DHS Blade. For osteoporotic bone.

Technique Guide

SYNTHES®

Original Instruments and Implants of the Association for the Study of Internal Fixation – AO ASIF

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Image intensifier control

Warning
This description is not sufficient for immediate application of the instrumentation. Instruction by a surgeon experienced in handling this instrumentation is highly recommended.

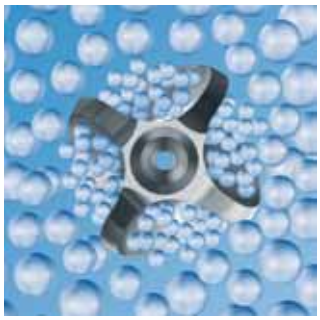
Features and Benefits

Increased rotational stability
The shape of the blade leads to improved rotational stability of the femoral head-neck fragment, which is vital for reducing the risk of cut-out, delayed union and varus angulation in unstable trochanteric fractures. [1]

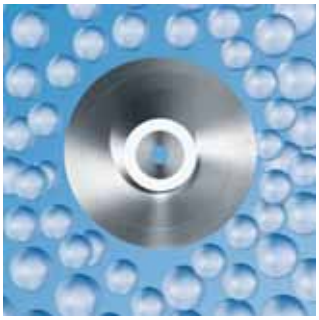
Better anchorage in the femoral head
The specially designed tip of the blade allows for compaction of the bone when the blade is inserted. This compaction leads to improved anchorage of the implant in the femoral head, which is beneficial especially in osteoporotic bone. [2]

Increased support surface
The weight-bearing surface of the DHS Blade is greater compared to the surface of the conventional DHS Screw and can therefore take greater loads. A larger surface means less pressure from the implant onto the bone and less risk for cut-out.

Less cut-out
Better rotational stability, better anchorage in the femoral head and an increased support surface result in a lower risk of cut-out.



rotational stability
bone compaction



no rotational stability
no bone compaction

DHS Blade

DHS Screw

Compatible with conventional and LCP DHS plate
Both the DHS Blade and the DHS Screw are compatible with the LCP DHS plate as well as the conventional DHS plate.

Various lengths ensure optimal anchorage
The DHS Blade consists of a shaft part and a blade part. The length of the blade part depends on the total length of the DHS Blade: the shorter the entire DHS Blade, the shorter the blade part. This ensures an optimal anchorage of the DHS Blade in the femoral head for different bone sizes.

Locking mechanism

During insertion: DHS Blade is unlocked
The shaft part and the blade part can rotate against each other.

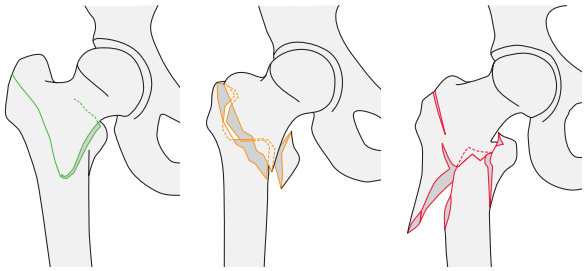
After implantation: DHS Blade is locked
When the bolt in the DHS Blade is screwed forward, the rotation between blade part and shaft part gets locked. The shaft part and the blade part cannot rotate against each other anymore.

Indications and Contraindications

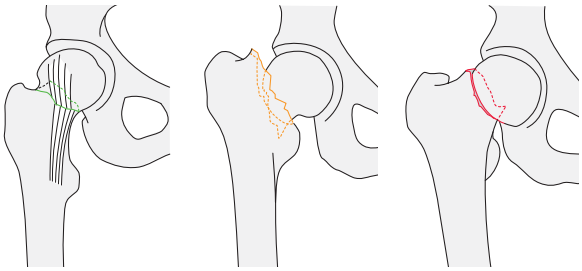
Indications
- Pertrochanteric fractures of type 31-A1 and 31-A2
- Intertrochanteric fractures of type 31-A3
- Basilar neck fractures 31-B

Contraindications
- Subtrochanteric fractures: for this type of fracture, a 95° DCS plate or the intramedullary nail PFNA Long is recommended.
- The DHS is not to be used in cases where there is a high incidence of:
  - Sepsis
  - Malignant primary or metastatic tumors
  - Material sensitivity
  - Compromised vascularity

Recommendation
Use the DHS Blade for osteoporotic patients and the DHS Screw for patients with good bone quality.



31-A1 31-A2 31-A3



31-B1 31-B2 31-B3

Clinical Cases

Pertrochanteric fractures
Special surgical considerations:

Implant of choice
Recent metanalysis has shown that the DHS tends to be statistically superior to intramedullary devices for trochanteric fractures.[3,4] Further studies are required to determine whether different types of intramedullary nails produce similar results, or whether intramedullary nails are advantageous for certain fracture types (e.g. subtrochanteric fractures).[4]

Prevention of cut-out: correct placement of the screw
The correct placement of the DHS Screw or Blade has shown to be one of the main success factors to prevent implant cut-out. The device should ideally be positioned in a center-center position in the femoral head and within 5 mm of subchondral bone.[5, 6] See surgical technique page 8.


80 year old female, fracture 31-A2.2, preoperative


postoperative


3 month follow-up

Femoral neck fractures
Special surgical considerations:

Implant of choice
For unstable basicervial fractures, the DHS seems biomechanically superior to three cannulated screws.[7] Nevertheless, operations of cervical hip fractures with a dynamic hip screw or three parallel screws seem to give similar clinical results.[8]

Emergency treatment
A femoral neck fracture should be treated surgically within 6 hours of admission whenever possible. Elderly patients who had surgery within 12 hours[9] or even within 24 hours[10] have a significantly lower mortality rate.

Antirotation screw
With the DHS Blade, rotational stability is achieved without an antirotation screw.


81 year old female, fracture 31-B2.1, preoperative


postoperative

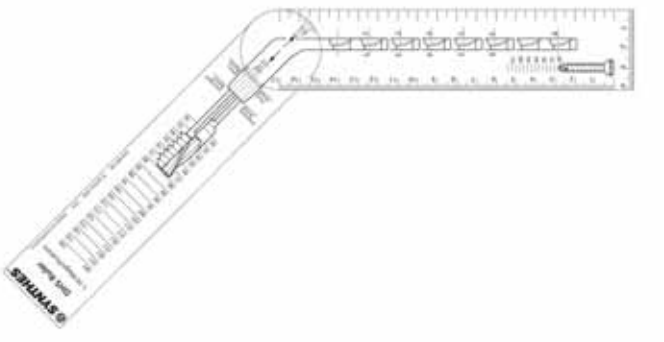

3 month follow-up

1

Preoperative planning

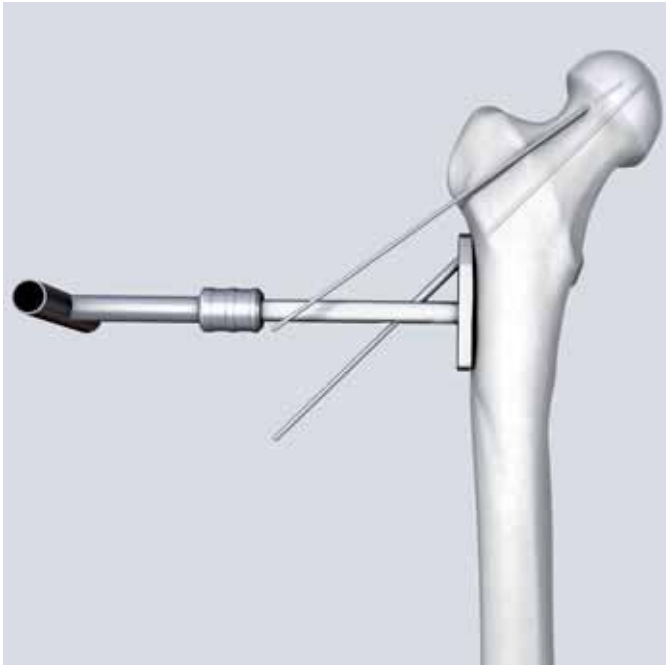
The size and angle of the plate as well as the length of the DHS Blade can be determined preoperatively by using the DHS Goniometer (Art. No. 034.000.185).

Important: If the DHS Blade is from 65 to 75 mm, a DHS plate with short barrel should be used to allow for sufficient dynamization.



2
Insert guide wire

Instruments	
292.200	Kirschner Wire ∅ 2.0 mm with trocar tip, length 150 mm
338.000	DHS/DCS Guide Wire ∅ 2.5 mm
338.005	DHS Angled Guide 130°
338.010	DHS Angled Guide 135°
338.020	DHS Angled Guide 140°
338.030	DHS Angled Guide 145°
338.040	DHS Angled Guide 150°



The first stage of the operation remains the same as with the standard DHS Screw.

Once the fracture has been stabilized with Kirschner wires and the anteversion wire has been placed in position, place the DHS/DCS guide wire at the desired angle with the correct angled guide. The guide wire should be placed in the middle of the femoral head and extend into the subchondral bone.

- Check the position of the guide wire in both AP and mediolateral positions.

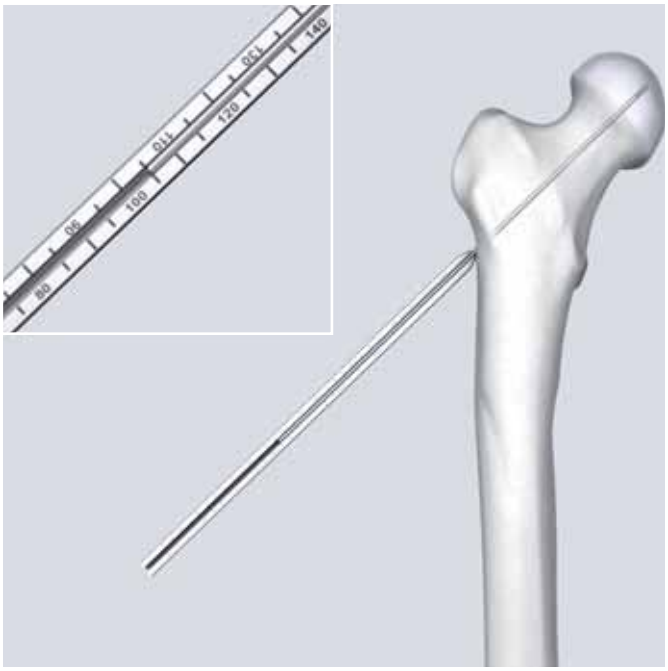
3
Determine length of DHS Blade

Instrument	
338.050	DHS/DCS Direct Measuring Device

Read the length of the DHS Blade directly off the guide wire with the measuring device.

If the guide wire is inserted into the subchondral bone, remove 5 mm from the measurement.

Example: If you read 105 mm on the direct measuring device, the measured length of the implant is 100 mm.

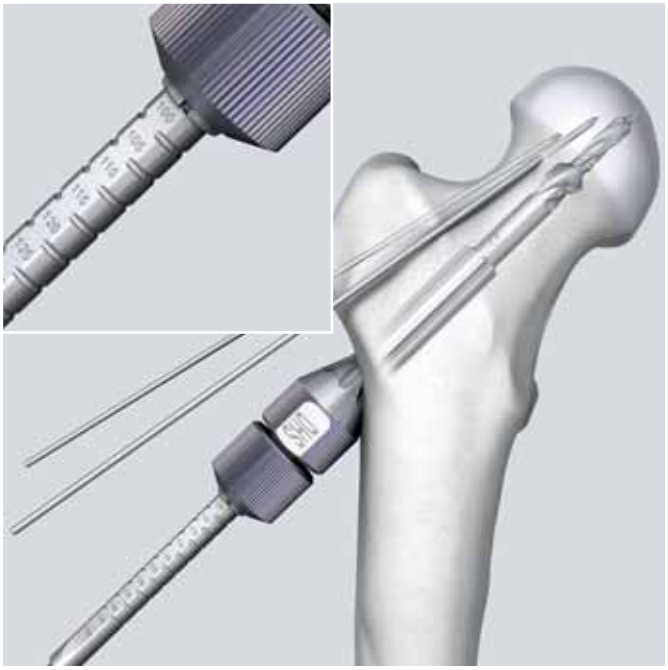


4
Drill for insertion of DHS Blade

Instruments	
03.224.009	Triple Reamer for DHS Blade, complete
Consisting of:	
03.224.003	Drill Bit ∅ 6.0/10.5 mm
338.110	DHS Reamer
338.120	Knut, knurled

Set the triple reamer at the length of the implant selected. (100 mm in the example)

Important: It is recommended that the femoral head is temporarily fixated to prevent any inadvertent rotation.

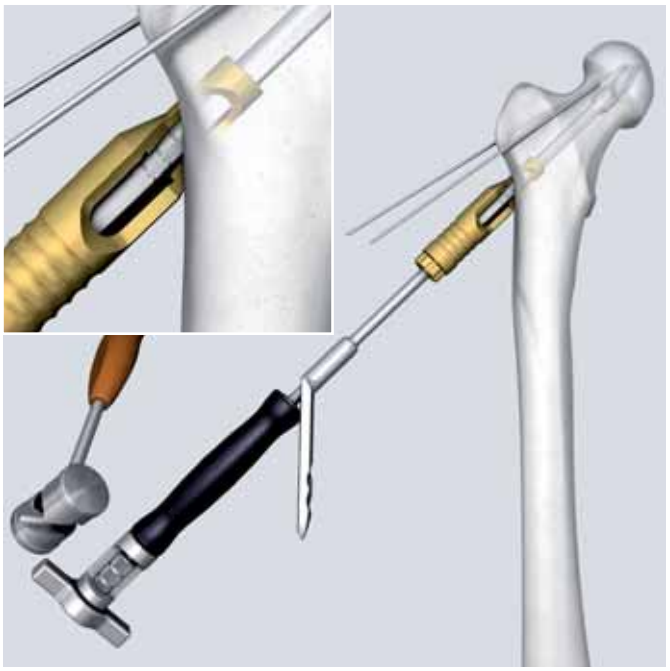


5
Insert DHS Blade

Instruments	
03.224.001	Insertion Instrument for DHS Blade
03.224.007	Connecting Screw for Insertion of DHS Blade
338.320	DHS/DCS Centering Sleeve

Insert the connecting screw into the insertion instrument. Slide the appropriate DHS plate onto the insertion instrument and connect the DHS Blade to the insertion instrument.

Warning: Be sure that the DHS Blade is unlocked before you insert it.



Mount the centering sleeve onto the insertion instrument and insert the DHS Blade with slight hammering.

If excessive hammering is needed to insert the blade, and if the triple reamer was not used to drill the entire length, remove the blade with the extraction instrument and drill the entire length.

Warning: The insertion instrument should not be used for the extraction of the DHS Blade.

6

Orient the DHS plate on the femoral shaft

Once the DHS Blade has been inserted to the correct position, the centering sleeve can be removed. The plate can then be slid over the shaft of the DHS Blade.

Due to the free rotation of the blade part relative to the shaft part, the DHS plate can be easily aligned to the femoral shaft.

7

Impact DHS plate onto the bone

Instruments	
338.280	DHS/DCS Impactor, for One-Step Insertion Technique
or	
338.140	DHS/DCS Impactor

The plate can be impacted onto the bone with one of the two impactors.

8

Fix the DHS plate onto the shaft

Remove all the insertion instruments and the guide wire. Then fix the plate to the femoral shaft.

A Cortex screws for the conventional DHS plate

Instruments	
323.460	Universal Drill Guide 4.5/3.2
310.310	Drill Bit ∅ 3.2 mm
319.010	Depth Gauge
314.150	Screwdriver Shaft, hexagonal

Use the drill guide and the drill bit to drill holes in a neutral position through the plate holes. Insert self-tapping 4.5 mm cortex screws of appropriate length.

B Locking screws for the LCP DHS plate

Instruments	
323.042	LCP Drill Sleeve 5.0, for Drill Bits ∅ 4.3 mm
310.430	LCP Drill Bit ∅ 4.3 mm with Stop
511.771 or 511.774	Torque Limiter, 4.0 Nm
314.119	Screwdriver Shaft Stardrive 4.5/5.0, T25, self-holding
or	
314.152	Screwdriver Shaft 3.5, hexagonal, self-holding
397.705	Handle for Torque Limiter

Carefully screw the LCP drill sleeve into the desired LCP hole until it is gripped completely by the thread.

Drill the screw hole using the drill bit.

Read the screw length directly from the laser mark on the drill bit.

Insert the self-tapping locking screws with a 4 Nm torque limiter.

In case a trochanter stabilizing plate is used
– Use a plate with 4 or more holes.
– Leave the first and the third stem hole of the plate empty.

9

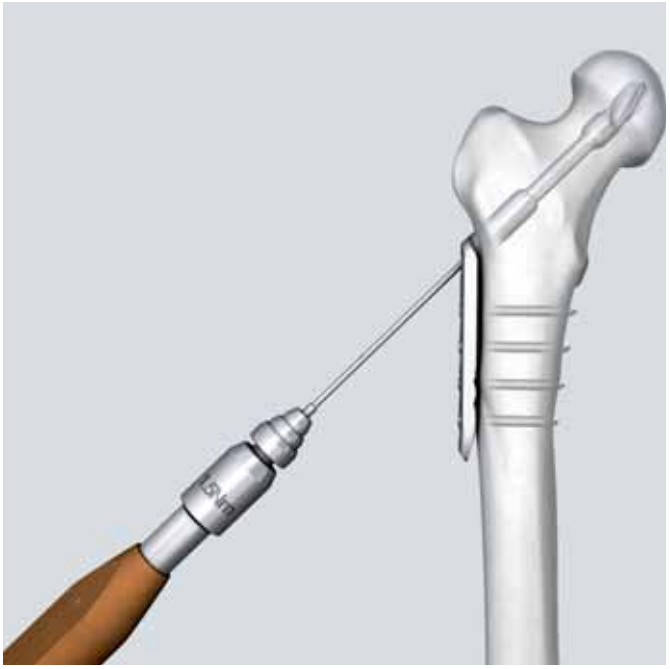
Lock the implant

Instruments	
03.224.004	Screwdriver Shaft Stardrive, T15, for DHS Blade
511.770	Torque Limiter, 1.5 Nm
397.705	Handle for Torque Limiter

The DHS Blade must be locked to be made rotationally stable.

Assemble the screwdriver shaft, torque limiter and the handle for torque limiter.

Insert the assembled instrument through the cannulation of the DHS Blade and tighten to a torque of 1.5 Nm. The DHS Blade is now rotationally stable.



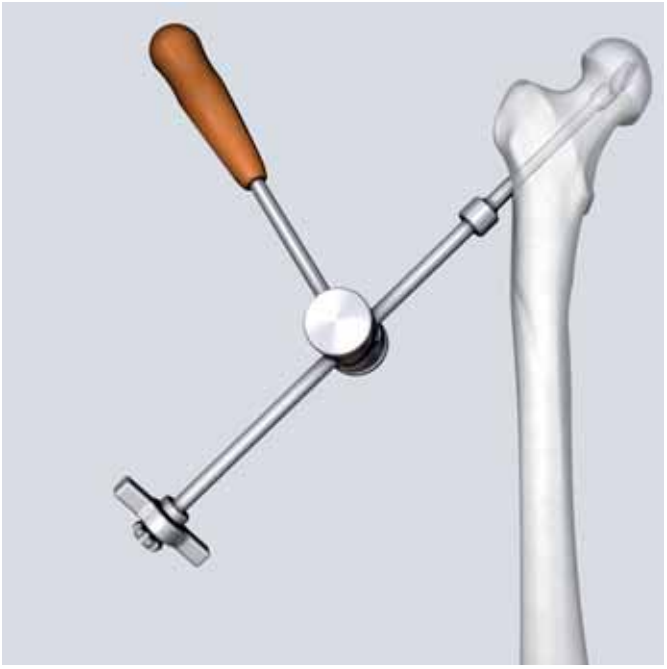
Implant Removal

Instruments

03.224.005	Extraction Instrument for DHS Blade
03.224.008	Connecting Screw for Extraction of DHS Blade
03.010.124	Combined Hammer 500 g

After removing the DHS plate, place the connecting screw through the cannulation of the extraction instrument and fix it to the DHS Blade. The blade is then removed with soft backward slide hammering on the extraction instrument.

Warning: Never use the insertion instruments for implant removal.



Bone growth around the shaft

Instrument	
03.224.006	Reamer for Extraction of DHS Blade

If removal of blade is difficult due to bone growth around the shaft, use the reamer for extraction to drill over the shaft of the DHS Blade.

DHS Blade

DHS Blade ∅ 12.5 mm

Art. No.	Length mm	Shaft mm	Blade mm
0X.224.065S	65	45	20
0X.224.070S	70	50	20
0X.224.075S	75	55	20
0X.224.080S	80	60	20
0X.224.085S	85	60	25
0X.224.090S	90	65	25
0X.224.095S	95	70	25
0X.224.100S	100	75	25
0X.224.105S	105	75	30
0X.224.110S	110	80	30
0X.224.115S	115	85	30
0X.224.120S	120	90	30
0X.224.125S	125	95	30
0X.224.130S	130	100	30
0X.224.135S	135	105	30
0X.224.140S	140	110	30
0X.224.145S	145	115	30

X=2: stainless steel
X=4: TAN

The DHS Blade is only available sterile packed.

Important: DHS Blades from 65 to 75 mm must be used with the DHS plate with short barrel.

Instruments

03.224.001	Insertion Instrument for DHS Blade	
03.224.007	Coupling Screw for Insertion of DHS Blade	
03.224.003	Drill Bit ∅ 6.0/10.5 mm, cannulated	
03.224.004	Screwdriver Shaft Stardrive T15, for DHS Blade	
397.705	Handle for Torque Limiter 511.770 and 511.771	
511.770	Torque Limiter 1.5 Nm	
03.010.124	Combined Hammer 500 g	

03.224.005	Extraction Instrument for DHS Blade	
03.224.008	Connecting Screw for Extraction of DHS Blade	
03.224.006	Reamer for Extraction of DHS Blade	
338.110	DHS Reamer	
338.120	Nut, knurled	
338.000	DHS/DCS Guide Wire ∅ 2.5 mm with threaded tip with trocar, length 230 mm	

Sets

DHS Blade

Implant Set for DHS Blades, in suitcase for sterile implants

01.224.802	stainless steel
01.224.804	titanium alloy / TAN

01.224.800	Instrument Set for DHS Blades in Vario Case

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