reduces the risk of loss of correction in osteotomies intra- and post-operatively even if fragments are only partially reduced and compressed.

## **Preservation of blood supply**

The features of the child periosteum allow blood supply to be preserved even if the periosteum is elevated.

## **Early mobilization**

The use of LCP implants allows an early and active mobilization, including cast-free postoperative management (Pediatric Hip Plates 3.5 and 5.0) in younger and handicapped children where appropriate.

For the LCP Pediatric Hip Plate 2.7, external splintage such as a spica is recommended as the plate is small and the infant not compliant.

# Indications

---

The LCP Pediatric Plate System consists of different plates for different indications.

This surgical technique focuses on the LCP Pediatric Hip Plate 3.5 for valgus osteotomies.

---

The LCP Pediatric Hip Plate for valgus osteotomies is intended for use in pediatric patients up to adolescence and for small stature adult patients.

Specific indications include:

- High riding of greater trochanter and low shortening of the leg
- Perthes' disease
- Congenital pseudarthrosis of the femoral neck
- Deformity of SCFE (Slipped Capital Femoral Epiphysis)
- PFFD (Proximal Femoral Focal Deficiency)
- Idiopathic coxa vara
- Posttraumatic pseudarthrosis of the femoral neck

---

**Important:** Make sure to choose the appropriate plate corresponding to age, size and bone quality of the patient.

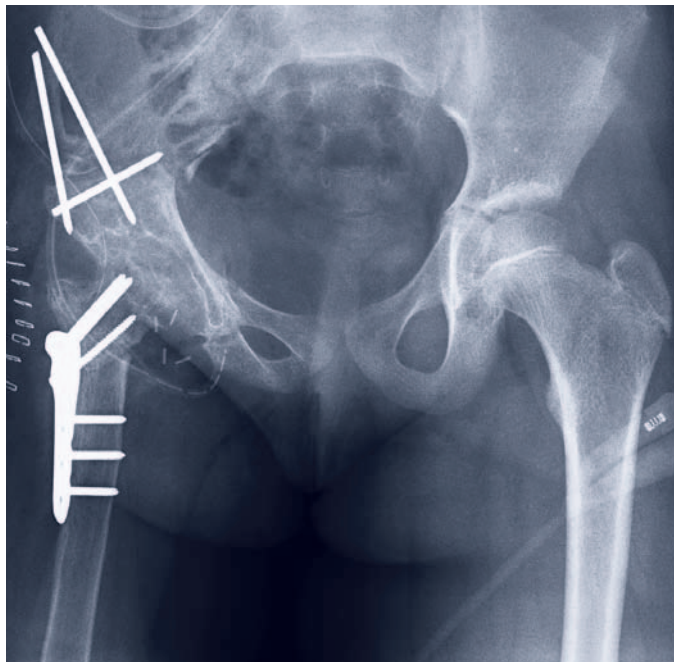
---

## Case 1\*

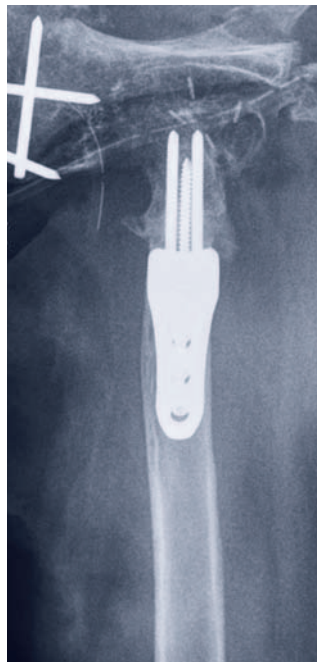
9-year-old girl; destroyed femoral neck after a plasmacellular osteomyelitis; healed in a 90° varus position and 40° retroversion of the rest of the femoral head.



preoperative



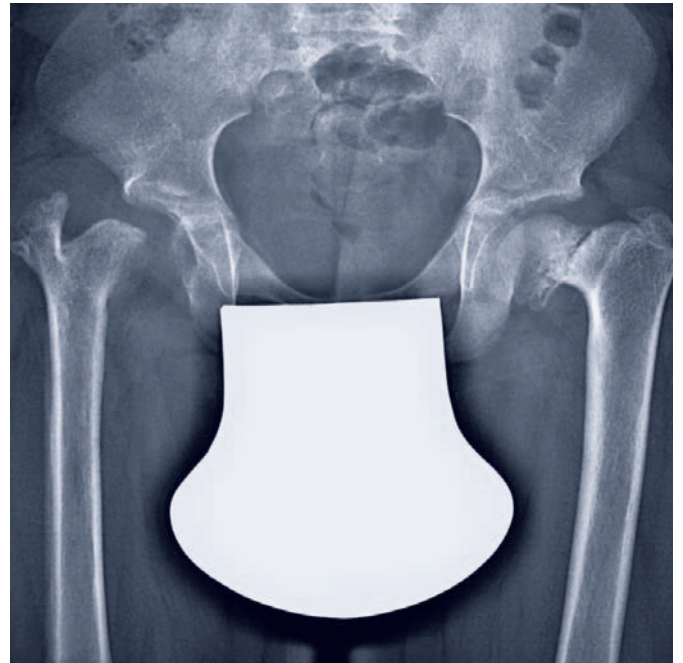
postoperative



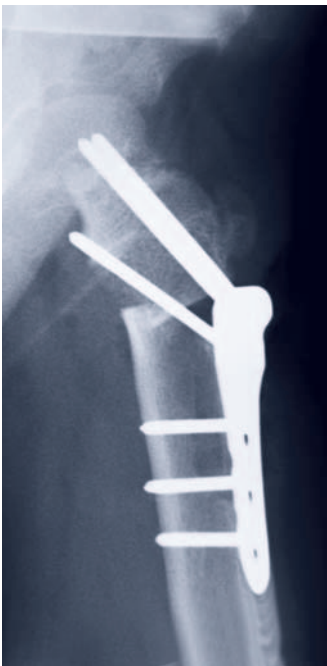


**Case 2\***

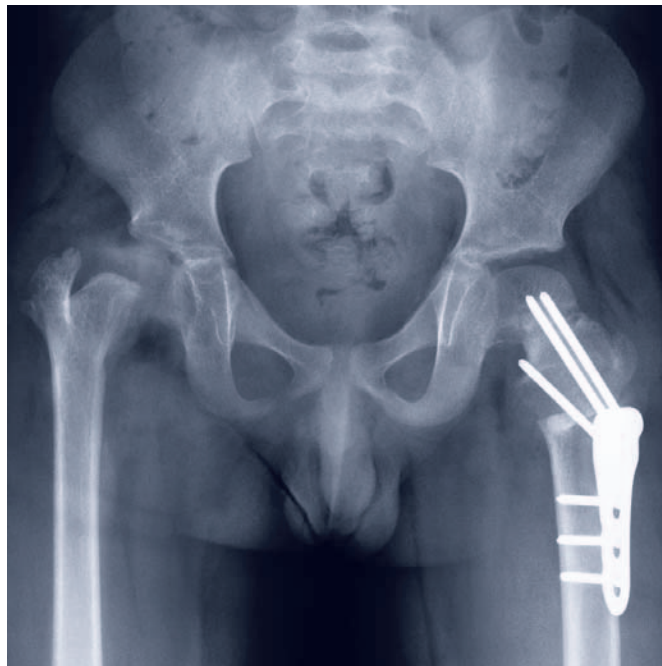
9-year-old boy, situation 8 and a half years after bilateral osteoarthritis in both hips; right hip fully destroyed; left 90° varus hip with pseudarthrosis of the femoral neck.



preoperative



postoperative



3 months postoperative



\* Acknowledgement: Teddy F. Slongo, MD Chirurgische Universitäts-Kinderklinik, Kinderspital Bern

# Standard Surgical Technique

## Preoperative Planning

---

### 1

#### **Determine correction angle**

The surgical procedure described on the following pages uses guide wires to help plate placement. These guide wires are inserted with the help of an aiming block. In order to set the correct angle of the aiming block, the correction angle has to be determined first.

The angle of the aiming block can be calculated on the basis of the plate/screw angle and the desired correction angle. The correction angle can be established with two different planning methods described below.

#### **A. Functional aspect: The functional abduction view on the x-ray shows the amount of correction**

This technique is based on the optimal anatomical position of the femoral head in the acetabulum (containment) and is not focused on an anatomical calculated correction angle. The pathological neck/shaft (CCD) angle is not relevant to determine the correction angle.

#### **B. Anatomical aspect: The planning is based on the actual pathological neck/shaft angle (CCD)**

This technique is used when the desired final neck shaft angle is not one of the plate/screw angles. The technique is derived from the original osteotomy technique described by Müller (1971).

## A. Functional aspect

The functional planning is based on a clear ap pelvis x-ray. For the calculation of the correction angle there are two options;

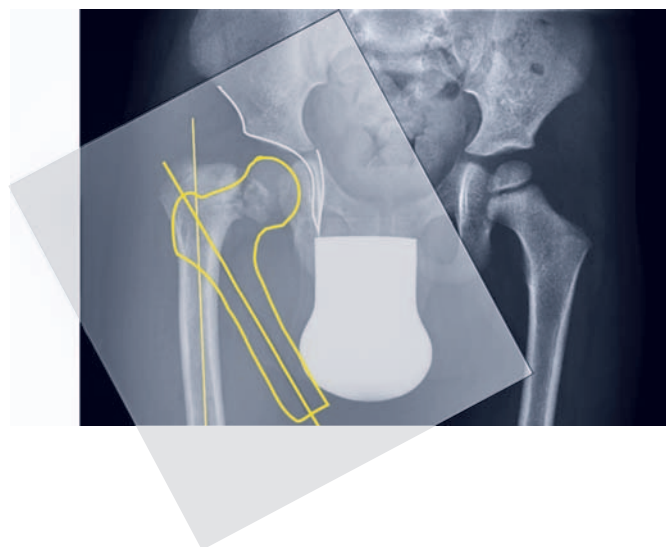
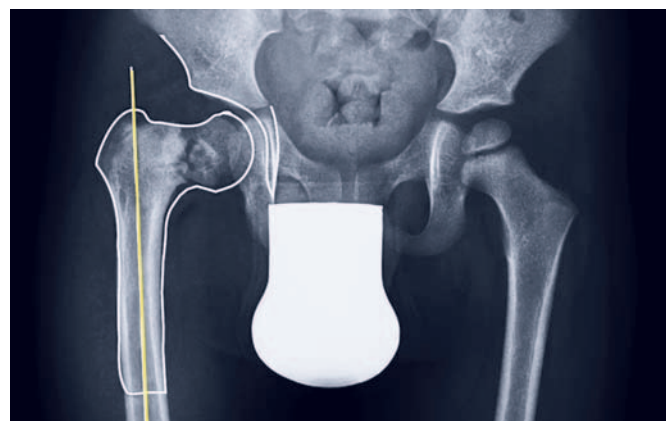
1. Functional, adduction x-ray until we have an optimal containment of the femoral head.
2. Create a blueprint of the proximal femur on the ap pelvic x-ray, rotate this blueprint around the center of the femoral head until you have a satisfactory containment.

**Calculation of the correction:** The angle between the anatomical axis of the femur in the ap x-ray and the adduction x-ray or the ap x-ray and the blueprint, respectively determine the correction angle.

---

**Note:** The use of the blueprint technique reduces the x-ray exposure!

---



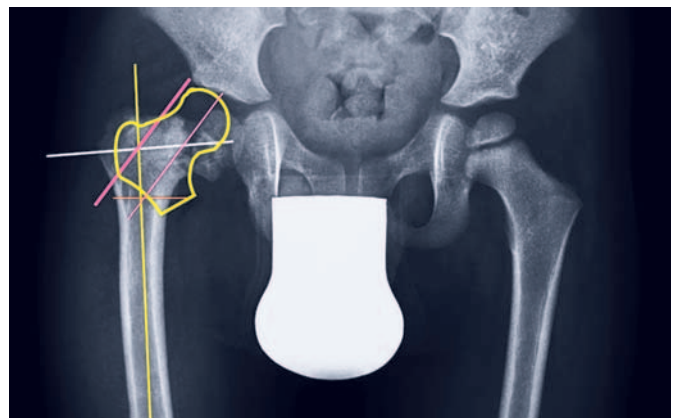
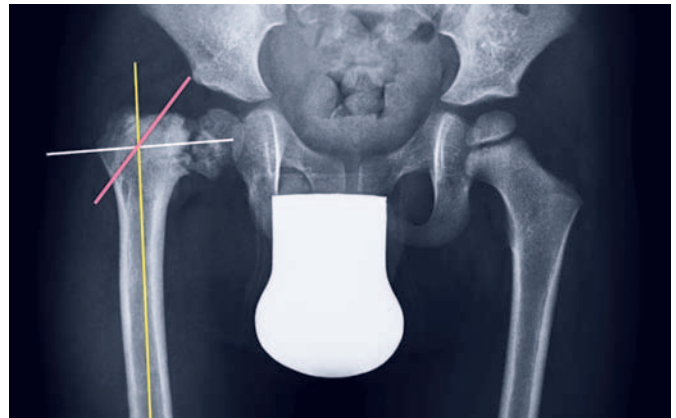
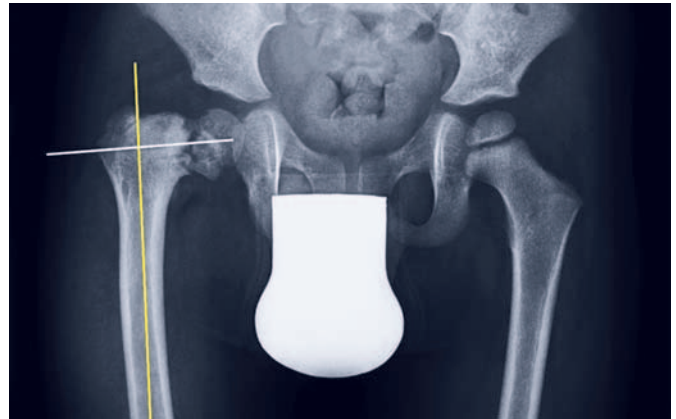
## B. Anatomical aspect

The anatomical planning is based on a clear ap pelvis x-ray with at least 30° of internal rotation of both legs. This guarantees the correct projection of the real femoral neck/shaft (CCD) angle.

1. Measure the pathological neck/shaft angle.
2. Determine the desired neck/shaft angle.

**Note:** To control the planned correction a blueprint of the proximal femur on the ap pelvic x-ray can be performed. Rotate this blueprint around the planned Osteotomy up your planned CCD angle and control the position of the femoral head.

Calculation of the correction: The angle between the initial axis of the femoral neck in the ap x-ray and the planned neck/shaft angle determine the correction angle.



## Formula

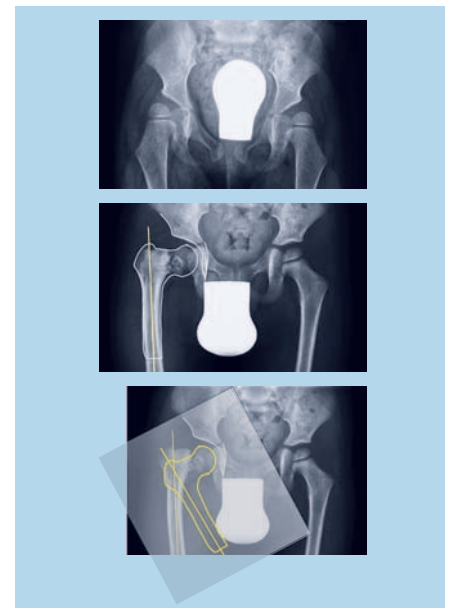
Positioning wire angle = plate/screw angle minus  
correction angle (results from the functional or anatomical aspects)



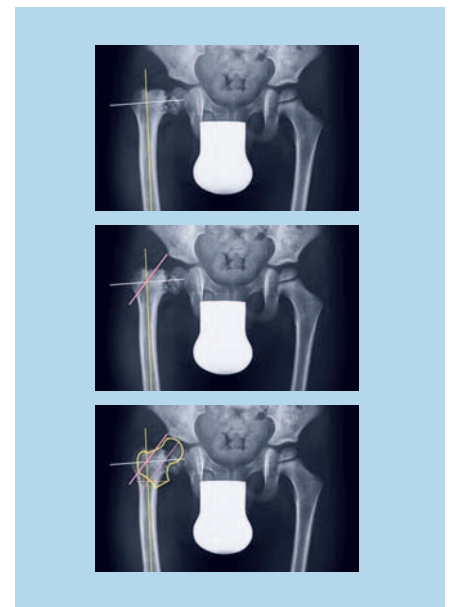
=



-



or



Current CCD: 95°  
Rotation: 35°  
Desired CCD: 130°  
Plate/screw angle: 140°

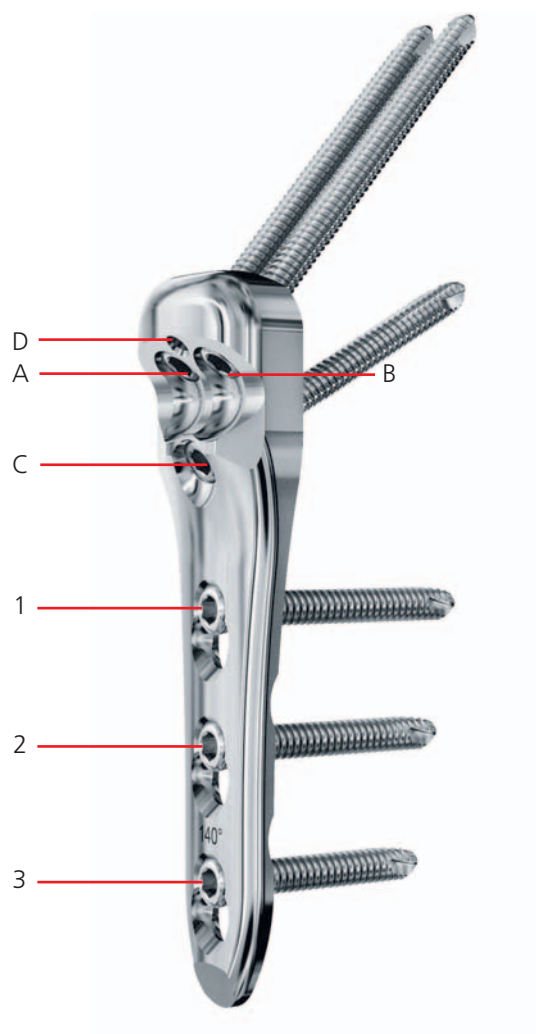
Positioning wire angle = 140°  
(plate/screw angle) minus  
35° (correction angle) = 105°

## 2

### Plate Type

This technique guide focuses on the LCP Pediatric Hip Plates and describes a valgus osteotomy of the proximal femur with 140° straight valgus plate (corresponds to implant Art. No. 02.108.316).

The surgical technique refers to screw holes where applicable. Please see the designation of each hole as marked.



- A, B: Neck screws
- C: Calcar screw
- D: Positioning Kirschner wire
- 1, 2 and 3: LCP or cortex shaft screws

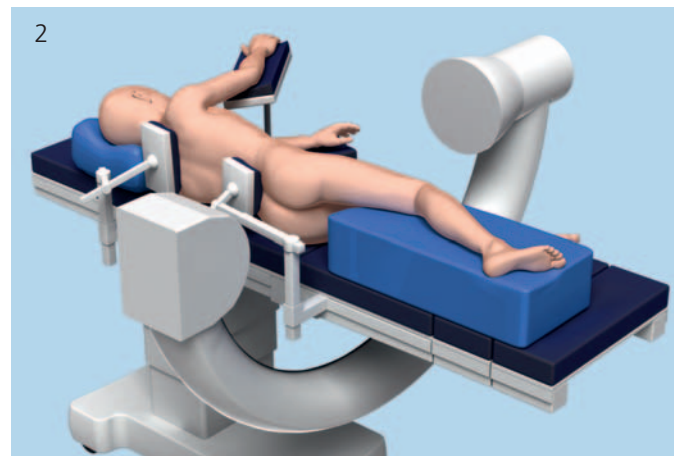
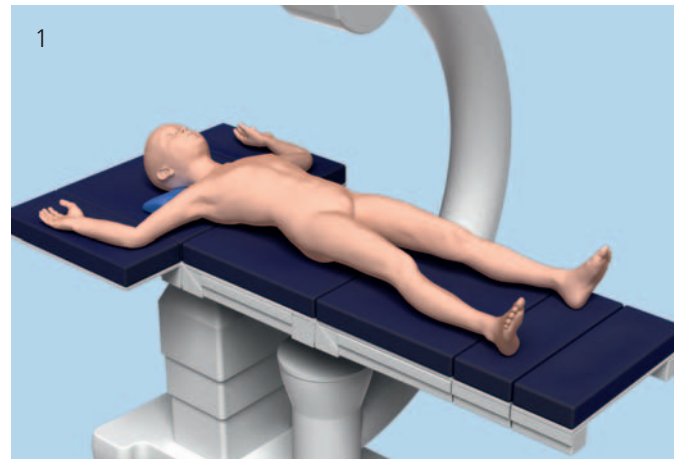


## Patient Positioning and Approach

### 1

#### Position patient

Position the patient either in the supine (1) or lateral (2) position. For the supine position a radiolucent table is recommended.



### 2

#### Approach

Use a standard lateral approach to the proximal femur.

### 1

#### Localize trochanteric epiphysis and determine anteversion

---

##### Instrument

---

292.790	Kirschner Wire Ø 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel
---------	--

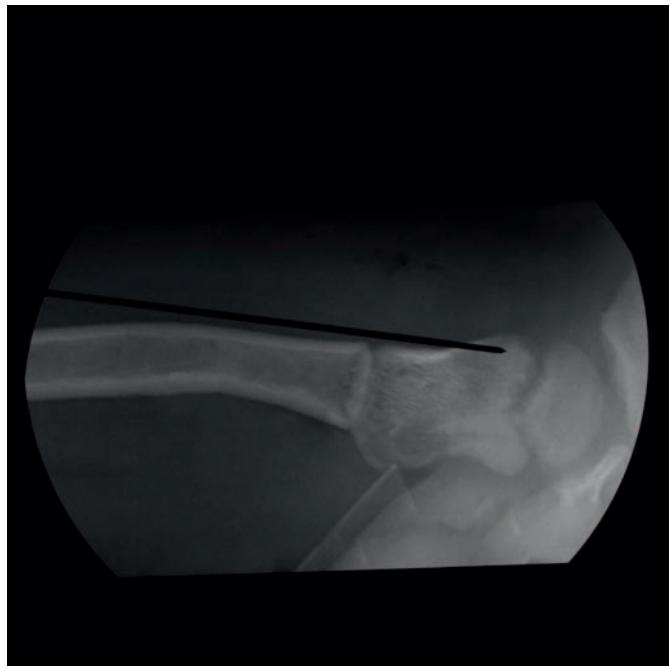
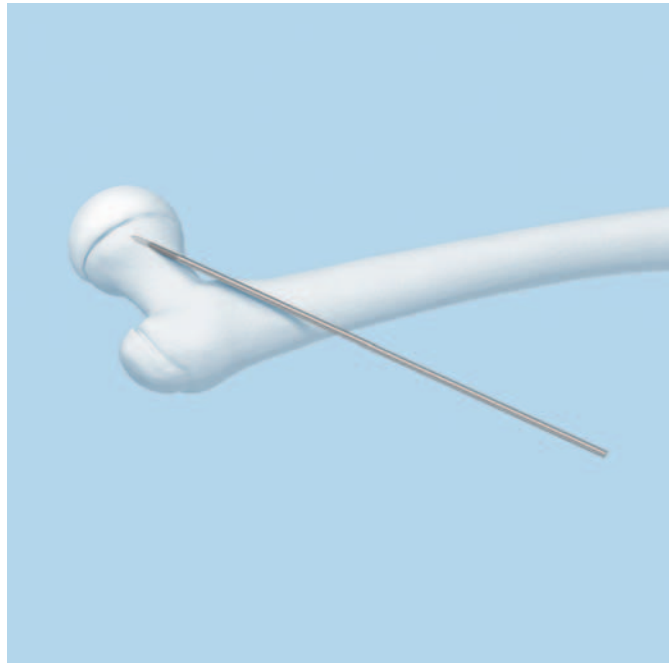
---

Place the Kirschner wire on the ventral aspect of the femoral neck to determine the anteversion. Control the parallel alignment of the Kirschner wire with the centerline of the femoral neck under the image intensifier.

---

**Note:** Position the Kirschner wire at a downward angle to avoid interference with the instruments.

---



Axial AP view



## 2

### Insert positioning Kirschner wire in hole D

#### Instruments for 3.5 mm plate

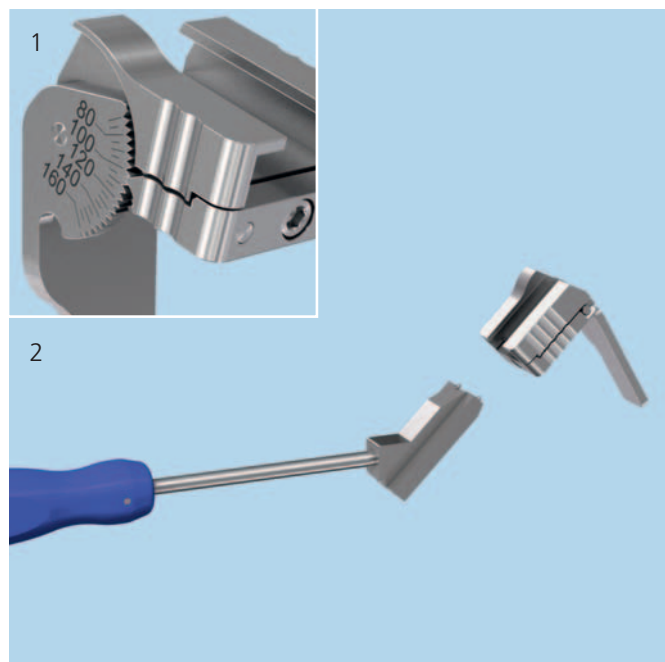
292.790	Kirschner Wire Ø 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel
03.108.001	Aiming Block for Screws Ø 3.5 mm, for LCP Pediatric Hip Plates
03.108.006	Positioner for Aiming Block
314.070	Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove

#### Instruments for 5.0 mm plate

292.790	Kirschner Wire Ø 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel
03.108.002	Aiming Block for Screws Ø 5.0 mm, for LCP Pediatric Hip Plates
03.108.006	Positioner for Aiming Block
314.070	Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove

Set the calculated positioning wire angle (see "Preoperative Planning" section) on the positioner for aiming block and tighten the hex screw. (1)

Assemble the positioner and the aiming block. (2)

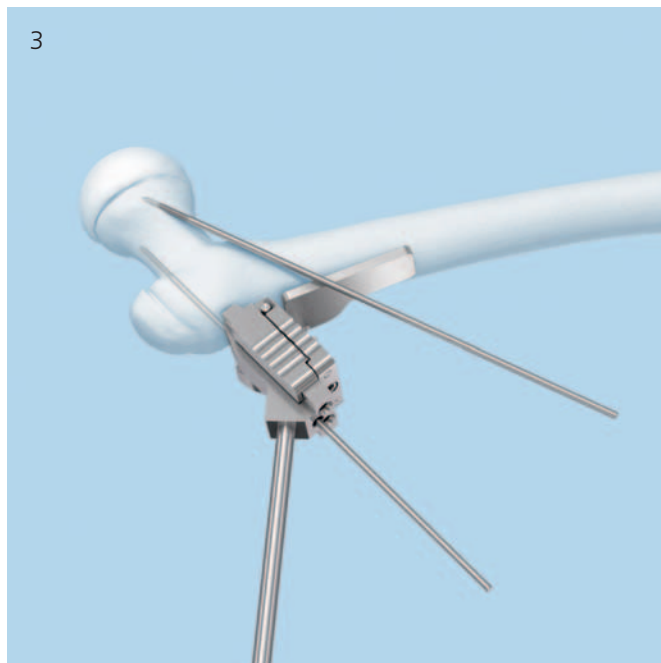


The wing of the aiming block must be placed parallel to the proximal femur shaft. The positioner and the two front spikes of the aiming block must be in contact with the femur. (3)

The entry point for the positioning Kirschner wire is 5 to 6 mm distal to the trochanteric epiphysis in the AP view. Insert the positioning Kirschner wire parallel to the initially positioned anteversion Kirschner wire and, in the axial view, in the center of the femoral neck. Remove the anteversion Kirschner wire.

**Tip:** To facilitate insertion, first center-punch the surface of the bone at the entry point before inserting positioner and wire.

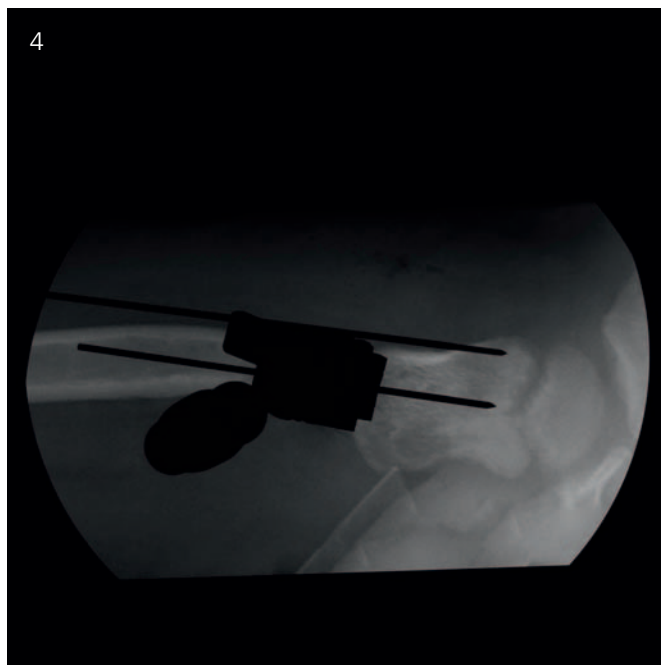
**Important:** All following steps refer to the positioning Kirschner wire, therefore its exact position is crucial for a successful surgery.



Verify optimal placement of the positioning Kirschner wire with the image intensifier. (4)

To avoid slippage of the positioner do not remove the positioning Kirschner wire until the two neck screws are in place.

**Note:** Do not bend the Kirschner wire while drilling as this may result in correction mistakes.



Axial AP view

### 3

#### Insert Kirschner guide wires for proximal screws

##### Instruments for 3.5 mm plate

03.108.001	Aiming Block for Screws Ø 3.5 mm, for LCP Pediatric Hip Plates
03.108.005	Kirschner Wire Ø 2.8 mm with spade point tip
03.108.006	Positioner for Aiming Block
03.108.040	Kirschner Wire Adaptor
314.070	Screwdriver, hexagonal small, Ø 2.5 mm, with Groove

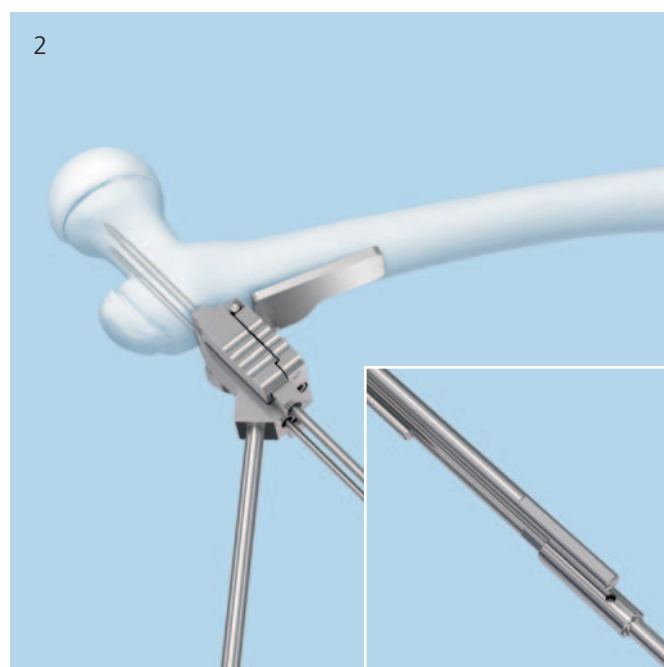
##### Instruments for 5.0 mm plate

03.108.002	Aiming Block for Screws Ø 5.0 mm, for LCP Pediatric Hip Plates
03.108.005	Kirschner Wire Ø 2.8 mm with spade point tip
03.108.006	Positioner for Aiming Block
03.108.040	Kirschner Wire Adaptor
314.070	Screwdriver, hexagonal small, Ø 2.5 mm, with Groove

Insert the Kirschner guide wires for holes A and B with the help of the aiming block (1). To prevent any interference with other wires adjust the Kirschner wire adaptor before inserting Kirschner guide wire for hole B (2).

In order to assure an optimal screw length place the Kirschner guide wires as close as possible to the growth plate (distance to the growth plate of the femoral head 5 mm).

If extension or flexion is required the aiming block has to be rotated accordingly around the positioning Kirschner wire (hole D) before insertion of the guiding Kirschner wire for proximal screws.



With the Kirschner guide wires for holes A and B, the position and length of the screws are defined while, at the same time, the holes are predrilled for the 3.5 mm screws.

When the Kirschner guide wires are inserted correctly, remove the aiming block and positioner for aiming block.

Avoid bending the positioning Kirschner wire with the aiming block while inserting the guide wires as this may result in correction mistakes.

---

**Note:** Once a guiding Kirschner wire is inserted, flexion or extension correction will not be able any more.

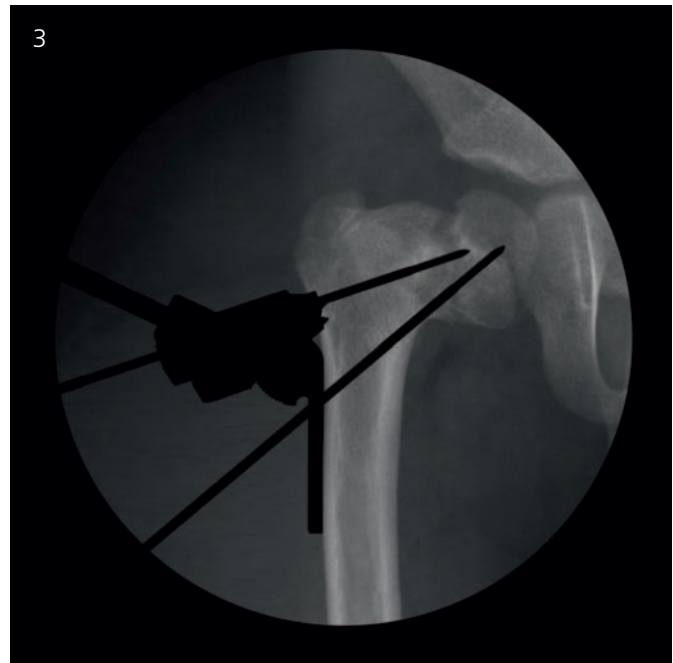
---

**Tip:** To remove the positioner and aiming block loosen the hex screw on the positioner.

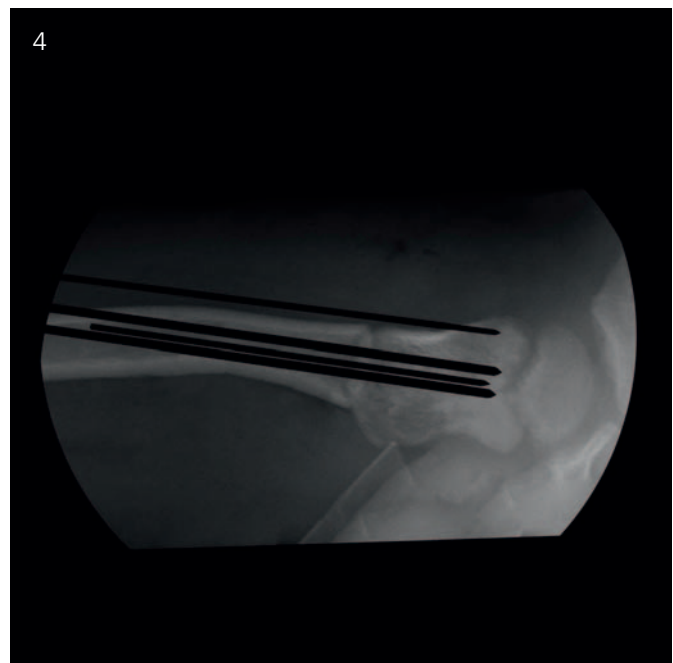
---

**Important:** Verify the optimal position of the Kirschner wires with the image intensifier in the AP and axial views. (3, 4)  
Do not penetrate the epiphysis.

---



AP view



Axial AP view

## Osteotomy

### Instruments

03.108.008	Positioner for Osteotomy
333.060	Positioning Plate, triangular, length 45 mm, 90°/50°/40°
333.070	Positioning Plate, triangular, length 45 mm, 80°/70°/30°
333.080	Positioning Plate, triangular, length 45 mm, 100°/60°/20°

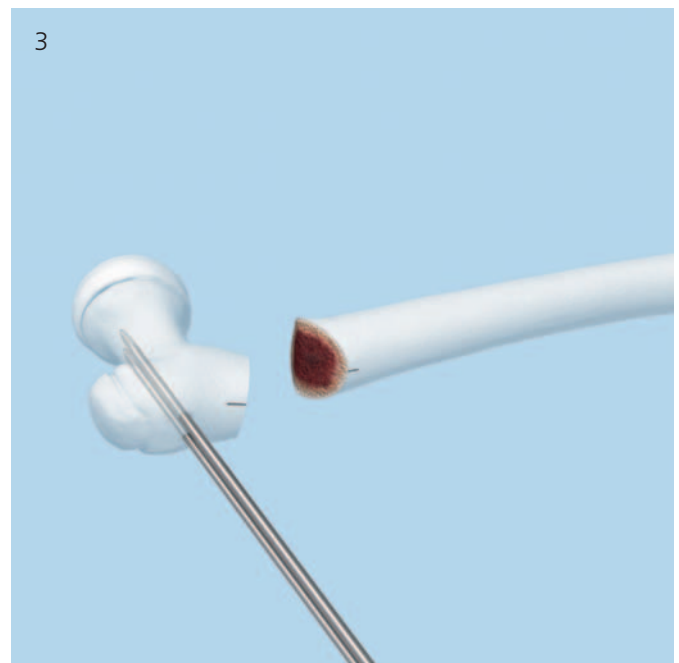
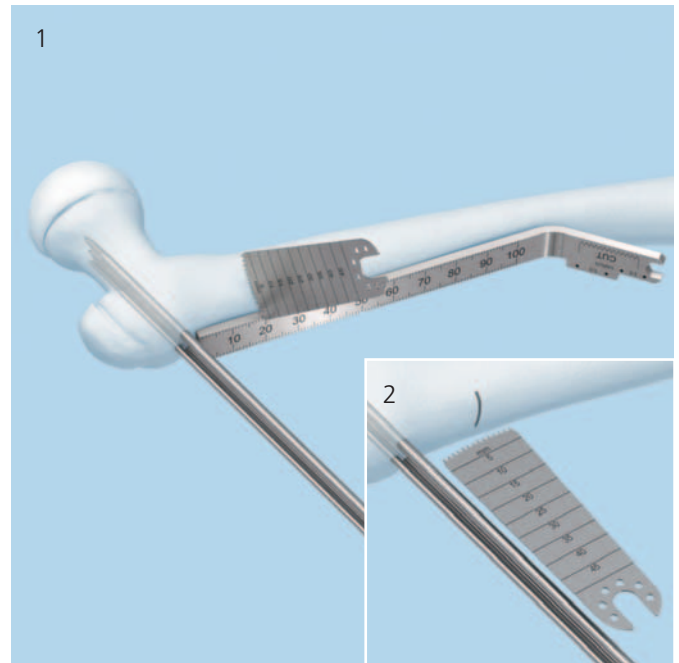
The optimal position of the osteotomy for the 3.5 mm plate is 18 mm distal to the Kirschner guide wires. Determine the distance with the corresponding end of the positioner for osteotomy (1). Hold the positioner for osteotomy against the two Kirschner guide wires and mark the distance with the oscillating saw or another sharp instrument on the bone.

Perform the osteotomy in one cut – with an oscillating saw and constant irrigation and cooling – perpendicular to the femoral shaft. (3)

**Note:** If there is extreme coxa vara the osteotomy cut has to be 3 – 4 mm further distal, otherwise the distance for the calcar screw is too short.

**Note for 5.0 mm plate:** The optimal position of the osteotomy is 23 mm distal to the Kirschner guide wires.

**Important:** In case of a planned derotation or rotation osteotomy, insert Kirschner wires bicortically into the greater trochanter and the distal fragment (either the shaft or the knee) to control the derotation or rotation. The positioning plates are used to adjust the correction angle of rotation/derotation. Even if no derotation or rotation is planned it is recommended to insert the two Kirschner wires or to make a mark onto the bone. This ensures that the two bone fragments are fixed in the right position. (2)



## Proximal Fixation

Fixation in the proximal fragment must always be done with locking screws. Ensure that the locking screws are at least 5 mm away from the growth plate of the femoral head.

### 1

#### Position plate

##### Instruments for 3.5 mm plate

03.108.009	LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm, for LCP Pediatric Hip Plate
------------	--

03.108.008	Positioner for Osteotomy
------------	--------------------------

##### Instruments for 5.0 mm plate

03.108.010	LCP Drill Sleeve 5.0, for Drill Bits Ø 4.3 mm, for LCP Pediatric Hip Plate
------------	--

03.108.004	Reduction Sleeve 4.3/2.8
------------	--------------------------

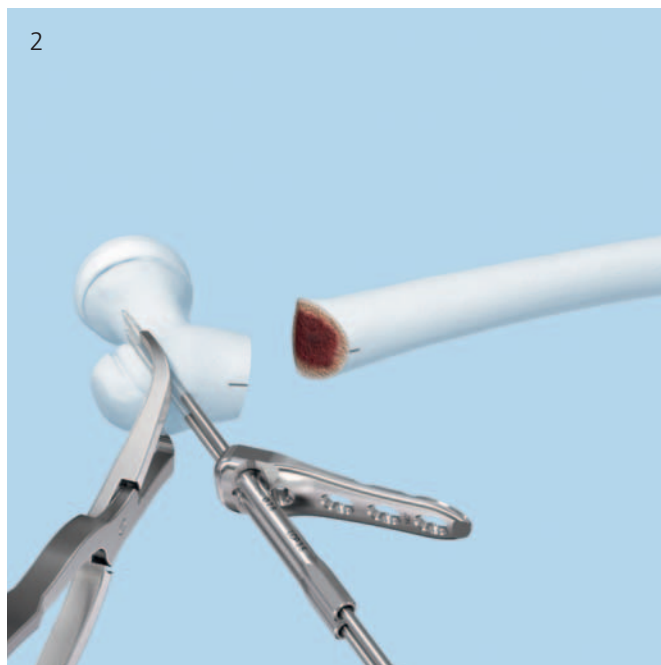
03.108.008	Positioner for Osteotomy
------------	--------------------------

Insert drill sleeves into plate holes A and B. Tighten the sleeves with the wrench of the positioner for osteotomy. Slide the plate over the Kirschner guide wires and the positioning Kirschner wire. (1)

**Note:** In case of a slight misfit of the proximal fragment, remove a small bone wedge.

**Tip:** Fix the proximal fragment (femoral neck/head fragment) with forceps taking care not to disturb the positioning of the plate. This provides better handling of the proximal fragment and greater safety in terms of rotation. (2)

**Note for 5.0 mm plate:** An additional reduction sleeve must be inserted in each LCP drill sleeve before sliding the plate over the wires.



## 2

### Determine screw length and insert femoral neck screws A and B

---

#### Instrument

---

03.108.003	Direct Measuring Device for Kirschner Wires Ø 2.8 mm, length 200 mm
------------	--

---

Determine the screw length by measuring the insertion depth of the Kirschner guide wire with the direct measuring device for Kirschner guide wires. Slide the appropriate end of the measuring device over the Kirschner guide wire against the LCP drill sleeve and determine the proper screw length, which will typically be the next size smaller than what was measured. Remove the LCP drill sleeve and the Kirschner guide wire in hole A. If necessary use the wrench at one end of the positioner for osteotomy.

Insert the screw in hole A.

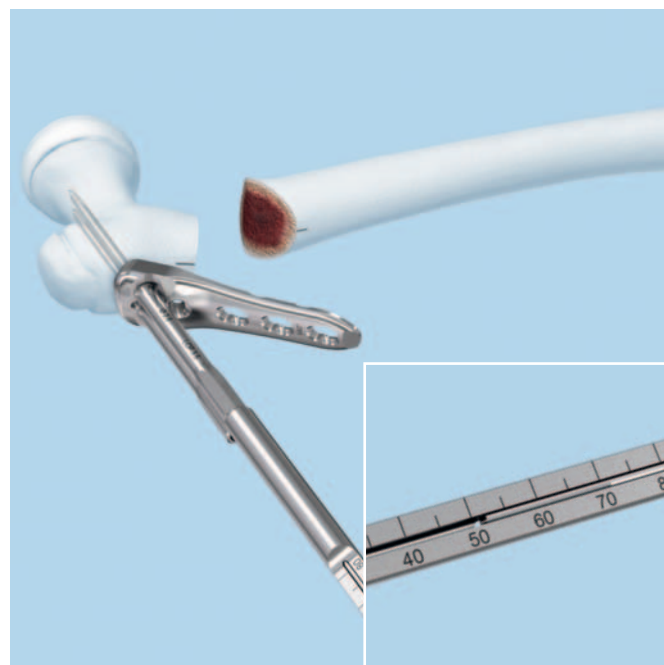
---

**Note:** If the positioning Kirschner wire has already been removed, for screw insertion it has to be reinserted in hole D since it protects against rotation during screw insertion.

---

**Note for 5.0 mm plate:** Remove the reduction sleeve and enlarge the hole from 2.8 mm to 4.3 mm with the LCP drill bit. Then follow the instructions as described in step 2.

---



#### Instruments for 3.5 mm plate

511.770	Torque Limiter, 1.5 Nm, for Compact Air Drive and for Power Drive
314.030	Screwdriver Shaft, hexagonal, small, Ø 2.5 mm
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling
397.705	Handle for Torque Limiter Nos. 511.770 and 511.771

#### Instruments for 5.0 mm plate

310.430	LCP Drill Bit Ø 4.3 mm with Stop, length 221 mm, 2-flute, for Quick Coupling
511.771	Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive
314.152	Screwdriver Shaft 3.5, hexagonal, self-holding
314.164	Screwdriver Stardrive 4.5/5.0, T25, with Groove, length 240 mm
397.705	Handle for Torque Limiter Nos. 511.770 and 511.771



#### Option A – Manual insertion

To insert the locking screw manually, attach the handle for torque limiter to the torque limiter and insert a screwdriver shaft. Insert the locking screw, and lock it in the plate. The optimum torque is reached after one click.

#### Option B – Insertion with a power tool

To insert the locking screw using a power tool, pick up the locking screw and insert it into the plate hole until the screw head is slightly above the plate. Do not fully tighten the screw with the power tool. Uncouple the power tool, mount the handle and manually tighten the screw. The optimum torque is reached after one click.

Insert the screw in hole B in the same way as in hole A. Then remove the positioning Kirschner wire in hole D.



---

### 3

#### Insert calcar screw in hole C

---

##### Instruments for 3.5 mm plate

---

310.284	LCP Drill Bit Ø 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling
03.108.009	LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm, for LCP Pediatric Hip Plate
319.010	Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm
511.770	Torque Limiter, 1.5 Nm, for Compact Air Drive and for Power Drive
314.030	Screwdriver Shaft, hexagonal, small, Ø 2.5 mm
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling

---

##### Instruments for 5.0 mm plate

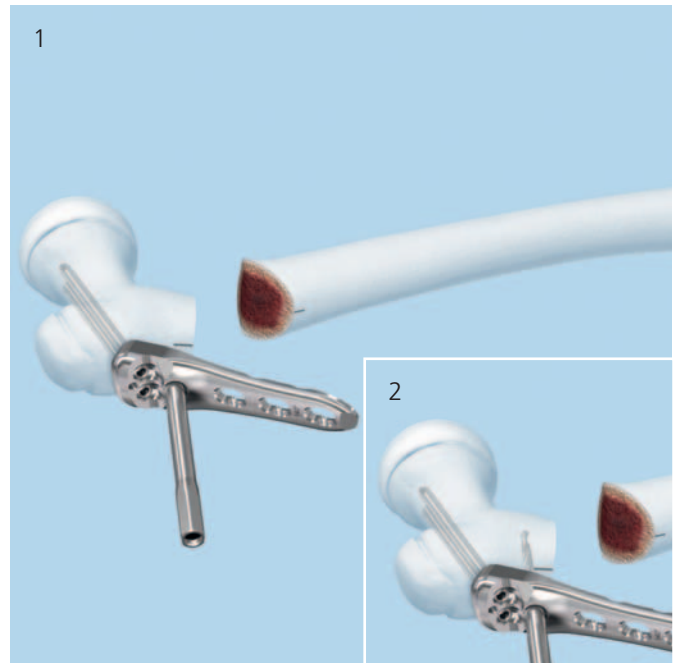
---

310.430	LCP Drill Bit Ø 4.3 mm with Stop, length 221 mm, 2-flute, for Quick Coupling
03.108.010	LCP Drill Sleeve 5.0, for Drill Bits Ø 4.3 mm, for LCP Pediatric Hip Plate
319.100	Depth Gauge for Screws Ø 4.5 to 6.5 mm, measuring range up to 110 mm
511.771	Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive
314.152	Screwdriver Shaft 3.5, hexagonal, self-holding
314.164	Screwdriver Stardrive 4.5/5.0, T25, with Groove, length 240 mm

---

Mount the LCP Drill sleeve onto hole C (1) and drill the hole for the calcar screw (2) with the LCP drill bit through both cortices. Remove the LCP drill sleeve and determine the screw length with the depth gauge.

Insert the screw in hole C. (3, 4)



## Reduction

---

### Instrument

---

399.121	Bone Holding Forceps, self-centering, soft lock, length 239 mm
---------	--

---

For an optimal fixation the plate must be aligned with the axis of the femoral shaft. When the plate is aligned, fix it with the reduction forceps. (1)

---

**Important:** If the plate is not aligned parallel to the femoral shaft in the AP view it can lead to variations of the planned neck/shaft (CCD) angle.

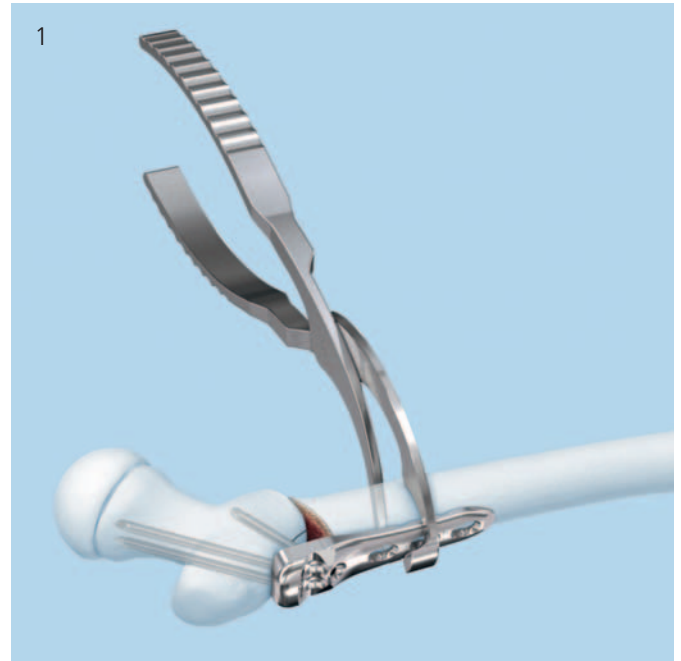
---

If additional extension or flexion is required, the plate will no longer be aligned with the femoral shaft, making fixation more difficult due to the skewed position of the plate.

---

**Tip:** The alignment can be facilitated with LCP drill sleeves in the distal part of the plate and /or with a forceps fixed on the proximal part. These instruments serve as handles during the repositioning of the osteotomy.

---



## Distal Fixation

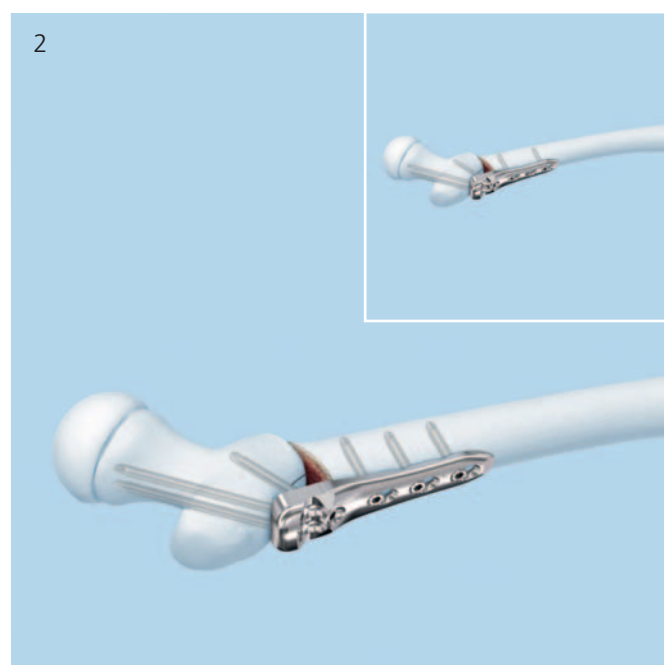
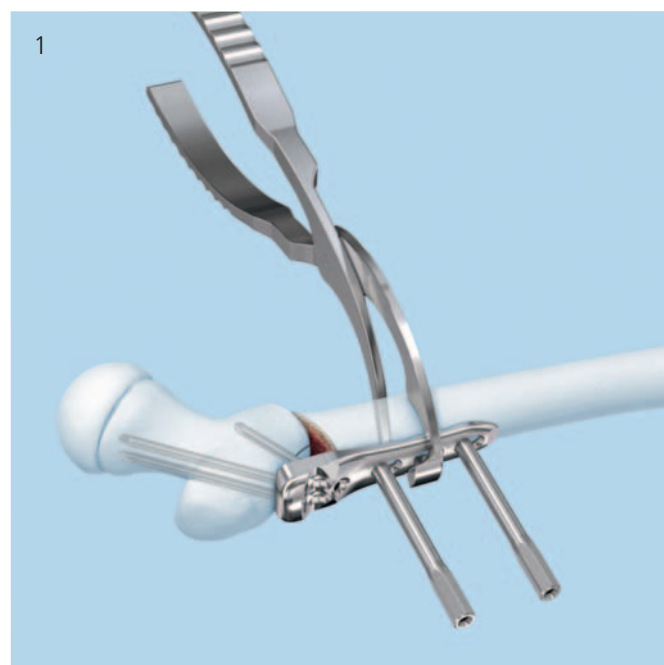
Since this plate is an LCP plate, it is important to use either locking or cortex screws.

### Option A: Distal fixation with locking screws

Insert screws in holes 1, 2 and 3.

Instruments for 3.5 mm plate		Instruments for 5.0 mm plate	
314.030	Screwdriver Shaft, hexagonal, small, Ø 2.5 mm	314.152	Screwdriver Shaft 3.5, hexagonal, self-holding
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling	314.119	Screwdriver Shaft Stardrive 4.5/5.0, T25, self-holding, for AO/ASIF Quick Coupling
319.010	Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm	319.100	Depth Gauge for Screws Ø 4.5 to 6.5 mm, measuring range up to 110 mm
511.770	Torque Limiter, 1.5 Nm, for Compact Air Drive and for Power Drive	03.108.010	LCP Drill Sleeve 5.0, for Drill Bits Ø 4.3 mm, for LCP Pediatric Hip Plate
397.705	Handle for Torque Limiter Nos. 511.770 and 511.771	310.430	LCP Drill Bit Ø 4.3 mm with Stop, length 221 mm, 2-flute, for Quick Coupling
03.108.009	LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm, for LCP Pediatric Hip Plate	511.771	Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive
310.284	LCP Drill Bit Ø 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling	397.705	Handle for Torque Limiter Nos. 511.770 and 511.771

Screw the LCP drill sleeves into the locking portion of combi holes 1, 2 and 3 until they are completely gripped by the thread (1). Drill the screw hole using an appropriate drill bit. Remove the drill sleeve. Determine the screw length with the depth gauge. Insert the screws in holes 1, 2 and 3 (2).



### Option B: Distal fixation with cortex screws

Insert screws in holes 1, 2 and 3.

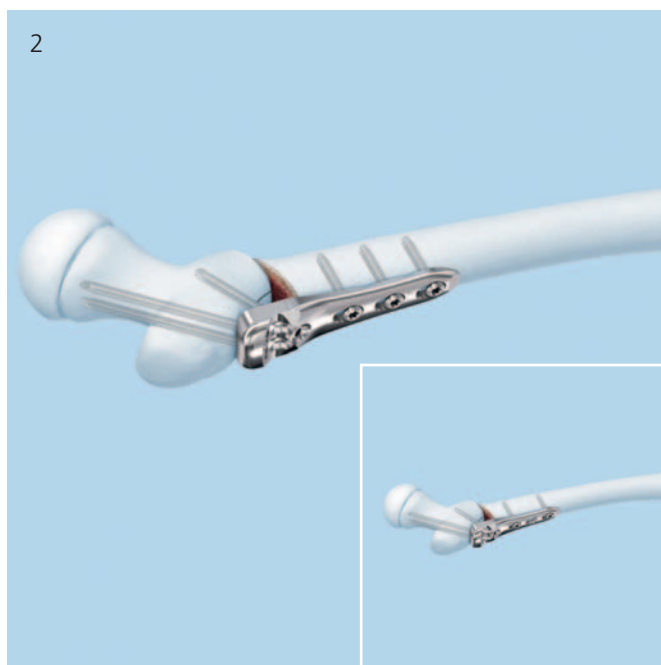
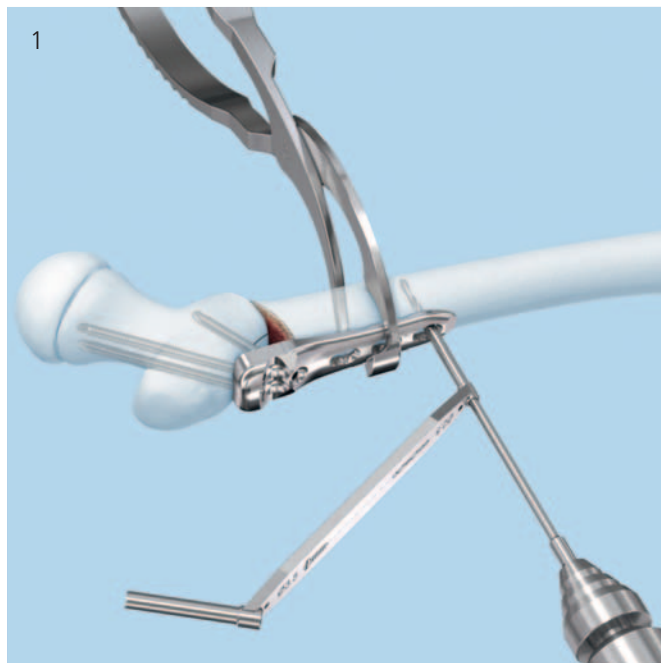
#### Instruments for 3.5 mm plate

314.070	Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove
314.030	Screwdriver Shaft, hexagonal, small, Ø 2.5 mm
314.041	Screwdriver Stardrive 3.5, T15, with Groove, length 200 mm
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling
319.010	Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm
312.280	Double Drill Guide 3.5/2.5

#### Instruments for 5.0 mm plate

314.270	Screwdriver, hexagonal, large, Ø 3.5 mm, with Groove, length 240 mm
314.152	Screwdriver Shaft 3.5, hexagonal, self-holding
314.164	Screwdriver Stardrive 4.5/5.0, T25, with Groove, length 240 mm
314.119	Screwdriver Shaft Stardrive 4.5 /5.0, T25, self-holding, for AO/ASIF Quick Coupling
312.460	Double Drill Guide 4.5/3.2
319.100	Depth Gauge for Screws Ø 4.5 to 6.5 mm, measuring range up to 110 mm

Pre-drill with the appropriate drill in the plate holes 1, 2 and 3 (1). Measure screw length with the depth gauge and place a self-tapping cortex screw in holes 1, 2 and 3 (2).

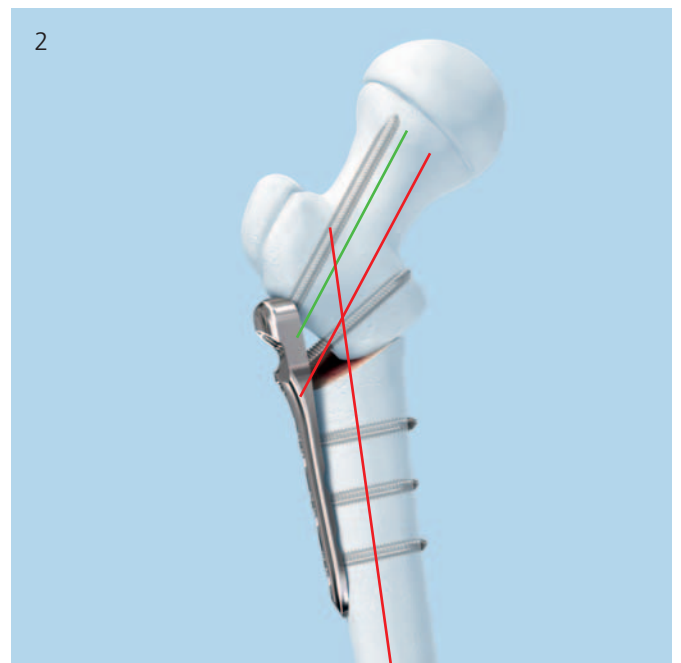
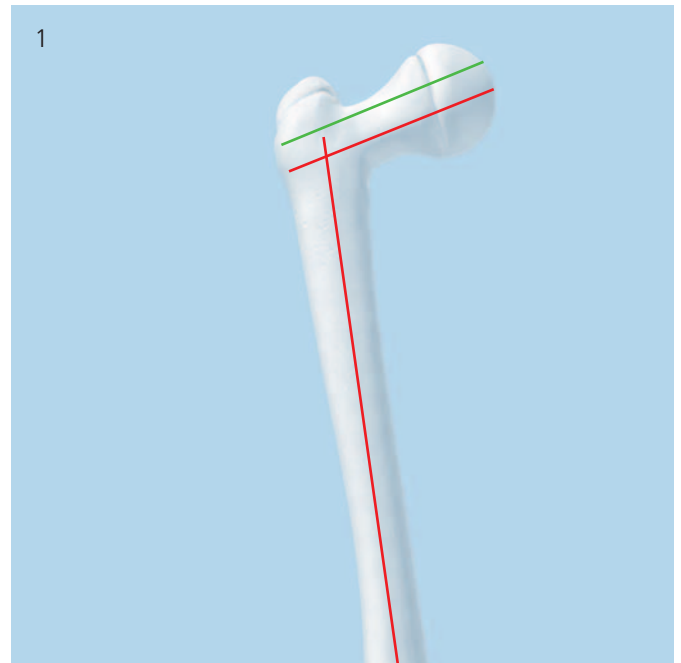


# Alternative Surgical Technique

## Preoperative Planning

### Surgical technique based on the plate/screw angle

In this technique the plate/screw angle defines the final neck shaft angle as the screws are inserted along the axis of the femoral neck in the AP view (1). It is suitable when the final desired angle conforms to one of the plate angles. The plate angle defines the final correction angle (2).

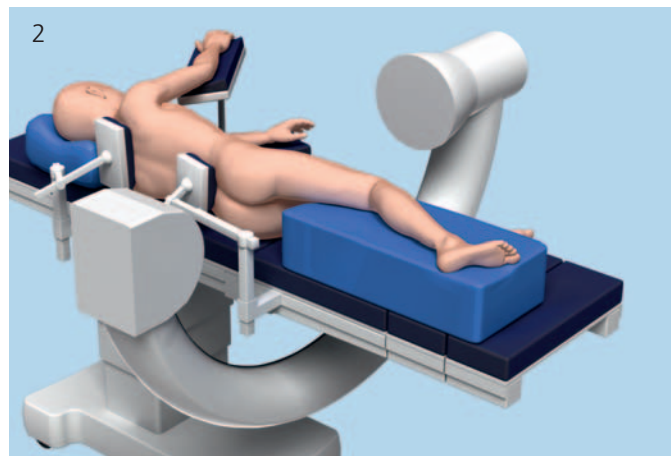
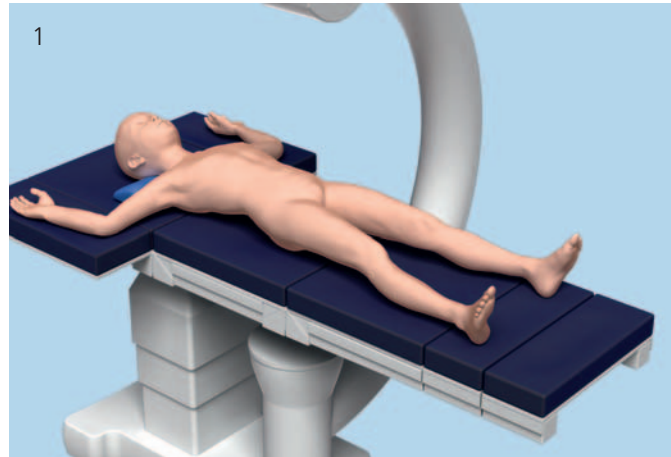


## Patient Positioning and Approach

### 1

#### Position patient

Position the patient in the supine (1) or lateral (2) position on the radiolucent table. Then position the image intensifier so that the visualization of the hip is possible in AP and axial views.



### 2

#### Approach

Use a standard lateral approach to the proximal femur.



# 1

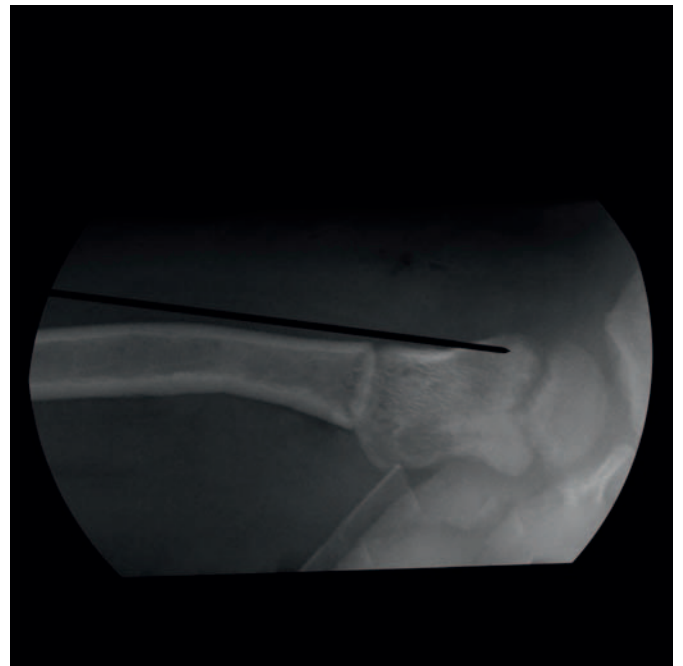
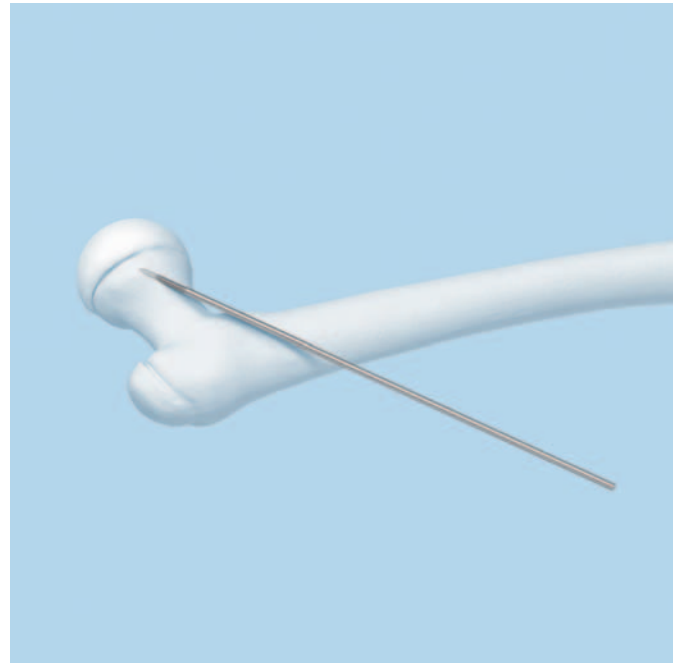
## Localize trochanteric epiphysis and determine anteversion

### Instrument

292.791	Kirschner Wire Ø 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel
---------	--

Place the Kirschner wire on the ventral aspect of the femoral neck to determine the anteversion. Control the parallel alignment of the Kirschner wire with the centerline of the femoral neck under the image intensifier

**Note:** When positioning the Kirschner wire do not interfere with the aiming block.



Axial AP view

## 2

### Insert positioning Kirschner wire in hole D

#### Instruments for 3.5 mm plate

292.790	Kirschner Wire Ø 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel
03.108.001	Aiming Block for Screws Ø 3.5 mm, for LCP Pediatric Hip Plates

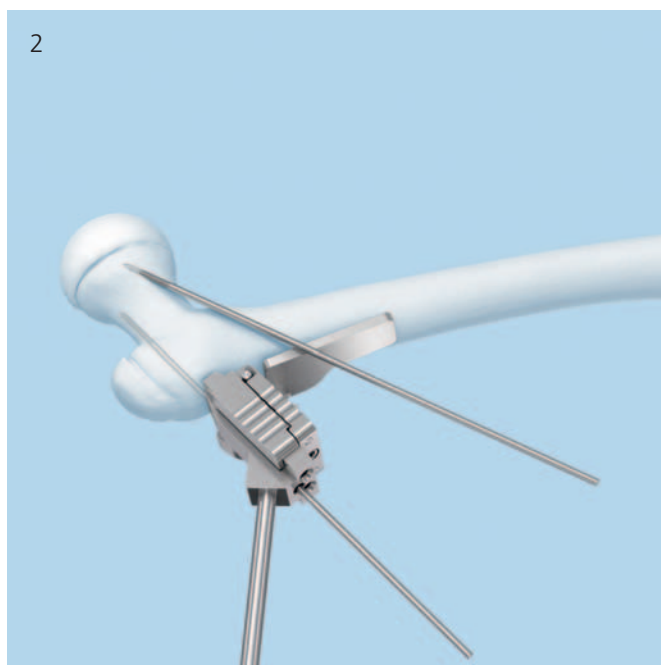
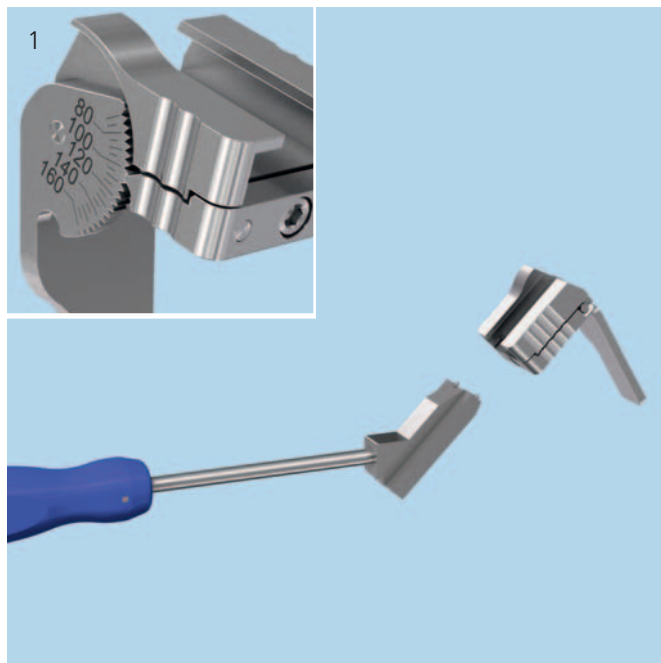
03.108.006	Positioner for Aiming Block
------------	-----------------------------

#### Instruments for 5.0 mm plate

03.108.002	Aiming Block for screws Ø 5.0 mm, for LCP Pediatric Hip Plates
292.790	Kirschner Wire Ø 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel
03.108.006	Positioner for Aiming Block

Assemble the positioner and the aiming block. Do not tighten the hex screw. (1)

Insert the positioning Kirschner wire parallel to the initial positioned anteversion guide wire in axial view so that the Kirschner wire corresponds exactly with the anti-torsion (AT) angle in line with the intermediary femoral neck. (2)



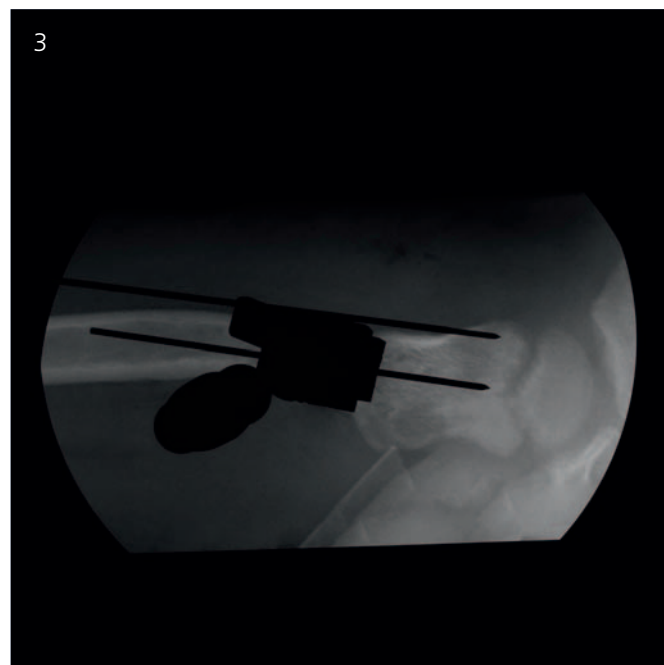
**Important:** All following steps refer to the positioning Kirschner wire, therefore the exact position is crucial for a successful surgery.

- Verify the optimal placement of the positioning Kirschner wire with the image intensifier. (3, 4)

#### Notes

- If additional extension or flexion is required the aiming block has to be positioned accordingly.
- The two front spikes of the aiming block must be in contact with the femur.
- The positioning Kirschner wire stays inserted until the two neck shaft screws are fixed.
- Do not bend the Kirschner wire while drilling as this may result in correction mistakes.

If the insertion of the positioning Kirschner wire is satisfactory, follow step 3 on page 17.



Axial AP view



AP view

# LCP Pediatric Plate System Overview

---

## Product range of LCP Pediatric Hip Plates and LCP Condylar Plates 3.5 and 5.0

The product range consists of 22 plates:

- Small fragment plates 3.5
- Large fragment plates 5.0
- Available sterile or unsterile packed

### For proximal femur

#### Plates for varus osteotomies (2.7\*, 3.5 and 5.0)

The plates are available with screw angles of 100°, 110° or 130° and 2 (2.7) or 3 (3.5 / 5.0) distal fixation screws.

#### Plates for valgization osteotomies (3.5 and 5.0)

The plates are available with a screw angle of 140° and 3 distal fixation screws.

#### Plates for fractures and rotation osteotomies (3.5 and 5.0)

The plates are available with a screw angle of 130° and 3, 5 or 7 distal fixation screws.

### For distal femur

#### Plates for supracondylar fractures and deformities

The plates are available with a screw angle of 90° and 3, 5 or 7 distal fixation screws.

### Overview of available technique guides:

- LCP Pediatric Hip Plate 3.5 and 5.0 for varus osteotomies (Art. No.036.001.073)
- LCP Pediatric Hip Plate 2.7 for varus osteotomies (Art. No.036.001.060)
- LCP Pediatric Hip Plate 3.5 and 5.0 for fractures / derotational osteotomies (Leaflet) (Art. No. 036.001.318)
- LCP Pediatric Hip Plate Straight Valgus 3.5 and 5.0 for valgus osteotomies (Art. No. 036.001.057)
- LCP Pediatric Condylar Plate 3.5 and 5.0 for supracondylar deformities and fractures (Art. No. 036.001.065)

\*First available in Q2 2011

---

**For proximal femur**  
**Plates for varus osteotomies**

---

02.108.300\*      LCP Paediatric Hip Plate 2.7, 100°,  
width 12 mm, length 46 mm




---

02.108.310      LCP Paediatric Hip Plate 3.5, 100°,  
width 19 mm, length 73 mm




---

02.108.320      LCP Paediatric Hip Plate 5.0, 100°,  
width 23 mm, length 90 mm




---

02.108.301\*      LCP Paediatric Hip Plate 2.7, 110°,  
width 12 mm, length 46 mm

---

02.108.311      LCP Pediatric Hip Plate 3.5, 110°,  
width 19 mm, length 73 mm




---

02.108.321      LCP Pediatric Hip Plate 5.0, 110°,  
width 23 mm, length 90 mm

**Plate for valgization osteotomy**

---

02.108.316      LCP Pediatric Hip Plate 3.5, 140°, straight,  
width 19 mm, length 70 mm




---

02.108.326      LCP Pediatric Hip Plate 5.0, 140°, straight,  
width 23 mm, length 90 mm

\* First available in Q2 2011

### Plates for fractures and derotation osteotomies

02.108.303\* LCP Pediatric Hip Plate 2.7, 130°,  
width 12 mm, length 46 mm



02.108.330 LCP Pediatric Hip Plate 3.5, 130°,  
width 19 mm, length 62 mm



02.108.340 LCP Pediatric Hip Plate 5.0, 130°,  
width 23 mm, length 79 mm



02.108.331 LCP Pediatric Hip Plate 3.5, 130°,  
width 19 mm, length 88 mm



02.108.341 LCP Pediatric Hip Plate 5.0, 130°,  
width 23 mm, length 111 mm



02.108.332 LCP Pediatric Hip Plate 3.5, 130°,  
width 19 mm, length 114 mm



02.108.342 LCP Pediatric Hip Plate 5.0, 130°,  
width 23 mm, length 143 mm

02.108.333 LCP Pediatric Hip Plate 3.5, 130°,  
width 19 mm, length 140 mm



02.108.343 LCP Pediatric Hip Plate 5.0, 130°,  
width 23 mm, length 175 mm

\* First available in Q2 2011

---

**For distal femur****Plates for supracondylar fractures and deformities**

---

02.108.410	LCP Pediatric Condylar Plate 3.5, 90°, shaft 3 holes
------------	---

---



---

02.108.420	LCP Pediatric Condylar Plate 5.0, 90°, shaft 3 holes
------------	---

---



---

02.108.411	LCP Pediatric Condylar Plate 3.5, 90°, shaft 5 holes
------------	---

---



---

02.108.421	LCP Pediatric Condylar Plate 5.0, 90°, shaft 5 holes
------------	---

---



---

02.108.412	LCP Pediatric Condylar Plate 3.5, 90°, shaft 7 holes
------------	---

---



---

02.108.422	LCP Pediatric Condylar Plate 5.0, 90°, shaft 7 holes
------------	---

---



---

**Screw overview**
**Cortex screws, self-tapping, stainless steel**

202.866– 202.969	Cortex Screws Stardrive Ø 2.7 mm, lengths 6–60 mm
---------------------	--

204.816– 204.860	Cortex Screws Ø 3.5 mm, lengths 16–60 mm
---------------------	---

02.200.016– 02.200.070	Cortex Screws Stardrive Ø 3.5 mm, self-tapping, lengths 16–70 mm
---------------------------	---

214.818– 214.870	Cortex Screws Ø 4.5 mm, self-tapping, lengths 18–70 mm
---------------------	---

**Locking screws, self-tapping, stainless steel**

202.206– 202.260	Locking Screws Stardrive Ø 2.7 mm (head LCP 2.4), lengths 6–60 mm
---------------------	--

213.016– 213.060	Locking Screws Ø 3.5 mm, lengths 16–60 mm
---------------------	--

212.104– 212.124	Locking Screws Stardrive Ø 3.5 mm, lengths 16–60 mm
---------------------	--

213.318– 213.375	Locking Screws Ø 5.0 mm, lengths 18–75 mm
---------------------	--

212.203– 212.224	Locking Screws Stardrive Ø 5.0 mm, lengths 18–75 mm
---------------------	--

All implants are also available sterile packed.  
Add Suffix “S” to part number.



# LCP Pediatric Plate System

## Instrument Overview

### Aiming Blocks

03.108.033\* Aiming Block for Screws  $\varnothing$  2.7 mm, for LCP Paediatric Hip Plates 2.7



03.108.001 Aiming Block for Screws  $\varnothing$  3.5 mm, for LCP Pediatric Hip Plates



03.108.002 Aiming Block for Screws  $\varnothing$  5.0 mm, for LCP Pediatric Hip Plates

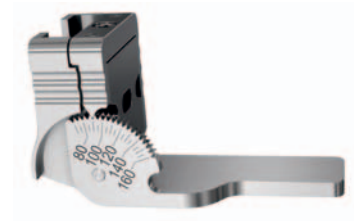


### Positioners for Aiming Blocks

03.108.034\* Positioner for Aiming Block, for LCP Paediatric Hip Plates 2.7



03.108.006 Positioner for Aiming Block



\*First available in Q2 2011

### Positioners for Osteotomy

03.108.039\* Positioner for Osteotomy, for LCP Paediatric Hip Plates 2.7



03.108.008 Positioner for Osteotomy



### Drill Sleeves and Reduction Sleeve

03.108.036\* LCP Drill Sleeve 2.7, for Drill Bits  $\varnothing$  2.0 mm, for LCP Paediatric Hip Plates 2.7



03.108.009 LCP Drill Sleeve 3.5, for Drill Bits  $\varnothing$  2.8 mm, for LCP Pediatric Hip Plate



03.108.010 LCP Drill Sleeve 5.0, for Drill Bits  $\varnothing$  4.3 mm, for LCP Pediatric Hip Plate



03.108.004 Reduction Sleeve 4.3/2.8



03.108.037\* Direct Measuring Device for Kirschner Wires  $\varnothing$  2.0 mm, for LCP Paediatric Hip Plates 2.7



03.108.003 Direct Measuring Device for Kirschner Wires  $\varnothing$  2.8 mm, length 200 mm



\*First available in Q2 2011

---

### Positioning Wires, Guide Wires and Adapter

---

292.200	Kirschner Wire Ø 2.0 mm with trocar tip, length 150 mm, Stainless Steel
---------	---



---

292.650	Guide Wire Ø 2.0 mm with threaded tip with trocar, length 230 mm, Stainless Steel
---------	---



---

03.108.005	Kirschner Wire Ø 2.8 mm with spade point tip
------------	--



---

03.108.040	Kirschner Wire Adaptor
------------	------------------------



## Drill Bits

323.062 Drill Bit Ø 2.0 mm, with double marking, length 140/115 mm, 3-flute, for Quick Coupling



310.284 LCP Drill Bit Ø 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling



310.250 Drill Bit Ø 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling



310.280 Drill Bit Ø 2.7 mm, length 125/100 mm, 2-flute, for Quick Coupling



310.310 Drill Bit Ø 3.2 mm, length 145/120 mm, 2-flute, for Quick Coupling



310.430 LCP Drill Bit Ø 4.3 mm with Stop, length 221 mm, 2-flute, for Quick Coupling



## Drill Guides

312.240 Double Drill Guide 2.7/2.0



323.260 Universal Drill Guide 2.7



312.280 Double Drill Guide 3.5/2.5



312.460 Double Drill Guide 4.5/3.2



Depth Gauges

319.010      Depth Gauge for Screws Ø 2.7 to 4.0 mm,  
measuring range up to 60 mm



03.503.036      Depth Gauge for MatrixMANDIBLE,  
measuring range from 6 to 40 mm



319.100      Depth Gauge for Screws Ø 4.5 to 6.5 mm,  
measuring range up to 110 mm



---

### Screwdrivers and Screwdriver shafts

---

314.070 Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove



---

313.302 Screwdriver Stardrive, T8, cylindrical, with Groove, shaft Ø 3.5 mm



---

313.304 Screwdriver Shaft Stardrive, T8, cylindrical, with Groove, shaft Ø 3.5 mm, for AO/ASIF Quick Coupling



---

314.041 Screwdriver Stardrive 3.5, T15, with Groove, length 200 mm



---

314.164 Screwdriver Stardrive 4.5/5.0, T25, with Groove, length 240 mm



---

314.270 Screwdriver, hexagonal, large, Ø 3.5 mm, with Groove, length 240 mm



314.030	Screwdriver Shaft, hexagonal, small, Ø 2.5 mm	
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling	
314.119	Screwdriver Shaft Stardrive 4.5/5.0, T25, self-holding, for AO/ASIF Quick Coupling	
314.152	Screwdriver Shaft 3.5, hexagonal, self-holding	



---

**Bone Holding Forceps and Reduction Forceps**

---

399.091 Bone Holding Forceps, self-centering, soft lock, length 191 mm



---

399.121 Bone Holding Forceps, self-centering, soft lock, length 239 mm



---


399.098 Reduction Forceps, toothed, soft lock, length 194 mm



---

399.124 Reduction Forceps, toothed, soft lock, length 250 mm

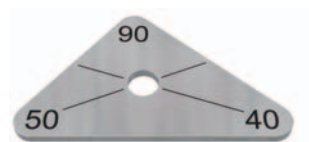


Torque Limiters		
03.110.005	Handle for Torque Limiters 0.4/0.8/1.2 Nm	
397.705	Handle for Torque Limiter Nos. 511.770 and 511.771	
511.776	Torque Limiter, 0.8 Nm, with AO/ASIF Quick Coupling	
511.770	Torque Limiter, 1.5 Nm, for Compact Air Drive and Power Drive	
511.771	Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive	

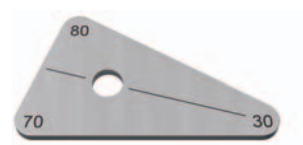
---

## Positioning Plates

333.060      Positioning Plate, triangular, length 45 mm,  
90°/50°/40°



333.070      Positioning Plate, triangular, length 45 mm,  
80°/70°/30°



333.080      Positioning Plate, triangular, length 45 mm,  
100°/60°/20°




---

## Others

03.108.007      Instrument for Medialization



313.300      Combined Holding Sleeve for Cortex  
Screws Stardrive Ø 2.4/2.7 mm, T8,  
for Screwdriver Shafts Ø 3.5 mm



# LCP Pediatric Plate System Module

## Overview

---

### Modules for implants, standard

68.108.032	Modular Tray for LCP Paediatric Plates 2.7, size 1/2, without Contents, Vario Case System
68.108.035	Labeling Clip for LCP Paediatric Plates 2.7, Vario Case System
68.108.030	Modular Tray for LCP Paediatric Plates 3.5, size 1/2, without Contents, Vario Case System
68.108.031	Modular Tray for LCP Paediatric Plates 5.0, size 1/2, without Contents, Vario Case System

### Modules for instruments, standard

68.108.041	Modular Tray for Instruments for LCP Paediatric Plates 2.7, size 1/2, without Contents, Vario Case System
68.108.044	Labeling Clip for Instruments for LCP Paediatric Plates 2.7, Vario Case System
68.108.040	Modular Tray for Instruments for LCP Paediatric Plates 3.5 and 5.0, size 1/1, without Contents, Vario Case System
68.108.042	Modular Tray for General Instruments, for LCP Paediatric Plates 3.5 and 5.0, size 1/1, without Contents, Vario Case System

---

**Labeling clips**

68.108.033	Labeling Clip for LCP Paediatric Plates 3.5, Vario Case System
68.108.034	Labeling Clip for LCP Paediatric Plates 5.0, Vario Case System
68.108.043	Labeling Clip for Instruments for LCP Paediatric Plates 3.5 and 5.0, Vario Case System
68.108.045	Labeling Clip for General Instruments, for LCP Paediatric Plates 3.5 and 5.0, Vario Case System

# Bibliography

---

Hefti F et al. (1998) Kinderorthopädie in der Praxis. Berlin Heidelberg New York: Springer

Müller ME (1971) Die hüftnahen Femurosteotomien. 2. Auflage. Stuttgart: Thieme

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

Morrissy RT, Weinstein SL (2001) Atlas of Pediatric Orthopedic Surgery. Philadelphia: Williams & Wilkins

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



