

HCPS

Dynamic Hip and Condylar Plate System

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Note:

The surgery instructions outlined below reflect the surgical procedure usually chosen by the clinical consultant. However, each surgeon must decide individually which course of action offers the best chance of success in the individual case.

► Introduction

Indication

Dynamic Hip Screw Plate

- Pertrochanteric fractures of type 31-A1 and 31-A2
- Intertrochanteric fractures of type 31-A3
- Lateral femoral neck fractures of type 31-B (DHS screw together with an antirotation screw)

Condylar Screw Plate

Distal femur

- Fractures of type 33-A
- Fractures of type 33-C

Proximal femur

- Subtrochanteric fractures of type 31-A

Trochanter Buttress Plate

- Unstable pertrochanteric fractures of type 31-A2 and 31-A3, especially multifragmentary fractures with a separated or longitudinally split of the trochanter major

► **Surgical technique**

Dynamic Hip Screw Plate

1. Positioning, repositioning and access

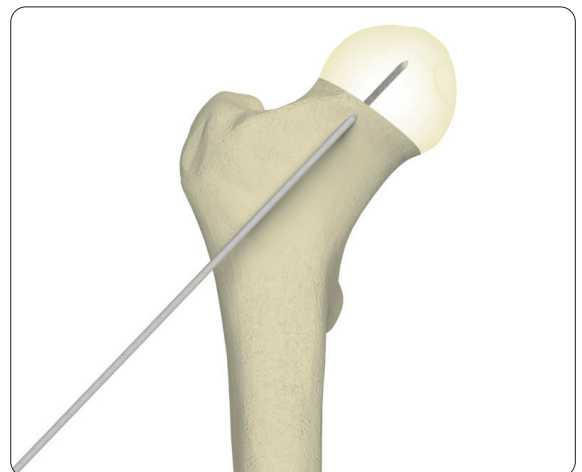
- The patient should be positioned lying on their back.
- X-ray images should be possible in the ML and AP directions.
- If possible, reposition the fracture using image intensification through traction, abduction and internal rotation.
- Carry out an approximately 15 cm long straight, lateral skin incision, starting two finger widths proximal of the tip of the trochanter major.
- Split the tractus iliotibialis along its length.
- Release the vastus lateralis dorsal muscle from the intramuscular membrane, pull back ventrally and if necessary create a small cutout in the muscle in the region of the tuberculum innominatum.
- Expose the proximal femur shaft without pulling back the periosteum.

2. Placement of the guide wire

Instruments

REF: 07.20025.000 Guide Wire Ø 2.5

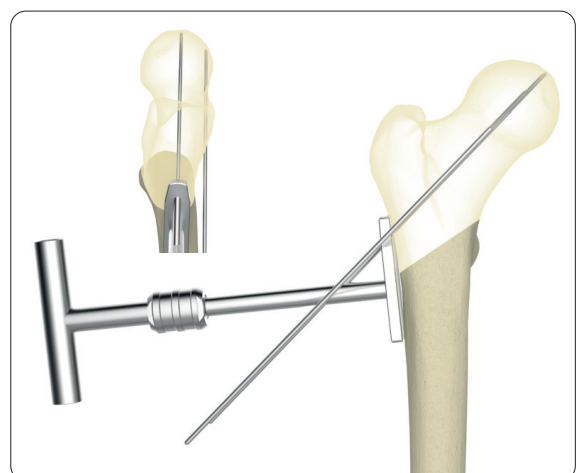
- Determine the anteversion of the femoral neck by inserting a Kirschner wire anterior of the femoral neck.

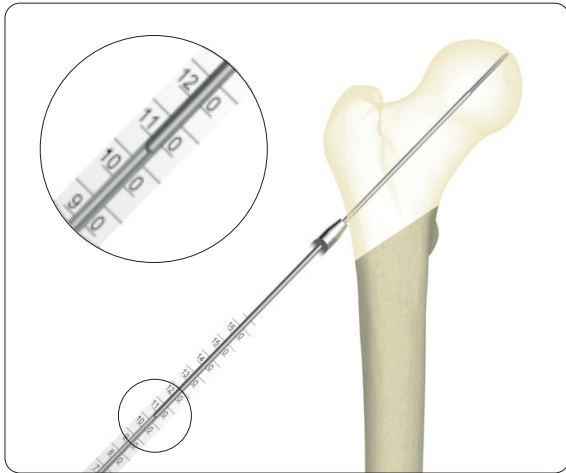


Instruments

- REF: 07.20025.000 Guide Wire Ø 2.5
- REF: 07.20130.000 Angled Guide for DHS plate 130°
- REF: 07.20135.000 Angled Guide for DHS plate 135°
- REF: 07.20140.000 Angled Guide for DHS plate 140°
- REF: 07.20145.000 Angled Guide for DHS plate 145°
- REF: 07.20150.000 Angled Guide for DHS plate 150°
- REF: 07.20160.000 T-Handle with Quick Coupling

- Insert the DHS guide wire with the matching target device at the desired angle.
- The guide wire should be positioned centrally in the femoral head and should extend into the subchondral bone.



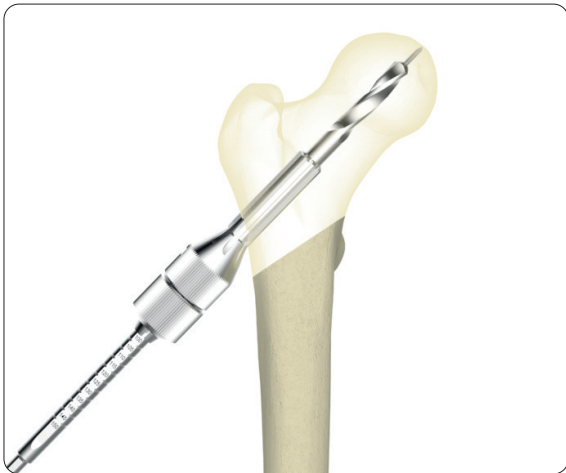


3. Insertion of the Dynamic Hip Screw

Instruments

REF: 07.20170.000 *Length Determination Instrument for Guide Wire*

- Advance the length determination instrument over the guide wire up to the bone; the length can be read off directly.
- The drilling depth and the length of the dynamic hip screw are both normally chosen to be 10 mm shorter than the measurement result (in the example: 105 mm - 10 mm = 95 mm).



Instruments

REF: 07.20180.000 *Drill Bit Ø 8 mm, L 245 mm*

REF: 07.20220.000 *Reamer for DHS plates*

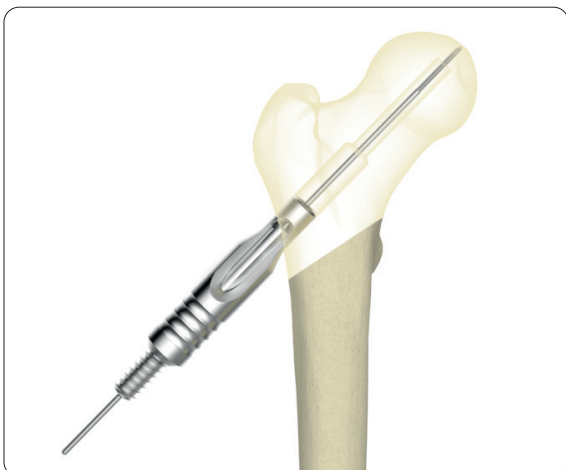
REF: 07.20230.000 *Reamer for DHS plates with short barrel*

REF: 07.20250.000 *Nut for Reamers*

- Slide the reamer to the selected implant over the drill bit until it engages with a click.
- Adjust the step drill to the required implant length (in the example: 95 mm) and secure it with the nut.
- Now drill the bit to the stop into the bone over the guide wire.

Caution:

- Under fluoroscopy monitoring check for potential migration of the guide wire and check the drilling depth.
- Continuous cooling of the milling cutter is recommended if the bone is particularly dense.



Renewed insertion of the guide wire

Instruments

REF: 07.20270.000 *Centring Sleeve, short*

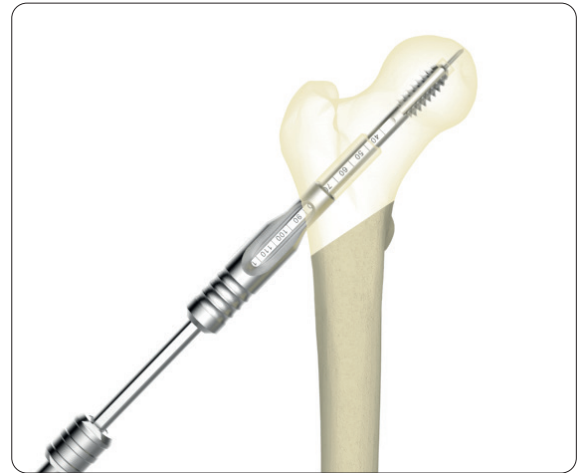
- If the guide wire is loosened or pulled out with the milling cutter, it is essential that it is reinserted again.
- The centring sleeve with reverse inserted dynamic hip screw serves as a positioning aid.

Cutting the thread for the Dynamic Hip Screw

Instruments

- REF: 07.20160.000 T-Handle with Quick Coupling
 REF: 07.20260.000 Tap for DHS, scaled
 REF: 07.20270.000 Centring Sleeve, short

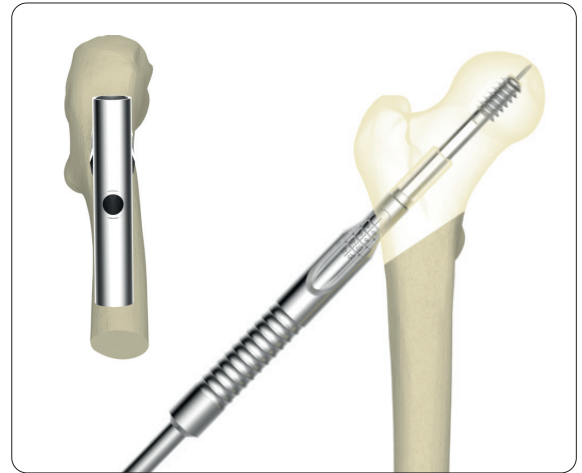
- Insert the centring sleeve as a guide in the bore, then insert the thread tap with T-handle through the centring sleeve and cut the thread to the measured depth.
- Do not cut a thread on osteoporotic bone; this is only done on dense, hard bone.



Instruments

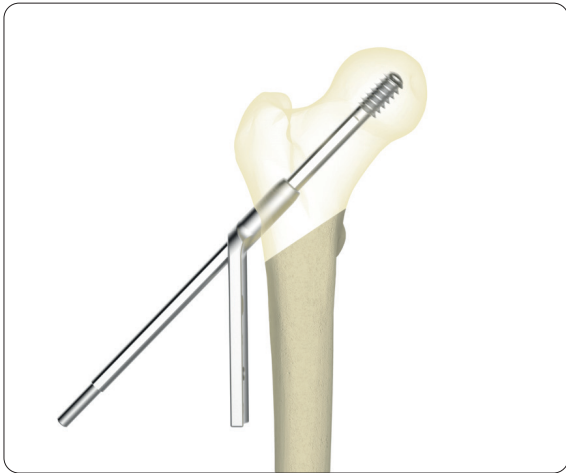
- REF: 07.20280.000 Wrench for DHS
 REF: 07.20290.000 Centring Sleeve, long
 REF: 07.20300.000 Coupling screw for insertion of the DHS
 REF: 07.20310.000 Guide Shaft for insertion of the DHS

- Removal of the short centring sleeve
- Insert the coupling screw in the guide shaft and connect it with the dynamic hip screw. Here, the lobes on the guide shaft must be correctly seated in the dynamic hip screw and the coupling screw must be fully tightened so that full contact is made.
- Insert the wrench in the centring sleeve, long and then insert the guide shaft with the dynamic hip screw in the wrench.
- Push the assembled instrument onto the guide wire, guide the centring sleeve into the bore and then screw in the dynamic hip screw.
- The screw is screwed in until the zero mark on the shaft of the wrench reaches the lateral cortex.
- At the end, the handle of the wrench must extend parallel to the femur shaft



Caution:

- In the case of osteoporotic bones, the dynamic hip screw should be inserted 5 mm deeper.

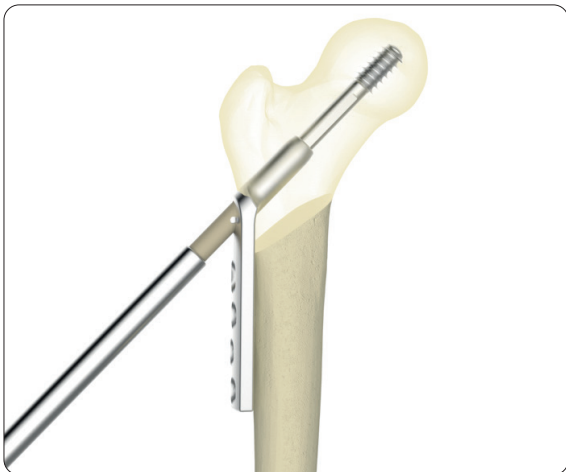


4. Insertion of the DHSP

- Remove the wrench and the centring sleeve, long.
- Afterwards the selected plate is pushed forwards over the guide shaft onto the dynamic hip screw.

Caution:

- In the case of dynamic hip screws with a length of 75 mm or shorter, a DHSP with a short cylinder should be used.



Instruments

REF: 07.20320.000 *Impactor*

REF: 07.20330.000 *Insert for Impactor*

- Remove the connecting screw, guide shaft and guide wire.
- The plate is tapped in with the aid of the impactor and light hammer blows until it fits closely on the femur shaft.



5. Fixation of the DHSP

Instruments

REF: 04.20010.032 *Drill Bit Ø 3.2mm*

REF: 04.20060.045 *Double Drill Guide 4.5 / 3.2*

REF: 04.20020.045 *Thread tap Ø 4.5 mm*

- Place the double drill guide in a neutral position on the bone.
- Afterwards drill with the drill bit Ø 3.2 mm.

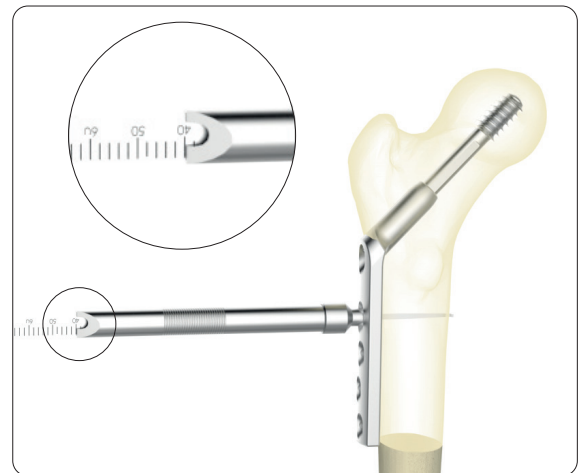
Caution:

- If the screws are not self-tapping screws, the thread must be cut with the thread tap.

Instruments

REF: 04.20100.110 *Length Determination Instrument for Screws up to 110 mm*

- The length of the screw is determined with the aid of the instrument for determining length.



Instruments

REF: 04.20040.035 *Hexagon Screwdriver, hex 3.5 mm*

- Screw in the matching screw with the hexagon screwdriver.



6. Compression of the fracture

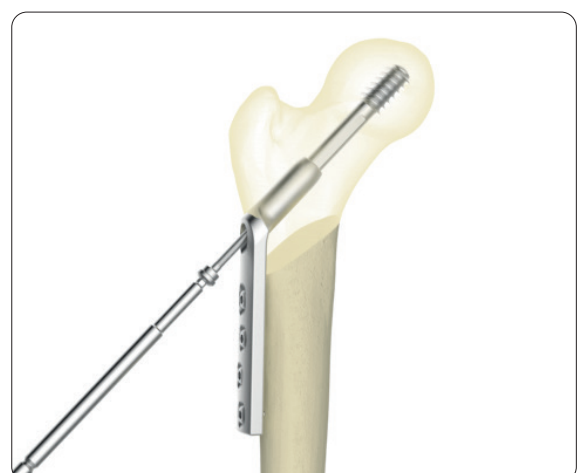
Instruments

REF: 04.20040.035 *Hexagon Screwdriver, hex 3.5 mm*

- Compression of the fracture can be achieved with the compression screw or by tapping several times lightly with the impactor against the hip plate.
- The compression screw is inserted with the hexagon screwdriver 3.5 mm in the dynamic hip screw.

Caution:

- To prevent tearout, proceed with caution when screwing the compression screw into osteoporotic bone.





7. Removal of the Dynamic Hip Screw

Instruments

REF: 07.20280.000 *Wrench for DHS*

REF: 07.20340.000 *Coupling screw for wrench*

- Removal of the cortical screws, compression screw and hip plate.
- Afterwards the wrench is pushed onto the dynamic hip screw and joined together fully with the coupling screw.

► **Surgical technique**

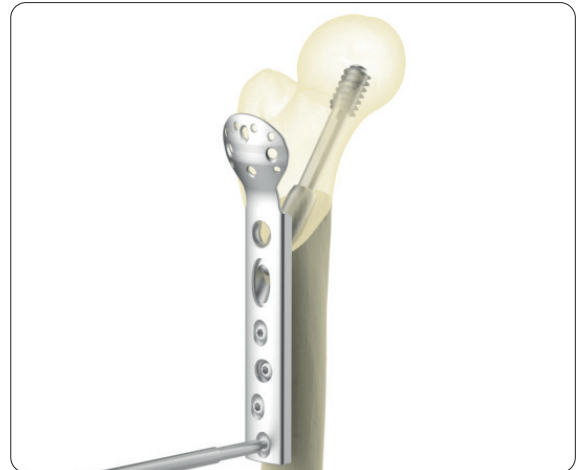
Trochanteric Buttress Plate

1. Positioning and fixation

Instruments

- REF: 04.20010.032 *Drill Bit Ø 3.2 mm*
- REF: 04.20060.045 *Double Drill Guide 4.5 / 3.2*
- REF: 04.20020.045 *Tap Ø 4.5 mm*
- REF: 04.20100.110 *Length Determination Instrument
for Screws up to 110 mm*
- REF: 04.20040.035 *Hexagon Screwdriver, hex 3.5 mm*

- When the TBP is used in combination with the DHSP (four holes or longer), the DHSP must only be fixed in the second hole and again from the fifth hole.
- The TBP / DHSP structure is fixed with Ø 4.5 mm cortical screws.
- The head of the TBP can be adapted to the bone using pliers.



2. Placement of the Antirotation Screw

- The antirotation screw must be fitted cranially and parallel to the DHSP screw.
- The following screws can be used as antirotation screws:
 - Ø 6.5 mm cancellous screw, 32 mm partial thread
 - Ø 7.0 mm cannulated screw
 - Ø 7.3 mm cannulated screw

Caution:

- Additional instruments are required for insertion of an antirotation screw.

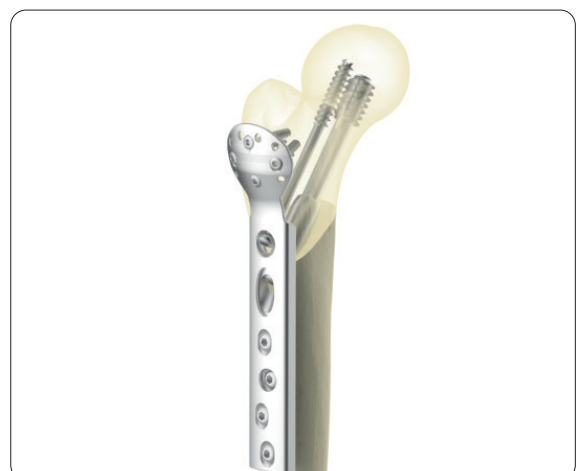


3. Fixation of the plate head

- The head of the TBP can be fixed to the bone with the following means:
 - Ø 4,0 mm cancellous screws
 - Cerclage wires
 - Orthopaedic cable
 - Bone suture

Caution:

- Additional instruments are required for insertion of the Ø 4.0 mm cancellous screws.



► Surgical technique

Condylar Screw Plate

1. Repositioning

Instruments

REF: 07.20025.000 Guide Wire Ø 2.5 mm

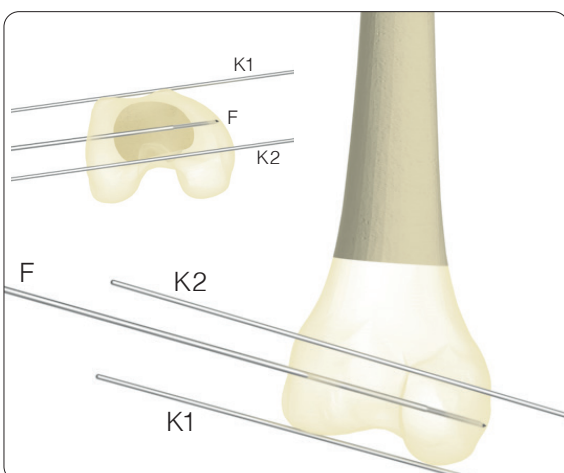
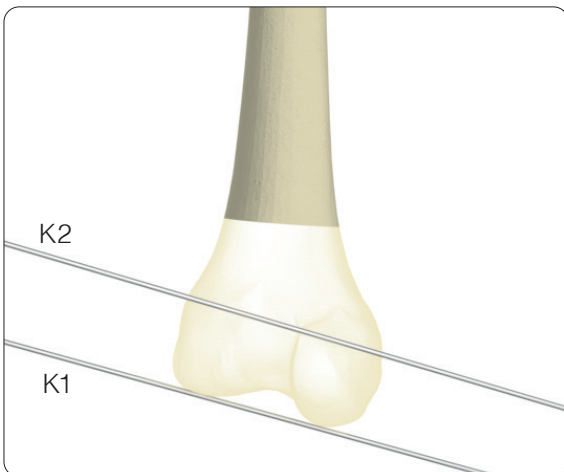
- The fracture can be temporarily fixed with Ø 2.5 mm K-wires.
- It must be ensured that the K-wires do not block the subsequent plate position.
- In the case of intercondylar fractures, the K-wires should be replaced with Ø 7.3 mm cannulated screws or Ø 6.5 mm cancellous screws.

2. Placement of the guide wire

Instruments

REF: 07.20025.000 Guide Wire Ø 2.5 mm

- To determine the direction of the central guide wire, angle the knee at 90° and mark the axis of the knee joint by placing one distal K-wire (K1) and a second anterior K-wire (K2) across the two condyles.



Instruments

REF: 07.20025.000 Guide Wire Ø 2.5 mm
 REF: 07.20095.000 Angled Guide for DCS plate 95°
 REF: 07.20160.000 T-Handle with Quick Coupling

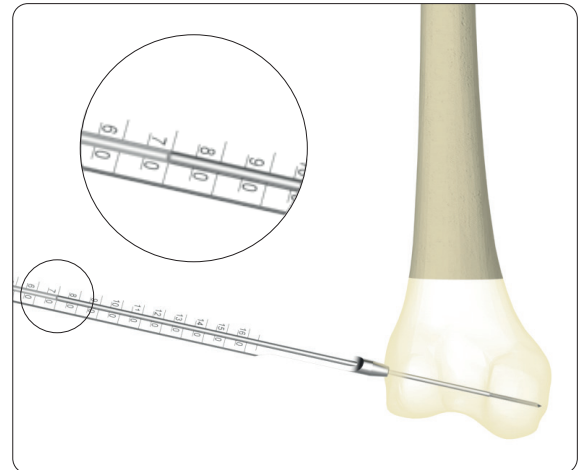
- Use the angled guide with T-handle to insert the central guide wire.
- The guide wire (GW) must lie parallel to the distal K-wire (K1) in the AP direction and parallel to the anterior K-wire (K2) in the axial direction.
- Under X-ray monitoring check the position of the central K-wire and readjust as required.
- Remove the two K-wires K1 and K2.

3. Insertion of the Dynamic Hip Screw

Instruments

REF: 07.20170.000 *Length Determination Instrument for Guide Wires*

- Advance the length determination instrument over the guide wire up to the bone; the length can be read off directly.
- The drilling depth and the length of the dynamic hip screw are both normally chosen to be 10 mm shorter than the measurement result (in the example: 70 mm - 10 mm = 60 mm).



Instruments

REF: 07.20180.000 *Drill Bit Ø 8 x 245 mm*

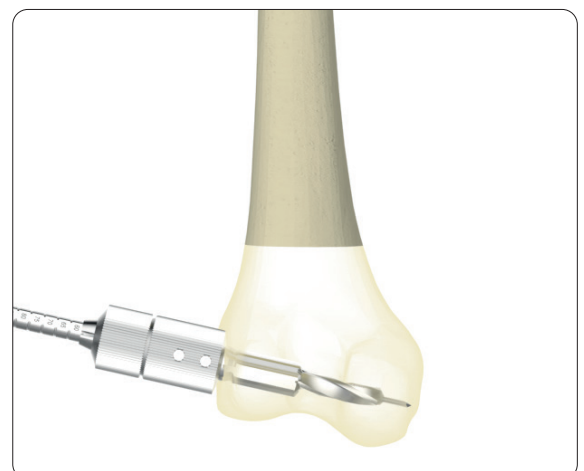
REF: 07.20240.000 *Reamer for DCSP*

REF: 07.20250.000 *Nut for Reamers*

- Slide the reamer over the drill bit until it engages with a click.
- Adjust the step drill to the required implant length (in the example: 60 mm) and secure it with the knurled nut.
- Now drill the bit to the stop into the bone over the guide wire.

Caution:

- Under fluoroscopy monitoring check for potential migration of the guide wire and check the drilling depth.
- Continuous cooling of the milling cutter is recommended if the bone is particularly dense.



Cutting the thread for the Dynamic Hip Screw

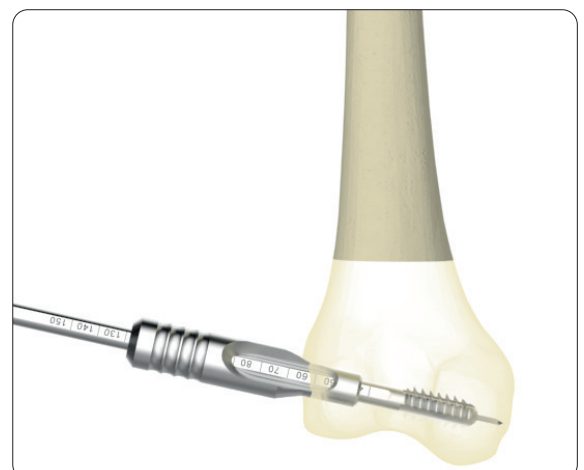
Instruments

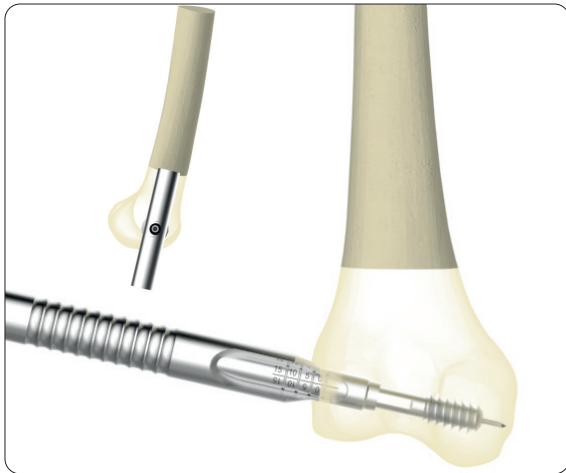
REF: 07.20160.000 *T-Handle with Quick Coupling*

REF: 07.20260.000 *Tap for DHS*

REF: 07.20270.000 *Centring Sleeve, short*

- Insert the centring sleeve as a guide in the bore, then insert the tap with T-handle through the centring sleeve and cut the thread to the measured depth.
- Do not cut a thread on osteoporotic bone; this is only done on dense, hard bone





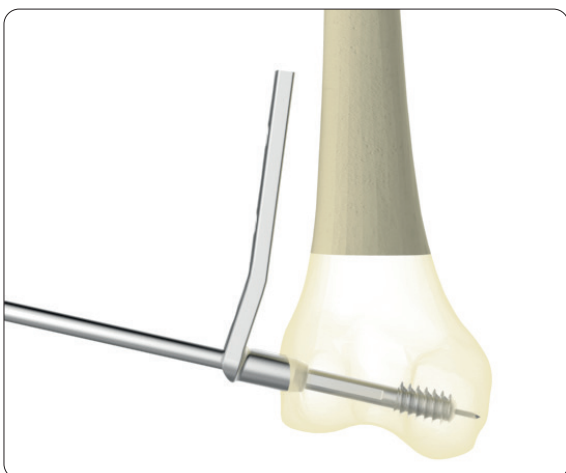
Instruments

REF: 07.20280.000	Wrench for DHS
REF: 07.20290.000	Centring Sleeve, long
REF: 07.20300.000	Coupling Screw for insertion of the DHS
REF: 07.20310.000	Guide Shaft

- Removal of the short centring sleeve.
- Insert the connecting screw in the guide shaft and connect it with the dynamic hip screw. Here, the lobes on the guide shaft must be correctly seated in the dynamic hip screw and the connecting screw must be fully tightened so that full contact is made.
- Insert the wrench in the centring sleeve, long and then insert the guide shaft with the dynamic hip screw in the wrench.
- Push the assembled instrument onto the guide wire, guide the centring sleeve into the bore and then screw in the dynamic hip screw.
- The screw is screwed in until the zero mark on the shaft of the wrench reaches the lateral cortex.
- At the end, the handle of the wrench must extend parallel to the femur shaft.

Caution:

- In the case of osteoporotic bones, the dynamic hip screw should be inserted 5 mm deeper.



4. Insertion of the DCSP

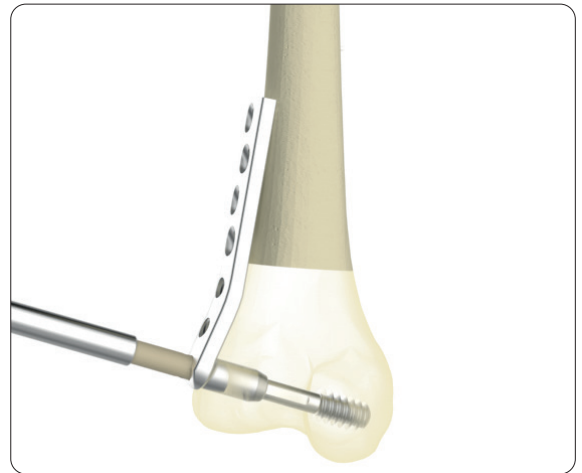
- Remove the wrench and the centring sleeve, long.
- Afterwards the selected plate is pushed forwards over the guide shaft onto the dynamic hip screw.

Instruments

REF: 07.20320.000 *Impactor*

REF: 07.20330.000 *Insert for Impactor*

- Remove the connecting screw, guide shaft and guide wire.
- The plate is tapped in with the aid of the impactor and light hammer blows until it fits closely on the femur shaft.



5. Compression of the fracture

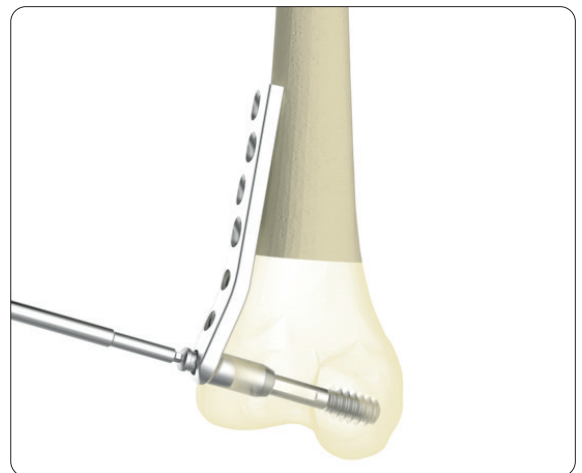
Instruments

REF: 04.20040.035 *Screwdriver, hex 3.5 mm*

- If the distal fracture pieces have not yet been repositioned with 6.5 mm cancellous screws, compression of the fracture can be achieved by using a compression screw.
- The compression screw is inserted with the hexagon screwdriver 3.5 mm in the dynamic hip screw.

Caution:

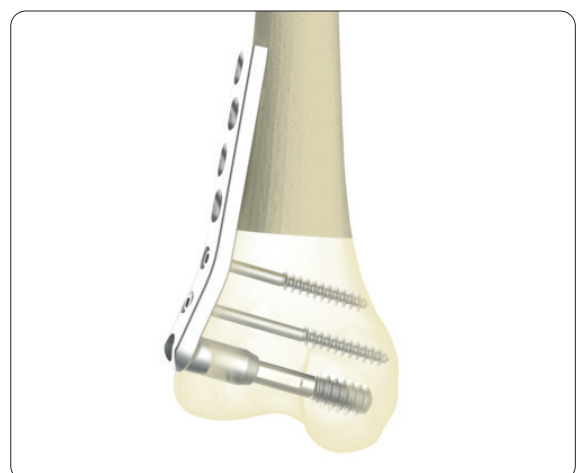
- To prevent tearout, proceed with caution when screwing the compression screw into osteoporotic bone.

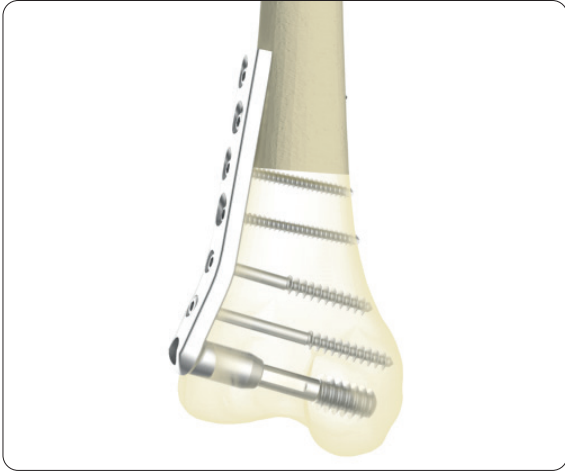


Instruments

REF: 04.20040.035 *Screwdriver, hex 3.5 mm*

- Further interfragmentary compression can be achieved by inserting two Ø 6.5 mm cancellous screws in the round holes in the plate head.





6. Fixation of the DCSP

Instruments

<i>REF: 04.20010.032</i>	<i>Drill Bit Ø 3.2 mm</i>
<i>REF: 04.20060.045</i>	<i>Double Drill Guide 4.5 / 3.2</i>
<i>REF: 04.20020.045</i>	<i>Tap Ø 4.5 mm</i>
<i>REF: 04.20100.110</i>	<i>Length Determination Instrument for Screws up to 110 mm</i>
<i>REF: 04.20040.035</i>	<i>Screwdriver, hex 3.5 mm</i>

- Place the double drill guide in a neutral position on the bone.
- Afterwards drill with the drill bit Ø 3.2 mm.
- The length of the screw is determined with the aid of the instrument for determining length.
- Screw in the matching screw with the hexagon screwdriver.

Caution:

- If the screws are not self-tapping screws, the thread must be cut with the thread tap.

► **Surgical technique**

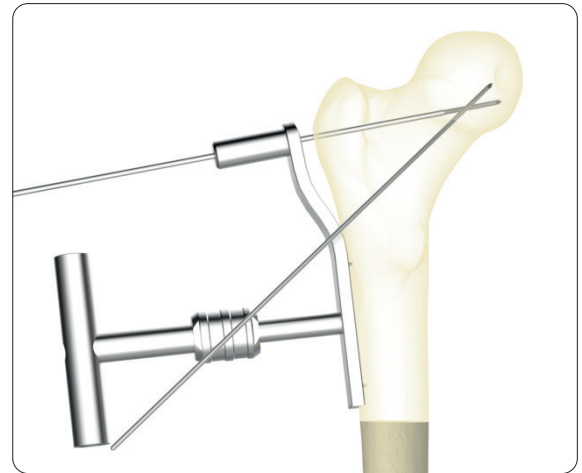
Dynamic condylar screw plate, proximal

1. Placement of the guide wire

Instruments

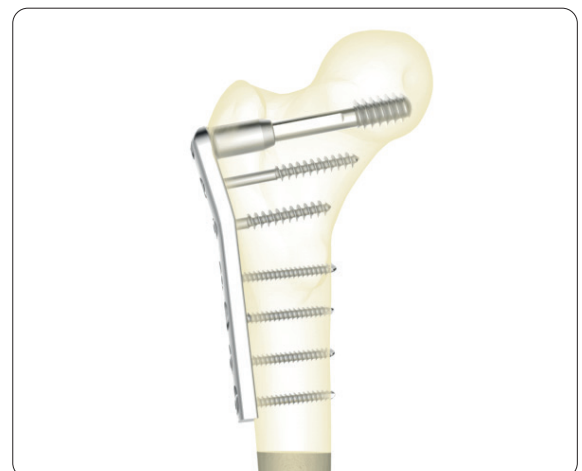
- REF: 07.20025.000 *Guide Wire Ø 2.5 mm*
- REF: 07.20095.000 *Angled Guide for DCS plate 95°*
- REF: 07.20160.000 *T-Handle with Quick Coupling*

- Choose the point of entry of the guide wire at the connection, one-third in the ventral direction and two-thirds caudal to the trochanter major.
- Insert the DCSP guide wire with the angled guide for DCSP 95° at the correct angle.
- Check the position of the DCSP guide wire in the AP and ML directions.



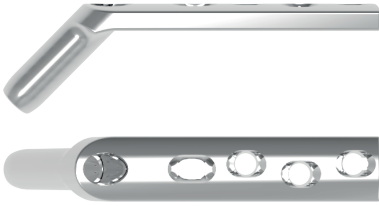
2. Positioning and fixation

- Insertion of the DCS dynamic hip screw is performed in the same way as the procedure on the distal femur.
- Once the screw has been fitted and the plate has been tapped in, fix the plate on the epiphysis with a screw that lies against the inner cortex of the neck in a gliding hole.
- Then reposition the fracture and fix with Ø 4.5 mm cortical screws on the shaft.



► Product information

Implants



Dynamic Hip Screw Plate

- Cylinder angle: 130° - 150°
- Cylinder length: 38 mm
- Material: 1.4441

Article Number	Flexion	Hole
07.10130.002(S)	130°	2
07.10130.003(S)	130°	3
07.10130.004(S)	130°	4
07.10130.005(S)	130°	5
07.10130.006(S)	130°	6
07.10130.008	130°	8
07.10135.002(S)	135°	2
07.10135.003(S)	135°	3
07.10135.004(S)	135°	4
07.10135.005(S)	135°	5
07.10135.006(S)	135°	6
07.10135.008	135°	8
07.10135.010	135°	10
07.10135.012	135°	12
07.10135.014	135°	14
07.10135.016	135°	16
07.10135.018	135°	18
07.10140.002(S)	140°	2
07.10140.003(S)	140°	3
07.10140.004(S)	140°	4
07.10140.005(S)	140°	5
07.10140.006(S)	140°	6
07.10140.008	140°	8
07.10140.010	140°	10
07.10140.012	140°	12
07.10145.002(S)	145°	2
07.10145.003(S)	145°	3
07.10145.004(S)	145°	4
07.10145.005(S)	145°	5
07.10145.006(S)	145°	6
07.10145.008	145°	8
07.10145.010	145°	10
07.10145.012	145°	12
07.10150.002(S)	150°	2
07.10150.003(S)	150°	3
07.10150.004(S)	150°	4
07.10150.005(S)	150°	5
07.10150.006(S)	150°	6
07.10150.008	150°	8
07.10150.010	150°	10
07.10150.012	150°	12

Article Number	Flexion	Hole
07.10230.004(S)	130°	4
07.10230.006(S)	130°	6
07.10235.004(S)	135°	4
07.10235.005(S)	135°	5
07.10235.006(S)	135°	6
07.10240.004	140°	4
07.10240.005	140°	5
07.10240.006	140°	6
07.10245.004	145°	4
07.10245.005	145°	5
07.10245.006	145°	6
07.10250.004	150°	4
07.10250.005	150°	5
07.10250.006	150°	6

Dynamic Hip Screw Plate, short cylinder

- Cylinder angle: 130° - 150°
- Cylinder length: 25 mm
- Material: 1.4441



Article Number	Flexion	Hole
07.10095.006	95°	6
07.10095.008	95°	8
07.10095.010	95°	10
07.10095.012	95°	12
07.10095.014	95°	14
07.10095.016	95°	16
07.10095.018	95°	18
07.10095.020	95°	20
07.10095.022	95°	22

Condylar Screw Plate

- Cylinder angle: 95°
- Cylinder length: 22 mm
- Material: 1.4441



Article Number	Hole
07.10300.148	6

Trochanteric Buttress Plate

- Material: 1.4441





Dynamic Hip Screw Ø 12.7 mm

- Thread diameter: 12.7 mm
- Screw diameter: 8.2 mm
- Cannulation: 2.8 mm
- Material: 1.4441

Article Number	Length
07.00127.050(S)	50 mm
07.00127.055(S)	55 mm
07.00127.060(S)	60 mm
07.00127.065(S)	65 mm
07.00127.070(S)	70 mm
07.00127.075(S)	75 mm
07.00127.080(S)	80 mm
07.00127.085(S)	85 mm
07.00127.090(S)	90 mm
07.00127.095(S)	95 mm
07.00127.100(S)	100 mm
07.00127.105(S)	105 mm
07.00127.110(S)	110 mm
07.00127.115(S)	115 mm
07.00127.120(S)	120 mm
07.00127.125(S)	125 mm
07.00127.130(S)	130 mm
07.00127.135(S)	135 mm
07.00127.140(S)	140 mm
07.00127.145(S)	145 mm



Compression Screw for Dynamic Hip Screw

- Thread diameter: M4
- Head diameter: 9.0 mm
- Hex (Allen) socket: 3.5 mm
- Material: 1.4441

Article Number	Length
07.00936.036(S)	36 mm

Article Number	Length	Article Number	Length
04.00845.028	28 mm	04.00845.042	42 mm
04.00845.030	30 mm	04.00845.044	44 mm
04.00845.032	32 mm	04.00845.046	46 mm
04.00845.034	34 mm	04.00845.048	48 mm
04.00845.036	36 mm	04.00845.050	50 mm
04.00845.038	38 mm	04.00845.052	52 mm
04.00845.040	40 mm	04.00845.054	54 mm

Cortical Screw \varnothing 4.5 mm



Article Number	Length	Article Number	Length
04.02845.028(S)	28 mm	04.02845.042(S)	42 mm
04.02845.030(S)	30 mm	04.02845.044(S)	44 mm
04.02845.032(S)	32 mm	04.02845.046(S)	46 mm
04.02845.034(S)	34 mm	04.02845.048(S)	48 mm
04.02845.036(S)	36 mm	04.02845.050(S)	50 mm
04.02845.038(S)	38 mm	04.02845.052(S)	52 mm
04.02845.040(S)	40 mm	04.02845.054(S)	54 mm

**Cortical Screw \varnothing 4.5 mm,
self-tapping**



Instruments

07.20025.000 Guide Wire Ø 2.5 mm, threaded tip, L 230 mm, steel



04.20010.032 Drill Bit Ø 3.2 mm, AO coupling, L 145 / 115 mm



07.20180.000 Drill Bit Ø 8.0 mm, scaled, L 245 / 205 mm



07.20260.000 Tap for DHS, scaled, L 240 / 150 mm



04.20020.045 Tap Ø 4.5 mm, AO coupling, L 125 / 95 mm



04.20060.045 Double Drill Guide 4.5 / 3.2



04.20100.110 Length Determination Instrument, for Screws up to 110 mm



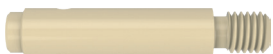
07.20170.000 Length Determination Instrument, for Guide Wires Ø 2.5 mm x 230 mm



07.20320.000 Impactor



07.20330.000 Insert, for Impactor REF 07.20320.000



07.20290.000 Centring Sleeve, long



07.20270.000 Centring Sleeve, short



07.20220.000 Reamer, for DHS Plates



07.20230.000 Reamer, for DHS Plates, with short barrel



07.20240.000 Reamer, for Dynamic Condylar Screw Plates



07.20250.000 Nut, knurled, for Reamers



07.20300.000 Coupling Screw, for insertion of the DHS



07.20310.000 Guide Shaft, for insertion of the DHS



07.20340.000 Coupling Screw, for Wrench REF 07.20280.000



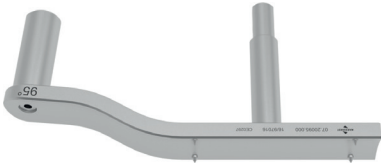
07.20280.000 Wrench, for DHS



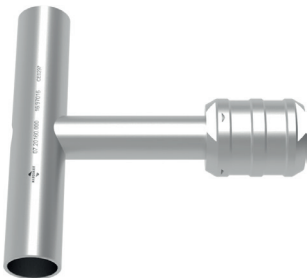
- 07.20130.000 Angled Guide, for DHS plate 130°
- 07.20135.000 Angled Guide, for DHS plate 135°
- 07.20140.000 Angled Guide, for DHS plate 140°
- 07.20145.000 Angled Guide, for DHS plate 145°
- 07.20150.000 Angled Guide, for DHS plate 150°



- 07.20095.000 Angled Guide, for Dynamic Condylar Screw Plates 95°



- 07.20160.000 T-Handle with Quick Coupling



- 04.20040.035 Screwdriver, hex 3.5 mm,
L 247 / 137 mm





MRI Safety Information

Non-clinical testing has demonstrated that the plates range from Marquardt Medizintechnik is MR Conditional in accordance with the ASTM F2503 standard definitions. A patient with this device can be safely scanned in an MR system meeting the following conditions:

- Cylindrical-bore
- Horizontal magnetic field (B_0)
- Spatial field gradient lower than or equal to
 - **1.5 T**: 23.45 T/m (2345 G/cm)
 - **3.0 T**: 11.75 T/m (1175 G/cm)
- Radiofrequency (RF) field exposure:
 - RF excitation: Circularly Polarized (CP)
 - RF transmit coil: whole-body transmit coil
 - RF receive coil type: whole-body receive coil
 - Maximum permitted whole-body averaged specific absorption rate (SAR):
Normal Operating Mode, 2 W/kg.
 - Scan duration and wait time:
 - 1.5 T**: 2 W/kg whole-body average SAR for **8min and 15s** of continuous RF (a sequence or back-to-back series/scan without breaks) followed by a wait time of **8min and 15s** if this limit is reached.
 - 3.0 T**: 2 W/kg whole-body average SAR for **6min and 19s** of continuous RF (a sequence or back-to-back series/scan without breaks) followed by a wait time of **6min and 19s** if this limit is reached.
- The plates are expected to produce a maximum temperature rise of 8.5 °C at 1.5 T and 6.9 °C at 3 T both after the scanning periods presented above.
- The presence of this implant may produce an image artifact. Some manipulation of scan parameters may be needed to compensate for the artifact. In non-clinical testing, the image artifact caused by the device extends approximately 83 mm from the device edge when imaged with a spin echo pulse sequence and 65 mm with a gradient echo, both at 1.5 T.
- Patients with uncompromised thermoregulation and under uncontrolled conditions or patients with compromised thermoregulation (all persons with impaired systemic or reduced local thermoregulation) and under controlled conditions (a medical doctor or a dedicated trained person can respond instantly to heat induced physiological stress).

Note:

Undergoing an MRI scan, there is a potential risk for patients with a metallic implant. The electromagnetic field created by an MRI scanner can interact with the metallic implant, resulting in displacement of the implant, heating of the tissue near the implant, or other undesirable effects.



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