DOUBLE MEDICAL
Dedicated to Rehabilitation

Pediatric Hip Locking Plate

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Warning

This publication describes the recommended procedures for using Double Engine devices and instruments. It offers guidance that you should pay attention to. But as with any such technical guide, the guide alone does not provide sufficient background for direct use of the instrument set, each surgeon should also consider the particular needs of each patient and make appropriate adjustments when required. Instruction by experienced surgeon is still highly recommended.

All non-sterile devices must be cleaned and sterilized before use. Multi-component instruments must be disassembled for cleaning. Please follow the instructions provided in our Reprocessing, Care and Maintenance Guide (RCMG-2012).

Please refer to Package Insert for a complete list of potential adverse effects, contraindications, warnings and precautions. The surgeon must discuss all relevant risks, including the finite lifetime of the device, with the patient, when necessary.

Caution

The implants are designed for temporary fixation of fractured bone fragments until the bone heals. Therefore, if bone does not heal or bone consolidation is delayed or not sufficient, the system may break. Post-operative care under the guidance of the surgeon is also very important and it must be done to ensure the promotion of bone consolidation.

Surgical Technique

Indications

The Pediatric Hip Plates 3.5 and 5.0 are intended for use in pediatrics (children from 2 to 16 years) and for small-stature adult patients. Specific indications include:

- Coxa varus
- Coxa valgus
- Developmental Dysplasia of the Hip (DDH)
- Fractures of the proximal femur

Preoperative Plan

Determine the plate size

The size of the implant is determined on the basis of the age, the weight, the size and the bone structure:

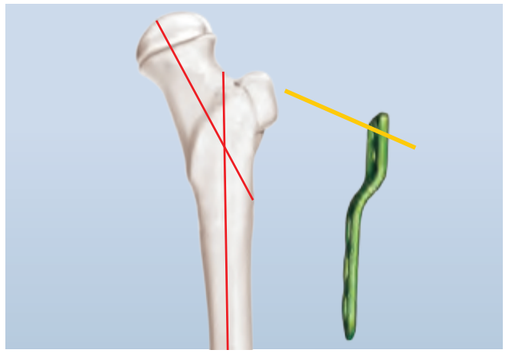
- Small fragment plate 3.5: Up to 35 kg / 2 to 8 years
- Large fragment plate 5.0: Up to 55 kg / 8 to 16 years

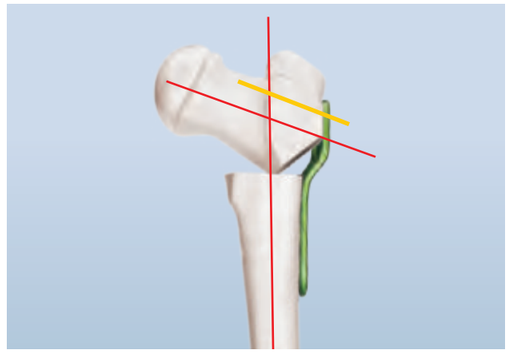
Determine the plate angle

Before the surgery, the surgeon determines which neck/shaft angle has to be achieved after surgery. And then the surgeon has to decide which technique to use. The pediatric hip locking plate can be implanted using two different surgical techniques. Only one step is different in the surgical technique, all other steps are similar.

(a) Surgical technique with fixed neck/shaft (CCD) angle

It is suitable when the final neck/shaft (CCD) angle conforms to one of the plate angles.

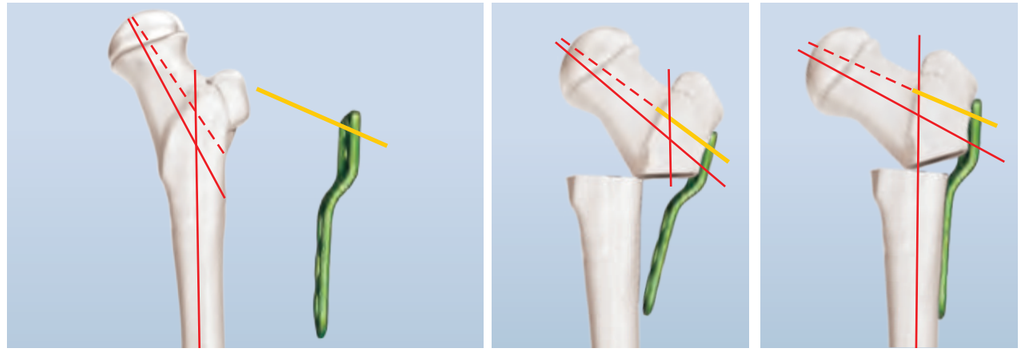




(b) Surgical technique with calculated neck/shaft (CCD) angle

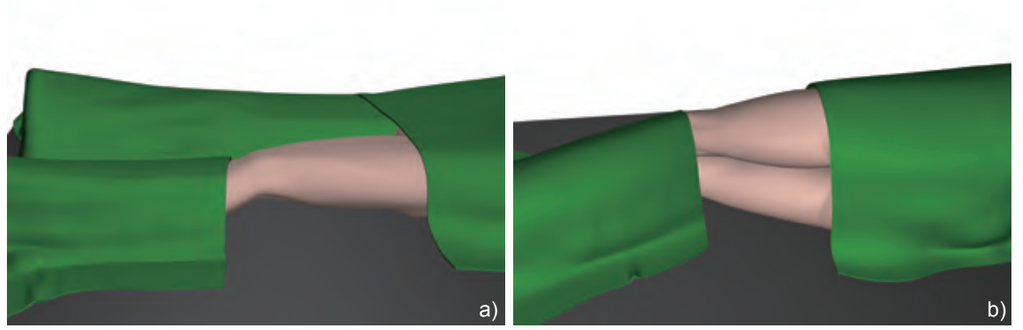
This technique is used when the desired final neck/shaft angle is not one of the plate/screw angles. The surgeon should determine the preoperative and the final postoperative neck/shaft angle and then calculate the correction angle. The angle must be measured on a view with anteversion and retroversion eliminated to prevent rotational error.

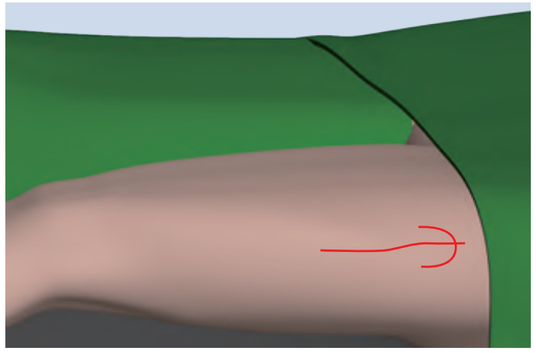
Correction angle = neck/shaft angle preoperative minus neck/shaft angle postoperative

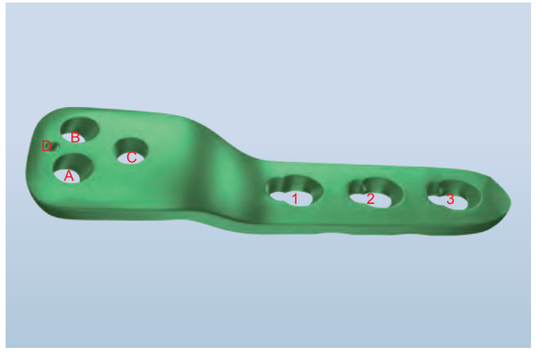


Patient Position

Position the patient supine (for bilateral rotational osteotomies) or lateral (normal case) on the radio-lucent table. Place the image intensifier for the visualization of the hip in AP and axial view.



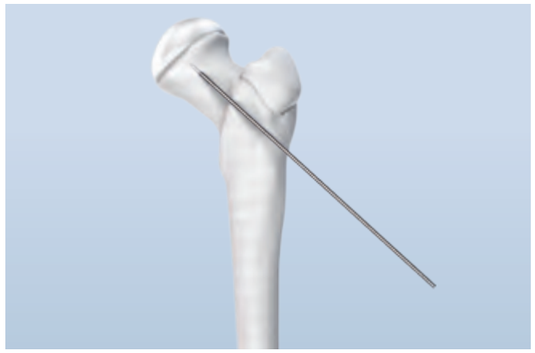


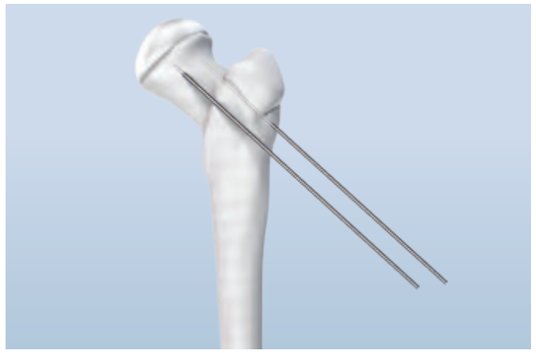


SURGICAL APPROACH

Use a standard lateral approach to the proximal femur.

Example of the surgical technique: a varus osteotomy of the proximal femur with 110° as the final neck/shaft angle (corresponds to plate 3.5).
The surgical technique refers to screw holes where applicable. Please see the designation of each hole as marked above.





STEP 1

DETERMINE PLATE POSITION

1. Localize the trochanteric epiphysis and determine the anteversion.

111250100 Guide Wire, φ2.0x150mm

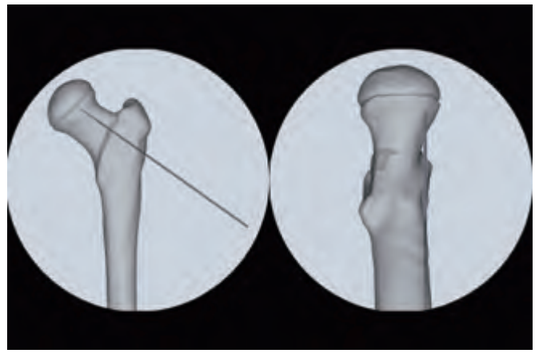
Localize the trochanteric epiphysis and mark it with a guide wire. Place guide wire on the anterior surface of the femoral neck to mark the anteversion of the femoral neck. Check the position under image intensifier.

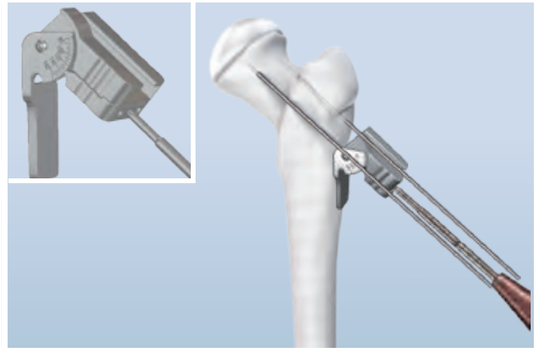
Note: Make sure that the guide wire is exactly parallel to the axis of the femoral neck.

2a. Insert positioning guide wire (fixed neck/shaft angle technique)

111250100 Guide Wire, φ2.0x150mm

Insert the positioning guide wire that parallels to the anteversion guide wire and absolutely parallels to the femoral neck axis so that the positioning guide wire corresponds exactly with the CCD and the AT Angle.





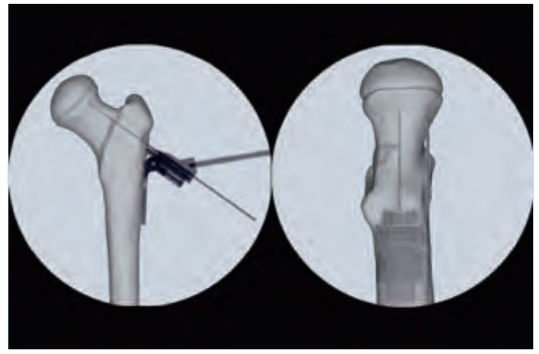
The entry point is 4 – 5 mm distal to the trochanteric epiphysis in AP view and in line with the femoral neck axis in axial view. Check the position of guide wire with the image intensifier.

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

2b. Insert positioning guide wire (calculated neck/shaft angle technique)

111250100 Guide Wire, φ2.0x150mm
111250300 Aiming Block, φ3.5
111250200 Positioner for Aiming Block
110011500 Screwdriver, hexagonal, SW2.5

AP view: This calculated angle (positioning guide wire angle) is figured out from the correction angle (varus or valgus, see preoperative plan) and the screw angle of the chosen plate.
Axial view: Parallel to the initial anteversion guide wire and in line with the femoral neck centerline (axis) so that the guide wire corresponds with the AT angle.



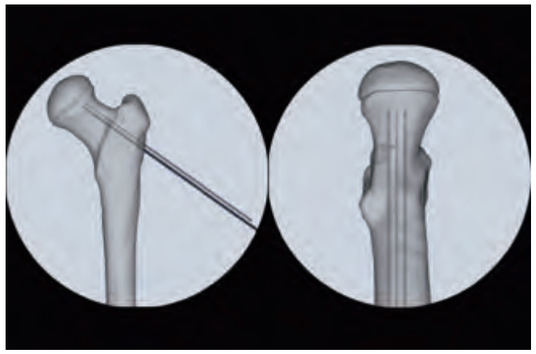
For varus correction
Positioning guide wire angle = correction angle plus screw angle
Example:
Varus correction of 25° with a 110° varus plate
Positioning guide wire angle = 25° + 110° = 135°

For valgus correction
Positioning guide wire angle = screw angle minus correction angle
Example:
Valgus correction of 20° with a 150° valgus plate
Positioning guide wire angle = 150° – 20° = 130°

Set the angle on the positioner for aiming block. First insert the positioner, then the aiming block and assemble them. Insert the positioning guide wire.

The entry point is 4-5 mm distal to the trochanteric epiphysis in AP view and in line with the femoral neck centerline in axial view. Check the position of guide wire with the image intensifier.

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



3. Determine proximal screw position

111250300 Aiming Block, φ3.5
111250500 Guide Wire, φ2.8x200mm
111250200 Positioner for Aiming Block

For fixed angle technique, place the positioner first and then slide the aiming block over the positioning guide wire and assemble it with the positioner for aiming block. Do not bend the guide wire while sliding the aiming block over the guide wire.

Insert the two superior proximal femoral guide wires one by one with help of the aiming block as close as possible to the growth plate (distance to the growth plate 5 mm) to assure an optimal screw length. When the guide wires are inserted correctly, remove aiming block, positioner and the anteversion guide wire.

Verify the optimal position of the guide wires with the image intensifier in AP and axial view.

Note:
- Do not bend the positioning guide wire while inserting the guide wires. That causes correction mistakes.
- The two front spikes must be in contact with the femur.

STEP 2

OSTEOTOMY

111250600 Positioner for Osteotomy

The optimal position of the osteotomy is 10mm distal to the femoral head guide wires. Hold the positioner for osteotomy against the two femoral head guide wires and mark the distance with the oscillating saw on the bone.

Completely perform the osteotomy in one cut with an oscillating saw in a right angle to the axis of the femoral shaft.

Note: In case of a derotation or rotation osteotomy, use two guide wires. Insert guide wires into the greater trochanter and the distal fragment to control the derotation or rotation. It is recommended to insert the two guide wires or to make a mark onto the bone even if no derotation or rotation is planned. This ensures that the two bone fragments are fixed in the right position.

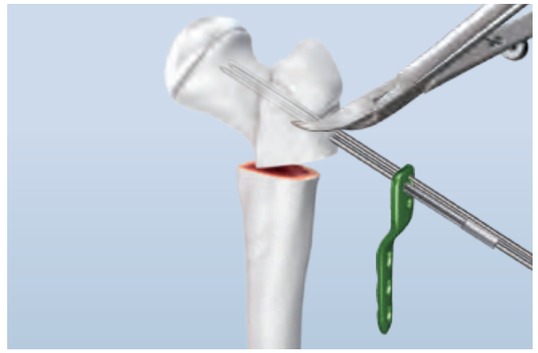
STEP 3

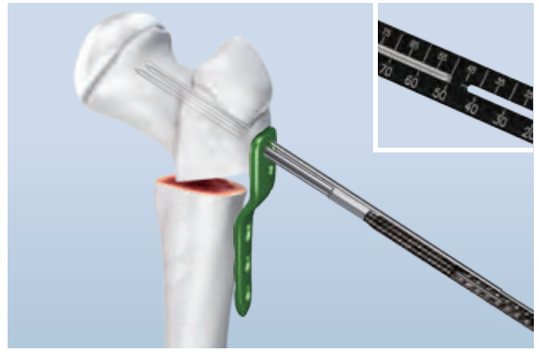
PROXIMAL FIXATION

1. Position of the plate

111250800 LCP Drill Sleeve, 2.8

Fix the proximal fragment (femoral neck/head fragment) with forceps, taking care not to disturb the positioning of the plate. This gives a better handling of the proximal fragment and safety in terms of rotation. Insert the drill sleeves into the two proximal plate holes. Then slide the plate over the two femoral head guide wires and the positioning guide wire.



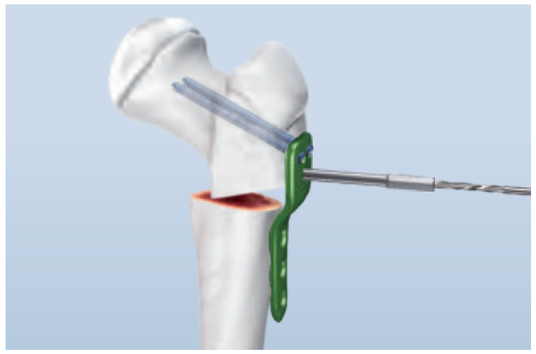


Note:
If the positioning guide wire was removed, it has to be placed in hole D again, because it is used as an anti-rotational protection during screw insertion.

2. Insert the femoral neck screws A and B

111251100 Depth Gauge, φ2.8
110040800 Torque Limiter, 1.5 Nm
111251600 Screwdriver Shaft, hexagonal, SW2.5
111251800 Handle for Torque Limiter

Determine the guide wire length by depth gauge. The proper screw length should better be smaller than what was measured. Remove the LCP drill sleeve and the guide wire in hole A. Insert the screw in hole A.

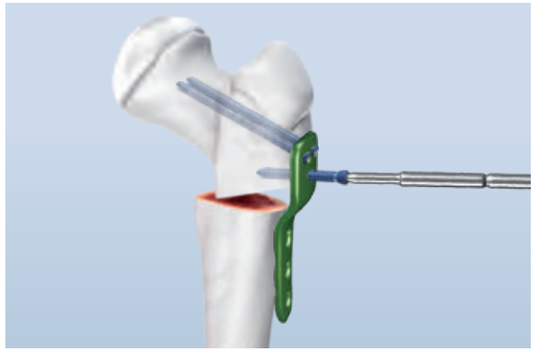


Insert the screw in hole B in the same way as in hole A. Use the torque limiter to perform final locking of the screw in the plate. After one click, the optimum torque is reached. Then remove the positioning guide wire in hole D.

Note:
The hole is predrilled by φ2.8 guide wire for 3.5mm plate, thus is unnecessary to use the φ2.8 drill.

3. Insert the screw in hole C

111252400 Drill Bit, φ2.8, length 160mm
111250800 LCP Drill Sleeve, 2.8
111251100 Depth Gauge, φ2.8
110040800 Torque Limiter, 1.5 Nm
111251600 Screwdriver Shaft, hexagonal, SW2.5



Screw the LCP Drill sleeve onto hole C and drill the hole for the calcar screw with a φ2.8 drill bit through both cortices. Remove the LCP drill sleeve and check the screw length with the depth gauge. Insert the screw in hole C.

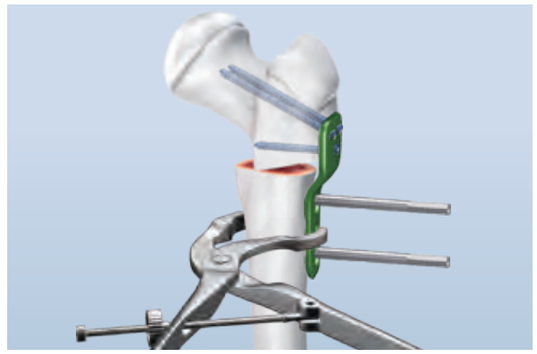
STEP 4
DISTAL FIXATION

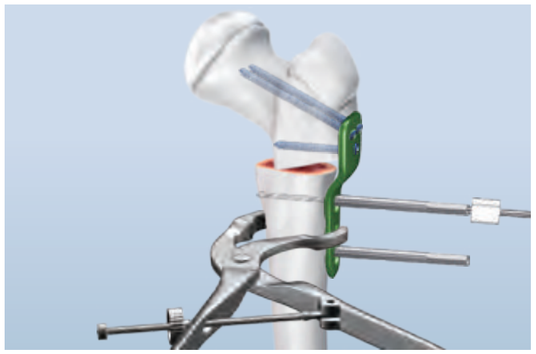
1. Reduction

110062000 Bone Holding Forceps, self-centering

The plate must be aligned distally to the axis of the femoral shaft. When the plate is satisfactorily aligned, fix it with the reduction forceps.

Note:
- If the plate is not aligned exactly parallel to the femoral shaft it can lead to variations of the planned neck/shaft (CCD) angle.
-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.

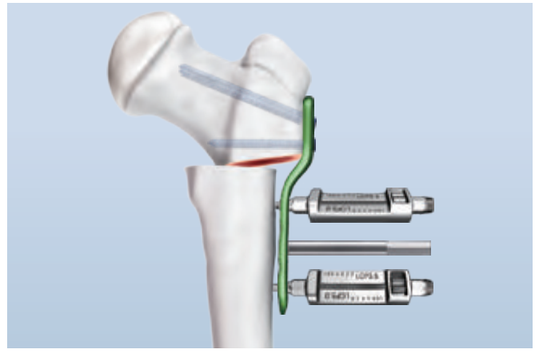


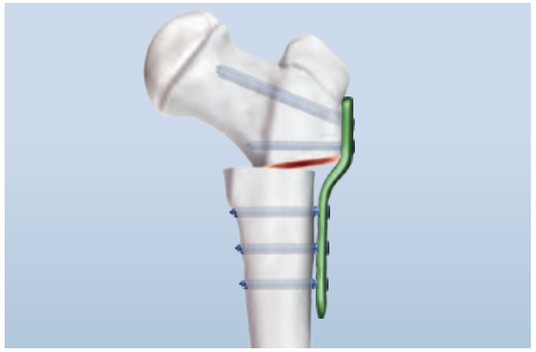


2. Distal fixation with locking screws

111251600 Screwdriver Shaft, hexagonal, SW2.5
110040400 Depth Gauge, φ3.5
110040800 Torque Limiter, 1.5 Nm
111251800 Handle for Torque Limiter
111250800 LCP Drill Sleeve, 2.8
111252400 Drill Bit, φ2.8, length 160mm

Screw the LCP drill sleeve into LCP hole 1, 2 and 3 until it is gripped completely by the thread. Drill the screw hole using a drill bit. Remove the drill sleeve. Determine the screw length with the depth gauge. Insert locking screws in hole 1, 2 and 3.





OPTION
MEDIALIZATION

111251600 Screwdriver Shaft, hexagonal, SW2.5
110040400 Depth Gauge, φ3.5
110040800 Torque Limiter, 1.5 Nm
111253900 Instrument for Medialization
111250800 LCP Drill Sleeve, 2.8
111252400 Drill Bit, φ2.8, length 160mm
111251800 Handle for Torque Limiter

Adjust the desired medialization with the instrument for medialization. Screw the correct ends of these instruments into the locking portion of LCP holes 1 and 3 until they are firmly gripped. Then screw an LCP drill sleeve into LCP hole 2 and drill the screw hole. After that, remove the drill sleeve and measure the screw length by the depth gauge. Insert a locking screw. Remove the instrument for medialization in hole 1 and insert a locking screw. Proceed in the same way in hole 3.

Note:
Medialization is only possible if the distal part is fixed with locking screws.

Instruments 111260000

111250100	Guide Wire, φ2.0, length 150mm	
111250200	Positioner for Aiming Block	
111250300	Aiming Block, φ3.5	
111250400	Aiming Block, φ5.0	
111250500	Guide Wire, φ2.8, length 200mm	
111250600	Positioner for Osteotomy	
111250700	Reduction Forceps, curved	
111250800	LCP Drill Sleeve, 2.8	

111250900	LCP Drill Sleeve, 4.3	
111251000	Reduction Sleeve, 4.3/2.8	
111251100	Depth Gauge, φ2.8	
110011400	Holding Sleeve, φ6	
110011500	Screwdriver, hexagonal, SW2.5	
110061800	Holding Sleeve, φ8	
110061700	Screwdriver, hexagonal, SW3.5	
111251600	Screwdriver Shaft, hexagonal, SW2.5	

111251700	Screwdriver Shaft, hexagonal, SW3.5	
111251800	T-handle with Quick Coupling	
110042500	Holding Sleeve for Torque Indicating Screwdriver, 1.5 Nm	
110072500	Holding Sleeve for Torque Indicating Screwdriver, 4.0 Nm	
110070700	Torque Indicating Screwdriver, 4.0 Nm	
110040800	Torque Indicating Screwdriver, 1.5 Nm	
111252300	Drill Bit, φ2.5, length 112mm	
111252400	Drill Bit, φ2.8, length 160mm	

111252500	Drill Bit, φ3.2, length 147mm	
111252600	Drill Bit, φ4.3, length 230mm	
111252700	Fixation Sleeve, for Drill Bit, φ2.8	
111252800	Fixation Sleeve, for Drill Bit, φ4.3	
110040400	Depth Gauge, φ3.5	
110070300	Depth Gauge, φ5.0	
110062000	Bone Holding Forceps, self-centering	
111253200	Double Drill Guide, φ2.5/φ3.5	

111253300	Double Drill Guide, φ3.2/φ4.5	
111253400	Tap, HA3.5	
111253500	Tap, HA4.5	
111253600	Positioning Plate, triangular, 90°/50°/40°	
111253700	Positioning Plate, triangular, 80°/70°/30°	
111253800	Positioning Plate, triangular, 100°/60°/20°	
111253900	Instrument for Medialization	

111264000	Pediatric Hip Locking Plate Instrument Case